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CO 001. NONSPECIFIC VENTILATORY PATTERN: EVALUATION BY FIXED PERCENTAGES VERSUS LIMITS OF NORMALITY

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Introduction: Non-specific ventilatory pattern (NVP) is defined as a low forced vital capacity (FVC), a low maximum expiratory volume at first second (FEV1), normal FEV1/FVC ratio and a normal total lung capacity (TLC). The American Thoracic Society/European Respiratory Society (ATS/ERS) guidelines recommends the interpretation of pulmonary function tests (PFT) based on normal limits of normality (5th percentile), not taking into consideration the use of fixed percentages of the predicted value.
Objectives: Evaluate PVI tests defined by fixed percentage and reinterpret them using the lower limits of normality (LLN), according to the European Coal and Steel Community (ECSC) reference equations.
Methods: Retrospective study of the analysis of pulmonary function tests (body plethysmography) performed since 2017 according to ATS/ERS quality criteria. All PFT characterized by a NVP defined by fixed percentages were included. The tests were reanalyzed using the limits of normality. All data were analyzed using software IBM® SPPS® Statistics version 22.
Results: 111 plethysmographys with NVP by fixed percentage (54.9% males and 92.8% Caucasian) were included, with an average of 62.16 years. The same tests were reanalyzed by the LLN method: 58.6% of the NVP became normal (NP), 35.1% continued as NVP and 6.3% became restrictive ventilatory pattern (RVP). A statistically significant difference was found in distribution between gender ($p = 0.018$), for men and women groups, we obtained 49.2% and 70% of NP, respectively. The patterns defined by the LLN showed statistically significant differences in age and the group of NP showed older ages ($p = 0.002$ in men and $p < 0.001$ in women). A statistically significant difference was noticed when comparing groups below and over 75 years ($p = 0.014$). In the group older than 75 years, we observed 16 PN (88.9%), in comparison to the group with 75 years or less (52.7% PN).
Conclusions: Interpretation of PFT using fixed percentages may lead to an overvaluation of functional changes, particularly in female gender and older ages. This work attests the importance of using LLN versus fixed percentage as recommended in international guidelines.

Keywords: *Pulmonary function test. Nonspecific ventilatory pattern. Fixed percentage. Limits of normality.*

CO 002. EXERCISE TEST RESULTS IN PATIENTS WITH ALVEOLAR-CAPILLARY DIFFUSION IMPAIRMENT: A COMPARATIVE ANALYSIS

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Introduction: Exercise capacity impairment in chronic respiratory patients is multifactorial and stems from the pathophysiological specificities of each disease. In COPD, among other factors, the role of dynamic hyperinflation is recognized. In diffuse lung diseases, reduction of lung compliance and lung microvasculopathy are relevant. Additionally, alveolar-capillary diffusion impairment is present in both COPD patients – namely in the context of pulmonary emphysema – and patients with diffuse (mainly fibrotic) lung diseases. The 1-minute sit-to-stand (1-STS) and 6-minute walk test (6MWT) evaluate the exercise capacity of chronic respiratory patients.
Objectives: Compare patients with COPD and diffuse lung diseases – with alveolar-capillary diffusion impairment – in their results in 1-STS and 6MWT tests. Understand the performance of these two tests in the measurement of exercise capacity impairment of these patients.
Methods: Prospective study taking place at the Pulmonology Department of a University Hospital Center including patients with prescription of 6MWT, without exclusion criteria for 1-STS. Patients first perform the 6MWT or 1-STS and, after rest, the other test. In this analysis, only patients with DLCO < 80% predicted are included

and two groups of patients are compared: COPD and/or pulmonary emphysema (COPD-E) [N = 54] and diffuse lung diseases(DLD) [N = 24]. The SPSS® program for statistical analysis has been used.
Results: In COPD-E and DLD patients, respectively, the prevalence of men is 66.7 and 62.5%(p = 0.799), the mean age is 64.6 and 61 years(p = 0.448), the mean BMI is 25.8 and 27.7 kg/m² (p = 0.074), the proportion of patients with mMRC dyspnea ≥ 2 is 56.6% and 29.2% (p = 0.03), the proportion of patients under home oxygen therapy is 11.1% and 4.2% (p = 0.427) and the mean DLCO is 52.6% and 54.8% (p = 0.559). In COPD-E patients, pre-BD FEV1 (median) = 44.6%; in DLD patients, pre-BD TLC(mean) = 89.7%. In DLD patients, the main diagnoses are: hypersensitivity pneumonitis(n = 5), idiopathic pulmonary fibrosis(n = 4), non-specific interstitial pneumonia (n = 4) and sarcoidosis(n = 4). In 1-STS, no significant differences between both groups were found in the blood pressure, heart rate and SpO2 responses, or end-test Borg (dyspnea/fatigue) scores. COPD-E patients performed significantly less repetitions than DLD patients (24.4 ± 6.1 and 30.2 ± 10.2, respectively; p = 0.015). In the 6MWT, no significant differences between both groups were found in the blood pressure, heart rate and SpO2 responses; However, end-test Borg(dyspnea) score is significantly higher in COPD-E patients than in DLD patients (5 ± 5 and 2.5 ± 5, respectively; p = 0.023) but no significant differences in end-test Borg (fatigue) scores were found. 6MW Distance is lower in COPD-E patients (395.5 ± 143m) than in DLD patients (413.1 ± 128.3m), but this difference is not statistically significant (p = 0.914).
Conclusions: Although both groups presented similar degrees of alveolar-capillary diffusion impairment, COPD-E patients had worse overall performance and became more symptomatic than DLD patients in these exercise tests. Furthermore, in these patients with alveolar-capillary diffusion impairment, the number of repetitions performed on 1-STS seems to better express the greater limitation of exercise capacity in COPD-E patients than the 6MWDistance. Thus, the 1-STS test may be more indicative of the contribution of specific COPD-E factors in exercise capacity impairment, namely dynamic hyperinflation.

Keywords: *6-minute walk test. 1-minute sit-to-stand. COPD. Diffuse lung disease. Alveolar-capillary diffusion impairment.*

CO 003. EXERCISE-INDUCED DESATURATION AND LUNG FUNCTION IN COPD, REAL LIFE DATA

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Introduction: Exercise-induced desaturation (EID) is a hallmark in COPD patients (pts) and a known predictor of mortality. The six-minute walk test (6MWT) has proven useful in accessing the functional status of pts with COPD. However, the relationship between 6MWT and respiratory function has a weak to moderate strength.
Objectives: To evaluate the correlation between 6MWT distance (6MWD) and oxygen desaturation (δSO2) during 6MWT and Pulmonary Function Test (PFT) parameters, and analyse potential determinants of a low walking distance and of EID in a real-life cohort of COPD pts.
Methods: We retrospectively identified COPD pts submitted to 6MWT and PFT in a tertiary hospital between July of 2017 and December of 2018. Information of lung function parameters and exercise tolerance evaluated by the 6MWT was analysed.
Results: 114 pts were included [80 men (70%), mean age 65 ± 12 years]. The mean 6MWT distance was 346 ± 82m and the mean values for FVC%, FEV1%, RV% and DLCO% were 98%, 64%, 165% and 60%, respectively. A 6MWT < 350m was found in 58 (51%) pts and δSO2 > 4% was observed in 55 (48%) pts. Using the Pearson's correlation test, significantly correlation was observed between 6MWD and FVC (r = 0.227, p = 0.015) and DLCO (r = 0.222, p = 0.023). We also found correlation between δSO2 and FEV1 (r = -0.377, p = 0.001), RV (r = 0.273, p = 0.005) and DLCO (r = -0.409, p = 0.001). In a multivariate analyses to assess the influence of PFT on distance and dessaturation of 6MWD, a 6MWD < 350m was positively associated with final Borg index (r^2 = 0.140, p = 0.01).
Conclusions: Despite observed correlations between PFT parameters and 6MWT (distance, δSO2), none of the studied PFT parameters were able to predict the final 6MWT outcome, pointing out that other determinants may be involved.

Keywords: *COPD. 6MWT. Lung function.*

CO 004. AMYOTROPHIC LATERAL SCLEROSIS: IMPORTANT SURVIVAL FACTORS

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Introduction: Amyotrophic lateral sclerosis (ALS) is a rare progressive neurodegenerative disease of the motor neuron, that ultimately leads to respiratory failure and death. The median survival of these patients is 2 to 5 years since the beginning of the disease. Factors as age, female gender and bulbar symptoms onset seem to be related to poor prognosis.
Objectives: Functional and clinical characterization of the patients with ALS and analyse their survival.
Methods: We conducted a retrospective study with evaluation of all patients with ALS that were referred to our centre's pulmonology consultation during a ten-year period. Clinical and respiratory functional test data were recorded. We used the software IBM SPSS Statistics 25 for data analyses. Kaplan-Meier curves were used to analyse overall survival and Mantel-Cox test to compare survival between groups. To compare the mean between FVC we used the parametric independent t-test. The results are presented in mean (± standard deviation) or median [25 percentile-75 percentile].
Results: Forty-three patients were included in the study, 21 of them female gender (48.9%). The mean age of diagnosis in women (67.5 (± 2.1) years) was more advanced than in men (62.6 (± 2)). Looking at the onset of the disease 22 patients had bulbar symptoms (51.2%) and 21 spinal symptoms (48.8%). 72.7% of the bulbar patients were women. We identified a normal respiratory pattern in 29 patients (67.4%), restrictive in 10 (23.3%) and obstructive in 4 (9.3%). The mean FVC was 80% (± 3.3) while the FEV1 median 85% [69-96] and TLC 91% [81-104]. The median maximal inspiratory pressure (MIP) was 42 cmH20 [24–55]. The bulbar patients had a mean FVC of 73% (± 23) and spinal patients 86.7% (± 20) (p = 0.039). The median survival since diagnosis was 22 months in women [10–25] and 27 months in men [9–78] (p ≥ 0.05). The survival in bulbar symptoms patients was 19 months [10-23] and in spinal patients 42 months [9-86] (p = 0.04). Patients with FVC equal or less than 80% had a mean survival of 23 months (± 5) while the ones with FVC superior to 80% revealed a mean survival of 53.1 (± 11) (p = 0.019). In the 43 patients 39 had criteria for non-invasive ventilation (NIV) although in 12 of them a correct adaptation was not possible (5 women and 7 men). The survival since the consultation for beginning NIV was 6 months [2-10] in the patients that did not adapt against 17 months in the patients that managed adaptation to NIV [9-58] (p = 0.007).
Conclusions: The distribution of disease was similar among the two genders, contrary to other studies that demonstrated a slight male dominance. Women had a later onset of disease and a median survival similar to men, although a higher prevalence of bulbar symptoms. Most of the patients had a normal respiratory pattern with a diminished MIP. FVC, adaptation to NIV and bulbar symptoms onset revealed to be the major prognostic factors in this study.

Keywords: *ALS. NIV. Survival.*

CO 005. NEW REFERENCE EQUATIONS: WHAT CHANGES IN THE STUDY OF ALVEOLAR-CAPILLARY DIFFUSION CAPACITY?

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Introduction: There are numerous reference equations available for conducting the Alveolar Capillary Diffusion Capacity study, however there are no standardized reference values for Europe. The Global Lung Function Initiative (GLI) recently published reference equations for Carbon Monoxide Diffusion Capacity for Caucasians. In clinical practice, the exchange of reference equations requires understanding of the impact of this exchange.
Objectives: To compare the interpretation of diffusing capacity of carbon monoxide using ERS-93 versus GLI-17 reference equations.
Methods: Cross-sectional study. Were included all caucasian individuals, aged 18 to 85 years, who underwent Pulmonary Function Tests (PFT), in the Pulmonary Function Laboratory of the Setúbal Hospital Center. PFT were performed, between January and May 2019, according to recommendations of the American Thoracic Society/European Respiratory Society (ATS/ERS) by the single breath method with carbon monoxide (CO). The functional parameters evaluated were Carbon Monoxide Diffusion Capacity (DLCOsb) and DLCO corrected for Alveolar Volume (DLCO/va). The interpretation was performed taking into account the lower limit of normality (LLN). Statistical analysis was performed using the statistical software of the IBM®, SPSS Statistics® version 22. A significance level of 5% was considered.
Results: We included 293 individuals, 60.4% male. The average age of the sample was 64.0 ± 12.46 years. Significant differences were observed for the mean DLCOsb and DLCO/va values when comparing the reference equations ERS-93 vs GLI-2017, in both genders (DLCOsb: pf < 0.001 and pm < 0.001; DLCO/va: pf < 0.001 e pm < 0.001). The mean LLN for DLCOsb in females was 5.2 ± 1.04 mmol/min/KPa (ERS-93) compared to 4.86 ± 0.70 mmol/min/Kpa (GLI-17) and the average LLN for DLCOsb in males was 6.2 ± 1.17 mmol/min/Kpa (ERS-93) compared to 6.0 ± 0.86 mmol/min/Kpa (GLI-17). For DLCO/va the mean LLN for females was 1.0 ± 0.13 mmol/min/KPa (ERS-93) compared to 1.1 ± 0.78 mmol/min/Kpa (GLI-17). In males the mean LLN for DLCO/va was 0.8 ± 0.12 mmol/min/Kpa (ERS-93) compared to 1.1 ± 0.43 mmol/min/Kpa (GLI-17). There was a higher proportion of DLCOsb alterations and higher severity when using the ERS-93 equations, however when corrected for the Alveolar Volume (VA), a higher proportion of DLCO/va alterations and greater severity was observed when using the GLI-17 equations, because VA predicted values are lower in GLI-17 equations.
Conclusions: The adoption of different reference equations leads to different interpretations of the results of the Carbon Monoxide Diffusion Capacity study, so it is necessary to standardize the reference equations that adequately represent the study population.

***Keywords**: Reference equations. DLCO. GLI-17.*

CO 006. RETROSPECTIVE EVALUATION OF MORBI-MORTALITY AND 6-MONTH SURVIVAL OF ≥ 75 YEAR OLD PATIENTS TREATED WITH NONINVASIVE MECHANICAL VENTILATION IN AN INTERMEDIATE CARE UNIT

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Introduction: Noninvasive mechanical ventilation has been established as a successful therapeutic option in respiratory failure, as it reduces the complications associated with invasive mechanical ventilation. In elderly patients with multiple comorbidities and potentially reversible acute respiratory insufficiency (ARI) that are not candidates to resuscitation manoeuvres, noninvasive mechanical ventilation reduces in-hospital mortality, without compromising postdischarge quality of life.
Objectives: Evaluate the morbimortality and the 6-month survival rate of ≥ 75 year old patients with acute respiratory insufficiency treated with noninvasive mechanical ventilation in an medical intermediate care unit. Identify factors associated with higher in-hospital and 6-month mortality rate as well as factors associated with higher 3-month hospital readmission rate.
Methods: Retrospective observational study conducted between October 2015 and December 2018 that included patients with ≥ 75 year old and acute respiratory insufficiency treated with noninvasive mechanical ventilation (NIV). Exclusion criteria were: ambulatory use of NIV, NIV as a rescue technique from invasive mechanical ventilation, AFR caused by a neurologic disease, and absence of adequate clinical data.
Results: Eligible for the study were 102 patients with the following in-hospital admission characteristics: mean age 84.2 year-old; 43% male; average Charlson and Barthel index of 7 and 30, respectively; average Score SAPS II of 39.1. 68.1% had a do-not intubate order. 94 patients (92%) presented with hypercapnic respiratory failure. Arterial blood gas values previous to the beginning of NIV: pH and pCO2 of 7.3 ± 0.08 and 64.2 ± 16.7, respectively. Main reasons for NIV introduction: decompensated heart failure (n = 81), pneumonia (n = 50), acute chronic obstructive pulmonary disease (n = 34) and sleep apnea-hypopnea syndrome/hypoventilation obesity syndrome (n = 19). Median days under VNI in the unit of 6 (total of 10). The rate of therapeutic failure was 7%. Average Barthel index of 35 at discharge. We identified the following factors associated with higher in-hospital mortality: age, SAPS II and time until the beginning of NIV. The only factor associated with higher 6-month mortality was the Barthel index at the time of hospital discharge. We found no factors associated with higher 3-month hospital readmission rate. In-hospital mortality rate was 21% and 6-month postdischarge mortality rate was 23%.
Conclusions: Noninvasive mechanical ventilation can be used successfully in the elderly, even in less well studied acute respiratory insufficiency causes like pneumonia. In our cohort, in-hospital mortality was similar to what is described in the literature for specific respiratory units. The delay in the beginning of the technique was identified as a factor associated with higher in-hospital mortality. The deterioration of patients' global health condition during hospital stay has an impact in long-term mortality, highlighting the importance of a global and eclectic approach to these patients.

***Keywords**: Acute respiratory insufficiency. Noninvasive mechanical ventilation. Elderly. Mortality.*

CO 007. ADDITION OF PEEP/EPAP DURING NOCTURNAL VENTILATORY SUPPORT IN PATIENTS WITH SEVERE RESTRICTIVE DISORDERS: PHYSIOLOGICAL EFFECTS AND TOLERANCE IN A RANDOMIZED PILOT STUDY

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Introduction: In patients with nocturnal hypoventilation due to Severe Restrictive Disorders (SRD) (namely neuromuscular disorders-NMD), events defined by poligraphic study software as obstructive or central apneas/hypopneas, can be misinterpreted and lead to suboptimal ventilatory settings. These events may, in reality, be only related to respiratory muscle weakness and not to any kind of apnea, therefore, that may not indicate the necessity to add PEEP/EPAP that can compromise the level of pressure support.

Objectives: To analyse the physiological effects and the need of PEEP/EPAP during sleep in patients with severe restrictive disorders under Non-Invasive Mechanical Ventilation (NIV) for more than 20h/per day.
Methods: A randomized prospective cross-over study was performed in 16 patients with a median age of 51.5 (39.7-64.7) years, that included 13 NMD and 3 severe kyphoscoliotic patients, with a severe restrictive ventilatory syndrome, median FVC (% predicted) of 38.5 (26.5-50.2). In two consecutive nights, they were randomly assigned to sleep one night with a PEEP/EPAP of 0 cmH2O and the other night with a PEEP/EPAP of 8 cmH2O, maintaining all the other ventilatory support parameters. All of them performed a home cardio-respiratory sleep study (Embletta, Resmed®, 7 channels, including X-Actrace-RIP and pneumotacograph). Subjective sleep quality, comfort and nocturnal dyspnea (Visual Analogical Scale-0-10), respiratory events and oxygen saturation parameters were analyzed and compared between the two nights.
Results: The attached table (PDF) presents the results. Only one patient did not tolerate PEEP/EPAP of 8 cmH2O and slept with a PEEP/EPAP of 6 cmH2O.
Conclusions: The application of PEEP/EPAP did not show superiority in terms of sleep parameters and symptomatic improvement. Although further research is warranted, the results of this pilot study suggest the use of noninvasive ventilatory support without the addition of PEEP/EPAP in patients with SRD, especially NMD.

Keywords: *Severe restrictive disorders. PEEP/EPAP. Non invasive ventilation.*

CO 008. MAXIMUM INSUFFLATION CAPACITY AND ASSISTED PEAK COUGH FLOW IN NEUROMUSCULAR PATIENTS: IMPACT OF LUNG RECRUITMENT MANEUVERS

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Introduction: Lung volume recruitment (LVR) maneuvers have a significant impact on increasing the Maximum Insufflation Capacity (MIC) and Assisted Peak Cough Flow (PCFass) and slow the rate of decline in Vital Capacity (VC) in neuromuscular patients. However, in these progressive diseases, it is important to characterize the evolution of the MIC/VC difference and its correlation with the maintenance of effective PCFass and consequent respiratory stability in this population.
Objectives: To evaluate the impact of daily LVR maneuvers in MIC and PCFAss values and to analyze the evolution of relation MIC/VC and PCF/PCFass over a 6-year period in neuromuscular patients.
Methods: Prospective study including patients followed at the Multidisciplinary Pulmonology Consultation -Neuromuscular Diseases of a central hospital- with a maximum VC of 2L and spontaneous PCF < 200 L/min, who were prescribed daily LVR maneuvers between 2013 and 2019. At each visit, the efficacy of the LVR maneuver was evaluated and the VC, MIC, spontaneous PFT and PFTass values were recorded in all patients. Compliance, duration of home ventilation and survival were also analyzed. Patients with Amyotrophic Lateral Sclerosis (due to the bulbar involvement of the disease), concomitant intrinsic pulmonary disease and inability to cooperate in PVR maneuvers were excluded from this analysis.
Results: We included 22 patients (6 women) with a mean age of 41.5 ± 19.2 years and the following diagnoses: Duchenne Muscular Dystrophy (n = 5), Congenital Myopathy (n = 6), Type 2 Spinal Muscular Atrophy (n = 4), Poliomyelitis sequelae (n = 2), Spinal Cord Injury (n = 2), other neuromuscular diagnoses (n = 3). During the 6 years of follow-up, there was a statistically significant decline in VC (from 1.052 ± 0.642 L to 0.718 ± 0.631 L; p = 0.019) and spontaneous PCF (from 216 ± 101 L/min to 156 ± 123 L/min; p = 0.023). Regarding the MIC and PCTass values despite the decline, there was not statistically significant: MIC from 2.156 L ± 0.978 L to 1358L ± 0.949 L; p = 0.083 and PFTass from 277 ± 99 L/min to 215 L/min ± 43 L/min; p = 0.192. The difference between MIC and VC over 6 years remained stable, with a decline rate of 0.04 liters per year. The difference between assisted and spontaneous PCF also remained constant (annual decline of 1.3 l/min). The mean adherence and mean duration of Home Ventilation were 22.2 ± 2.1 hours/day and 106.2 ± 55.8 months, respectively. During the 6 years of analysis, 2 patients died, all due to non-respiratory causes.
Conclusions: PVR maneuvers have a significant impact on the stability of MIC and PCFass values despite a progressive loss of spontaneous CV and PCF values. Thus, neuromuscular patients with preserved bulbar muscle function who have decreased spontaneous VC and PCF values benefit from daily use of PVR maneuvers to maintain their ventilatory stability and cough effectiveness that is critical for good bronchial hygiene.

Keywords: *Maximum insufflation capacity. Assisted peak cough flow. Neuromuscular.*

CO 009. BREAST TUBERCULOSIS AND MYCOBACTERIUM ABCESSUS MASTITIS AFTER REDUCTION MAMOPLASTY: 2 CASE REPORTS

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Case reports: Case 1: Breast tuberculosis is a rare disease, with an incidence of less than 0.1% of all breast lesions in Western countries and 3-4% in tuberculosis endemic regions, such as India and Africa. We report the case of a 85 years-old woman, non-smoker with obesity, hypertension and dyslipidemia, resident in Portugal. In May 2017 she detected a painless tumefaction on the right breast without complaints of fever, dyspnea, cough or constitutional symptoms. It was performed a breast ultrassonography and a chest CT that showed a 10 × 3.5 cm polylobed lesion centered in the inner quadrants of the right breast, extending from the cutaneous surface to the anterior thoracic wall. The diagnostic hypothesis were breast abscess or an overinfected breast. It was performed a core biopsy concordant with giant multinucleated cells with necrotic areas, no signs of malignity and a positive PCR for M. tuberculosis. It was started a tuberculostatic scheme with isoniazid (H) ryfampicin (R), pirazinamide (Z) and ethambutol (E) on october 2017. On January 2018 it was performed a chest CT to evaluate the response and it was seen a reduction on the size of the breast lesion to 6.5 × 2 cm, so it was progressed to the maintenance with 3 drugs (HRE), because the susceptibility test wasn't available at that time. Case 2: Mycobacterium abscessus is a rapidly growing mycobacterium usually causing skin and soft tissue infections in immunocompetent patients following contaminated traumatic or surgical wounds or contaminated injected medications. Infection with these organisms is exceptionally rare following breast surgery in the absence of a prosthetic implant. We report a case of a 43 year- old Brazilian woman, non smoker, with no significant medical history, HIV- negative. She underwent bilateral reduction mammaplasty in March 2016. Two months after surgery, she presented with left breast swelling and tenderness. The clinical examination revealed redness, induration, swelling and purulent drainage of the left breast scar. At that time, Zhiel-Neelsen staining in the pus showed acid-fast bacilli and M. abscessus was identified and confirmed in two subsequent cultures. The treatment with clarithromycin and amikacin was started in June 2016, with insufficient response, so it was added ethambutol in August and linezolide in September. She completed 4 months of treatment with the 4 drugs before she moved to Portugal in December 2017. The treatment was interrupted and there was a clinical worsening and recurrence of the purulent drainage. Breast ultrasonography showed an abscess around the mam-

maplasty scar (17 × 7 mm). It was restarted treatment in January 2017 with clarithromycin, amikacin, linezolide and clofazimine, discontinued after 3 days because of nausea. Amikacin was discontinued after 6 months in relation with toxicity and it was maintained treatment with clarithromycin, linezolide and clofazimine during 7 months, until august 2017. It was maintained treatment with clarithromycin and clofazimine, and it was achieved clinical and imagiological improvement.
Discussion: The authors describe these 2 cases not only because of its rarity, but also because of the challenging clinical and therapeutic management.

***Keywords**: Breast tuberculosis. Mycobacterium abscessus mastitis. Mamoplasty.*

CO 010. BCGITIS: A RARE COMPLICATION OF INTRAVESICAL BCG. A CASE SERIES

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Introduction: Intravesical BCG is currently approved for the treatment of superficial carcinoma of the bladder after transurethral resection (TUR). Although it is well tolerated, there are some reports describing localized or systemic dissemination of the Mycobacterium bovis, called BCGitis.
Case reports: Case 1: Male, 64 years-old. He had a history of in situ bladder adenocarcinoma treated with TUR + mitomycin + intravesical BCG until 06/2012. In 2015 new ulcerated lesions were detected in the bladder. Histology revealed chronic inflammatory infiltrate with foci of necrosis and Mycobacterium bovis was isolated. Pulmonary involvement was excluded and HIV was negative. It was proposed isoniazid, rifampicin and ethambutol (HRE) for a period of 6 months. The patient presented clinical and imaging improvement. Case 2: Male, 69 years-old. He had history of in situ bladder adenocarcinoma, submitted to TUR + intravesical BCG. Four days after the last instillation, the patient presented a cystitis and he began a treatment with fluoroquinolone without clinical response. Microbiological and mycobacterial tests were negative. Due to suspicion of localized BCGitis, he was admitted to the hospital and he started HRE. The patient presented a good clinical response after starting treatment, so he maintained it for 6 months. Case 3: Male, 72 years-old. He had a history of urothelial carcinoma. He was treated with TUR+intravesical BCG until 12/2013. On 02/2014 he was admitted at the hospital for a pneumonia and started amoxicillin/clavulunate. In this context, the patient underwent a thoracic-CT, which showed a random micronodular pattern associated with hilar/mediastinal lymph nodes. The bronchoalveolar lavage (BAL) was positive for the Mycobacterium tuberculosis complex DNA test and the patient started HRE and pyrazinamide (Z) with clinical improvement. Meanwhile, the culture test was positive for Mycobacterium bovis and a diagnosis of disseminated BCGitis was made. Pyrazinamide was suspended. In the maintenance phase, only isoniazid and rifampicin were maintained. After 6 months of treatment, the patient presented a good clinical/imaging response. Case 4: Male, 73 years-old. He had a history of bladder carcinoma which was treated with TUR + intravesical BCG. One year after beginning BCG, he was hospitalized on suspicion of disseminated BCGitis. Thoracic-abdominal-CT showed a random bilateral micronodular pattern and liver/splenic nodules. The BAL study was negative and a liver biopsy showed granulomatous inflammatory process. It was assumed the diagnosis of disseminated BCGitis and it was started HRE. The treatment was suspended twice for haematological toxicity. Due to the absence of clinical/imaging improvement and adverse effects of treatment, a new BAL was performed: positive Mycobacterium tuberculosis complex DNA test and negative culture examination. It was decided to start HRZE + amikacin. Since then no new adverse effects appeared and after 2 months it was initiated the maintenance phase with HRE. In the end, he fulfilled a 9 months of treatment with clinical/imaging improvement.
Discussion: The diagnosis of BCGitis remains a challenge due to its extreme rarity in immunocompetent patients and its poorly understood pathogenesis. The authors aim to alert to the symptoms/signs that should lead to their suspicion as well as to emphasize the need for close surveillance in patients undergoing intravesical BCG.

***Keywords**: BCGitis. Mycobacterium bovis. Intravesical BCG.*

CO 011. PULMONARY TUBERCULOSIS: CAVITATED VS NON CAVITATED. DIFFERENTIATING FINDINGS

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Introduction: Tuberculosis is common infectious disease with the potential to affect virtually any organ or system, with the respiratory system being the most commonly affected.
Objectives: To identify clinical and laboratory distinctive features in patients diagnosed with cavitated (TPC) and non-cavitated pulmonary tuberculosis (TPNC).
Methods: Retrospective analysis of imaging, clinical (including symptoms and comorbidities), laboratory and anatomopathological findings, of all patients diagnosed with pulmonary tuberculosis who were observed at the Coimbra Pneumological Diagnostic Center (CDPC) during the period between January 1, 2014 and December 31, 2016.
Results: A total of 110 patients were included, of which 75 men (68.2%), with a mean age of 49.45 ± 18.8 years. The most frequently reported symptoms were cough (63.2%), weight loss (44.6%), asthenia 36.4%) and fever (31%). Based on the imaging findings, two groups were defined: 35 patients (31.8% of the sample) had cavitation-tuberculosis compatible (TPC) X-ray and the remaining 75 patients (68.2%) without cavitation-related tuberculosis (TPNC). In both groups the most frequent gender was male (64.1% of TPNC and 77.1% of TPC). The mean age was also higher in the group of patients with TPNC (51.6 years vs 44.8 years in TPC). Individuals with TPNC had more comorbidities per individual (1.24 vs 1.14 in TPC), a higher proportion of addicted or former drug users (13% vs 8.8% in TPC), and patients with cancer (13.1% vs 6.25%), HIV+ (8.6% vs 5.7%) and HVC/HBV + (12.9% vs 8.8%). Although with less noticeable difference, TPNC had an even higher proportion of individuals with diabetes mellitus (5.9% vs 2.9%) and lung disease (15.9% vs 12.9%). Individuals with TPC had a higher proportion of smoking (12.5% vs 8.7%) than TPNC. The diagnostic modalities also showed differences between groups, being the diagnosis in patients with TPNC mostly obtained by Cultural exam (50.6%), followed by lung biopsy (24%), Direct Exam + TAAN (18.4%). In the case of TPC patients, the diagnosis was obtained by Cultural exam in 85.8% of cases, by Direct EXAM + TAAN in 8.6%. No diagnosis by biopsy. Regarding symptoms, individuals in the TPC group had a higher average number of symptoms compared with the TPNC group (2.23 vs 1.71 symptoms per patient). Patients with TPC had a higher proportion of individuals with dyspnea (25% vs 15.3%), cough (75.9% vs 56.9), fever (39.3% vs 26.8%), sweating (21.4% vs 14.3%) and weight loss (51.9% vs 41.1%). On the other hand, individuals with TPNC had a higher proportion of hemoptysis (16.7% vs 10.7%). Little expressive differences were found in the proportions of individuals with thoracalgia (15.8% of TPNC vs 14.3% in TPC) and asthenia (35.6% in TPNC vs 37.9% in TPC). Differences in treatment duration were also noted, with a mean duration of 7.63 months in subjects with TPNC vs 8.5 months in subjects with TPC.
Conclusions: Despite the dimensional asymmetry between groups, there were important differences in the mode of diagnosis, main

symptoms, comorbidities and duration of treatment between groups of patients with TPNC and TPC.

Keywords: *Pulmonary tuberculosis. Cavitation. Clinical findings.*

CO 012. TUBERCULOSIS INVOLVEMENT OF TWO RESPIRATORY ORGANS: FROM UNCERTAINTY OF DIAGNOSIS TO RETREATMENT CHALLENGE

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Introduction: Due to its pathogenic specificities, the causative agent of tuberculosis (TB) affects primarily the lungs, occurring sometimes extrapulmonary involvement, concomitantly. The occurrence of a granulomatous inflammatory process of larynx, nevertheless rare, should be considered in the presence of ulcerative lesions and/or tumefaction at this level, being a differential diagnosis of neoplasia.
Case report: We present a clinical case of a 32-year-old male patient, Caucasian, unemployed, active smoker; he had personal antecedents of latent infection tuberculosis (after exposure to a case of active TB) with an incomplete treatment due to dropout, and progression to bilateral, pulmonary tuberculosis, in three years, with successfully completed 9 month-therapeutic regimen. The patient remained asymptomatic for four years; then he initiated progressive dysphagia and odynophagia, with multiple recurrences to health department, always medicated to symptom control, but with no reports of clinical improvement; subsequently he developed productive cough with clear secretions, asthenia, fever and marked weight loss. At otolaryngology evaluation, epiglottis edema and scattered ulcerative lesions were observed; biopsy of one of the lesions documented an inflammatory process with many epitelioid granuloma, with Langerhans giant cells and central necrosis, as well as positive stain for acid-fast bacillus of Mycobacterium tuberculosis (Mt). A therapeutic regimen with isoniazid (H), rifampicin (R), pirazinamide (Z), etambutol (E), levofloxacin (Lfx) and amikacin (Amk) was initiated. Sputum microscopy and culture were both positive for Mycobacterium tuberculosis complex. Rapid HIV was negative. Molecular test was negative for resistance to isoniazid and rifampicin. Susceptibility testing for first line antibacillary agents, performed on sputum sample, was like one of the previous tuberculosis episode, revealing resistance only to streptomycin. Clinical evolution was progressively favourable, with resolution of odynophagia and sputum negativity, however, large, cavitated, pulmonary lesions were still evident...
Discussion: This case illustrates that, even though supraglottic lesions are frequently unspecific, bacillary etiology should not be ruled out, especially when associated with consumptive symptoms. Even if infectious process involves, beyond lungs, an extrapulmonary structure, this case comprises participation of two contiguous organs in respiratory tree. The retreatment context, with substantial probability of resistance, constituted an element of complexity in the patient approach. The study of possible concurrent factors to this early relapse would be equally interesting.

Keywords: *Retreatment. Tuberculosis. Larynx.*

CO 013. PULMONARY NOCARDIOSIS IN AN HIV-NEGATIVE PATIENT COMPLICATING PLEURAL AND CHEST WALL TUBERCULOSIS

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Introduction: Musculoskeletal and joint tuberculosis (TB) is uncommon, accounting for less than 10% of EPTB cases. Chest wall abscesses are rare forms of TB. Nocardiosis is an infrequent infection, usually in immunocompromised hosts. There is an established association between isolation of Nocardia spp and Mycobacterium tuberculosis (MTB), especially in individuals with human immunodeficiency virus (HIV). We present a case of pulmonary nocardiosis in an HIV-negative individual complicating chest wall and pleural TB.
Case report: A 68-year-old male patient, non-smoking, HIV-negative with extensive pleural calcification secondary to pulmonary and pleural TB treated in 1977. In December 2017, he had anorexia, productive cough, chest pain, and swelling in the left hemithorax at 1 month. A computed tomography (CT) was performed and showed "calcified pleural plaques on the left;,bronchiectasis and pulmonary micronodules; soft tissue mass on the left lateral aspect of the chest wall, with peripheral contrast uptake and contact with the pleural cavity and 6th costal arch ". The abscess was drained, whose direct microscopy was negative for mycobacterias, but PCR and subsequent culture positive for MTB; there was no MTB in the sputum and or bronchoalveolar lavage. Rifampicin (R), isoniazid (H), pyrazinamide (Z) and ethambutol (E) were started. During the continuation phase, the abscess increased to the pleural space, soft tissues, costal arches and spontaneous drainage to the outside. During this phase, multiples punctures were performed to collect material for microbiological and molecular analysis and reassessment of the antimicrobial susceptibility profile. After a multidisciplinary discussion, in August 2018, the patient is hospitalized to start a new antibacillary regimen [HRZE + levofloxacin (LFX) + amikacin (AMK)] and subsequent surgical debridement of the chest wall. Histology of the tissue showed caseous granulomas, but direct, molecular and cultural tests were negative for MTB. The patient was discharged 18 days later with a recommendation to maintain HRZE + LFX therapy. However, in the sputum samples there was culture and PCR positives from Nocardia spp. After a new multidisciplinary discussion, the patient was hospitalized and empirical treatment of pulmonary nocardiosis was started with sulfamethoxazole-trimethoprim (SMX-TMP) and AMK for 4 weeks and subsequently SMX-TMP and cefuroxime for 6 months. Maintenance of prophylactic SMX-TMP until the end of TB treatment. After the antibacillary treatment is completed, the patient has no constitutional, local and respiratory symptoms, presenting with healing of the chest wall and radiological improvement.
Discussion: This case is of clinical interest since these pathologies are rare and difficult to treat, requiring constant multidisciplinary discussions. Antibacillary treatment is the first-line treatment of pleural and chest wall TB, but the surgical approach is essential if there is no response. Pulmonary nocardiosis can clinically and radiologically mimic pulmonary TB, and an accurate clinical sense is essential for the diagnosis of the former. The treatment of these conditions is different and may be negatively related and predisposing to clinical deterioration if both are not treated correctly and directed.

Keywords: *Pulmonary nocardiosis. Pleural and chest wall tuberculosis.*

CO 014. TUBERCULOS<IS OUTBREAK IN A BRAZILIAN IMMIGRANT COMMUNITY

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Introduction: A significant number of tuberculosis (TB) cases have been reported in immigrants from high incidence countries. Portugal is currently considered a country with a low incidence of TB. A Tuberculosis outbreak is defined when the number of TB cases is greater than expected in a given time, geographic area or popula-

tion with evidence of recent transmission i.e. 2 or more contacts are diagnosed with TB disease and molecular typing identifies identical profiles. A Probable Outbreak is defined as 2 or more cases of active disease with an epidemiological link but no molecular typing.
Methods: The authors describe a probable outbreak of TB among immigrants from Brazil, at the Torres Vedras Pneumologic Diagnostic Center, whose common epidemiological factor was the usual coexistence in a local Evangelical Church.
Results: In June 2015, a 29 years old female patient, Brazilian immigrant, was referred for bacilliferous cavitary pulmonary tuberculosis, whose symptoms duration until diagnosis was 151 days (index case). She began treatment and close contacts were screening at once, following a concentric cycle approach. The first circle of contacts included the 3-year-old son and the 31-year-old husband. Both were found to have bacilliferous TB. It was found to be Brazilians living in Portugal for 8 years; the wife worked at home and took care of her 3-year-old son (did not attend daycare) and the husband worked in a greenhouse. Given the two cases of TB disease in the first circle, it was decided to broaden the screening and prioritize contacts. The family attended the local Evangelical Church - a closed, small and poorly ventilated space, so all the churchgoers (32 Brazilians and 2 Portuguese, including children) were screened and identified as follows: a) Three cases with TB disease - one female (35 years old) and 18 months old daughter; a 14-year-old male with ganglionar TB. b) 7 cases with Latent Tuberculosis Infection (LTBI). The investigation continued into contacts (15) of each case with TB disease, counting three cases with LTBI and no cases of TB disease. Although there was no genetic identification of the strains, there is a clear epidemiological link between the patients (all attending the church) - 6 cases of disease and 7 cases of LTBI. In all patients, M. tuberculosis was identified (sensitive to all first-line drugs), none had HIV or other immunosuppression, and all completed treatment. All contacts with LTBI were treated with isoniazid and have no evidence of disease to date. There were no more associated TB cases in the following two years period.
Conclusions: For the effective diagnosis of a Tuberculosis Outbreak are crucial: A high index of suspicion, especially in individuals belonging to at-risk groups, namely immigrants. Knowledge of local epidemiology (TB incidence). Evaluation of contexts that facilitate the spread of the disease, following the methodology of prioritization of contacts.

***Keywords**: Tuberculosis. Outbreak.*

CO 015. PULMONARY TUBERCULOSIS: A CASE OF RETURN TO THE PAST!

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Introduction: Primary tuberculosis is usually self-limiting, whereas post-primary tuberculosis is progressive, characterized by pulmonary cavitation, hematogenous and bronchogenic dissemination. This process, subsequent fibrosis and calcification can cause significant structural changes with severe parenchymal destruction and lead to important lung function impairment. Until the development of anti tuberculosis drugs in the 1950s, we had no effective means of stopping this process. Currently, delayed diagnosis and initiation of therapy and their ineffectiveness or non-compliance are increased risk factors for further lung injury. These cavitations provide an ideal environment for colonization by microorganisms, namely Aspergillus fungi. In these situations host immunity is the major determinant of disease severity ranging from aspergillomas (fungus balls within pre-existing cavities) to invasive pulmonary aspergillosis.
Case report: 35-year-old man diagnosed with tuberculosis in 2015 after over 1 year of symptoms (fever, weight loss, productive cough), initial presentation with extensive pulmonary destruction, multiple cavitations leading to near obliteration of the upper lobes. After the diagnosis the patient completed a 6 month regiment of antituberculosis drugs and left medical follow-up at the end of it. Four years after this initial diagnosis the patient returned to the Emergency Department presenting with moderate volume hemoptysis (~ 100 mL) and also 4-months-old complains of productive cough with mucopurolent sputum, without fever or other symptoms. Chest CT showed bilateral cavitations in the apical segments of the upper lobes, associated with varicose and cystic bronchiectasis, presence of hypodense content inside the cavitations (intracavity content not present on previous CT performed 5 months earlier). HIV testing was negative and other immunosuppressive disorders were excluded. Considering the diagnostic hypothesis of infected bronchiectasis, he started empirical antibiotic therapy with amoxicillin/clavulanic acid and antifibrinolytic therapy, while maintaining daily hemoptysis (10-100 mL/day). Videobronchofibroscopy revealed bilateral diffuse hemorrhage, making resolution impossible with this technique. Since hemoptysis persisted, Galactomannan testing was positive both in serum and BAL, Aspergillus IgG 178 mg/dL and Total IgE 134 mg/dL, and considering the imaging findings, the hypothesis of aspergilloma was admitted. The patient underwent right upper lobectomy and the histopathological examination of the surgical specimen confirmed the presence of multiple necrotic nodules with hyphae without tissue invasion compatible with aspergilloma. No further blood loss after surgery, discharged after seventeen of the intervention and 4 weeks of antifungal therapy. Proposed for elective upper left lobectomy and is currently awaiting this second procedure.
Discussion: Within the spectrum of chronic pulmonary aspergillosis, aspergilloma is the usual form of presentation in immunocompetent patients, constituting the least aggressive manifestation of the disease and no therapy is indicated in asymptomatic cases. Surgical resection is the definitive treatment option and should be considered in cases of severe hemoptysis. When performed by experienced teams relapses are rare. Antifungal therapy, used when there is surgical contraindication, is usually ineffective. The authors highlight the relevance of this case by the rarity and severity of the pulmonary destruction presented, demonstrating the natural evolution of tuberculosis with impressive and nowadays unusual CT images.

***Keywords**: Tuberculosis. Pulmonary cavitation. Hemoptysis. Aspergiloma.*

CO 016. ABDOMINAL TUBERCULOSIS. CASE REPORT

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Introduction: Abdominal tuberculosis is a rare form of tuberculosis and it comprises around 5 percent of all cases of tuberculosis worldwide. This disease includes involvement of the gastrointestinal tract, peritoneum, lymph nodes, and/or abdominal solid organs.
Case report: 42-year-old negro female patient, housekeeper, born in Angola (resident in Portugal since 2000), currently living with her husband and two sons (8 and 15 years-old). Clinical history of pulmonary tuberculosis by the age of 20 (she was under specific therapy for one month only, in Angola), sickle cell trait, asthma. Non-smoker, with ethyl habits of 10 g/day and contact with an aunt with tuberculosis by the age of 12. The patient resorted to the emergency service due to progressive painless increase of the abdominal volume for the past three months, combined with diarrhoea, vomiting and fever for the past week. Objective clinical examination showed moderate ascites. The patient was then hospitalized for complementary study. Paracentesis showed lactate dehydrogenase

(LDH) of 642U/L, proteins of 6.1 g/dL, glucose of 73 mg/dL, adenosine deaminase (ADA) of 255 U/L, mononucleocytes of 72.3%; Abdominopelvic computed tomography (CT) angiography showed high volume ascites, mesenteric thickness, spleen with volume within the normal values but presenting small infracentimetric hypodense lesions diffusely distributed by the spleen parenchyma (microabscesses/secondary lesions), small bilateral pleural effusion, some infracentimetric retroperitoneal lymph nodes; positron emission tomography-CT (PET-TC) showed uptake in bilateral internal mammary chain lymphadenopathies, abdominopelvic lymphadenopathies and abdominopelvic peritoneal lesions, as well as heterogeneous diffuse glycolytic spleen hypermetabolism; Thoracic-CT showed bilateral pleural effusion, a 5 mm nodule in the middle lobe, large volume ascites with mesentery root densification suggestive of peritoneal carcinomatosis; Two negative sputum cultures; HIV negative. She performed CT-guided aspiration needle biopsy of the peritoneal lesions with Mycobacterium tuberculosis isolation, molecular resistance test (MRT) with negative rifampicin (R) and isoniazid (H) resistance mutations, histology with necrosis-free granulomas, antibiotic susceptibility test was negative for resistance to any of the first-line drugs. The patient started anti-bacillary therapy with H, R, Pyrazinamide (Z), Ethambutol (E) and amikacin. Suspended amikacin after MRT results. Afterwards the therapy was changed to the continuation phase, with HR. At this therapeutic stage, chest X-ray showed no apparent pleural effusion and abdominal ultrasound showed small ascites and some lymphadenopathies in the hepatic hilum.
Discussion: The authors present a clinical case of abdominal tuberculosis, a challenging condition due to its perilous diagnostic path, since clinical manifestations and results of laboratory and imaging studies are often nonspecific. Abdominal echography may present mesenteric thickness, ascites and mesenteric lymphadenopathy, as well as solid organ involvement. Ascitic fluid examination reveals straw coloured fluid with high protein, serum ascitis albumin gradient less than 1.2 g/dL, predominantly lymphocytic cells, and adenosine deaminase levels above 40 U/L. Management is with conventional antitubercular therapy for at least 6 months.

Keywords: *Tuberculosis. Abdominal.*

CO 017. BCGITE, A RARE BUT POSSIBLE COMPLICATION OF INTRAVESICAL BCG TREATMENT

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Introduction: Bacille Calmette–Guerin (BCG) is a common approach as immunotherapy treatment for urothelial carcinoma in last decades. In most cases it is well tolerated, however, disseminated BCGitis is a possible and serious complication of this therapy. We present 4 clinical cases of BCGitis observed at the Centro de Diagnóstico Pneumológico Dr. Ribeiro Sanches (CDP-RS) in the last 2 years.
Case reports: Case 1: a 59-year-old man with high-grade infiltrative urothelial carcinoma, treated in April 2017 with intravesical BCG and referred in September 2017 to CDP-RS for prostate biopsy histology with necrotizing granulomas suggestive of TB. Case 2: a 92-year-old man with high-grade papillary urothelial carcinoma, treated in August 2017 with intravesical BCG and referred to CDP-RS for right orchitis with testicular histology showing granulomatous skin infiltration with isolation of Micobacterium bovis in the exudate. Case 3: a 73-year-old man with high-grade bladder urothelial carcinoma treated in April/2018 with intravesical BCG and who began in May 2018 complaints of urinary culture with positive urine culture for M. bovis. Case 4: a 73-year-old man with prostatic invasion of urothelial bladder carcinoma who started intravesical BCG in March 2019. In April 2019, he presented with urosepsis, with mycobacterial DNA screening for positive polymerase chain reaction (PCR), although with negative direct and cultural examination. With the exception of patient in case 4, who is still under treatment, all others completed 6 months with Isoniazid, Rifampicin and Ethambutol, with clinical recovery.
Discussion: Although BCG immunotherapy is relatively safe, and most patients have only local side effects, there are several reported cases of BCGitis, with more severe complications occurring in about 3% of cases. The pathogenesis of this entity is still unclear, but it is thought that it may result from the combination of hematogenous dissemination with hypersensitivity reaction, which explains the low accuracy of the microbiological investigation. In most cases is an exclusion diagnosis and supported by a clinical history with a suggestive causal and temporal relationship. PCR detection of M. bovis has already been described, although not yet available in most hospital institutions. For this reason, the diagnosis is often inferred from the positivity of M. tuberculosis complex PCR detection. In this report, where we presented 4 cases with BCGitis, we intend to alert to the potential local and systemic complications of BCG therapy, as well as the importance of early recognition and appropriate treatment of this entity.

Keywords: *Tuberculosis. BCGite.*

CO 018. RESIDUAL EXCESSIVE SLEEPINESS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA ON POSITIVE AIRWAY PRESSURE TREATMENT

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Introduction: Excessive daytime sleepiness is a common symptom in patients with obstructive sleep apnea (OSA). Positive airway pressure (PAP) therapy objectively reduces this symptom in most patients, but a variable percentage maintain residual excessive sleepiness (RES) despite good adherence to this treatment.
Objectives: To explore the potential causes of RES in OSA patients appropriately treated with PAP.
Methods: Retrospective cohort study that included patients followed at the sleep clinic of a central hospital over a 5-year period. Inclusion criteria (all of them): OSA diagnosis; ≥ 1 year of PAP treatment and mean use ≥ 4 hours/night on ≥ 70% of nights; Epworth sleepiness scale (ESS) ≥ 11; apnea-hypopnea index (AHI) < 5/hour in ventilator software analysis; oximetry with no nocturnal hypoventilation; therapeutic polysomnography (PSG) followed by multiple sleep latency test with evidence of pathological sleepiness without criteria for narcolepsy. Patients who met all of these criteria but who had residual AHI > 5/hour on therapeutic PSG were excluded, thus assuming ineffective treatment of the disease as the cause of RES. Demographic data were analyzed and potential causes of RES explored.
Results: We included 24 patients, 62.5% male. The average age at diagnosis of OSA was 52.3 ± 10.6 years. 29.2% of patients had mild OSA, 33.3% moderate OSA and 37.5% severe OSA. The mean pretreatment value in the ESS was 17.9 ± 3.2 and the mean postreatment value was 15.5 ± 2.4. The mean duration of PAP treatment was 38.8 ± 27.2 months, with a mean percentage of days of use of 93.5 ± 8.5% and average use of 6.7 ± 0.9 hours/night. 87.5% of patients were under APAP, 29.2% under CPAP and 8.3% under bilevel PAP. Regarding non-OSA-related causes of sleepiness 45.8% of patients had diagnosis of depression, of which 90.9% were on antidepressant treatment (predominantly serotonin reuptake inhibitors); 25.0% were on daily benzodiazepine therapy; 8.3% worked shifts; 8.3% were under antiepileptic treatment; 4.2% had advanced chronic kidney disease; 4.2% had fragmented sleep due to children in their

care; 4.2% were under regular antihistamine treatment and 4.2% had dementia. In the analysis of therapeutic PSG data, it was found that the mean residual AHI was 2.1 ± 1.4/hour, 16.7% of patients had a percentage of deep sleep ≤ 10% of total sleep time (TST), and 83.3% of the patients had a REM sleep percentage ≤ 20% of the TST. 2 patients were diagnosed with restless leg syndrome after therapeutic PSG and started targeted therapy.
Conclusions: The presence of comorbidities and/or drugs that potentially induce sleepiness was relevant in this group of patients, predominantly depression and treatment with antidepressants and benzodiazepines. These data are relevant because of the frequent impossibility of withdrawing these drugs from the patients' treatment regimen, constituting a subgroup of patients with expected lower benefit from PAP therapy in improving sleepiness.

Keywords: *Obstructive sleep apnea. Residual excessive sleepiness. Positive airway pressure.*

CO 019. OBSTRUCTIVE SLEEP APNEA AND LUNG CANCER: CAN WE MAKE A CONNECTION?

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Introduction: Obstructive Sleep Apnea (OSA) has been increasingly associated with cancer. Indeed, hypoxia appears to trigger tumorigenesis, tumor progression and spread, and this association may be especially relevant for smoke-related tumors, such as lung cancer (LC).
Objectives: To investigate OSA prevalence and features in a cohort of LC patients and to determine its impact in overall survival.
Methods: We retrospectively analyzed patients with LC diagnosis who underwent polysomnography (PSG) for clinical suspicion of OSA, from January 2014 to July 2019.
Results: Of the 1707 patients followed by LC, 96 (5.6%) had OSA' clinical suspicion and underwent PSG. Twelve patients were excluded due to absence of PSG data. A total of 84 patients were enrolled, with median age of 69 years (min 47, max 91), 78.6% were males, 76.1% were former or active smokers, 85.7% had BMI > 25 and 52.4% had also COPD diagnosis. Fifty (59.5%) were staged as local, 12 (14.3%) as locally advanced, and 22 (26.2%) as metastatic LC. Regarding histology, 51 (60.7%) were lung adenocarcinomas, 17 (20.2%) squamous cell lung carcinomas and 7 (8.3%) small-cell lung carcinomas. The prevalence of OSA was 4.5%. Seven (8.3%) had AHI < 5, 22 (26.2%) had mild (AHI = 5-14), 25 (29.8%) moderate (AHI = 15-30) and 29 (34.5%) severe OSA (AHI > 30). Time SpO2 < 90% (T90) > 20% was also observed in 47.6% (n = 40) of patients. Median minimal SpO2 was 79% (min 50, max 91) and mean SpO2 was 91.1% (min 75, max 97). Regarding OSA treatment, 40.5% (n = 34) had no ventilation therapy, 34.5% (n = 29) had auto-adjusting (APAP), 4.8% (n = 4) continuous (CPAP) and 19.1% (n = 16) bi-level positive airway pressure (BiPAP). There were no differences for age, gender, BMI, histology, LC staging, comorbid COPD, smoking status, or pack years among OSA severity or adherence subgroups. Overall survival (OS) was not statistically different among OSA severity groups (p = 0.722). Patients with T90 > 20% had worse median overall survival (OS) than those with T90 < 20% (33.0 months, 95%CI 11.5-54.5 vs 168.0 months, 95%CI 48.0-288.0; p = 0.023). Also, adherent patients (> 4h/day and > 70% use) had better median OS that non-adherent (62.0 months, 95%CI 35.1-88.7 vs 13.0 months, 95%CI 4.3-21.7; p = 0.001). Patients with > 4 h (p = 0.001) and > 6 h (p = 0.009) of median daily use had better OS, but no differences were stated between patients with > 8h of daily use (p = 0.327).
Conclusions: Our data suggest that nocturnal hypoxemia interferes with overall survival of OSA/LC patients, and that adherence to OSA treatment may lead to a better prognosis of LC. Moreover, treatment benefits seem to reach a plateau between 6 and 8h of median daily use.

Keywords: *Obstructive sleep apnea. Lung cancer.*

CO 020. FOLLOW-UP OF OBSTRUCTIVE SLEEP APNEA TREATMENT: DIFFICULTIES FACED BY PRIMARY CARE UNITS

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Introduction: Obstructive sleep apnea (OSA) management is challenging for health systems. Due to the increasing demand for hospital sleep units, there has been growing interest in ambulatory models of care. Since 2015, the Portuguese model determinates the referral to primary care units of OSA patients with CPAP compliance and efficacy and without treatment complaints.
Objectives: The aim of this study was to evaluate the difficulties faced by primary care physicians in the follow-up of patients with OSA after discharge from sleep centers.
Methods: An anonymous, non-refundable and online survey was created and emailed to all primary care physicians belonging to the Lisbon North primary care units.
Results: We obtained 187 responses, whose physicians presented an average age of 37.7 (+11.3) years. Most respondents reported that they never (27.8%) or rarely (54.5%) had access to the reports of CPAP adherence delivered by home respiratory care providers. When questioned about the reports, 61.5% presented difficulties in their interpretation, and only 28.3% performed some therapeutic attitudes (mask replacement and/or humidifier placement). Regarding the recognition of the side effects of CPAP therapy as well as their correction, only 41.7% and 16.6% presented an affirmative answer, respectively. In relation to the renewal of the CPAP prescription in the Electronic Prescription (EP) of respiratory home care platform; most of them (85.6%) didn't report any difficulty. When they needed to refer patients to a hospital sleep unit, 77% reported it was an easy process, being the main reasons for a new hospital referral: difficulties in adherence/adaptation to CPAP (65%), presence of side effects (24.1%), daytime sleepiness (18.7%) and difficulties in EP (12.3%).
Conclusions: This study showed that a better articulation of primary care with the home respiratory care providers is still necessary, as well as more training of general practitioners in the management of OSA in our country.

Keywords: *OSA management. Sleep units. Primary care units. Follow-up.*

CO 021. VALIDATION OF THE NO-OSAS MODEL AS A SCREENING METHOD FOR OBSTRUCTIVE SLEEP APNEA SYNDROME IN PATIENTS UNDERGOING PRE-OPERATIVE EVALUATION FOR BARIATRIC SURGERY

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Introduction: Obesity is an important risk factor for Obstructive Sleep Apnea Syndrome (OSAS). However, significant subdiagnostic of this pathology is verified in obese patients. As a means to overcome such a difficulty, a 6 item model called NO-OSAS was proposed, through which a score equal or above 3 may identify patients with moderate to severe cases of OSAS.
Objectives: Validate the NO-OSAS model as a screening method for moderate do severe OSAS in our population of patients undergoing pre-operative evaluation for bariatric surgery for bariatric surgery.

Methods: 131 patients followed in Pulmonology consultations at Beatriz Ângelo Hospital between January 2017 and April 2019, undergoing pre-operative evaluation for bariatric surgery for bariatric surgery and already subjected to sleep studies, were evaluated. The NO-OSAS model consists in a multiple logistic regression, using a cut-off value of three (≥ 3) to identify patients with moderate to severe cases of OSAS (Apnea-Hypopnea Index [AHI] ≥ 15) in the selected patient population. The predictive factors considered most significant were: male gender, cervical perimeter ≥ 42 cm, Body Mass Index (BMI) ≥ 42, age ≥ 37 years, presence of roncopathy and witnesses apneas. As means to assess the predictive power of the proposed model the area below the AUC-ROC curve was evaluated.
Results: Of the 131 patients, 103 were female (78.6%). Average age of the sample is 43.29 ± 10.60 years and the average Body Mass Index (BMI) is 43.73 ± 5.45 kg/m^2. Most patients (n = 99, 75.6%) did not report occurrence of apneas and 76.3% (n = 100) mentioned roncopathy. 87% (n = 114) had a diagnostic for OSAS, approximately half with moderate to severe cases. With the exception of gender, all other variables of the NO-OSAS model were found to be statistically significant predictive factors ($p < 0.001$), with sensitivity and specificity values of the model assessed at 0.981 and 0.872, respectively. The AUC associated to the model was found at 0.934, corresponding to exceptional discriminating power. Despite gender not having statistically significant power as a predictive factor, statistically significant differences between males and females were found, namely in superior values of males in what concerns: cervical perimeter (46.95 cm ± 4.06 cm vs 40.2 cm ± 4.01 cm; $p < 0.00001$), AHI (49.96 ± 29.09 vs 21.61 ± 28.64; $p = 0.019$) and t90 (20 ± 20.08 vs 8.25 ± 20.23; $p = 0.0002$).
Conclusions: Given the high prevalence of OSAS in this patient population, it is clear the importance of a screening method for this pathology. In the patient sample evaluated, it was verified that the NO-OSAS model (without the gender variable) presented good performance in the diagnostic of moderate to severe cases of OSAS. Gender did not present statistical significance as predictive factor in the diagnostic of moderate to severe cases of OSAS in this study. However statistically significant differences were found between males and females in what concerns AHI, cervical perimeter and t90. Taking into account the low number of males in this sample, the use of this variable as a predictive factor should be clarified going forward.

Keywords: *Obstructive sleep apnea syndrome. Bariatric surgery. Screening. AHI. BMI. Witnessed apneas. Roncopathy. Age.*

CO 022. THE MEAN DURATION OF RESPIRATORY EVENTS IN SAHS: CLINICAL AND POLYSOMNOGRAPHIC IMPLICATIONS

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Introduction: Severity classification for therapeutic decisions of sleep apnea-hypopnea syndrome (SAHS) is determined by the number of apnea/hypopnea events per hour (AHI). Intermittent hypoxia is determinant for the pathophysiological effects of SAHS and therefore the duration of events can be as determinant as their number for the consequences of the disease.
Objectives: To determine the relationship between the mean duration of respiratory events (MDRE) and clinical and polysomnographic parameters.
Methods: A retrospective analysis of subjects referred to the sleep laboratory for 2 years was performed. Only diagnostic polysomnography (PSG) (AHI > 5/h) were included. Anthropometric data, comorbidities (arterial hypertension, diabetes, dyslipidemia, previous heart stroke and ischemic stroke, atrial fibrillation, congestive heart failure, otolaryngology and psychiatric disease), daytime sleepiness (assessed by the Epworth scale) and polysomnographic data (sleep efficiency, sleep stages, minimum and mean SO2, CT90, ODH, global IAH, supine and non-supine IAH, mean HR) were recorded. Subjects were divided into 2 groups - short (G < 20) and long (G > 20) duration according to the MDRE, considering the cutoff value of 20 seconds. Comparison of variables was performed using Chi-square and Spearman tests using SPSS®, version 24.
Results: We identified 156 individuals with a mean age of 62 ± 13 years, slight male predominance (n = 81, 51.9%) and mean BMI of 31.4 ± 6.5 kg/m^2. 51.3% (n = 80) individuals were classified in G > 20 and 48.7% (n = 76) individuals in G < 20, with a mean duration of events of 17.1(± 1.8) seconds in G < 20 and 25.5 (± 6.3) seconds in G > 20. There were no statistically significant differences in the polysomnographic variables evaluated. In the analysis of cardiovascular risk factors, there was a higher incidence of atrial fibrillation (16 vs 9), acute coronary syndrome (9 vs 6) and heart failure (15 vs 8) in group G > 20, although no statistically significant difference was observed ($p > 0.005$).
Conclusions: The tendency demonstrated by our results, although conditioned by the small sample size, allows us to emphasize the need to evaluate the average duration of respiratory events in the interpretation of the PSG results. We have not had conclusive results for polysomnographic variables, although it is predictable that the average duration of events will have consequences on sleep efficiency, night desaturation and heart rate, for example. Regarding comorbidities, it is possible to infer that there is a higher incidence of cardiovascular comorbidities in this group of individuals, highlighting the value of this parameter both for determining the severity of SAHS and for the impact and prognosis of the disease.

Keywords: *Polysomnography. Mean duration of events. Pathophysiological.*

CO 023. PREDICTIVE FACTORS OF OBSTRUCTIVE SLEEP APNEA SYNDROME IN PATIENTS UNDERGOING PRE-OPERATIVE EVALUATION FOR BARIATRIC SURGERY

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Introduction: In face of a growing number of patients suspected of suffering from Obstructive Sleep Apnea Syndrome (OSAS), a screening method is becoming an imperative. Despite obesity being a relevant and widely recognised risk factor for OSAS, a subdiagnostic of this pathology is verified in a significant proportion of obese patients undergoing pre-operative evaluation for bariatric surgery.
Objectives: Identify predictive factors for OSAS in a population of patients undergoing pre-operative evaluation for bariatric surgery such that these can be used as screening method for this pathology.
Methods: A patient sample was gathered from those followed in the sleep apnea consultations between January 2017 and april 2019, undergoing pre-operative evaluation for bariatric surgery and already subjected to sleep studies (level I or III). Demographic, anthropometric, clinical (roncopathy, witnessed apneas and excessive daytime sleepiness), comorbidities (HT, diabetes, dyslipidaemia and hyperuricemia), and polysomnographic/polygraphic (AHI, T90, ODI) characteristics were evaluated. It was considered a positive study for obstructive sleep apnea the presence of an Apnea-Hypopnea Index (AHI) equal to or above 5, being classified as mild, moderate or severe in accordance with the AHI (5 to 14, 15 to 29 and ≥ 30, respectively). Based on a simple logistic regression model (with one predictor), the presented cut-offs for each of the continuous predictors were those that maximised discriminating power of the

model (specificity, sensitivity, area below the AUC-ROC curve, Somers correlation, positive predictive value).
Results: 131 patients were evaluated, 103 of which were female (78.6%). Average age of the sample was 43.29 ± 10.60 years and the average Body Mass Index (BMI) was 43.73 ± 5.45 kg/m^2, and average cervical perimeter of 41.67 ± 4.01 cm. The prevalence of OSAS in patients undergoing pre-operative evaluation for bariatric surgery was found at 87% (n = 114), 30.5% (n = 40) of which suffered from mild OSAS, 29.8% (n = 39) from moderate OSAS and 26.7% (n = 35) from severe OSAS. However, presence of symptoms in the form of witnessed apneas was only found in 25.4% (n = 29) of cases and Epworth scores above 10 in 22.8% (n = 26) of patients with OSAS. The identified predictive factors, statistically significant for an OSAS diagnostic, are: BMI (p < 0.001), age (p = 0.0027), cervical perimeter (p = 0.001) and HT (p = 0.018). However, in the case of patients with moderate to severe OSAS, only age and cervical perimeter were found to be statistically relevant predictors (p < 0.001). In what concerns cut-offs for the predictors mentioned, values found were as follows: 40.573 kg/m^2 for BMI, 37 years for age and 40 cm for cervical perimeter.
Conclusions: The prevalence of OSAS in this sample was high, even if clinical characteristics indicating presence of the pathology were not. The use of predictive factors, as those identified in this study, may help in prioritizing patients at high risk of moderate to severe OSAS, giving more timely indication for complementary diagnostic examination to be carried out.

***Keywords**: Obstructive sleep apnea syndrome. Bariatric surgery. Screening. AHI. BMI. Cervical perimeter. Age. Epworth sleepiness scale. HT.*

CO 024. AUTOMATIC VS MANUAL STAGING OF CARDIORESPIRATORY SLEEP STUDY IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction: Obstructive sleep apnea syndrome (OSAS) has a growing prevalence. When the suspicion of OSAS is high, one option is to perform a cardiorespiratory sleep study at home thus decreasing the time to diagnosis. One of the systems used for its execution is from NOX® Medical. This device has automatic event detection software.
Objectives: Comparison of automatically verified AHI (apnea and hypopnea index), apnea index and hypopnea index and ODI (oxygen desaturation index) values with the same manually corrected values.
Methods: Retrospective study comparing the mentioned scores in 29 patients who underwent a sleep study with the NOX® T3 device (software version 5.1.1.19824) at the CHUC Sleep Medicine Center. Event analysis was performed according to the criteria of the American Academy of Sleep Medicine, version 2.5 of 2018, with subsequent statistical analysis using the IBM SPSS® software (version 20).
Results: The sample included 65.5% male patients, mean age 63.5 ± 13.5 years and mean STOPBANG 4.7 ± 1.4. Twenty patients (69%) had hypertension, eighteen patients (62.1%) were obese, nine patients (31%) had cardiac disease and five patients (17.2%) had respiratory disease. The median of manually corrected AHI was 27. We compared the values of manually corrected vs automatic AHI. The difference in medians between the two variables was not statistically significant (p = 0.952), which was equally true for apnea (p = 0.933) and hypopnea (p = 0.647). However, when comparing the ODI we found that the difference in the medians of the obtained values was statistically significant (p = 0.000). Regarding the AHI value, the two scoring methods showed no statistically significant difference in patients with the co-morbidities referred (obesity, cardiac disease and respiratory disease), and were independent of the AHI value itself. Thus, the difference between the medians of AHI values (manual vs automatic) was not statistically significant regardless of whether this value was less than 15 events/h (p = 1.000), between 15 and 30 events/h (p = 0.176) or greater than 30 events/h (p = 0.123).
Conclusions: In the presence of a cardiorespiratory sleep study with good technical conditions, the possibility of using automatic event detection software can significantly reduce manual staging time while also saving associated resources. This is important especially in patients with very high AHI values whose therapeutic decision is independent of small differences in this value. Thus, we have to validate the sensitivity of event detection, which is the purpose of the presented study. We must, however, take into account its main limitation - the size of the sample. We therefore recognize the need for further data collection so that in the future we can more substantively confirm the results presented.

***Keywords**: OSAS. Cardiorespiratory sleep study.*

CO 025. BIOLOGICAL CLOCKS IN THE DIAGNOSIS OF OBSTRUCTIVE SLEEP APNEA

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Introduction: Obstructive Sleep Apnea (OSA) is one of the most common sleep disorders worldwide. Still, 80-90% of the OSA cases are estimated to be undiagnosed, which leads to major health, social and economic consequences. OSA clinical practice has relied on typical symptoms, such as excessive weight, snoring and daytime sleepiness, to refer patients for sleep studies. However, less symptomatic OSA clinical phenotypes have been increasingly recognized and sleep studies are expensive, labor intensive and time consuming. In this context, new OSA biomarkers emerge to overcome current OSA diagnostic limitations. Biological clocks are internal timekeepers that regulate virtually all biological processes. Their functioning is modulated by external and internal time cues that act as input signals to adjust internal time and assure body homeostasis. Several studies have showed that oxygen also modulate biological clocks and that altered levels compromises clocks functioning in a dose-dependent manner. Understanding how OSA impacts on biological clocks may open new avenues for OSA diagnosis and treatment.
Objectives: To evaluate biological clocks functioning in OSA patients, before and after OSA treatment.
Methods: A cohort of 13 Portuguese male patients [age: 54 ± 2 years; BMI: 30.7 ± 1.3] diagnosed with mild, moderate and severe OSA [36.5 ± 8.4 apneas/hypopneas per hour - AHI] was followed from the moment of diagnosis with conventional polysomnography - PSG (t0), up to 4 months (t4M) and 2 years (t24M) of treatment with standard continuous positive airway pressure (CPAP). In each phase (t0, t4M and t24M), the axillary body temperature was measured and blood was collected at 4 time points along the day (8h, 11h, 16h30 and 22h30). Peripheral blood mononuclear cells were isolated and the expression levels and profile of 11 genes that regulate clocks functioning were assessed by qRT-PCR. Results were compared to age-matched controls [age: 47 ± 7 years; BMI: 25.6 ± 0.5; AHI: 4.7 ± 0.8], validated by PSG. This study was approved by the ethical committee of the Faculty of Medicine of the University of Coimbra and of Coimbra Hospital and University Centre.

Results: Patients at t0 and t4M show similar diurnal profiles of axillary body temperature and clock-genes expression. The expression levels of several clock genes is significantly lower in comparison with age-matched controls ($p < 0.05$ and 0.01) and show no evident oscillations along the day. By contrast, at t24M there are evident changes in both axillary temperature and clock genes expression. The expression levels of clock-genes increased and diurnal oscillations became evident, similar to age-matched controls. Different profiles were observed in moderate OSA patients. The expression levels of several clock genes, at specific times of the day, correlates with the number of obstruction episodes ($p < 0.05$, $r = -0.40$), desaturation index ($p < 0.01$, $r = -0.84$), arousals frequency ($p < 0.01$, $r = -0.74$) and sleepiness ($p < 0.05$, $r = -0.54$).
Conclusions: The obtained results suggest that OSA dampens biological clock oscillations and that these are not reverted upon CPAP short-term treatment. By opposite, long-term CPAP treatment might be able to ameliorate/reestablish clocks functioning. These findings pinpoint possible biomarkers with potential to early diagnose OSA, stratify OSA patients and infer on treatment response and efficacy.

Keywords: *Obstructive sleep apnea. Diagnosis. Biomarkers. Biological clocks.*

CO 026. THE ROLE OF SURGERY IN SMALL CELL LUNG CARCINOMA - LIMITED DISEASE

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Introduction: Small cell lung carcinoma (SCLC) constitutes about 10 to 15% of lung tumors. It presents an aggressive behavior and a potential for early metastasization at a distance. As a result, systemic chemotherapy (QT) and/or radiotherapy (RT) are the cornerstones of treatment in most SCLC patients. In cases of limited disease (T1-2N0M0) and in selected patients, pulmonary resection surgery may be an option. Descriptive analysis of three patients with SCLC who underwent pulmonary resection surgery in 2019, 2017 and 2015, respectively.
Case reports: Case 1: male 66 years old, former smoker 60 pack ear, asymptomatic. A 10 mm pulmonary nodule is detected in the right upper lobe (inaccessible for biopsy) and mediastinal adenomegalies without PET-CT uptake. After negative mediastinal staging, the patient is submitted to atypical pulmonary resection, with an extemporaneous examination identifying carcinoma and lobectomy with mediastinal ganglion emptying (EGM) is completed. The definitive anatomopathological diagnosis is compatible with SCLC - pT1b N2 (stage IIIA) without residual disease (R0). Performed QT + RT concurrently. No evidence of relapse to date, with a disease-free survival of six months. Case 2: female, 45 years old, non-smoker. Personal history of Gaucher disease. After weight loss study, a SCLC in stage IIA is diagnosed. QT begins with cisplatin and etoposide suspended by severe pancytopenia (aggravated by hypersplenism of Goucher disease). After restaging, it is submitted to lobectomy with EGM. Preoperative diagnosis - SCLC pT2b N0 (stage IIA) without residual disease (R0) was confirmed. He underwent prophylactic brain radiotherapy. No evidence of relapse to date, with a disease-free survival of 33 months. Case 3: male, 79, former smoker 40 pack-year asymptomatic. A 23 mm pulmonary nodule is detected whose transthoracic biopsy showed SCLC, stage IA. It is proposed for QT which declined. After six months of surveillance, the tumor maintained dimensional stability and after restaging, underwent atypical pulmonary resection. The definitive anatomopathological diagnosis showed SCLC combined with areas of adenocarcinoma, pT1Nx, without residual disease (R0). Refused adjuvant therapy. No evidence of relapse to date, with a disease-free survival of 51 months.
Discussion: The multidisciplinary approach in SCLC is fundamental and in these three cases proved crucial given its particularities and complexity. Despite the minor role of thoracic surgery in the treatment of SCLC, in cases of limited disease, the most recent studies have already shown good results, either as an initial approach (followed by QT) or after induction QT.

Keywords: *Surgery. Limited disease. Small cell lung carcinoma.*

Withdrawn abstract

CO 028. LUNG ABSCESS: MEDICAL OR SURGICAL TREATMENT?

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Introduction: Lung abscess is defined as an area of necrosis of lung parenchyma leading to a cavity with air fluid level. They can be

primary or secondary to underlying lung disease, acute or chronic based on the duration of the disease. Most cases are associated with recognized risk factors including alcohol abuse, periodontal disease, neurologic dysfunction and others. Historically, lung abscesses were associated with anaerobic bacteria, however recent reports suggest a poly microbial spectrum of etiological agents. In lung abscess the predominant anaerobic bacteria isolated are: gram-negative Bacteroides fragilis, Fusobacterium capsulatum e necrophorum, and gram-positive anaerobic Peptostreptococcus and Microearophillic streptococci. From aerobic bacteria are Staphylococcus aureus, Streptococcus pyogenes and pneumonia, Klebsiella pneumonia, Pseudomonas aeruginosa, Haemophilus influenza, Acinetobacter spp, Escherichia coli and Legionella. Although 80-90% of lung abscess are successfully treated with antibiotics, surgical intervention is required in specific cases.
Case report: A 71 year old male with past medical history of hypertension and diabetes mellitus, recently hospitalized during a month with urinary sepsis do to Escherichia Coli complicated with bacteraemia and pioventriculitis, presented with 1 week of productive cough, fever and shortness of breath. Chest X ray showed right basal consolidation and started empiric IV antibiotics. However, his symptoms did not resolve, and follow up CT thorax showed large cavitary (80 × 100 mm) mass with air fluid level that involved the lower lobe of the right lung. Patient got lobectomy and decortication of the right lower lobe, with hemodynamic and radiological resolution. A 30 years old male in psychiatric internment unit, for decompensated schizophrenia, developed fever, leucocytosis and growth of serum C-reactive protein, at 15 day. Chest X ray showed left basal consolidation and started empiric IV antibiotics. For sustained fever, a thorax CT was performed and showed a consolidation with a large cavitary mass (68 × 48 mm) and a loculated pleural effusion. Despite the antibiotic treatment escalation, he kept up with clinical deterioration. Follow up CT Thorax showed a hydropneumothorax, drained by a percutaneous transthoracic tube. However, with no function after 48h, the patient underwent decortication and segmentectomy of left lower lobe, with hemodynamic and radiological resolution.
Discussion: We know that in pre-antibiotic era, the mortality of lung abscess was higher, and is now reduced to 8.7%. With all of the possible etiologic pathogens of lung abscess, and the emergence of multidrug-resistant bacteria, it is now a real challenge to define the choice and duration of antibiotic therapy. To provide a better treatment to patient, surgical therapy should be considered, and not delayed, as a valuable option treatment when conservative approach have little chances. We must remember the indications for surgical resection of lung abscess: (in the acute phase) haemoptysis, prolonged sepsis and fever, bronchopleural fistula, rupture of abscess to the pleural cavity with pyopneumothorax/empyema; and (in the chronic phase) unsuccessfully treated lung abscess more than 6 weeks, cancer suspicion, cavitary larger than 6 cm, leucocytosis in spite of antibiotics. With this case series report we could review the clinical presentation, radiological and treatment of lung abscess,

***Keywords**: Lung abscess. Necrotizing pneumonia. Antibiotic therapy. Cardiothoracic surgery.*

CO 029. TWO YEARS OF EXPERIENCE IN VIDEO-ASSISTED THORACIC SURGERY AT UNIVERSITY HOSPITAL CENTER OF SÃO JOÃO

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Introduction: Video-assisted thoracic surgery (VATS) completely change the current practice of thoracic surgery. VATS is safe and effective, and because it is less invasive than thoracotomy allows for shorter hospitalization and faster recovery time.
Methods: Retrospective analysis of patients diagnosed with lung cancer who were submitted to VATS, from June 2018 to June 19 at São João University Hospital Center.
Results: Eighty-six patients were included, with a median age of 67 years (min-max 37-83 years); the majority of patients were male (62.8%). The most frequent histology was adenocarcinoma (82.6%). A large majority of patients had a history of smoking (43% were former smokers, 30.2% were active smokers, the remaining were non-smokers). Eighty percent of the patients had FEV1 higher than 80%. Twenty-eight (32.6%) patients had a previous history of cancer. The most frequently found were breast (5.8%), gastric (5.8%) and colorectal (4.7%) cancers and two (2.3%) patients had a history of lung cancer. Chronic obstructive pulmonary disease was the most frequently diagnosed respiratory disease (10.6%). Almost half of the patients had cardiovascular risk factors (CRF), but only 20% had heart disease. Right upper lobectomy was the most frequently performed surgery (29.1%), followed by left upper lobectomy. Nearly 90% of surgeries were performed with 3 ports, and the remaining ones with 2. The median time between diagnosis and day of surgery was 94 days, varying from 0 (extemporaneous examination) to 230 days (two nodules in different lobes, with transthoracic lung biopsy at different times with the need for a harpoon for intraoperative localization). The median drainage time was 4 days (range 2-36 days). The days of hospitalization varied from 2 to 64 days (median of 4 days). There were 8 conversions: 3 cases due to failure of single-lung ventilation, 2 because of calcified adenopathies that made vascular dissection unsafe, and 3 cases due to bleeding, Postoperative complications occurred in 22 patients, 10 being minor isolated complications (persistent air leak was the most frequent); pneumonia was the most common major complication (8.1%). The median time of hospitalization of patients with CRF and postoperative complications was higher, and the difference was statistically significant. There is a significant correlation between days of hospitalization and days of drainage, numbers of ports, and time from diagnosis to surgery.
Conclusions: The authors intend to disclose their experience with a VATS program since its beginning, at their surgical center. The time from diagnosis to surgery leads to a reflection on how these times can be shortened and how complications can be avoided. The median draining days equal days of hospitalization, and the results are very satisfactory. The conversion rate is similar to other studies published. These results show what was achieved with the VATS program and also how and what can be improved.

***Keywords**: Video assisted thoracic surgery. Lung cancer.*

CO 030. REEXPANSION PULMONARY EDEMA IN SPONTANEOUS PNEUMOTHORAX. A RETROSPECTIVE STUDY

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Introduction: Reexpansion pulmonary edema (RPE) is a complication that can occur after reinflation of the lung following drainage of a spontaneous pneumothorax (SP). The exact underlying risk factors are unclear.
Objectives: The purposes of this study were to determine the incidence of RPE after drainage of primary SP and possible correlation with risk factors.
Methods: We retrospectively reviewed the clinical records of all patients with primary SP diagnosis, hospitalized in Algarve University Hospital Center-Faro Pulmonology Department, admitted between January 2014 and December 2017. SP cases with and without RPE (radiological diagnosis) after drainage were compared regarding several risk factors.
Results: During the four-year period, seventy-four cases of primary SP were treated with drainage, 61 men and 13 woman; mean age

28.7 years. RPE developed in 13 (17.6%) of those 74 cases. Mortality rate was zero. RPE was predominant in men (100%) and smokers (94.4%). One quarter (25%) of these patients had previous drug addictions. The right side was more commonly affected (76.9%). It was possible to find an association using chi-square test between RPE and large bore chest tubes (equal or larger than 18F) in 92.3% of the situations and between RPE and faster lung reexpansion (first 24 hours) in 61.5% of the cases.
Conclusions: The size of the chest tube used for draining primary SP and the velocity of lung reexpansion seem to be risk factors for RPE, although confirmation requires future studies using a larger sample size.

Keywords: *Reexpansion pulmonary edema.*

CO 031. RECURRENCE OF PRIMARY SPONTANEOUS PNEUMOTHORAX

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Introduction: The defined recurrence rate of a primary spontaneous pneumothorax is very variable in the literature. Risk factors for recurrence are not well established and therefore it is not possible to stratify the individual risk of a patient.
Objectives: To characterize primary spontaneous pneumothorax and define recurrence rate and its risk factors.
Methods: A retrospective study of patients admitted to the Pulmonology Department of the Coimbra Hospital and University Center - HG center - between 2008 and 2016 with diagnosis of primary spontaneous pneumothorax was conducted. Epidemiological, clinical and radiological data were collected. Possible risk factors for pneumothorax recurrence were studied through statistical analysis.
Results: Forty patients were included, 32 (80.0%) males. The average age was 27.4 ± 7.4 years. A total of 33 patients (82.5%) were smokers at the time of diagnosis (with a median of 7.5 pack years), with a mean height of 1.72 ± 0.10 meters and a maximum height of 1.92 meters. A mean BMI of 22.9 ± 3.9 and a minimum BMI of 18. Most patients had a large pneumothorax (67.6%), defined as a distance greater than 2 cm between the hemithorax and the pulmonary line at the hilar level. Conservative treatment was chosen in 4 patients (10.0%), needle drainage in 2 patients (5.0%), chest tube in 34 patients (85.0%). Two patients underwent surgery after the first episode of pneumothorax (5.0%), as they maintained chest tube air leakage. The recurrence rate in our sample was 26.3%, and 50.0% had recurrence in the first year. In 40.0% of the sample recurrence was contralateral. In the present sample, gender, age, smoking habits, height or BMI were not associated with a higher risk of pneumothorax recurrence. Smoking cessation after the first pneumothorax (11 patients, 29.7% of the sample) was associated with a lower risk of recurrence (p-value < 0.05). The imaging presence of blebs on follow-up chest CT (65.6%) was not associated with higher recurrence. There was no statistically significant difference between initial pneumothorax size or treatment and risk of pneumothorax recurrence.
Conclusions: In our study, there was no higher risk of recurrence in females, contrary to data published in the systematic review by Walker et al. There was a total recurrence rate of 27.5% and only half of these occurred in the first year, which is not in accordance with the literature describing a higher recurrence rate in the first year. Smoking cessation after first pneumothorax was associated with lower risk of recurrence. This risk was independent of the initial size of the pneumothorax or the treatment used, so in certain cases choosing the optimal treatment to prevent recurrence may be difficult.

Keywords: *Primary spontaneous pneumothorax. Recurrence.*

CO 032. CANNABIS SMOKERS PNEUMOTHORAX. RETROSPECTIVE STUDY FROM A DISTRICT HOSPITAL

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Hospital Prof. Doutor Fernando Fonseca.

Introduction: Spontaneous pneumothorax is a common condition and the etiological factors are diverse, including environmental factors such as tobacco and cannabis use. Cannabis is the most widely used illegal drug in the world, with a prevalence of use of between 2.5-5%. Several studies point to an increased risk of pneumothorax among cannabis smokers.
Objectives: Characterization of patients cannabis consumers hospitalized for pneumothorax.
Methods: Retrospective 5 years study (2014-2019) of patients cannabis consumers hospitalized for pneumothorax on Pulmonary Department of tertiary hospital (Hospital Prof Doutor Fernando Fonseca).
Results: We included 22 patients, mostly male (n = 21; 95.5%), corresponding to x% of the total patients admitted to the Service for pneumothorax during the study period. The mean age of the patients was 31.7 ± 8.0 years (21 - 51 years). As for smoking habits, 90.9% (n = 20) were smokers, while 9.1% (n = 2) were former smokers. All patients were inhaled drug users. The average length of stay was 8.8 days. According to spontaneous pneumothorax cases, 17 (77.2%) were considered primary and 5 (22.7%) were considered secondary. Among the 6 cases of secondary spontaneous pneumothorax, 6 (27.2%) were 2nd episode. The main symptom presented by the patients was chest pain, observed in all patients (100%) cases; then dyspnea in 6 (27.2%) and dry cough in 4 (18.2%). Pneumothorax was right in half of the cases and unilateral in all cases. CT was performed in 13 patients. Regarding imaging findings, 6 of the patients had blebs and 11 patients had subpleural paraseptal emphysema. As for the remaining 2 patients, they had no emphysematous changes. 21 patients were treated invasively with pleural drainage. One case was treated conservatively. Drainage time was less than 7 days in 17 (77.2%) cases and longer than 7 days in 5 (22.7%) cases. The average time of pleural drainage was 6.3 days. Regarding cases that underwent medical thoracoscopy (n = 6), two thirds (n = 4) of patients had a history of pneumothorax in the past. In all cases, pleurodesis was performed. There were no complications and full lung expansion was achieved in all patients.
Conclusions: This series is in agreement with similar ones, with a higher prevalence of this pathology in men, all with present or past smoking habits. Most patients had structural changes in thoracic CT, namely bullous emphysema. Thus, it is stressed the importance of investigating cannabis use in young patients with pneumothorax, in addition to tobacco use. Despite the lack of data in the literature, cannabis is probably an important etiological factor in the onset of pneumothorax.

Keywords: *Pneumothorax. Cannabis. Emphysema.*

CO 033. INDWELLING PLEURAL CATHETERS IN THE MANAGEMENT OF RECURRENT PLEURAL EFFUSION. FIVE YEARS' EXPERIENCE

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Introduction: A malignant pleural effusion is a frequent complication in several neoplasias, and is associated with a poor prognosis. In cases of recurrent effusion and/or trapped lung the placement of na indwelling pleural catheter is an effective method in the palliation of symptoms.
Methods: Retrospective analysis of demographic data, clinical characteristics, complications and evolution of patients who underwent

placement of an indwelling pleural catheter due between 2014 and 2019 in a university hospital.
Results: 34 patients were included. 20 (58.5%) were male, and mean age was 66.4 ± 12.2 years. In almost all patients (n = 33) the base diagnosis was malignant, the most frequent being lung cancer, accounting for 17 patients, followed by breast cancer (n = 6). One patient had a benign pleural effusion (familiar hypertrophic cardiomiopathy) and the rest were caused by other malignancies. The indications for the placement of the catheter were pleurodesis failure in 10 patients (29.4%), trapped lung in 15 (44%) and recurring pleural effusion on the remaining 9 (26.5%). The catheter placement was made on an inpatient context in 23 cases (67.6%) and outpatient in 11 (32.4%). There were no immediate complications and the late complications rate was 32%. The most frequent was pleural infection (n = 7, 20%), which in most cases evolved favorably under antibiotic therapy. Notably, after implementation of protocols in the management and evaluation of the catheter this rate diminished greatly (45% to 14%); although the numbers did not reach statistical significance. In 9 patients the catheter was removed, due to spontaneous pleurodesis (n = 5), infection (n = 2) or accidental removal (n = 2). 32 patients died during follow-up, with a median survival after catheter placement of 44 days (interval 2-423 days).
Conclusions: Indwelling pleural catheters are effective in the management of symptoms in patients with a recurrent pleural effusion in whom pleurodesis isn't successful or isn't indicated, especially due to trapped lung. The main complication is pleural infection, but the development of medical and nursing protocols in the management of the catheter results in fewer complications and improved clinical results.

***Keywords**: Pleural effusion. Indwelling pleural catheter.*

CO 034. E-FACED AND BRONCHIECTASIS SEVERITY INDEX FOR ASSESSMENT OF THE SEVERITY OF NON-CYSTIC FIBROSIS BRONCHIECTASIS: WHICH ONE IS THE BEST?

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Introduction: Non-cystic fibrosis bronchiectasis (NCFB) is a multidimensional and etiologically diverse disease and, therefore, no single parameter can be used to determine its overall severity and prognosis. The E-FACED score and the Bronchiectasis Severity Index (BSI) are two different validated scores currently used for such assessment.
Objectives: To describe the etiology of NCFB and to compare the results of the assessment of NCFB severity and prognosis obtained via E-FACED and BSI scores.
Methods: A retrospective study including NCFB patients from a sample of patients attending the "Functional Breathing Re-adaptation" appointment at the Pneumology B Unit (CHUC). All patients underwent evaluation of the variables incorporated in the E-FACED score (number of severe exacerbations in the last year, FEV1% predicted, age, chronic colonization by Pseudomonas aeruginosa, radiological extent of the disease and dyspnea) and in the BSI (age, body mass index, FEV1% predicted, hospitalization and exacerbations in previous year, dyspnea, chronic colonization by Pseudomonas aeruginosa and other microorganisms and radiological extent of the disease). Patients with active malignancies, cystic fibrosis, active mycobacterial infection, HIV, pulmonary fibrosis, sarcoidosis, secondary bronchiectasis or those undergoing antibiotic therapy previous to the study were excluded.
Results: The sample included 39 patients (24 females and 15 males, aged 37 to 87 years). Regarding the etiology, most NCFB analyzed were idiopathic (61.3%), whereas 16.1% were sequelae of tuberculosis, 12.9% post-infectious and 9.7% related with primary immunodeficiency. According to the derived E-FACED score for severity and prognosis of NCFB we found 22 patients (56.4%) with mild bronchiectasis, 13 patients (33.3%) with moderate bronchiectasis and 4 patients (10.3%) with severe bronchiectasis. Regarding the derived BSI score, the frequency of patients with low, intermediate and high BSI score was 11 (28.2%), 12 (30.8%) and 16 (41.0%), respectively. Moreover, we observed a statistically significant association between E-FACED and BSI scores (Fisher's exact test, $p < 0.001$, tau-b de Kendall = 0.691), which is due to the fact that 50.0% of the NCFB patients classified as mild on the E-FACED score were classified as low BSI and 100% of the NCFB patients classified as severe on the E-FACED were classified as high BSI. The Kappa test ($p = 0.023$) also show 56.2% of agreement between the two scales.
Conclusions: Our results show that there is a significant association between the two scales and they are globally similar. Regarding previous studies comparing FACED and BSI, we can also deduce that the introduction of the variable "exacerbations" in the E-FACED score contributed to increase the similarity between the two scales. The E-FACED score is a simpler and faster tool to apply than BSI, which can be an extremely important, practical and appropriate tool for routine assessment of NCFB patients.

***Keywords**: E-Faced. BSI. Non-cystic fibrosis bronchiectasis.*

CO 035. UTILITY OF ALFA-1 ANTITRYPSIN DEFICIENCY SCREENING IN PATIENTS WITH BRONCHIECTASIS

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Introduction: Alpha-1 Antitrypsin Deficiency (AATD) is a potential cause of bronchiectasis and some patients might benefit from augmentation therapy, particularly in case of severe disease with airway obstruction. However, the clinical utility of its screening in bronchiectasis patients remains unclear. We aimed to investigate if routine measurement of serum A1AT in the aetiologic assessment of bronchiectasis was clinically useful.
Methods: Between January 2012 and December 2016, 675 patients were observed in the Bronchiectasis Clinic at Ninewells Hospital for initial investigation of bronchiectasis etiology. All patients had documented bronchiectasis by High Resolution Computer Tomography (HRCT) scans. Serum A1AT level was measured in all of them and in case of low level, defined as < 1.0 g/L, genotyping was performed.
Results: We identified 17 patients (2.52%) with low A1AT levels, with an average level of 0.79 g/L (± 0.18). Genotypes were PiMZ in 13 patients (average 0.86 g/L ± 0.09), PiSZ in 3 patients (average 0.7g/L ± 0.06) and PiZZ in 1 patient (0.20 g/L). Each patient's serum A1AT level and genotype is described in table 1.
Conclusions: We identified 1 patient with severe AATD disease (PiZZ), 3 patients with moderate AATD disease (PiSZ) and 13 with mild disease (PiMZ). Augmentation therapy is recommended only to non-smoking patients with pulmonary emphysema and reduced or progressive decline on lung function. Non-smoking PiMZ patients don't have increased risk of lung disease and PiSZ usually don't have indication for augmentation therapy, since serum A1AT levels are usually above the protective threshold (0.5 g/L). So, in 675 bronchiectasis patients, only one (0.15%) had severe AATD that could possibly benefit from specific treatment with augmentation therapy. Clinical benefits of augmentation therapy of AATD in bronchiectasis patients are unknown and extrapolated from COPD patients. To our knowledge, there have been no studies evaluating its clinical benefits for bronchiectasis patients with AATD. Our findings show that the prevalence of AATD in bronchiectasis patients is not superior to the overall population, and so screening of these patients does not improve bronchiectasis management neither provide effective early diagnosis of AATD. We acknowledge that there are

geographic differences in the prevalence of AATD and that this conclusion might not apply to general practice in every country. Until there is further evidence, it is authors opinion that, in the light of our findings, AATD screening in bronchiectasis should not be performed, unless there is concomitant COPD or pulmonary emphysema. Prevalence of AATD in bronchiectasis patients is not superior to overall population and its routine screening is not useful for aetiologic investigation. GOLD guidelines recommend screening for AATD in patients with emphysema and/or COPD and we believe that bronchiectasis patients who concomitantly have these diseases will probably benefit from AATD screening, but future studies on this matter are needed.

Keywords: *Bronchiectasis. Alfa-1 antitrypsin deficiency.*

CO 036. EVALUATION OF THE EFFECT OF HIGH-FLOW NASAL OXYGEN IN THE 6-MINUTE WALK DISTANCE IN COPD PATIENTS UNDER PORTABLE OXYGEN THERAPY. PILOT STUDY

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Introduction: Exercise intolerance is a major issue in COPD. Portable oxygen therapy (POT) is a possible solution. Nonetheless, the compliance to POT is low and it's not effective in all patients. High-flow nasal oxygen (HFNO) appears to have several benefits in ventilation, such as decreased work of breathing and increased tidal volume and respiratory efficiency. Some studies showed improved exercise performance of COPD patients under HFNO.
Objectives: Evaluate the effect of HFNO in the 6-minute walk distance (6WD) in COPD patients under POT.
Methods: Prospective study. We included patients with stable COPD under POT. We performed three 6-minute waking tests (6WT): the first to ascertain the adequate flow rate of oxygen to correct exercise desaturation, the second, after 20 minutes of rest, to evaluate the 6WD under the previously defined flow and the third after 30 minutes of HFNO.
Results: 7 patients were included, 4 males, mean age of 65.7 ± 9.6 years and mean post-bronchodilator FEV1 of 46.1 ± 20%. Three patients had an increase in the 6WD after HFNO. The initial and final Borg dyspnoea scores were lower in the 6WT after HFNO (1.9 ± 1.5 vs 1.3 ± 1.1 and 5.4 ± 2.7 vs 4.8 ± 2.4), as well as the maximum heart rate (114.3 ± 14.4 vs 110.9 ± 19.4), although not statistically significant. The patients that walked farther after HFNO were significantly older (73.7 ± 9.5 vs 59.8 ± 3.9 years, p = 0.041) and had a higher post-bronchodilator FEV1 (57.9 ± 21.3 vs 37.2 ± 16.0; p = 0.197), although not statistically significant.
Conclusions: There seems to be some benefit of using HFNO before exercise in COPD patients. However, since our sample is small, more studies are needed to evaluate the effect of HFNO in the exercise tolerance, either at rest or during exercise when it becomes available.

Keywords: *COPD. High-flow nasal oxygen. 6-minute walking test.*

CO 037. BEYOND BLOOD VALUES IN ALPHA1-ANTYTRIPSIN SCREENING

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Introduction: Alpha1-antytripsin (A1AT) deficit is the most common potentially fatal hereditary disease in adults. Often underdiagnosed, it is mostly detected in advanced stages of lung disease. Early screening is critical in chronic respiratory or liver disease. The reference values corresponding to the different phenotypes are validated, however, phenotypes with distinct clinical implications may have similar assay values.
Objectives: To identify the cut-off points for each phenotype, analyzed in a population of A1AT-phenotyped patients in a hospital center over the past 15 years.
Methods: Retrospective observational study including A1AT phenotyped patients from 2004 to 2019. The protein value was obtained by radial immunodiffusion. IBM SPSS statistics 23 software was used for statistical analysis. Continuous variables were expressed as median and interquartile range; categorical variables were expressed in frequency and percentage. For the comparative analysis between the different phenotypes the Kruskal-Wallis test was used. For comparison in pairwise groups the Mann-Whitney U test was used. ROC curves were used to determine the cutoff points. The significance level was defined as $p < 0.05$; Bonferroni correction was applied.
Results: A total of 194 patients were included; 30 were excluded for incomplete data and 11 for representing rare genotypes. The included phenotypes are the most common in the general population (MM, MS, MZ, SS, SZ, ZZ). Significant differences were found between the medians of the different phenotypes. In pairwise comparisons it was found that SZ and ZZ have significantly lower blood values than the others, moreover ZZ has significantly lower values than SZ. Among the MM, MS, MZ and SS groups there were no statistically significant differences. Phenotypes without any M alleles had values below those defined as normal (90-120 mg/dL). In MS and MZ patients the possibility of normal blood values is described. In the present sample this was only found in 9 cases, mostly family screenings or values at the lower limit of normality. It was possible to identify as cutoff for the MM phenotype a value > 93.2 mg/dL (sensitivity 50%; specificity 95.6%) and for ZZ a value ≤ 38.1 mg/dL (sensitivity 89.5% specificity 99.3%). Dosing > 74 mg/dL is associated with the presence of at least one M allele (sensitivity 76.3%; specificity 76.7%). On the other hand, a value ≤ 69.2 mg/dL has a sensitivity of 56.5% and specificity of 90.2%, for the presence of at least on Z allele.
Conclusions: In severe phenotypes A1AT dosage is significantly lower than in intermediate or normal phenotypes. Without the presence of at least one M allele, the value obtained was always bellow the lower limit, so phenotyping would be indicated. Normal values do not exclude altered phenotype, namely MS or MZ heterozygotes. Normal blood values with normal CRP does not imply phenotyping, except in family screenings. The aim of this study is to highlight the relevance of phenotyping in all patients with chronic lung and/or liver disease with values below the normal range or close to its inferior limit, in order to stratify personal and family risk and because it may involve prophylactic measures.

Keywords: *Alpha1-antytripsin. COPD. Screening. Phenotypes.*

CO 038. EOSINOPHILIA IN ACUTE EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Introduction: peripheral eosinophilia has emerged as a marker of response to inhaled and systemic corticosteroid therapy in acute exacerbations of chronic obstructive pulmonary disease (AECOPD). Although it is being studied as a possible phenotyping marker of COPD patients, the relationship between eosinophilia on AECOPD and short- and long-term outcomes is not well defined.
Methods: retrospective analysis of clinical data of patients hospitalized to hospital with AECOPD for 14 months. Demographic, clinical,

analytical data (eosinophils, C-reactive protein) in-hospital mortality, corticosteroid therapy, and one-year exacerbations (SPSS statistics v24) were analyzed. The 2% value was used as a cut-off for eosinophilia.
Results: a total of 91 patients were included, with a mean age of 77.5 ± 8.05 years, 97.9% males. The mean duration of hospitalization was 11.23 ± 10.74, with 5 deaths (5.5%). 87.9% of the patients were treated with intravenous corticosteroids and 93.4% with antibiotics. Most of the patients were on GOLD class D (63.7%), followed by classes A and B (with 14.3% of patients) and class C (7.7%). 25.3% of the patients were non-smokers and 74.7% were smokers or former smokers. About 65.1% of the patients presented exacerbations in the year following hospitalization, and 49.4% presented severe exacerbations that justified a new hospitalization. Patients without eosinophilia (E < 2%) presented higher median CRP value ($p < 0.05$). Although not statistically significant, it was observed that patients without eosinophilia (E < 2%) had a longer hospitalization. In addition, there was no statistically significant relationship between eosinophil values and mortality, FEV1, intravenous corticosteroid therapy during hospitalization, smoking status and 1-year exacerbations. Of the 5 deaths, 4 had eosinophils < 2%.
Conclusions: this study suggests a shorter length of stay in AECOPD patients with eosinophilia, as there seems to be a better response to systemic corticotherapy. On the other hand, the absence of eosinophilia was associated with higher CRP values. Thus, eosinophils may help phenotyping patients and distinguish which patients will benefit most from antibiotic treatment (absence of eosinophilia) or corticotherapy (presence of eosinophilia). Contrary to what has been described, there was no relationship between the presence of eosinophilia and the one-year increase in exacerbations in our sample.

Keywords: *COPD. AECOPD. Eosinophilia.*

CO 039. HOME NON-INVASIVE VENTILATION AFTER ACUTE COPD EXACERBATIONS

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Introduction: Non-invasive ventilation (NIV) is indicated as first-line treatment of acute exacerbation of COPD (AECOPD). The effectiveness of home-NIV after AECOPD is not established.
Objectives: To identify predictive factors of NIV response and evaluate the effectiveness of home-NIV at reducing exacerbations.
Methods: Retrospective analysis from clinical data of patients without previous home NIV, admitted to the hospital with AECOPD and submitted to NIV, during 3 years. Demographic data, predictive factors and results of VNI were analyzed (SPSS® statistics v20).
Results: Included 28 patients admitted with AECOPD, 79% male, aged 43 to 92 years, with mean of 74.4 (± 12.3) years. Our sample consisted in 79% patients GOLD D, 14% GOLD C and 7% GOLD B. NIV was successful in 79% of patients with AECOPD. pH value greater than 7.25 and comorbidities were not predictive of response ($p > 0.05$). Low value of DECAF score and absence of eosinopenia were predictive of successful with NIV ($p < 0.05$). Of the 21 patients alive at discharge, 67% started home NIV. Patients submitted to home VNI presented mean of 0.93 exacerbations and patients discharged without VNI presented mean of 0.71 exacerbations ($p > 0.05$).
Conclusions: NIV was effective in the resolution of the acute episode. The majority of patients were discharged with NIV, but the use of home NIV did not decrease the mean of exacerbations in the following year.

Keywords: *COPD. Non-invasive ventilation.*

CO 040. THE VALUE OF PH AT ADMISSION AS PREDICTOR OF MORTALITY IN COPD PATIENTS

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Introduction: Chronic obstructive pulmonary disease (COPD) is characterized by airway obstruction. Acute exacerbations (AE) often lead to global respiratory insufficiency that requires non invasive mechanic ventilation (NIMV).
Objectives: To evaluate the impact of the pH value at admission on outcomes of patients with AE of COPD, who required NIMV.
Methods: We conducted an analytic retrospective study. We evaluated a period of two years, selecting data from patients hospitalized in an internal medicine ward with AE of COPD. We studied demographic data, story of tobacco smoke, use of long term oxygen therapy, semiology, arterial gasometry (AG) at admission, Simplified Acute Physiology Score II (SAPS II), NIMV use, need of invasive mechanical ventilation (IMV) and occurrence of intra-hospital death by any cause. We categorized patients in two groups: group 1 – pH at admission between 7.35 and 7.25; group 2 – pH between 7.25 and 7.15. Statistical analysis was performed using SPSS 19. We considered value of $p < 0.05$ as threshold for statistical significance.
Results: We analyzed 56 cases, with equal distribution between genders and a mean age of 77.4 years. Six patients had at least one previous hospitalization (10.7%) and 22 patients (39.6%) had present or past history of tobacco smoking. In AG at admission, the mean pH was 7.29 and mean paCO2 was 71.7 mmHg, ratio pO2-FiO2 was 71.7, HCO3- 33.5 mmol/L. Medium SAPS II was 39.8. The average duration of hospitalization was 7.3 days. In two cases there was need for IMV (3.6%) and nine patients end up dying (16.1% mortality). Every case was treated with NIMV on spontaneous mode with inspiratory and expiratory differentiated pressures with facial mask as interface. Group 1 and 2 were composed by 45 (80.4%) and 11 (19.6%) patients, respectively. Mean pH at admission was 7.30 for group 1 and 7.20 for group 2. Outcomes in both groups were different: mortality of 8.9% versus 45.4%, $p = 0.003$. When comparing other parameters, there were no differences with statistical significance. Having pH < 7.25 at admission was associated with in-hospital death (odds ratio of 6.037, $p = 0.042$).
Conclusions: Values of arterial pH below 7.25 at admission, despite the use of NIMV, are associated with worst intra-hospital outcomes.

Keywords: *COPD. Non-invasive mechanical ventilation. Respiratory acidemia. Global respiratory insufficiency.*

CO 041. THE DIAGNOSIS OF COPD IN A PRIMARY AND A SECONDARY CARE CENTER. WHERE DO WE STAND?

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Introduction: According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD), spirometry is a mandatory exam to diagnose COPD (Chronic Obstructive Pulmonary Disease), as it is to evaluate the severity and the level of obstruction.
Objectives: To determine the proportion of patients with a correct diagnosis of COPD, according to the GOLD criteria in two different samples: patients of a primary health care center and patients admitted to a secondary health care center.
Methods: A retrospective study was conducted regarding the evaluation of all patients with an active diagnosis of COPD from January to December 2018 in Unidade de Saúde Familiar (USF) Ouriceira and patients admitted to the internal medicine ward in Hospital de Santa Marta (HSM). The informatic data was consulted in order to select the patients with a previous codification of COPD in both centers. In these patients, the existence of a spirometry prior to

the diagnosis was searched and determined if the GOLD criteria were present - forced expiratory volume in 1 second/forced vital capacity ratio (FEV1/FVC) < 0.70 post-bronchodilator.
Results: The total of patients codified as COPD in the USF were 121. Of these, 103 (85.1%) with register of having performing spirometry and 18 (14.9%) with no registry of this exam. Of the 103 with spirometry, 62 (60.2%) had spirometric confirmed COPD, in contrast with 41 patients (39.8%) which did not. Between these patients, 25 (24.3%) had no spirometric criteria for COPD and in 16 (15.5%) the results were not available. In HSM, a total of 448 patients were admitted to the ward of internal medicine. Among these patients, 58 (11.8%) had a registry of COPD as an active diagnosis. Spirometry was registered in 38 (64.5%) while 20 (34.5%) had no registry of having performed this exam. Only 25 (43.1%) of the patients with a spirometry filed the criteria for COPD, as 5 (8.6%) did not had criteria and in 8 (13.8%) the results were not available. The totality of the sample in both centers showed either symptoms, radiologic findings, tobacco smoke or environmental exposure.
Conclusions: Less than two thirds of the USF patients and less than half of the HSM patients had a true diagnosis of COPD according to GOLD criteria. All analysed patients had exposure to risk factors, radiologic alterations or symptoms suggesting COPD, although 24.3% of the primary care center patients and 8.6% of the hospital patients showed no disease in the spirometry. COPD is the third leading cause of death worldwide, killing more than three million people every year. The diagnosis of this disease is many times undervalued in clinical practice and spirometry not performed. We pretend to emphasize the importance of a correct diagnosis and management.

Keywords: *COPD. Spirometry. Diagnosis.*

CO 042. EXERCISE LIMITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Introduction: Patients with chronic obstructive pulmonary disease (COPD) often have exercise intolerance, which affects their quality of life. The main causes of limitation are: ventilatory and gas exchange limitation, muscle deconditioning and the presence of comorbidities.
Objectives: To identify exercise limitation factors in COPD patients through Cardiopulmonary Exercise Testing (CPET).
Methods: Retrospective study of COPD patients (GOLD criteria) who underwent CPET in the last 2 years at the Pulmonology Department of CHUC - General Hospital.
Results: We included 47 patients, 78.7% male, mean age 66 ± 8.6 years. They performed a respiratory functional study prior to CPET with mean FEV1 of 58.6% and mean DLCO of 66%. Twenty-eight patients (59.6%) had hyperinflation/air trapping. Fourteen patients (29.8%) had arterial blood gas hypoxemia. In CPET patients reached an average maximum load of 76.6 watts with an average duration of 7:54 minutes. The mean VO2peak was 15.5 mL/kg/min (63.2% of predicted). Most patients (68.1%) discontinued the test for maximum lower limb discomfort (BORG scale). Two patients (4.3%) did not complete the test because of joint pain/limitation. Four patients (8.5%) showed no effort limitation. The remaining 41 patients had limitations due to: deconditioning (10.6%), cardiovascular events (10.6%), cardiovascular events associated with gas exchange abnormalities (6.4%), ventilatory and gas exchange abnormalities (25.5%), only gas exchange abnormalities (29.8%) and ventilatory alterations alone (4.3%). Patients without effort limitation had mean FEV1 75.0% and mean DLCO 78.0%. In patients in whom the limitation occurred due to deconditioning, mean FEV1 was 64.5% and mean DLCO was 71.5%. The 5 patients whose limitation resulted solely from cardiovascular events had a mean FEV1 of 56.6% and a mean DLCO of 70%. Twenty-nine patients (61.7%) had abnormal gas exchange: 11 (23.4%) with normal end-exercise blood gases (mean FEV1 66% and mean DLCO 60%) and 18 (38.3%) with end-exercise blood gas abnormalities - 8 patients (17%) with isolated desaturation (mean FEV1 56.9% and mean DLCO 55.9%), 7 patients (14.9%) with desaturation and hypercapnia (mean FEV1 46.0% and mean DLCO 75.4%) and 3 patients (6.4%) with isolated hypercapnia (mean FEV1 43.0% and mean DLCO 61.2%). The only 2 patients with ventilatory limitation (4.3%) had dynamic hyperinflation as the only factor limiting their exertion (mean FEV1 76.0% and mean DLCO 78.5%).
Conclusions: We found that most patients had effort limitation. The main limiting factors were ventilatory and gas exchange alterations, which appeared even in patients without abnormalities at rest. Desaturation and/or hypercapnia with exercise seem to be associated with more severe changes in lung function. CPET proved to be a useful tool in detecting factors such as dynamic hyperinflation and comorbidities, particularly cardiac, that contribute to exercise limitation. Thus, effort assessment of COPD patients can help us better understand individual exercise limitation mechanisms and adjust therapy/rehabilitation plan.

Keywords: *CPET. COPD. Lung function.*

CO 043. NORMOXEMIC COPD PATIENTS WITH DESATURATION IN THE 6MWT. WHAT'S THE ROLE OF AMBULATORY OXYGEN?

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Introduction: The six-minute walking test (6MWT) is a useful tool in COPD. Ambulatory oxygen in patients with Chronic Obstructive Pumonary Disease (COPD), normoxemic at rest, may be used if there is a peripheral O2 saturation < 88% or reduction of 4% to levels inferior to 90% in the 6MWT. There should also be an improvement in dyspnea and exercise capacity.
Methods: Retrospective study, clinical data from COPD patients followed in the Pulmonology department, from 2012-2014, that performed 6MWT with ambulatory oxygen criteria, normoxemic at rest. We obtained data regarding exacerbations, respiratory failure development, Non-Invasive Mechanical Ventilation (NIV) or OLD use and mortality. Patients under NIV, OLD or other major conditions leading to desaturation. The study was approved by the local ethics committee.
Results: A total of 100 patients were included, median age of 67 years, with obstructive ventilatory syndrome (median FEV1% = 42.8%), mean resting PaO2 71.5 ± 9.3 mmHg. In the 6MWT, mean distance was 387.6 m, with initial Borg score of 1 (IQR 6), final Borg score of 4 (IQR 10) and mean desaturation of 9.54 ± 3.8%. The mean time to first exacerbation was 23.2 ± 18.1 months. It correlated with survival, distance in the 6MWT, FEV1 and tend to correlate to initial Borg score (p = 0.053) There was no correlation between time to exacerbation and desaturation the 6MWT. In 5 years follow-up, 24.0% of patients started NIV, with a mean tome to NIV use of 26.6 months. Ambulatory O2 was prescribed initially to 21% of patients. Lung function tests and arterial blood gas (ABG) analysis were similar between patients with or without ambulatory O2 prescription. Patients with ambulatory O2 prescription walked a smaller distance (346.1 ± 133.1 vs 398.6.1 ± 87.4 meters), had higher desaturation (12.7 vs 8.6%) and higher initial Borg score in the 6MWT. Patients with ambulatory oxygen prescription had lower survival (47.9 ± 22.4 vs 60.4 ± 19.4 months). There were no differences in time to first exacerbation between groups. Patients who died in 5 years follow-up, had higher initial Borg score (1.2 vs 0.5) in the 6MWT, and less

time to first exacerbation (17.4 vs 26.2 months, p < 0.05). Other characteristics of the 6MWT were similar.
Conclusions: Of all patients with COPD, normoxemic at rest, with significant desaturation in the 6MWT, only 21% had ambulatory oxygen prescription. These patients had a shorter distance in the 6MWT, higher desaturation and higher initial Borg score, despite similar lung function and ABG characteristics. Ambulatory O2 prescription didn't lead to a survival benefit. Main limitations to this study include lack of control to comorbidities that could be not reported and adhesion data.

***Keywords**: COPD. Oxygen. 6-minute walking test.*

CO 044. PROLONGED DOMICILIARY VENTILATORY SUPPORT IN ADVANCED PULMONARY DISEASE: CLINICAL IMPACT AND SURVIVAL ANALYSIS

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Introduction: The impact of domiciliary noninvasive ventilation (dNIV) in patients with stable COPD has only recently been shown in reducing exacerbations and significantly increase survival. Its indication is still controversial in other pulmonary pathologies. The use of prolonged dNIV (> 12h/day) in this population has never been described.
Objectives: To describe and analyze the evolution of noninvasive ventilatory support dependence (from nocturnal to use > 12 hours/day), adherence to treatment, exacerbations and hospital admissions in the pre and post of dNIV institution in patients with advanced pulmonary disease (APD).
Methods: A retrospective study that included patients with APD followed in an outpatient Pneumology Department, with clinical indication for nocturnal dNIV, with settings titrated in a ventilation laboratory and due to the evolution of their disease, they needed to extend the ventilatory support to daytime use. Ventilatory settings, NIV adherence data, ventilatory monitoring data (leaks, % activated breaths, tidal volume, respiratory rate), 24-hour oximetry data and CO2 values under NIV were analyzed.
Results: Twenty patients (6 females) were analyzed, with a mean age of 67.4 ± 11.7 years, of which 15 (75%) were diagnosed with COPD, 4 (20%) with bronchiectasis and 1 (5%) with hypersensitivity pneumonitis, with FVC-1.92 ± 0.62 L and %FVC-66 ± 21%, mean FEV1 of 0.84 ± 0.34 L, mean %FEV1 of 33 ± 12%, mean FEV1/FVC of 44.3 ± 17.5, mean pH of 7.41 ± 0.02, PaO2 of 60.9 ± 12.6 mmHg and PaCO2 of 53.1 ± 11.5 mmHg. The ventilatory settings for nocturnal NIV were gradually titrated in the laboratory. The bi-level S/T pressure mode was used in all patients (1 under AVAPS algorithm) with mean IPAP of 20 ± 4 cmH2O, EPAP of 6 ± 1 cmH2O, respiratory rate (RR) of 15.2 ± 1.0 cpm and O2 supplementation of 2.1 ± 0.8 l/min. Due to disease progression and clinical worsening, all patients required prolonged ventilatory support during the day after a mean of 38 ± 32 months under nocturnal dNIV. After this increase in ventilatory dependence, an alternative interface was introduced and the ventilatory settings were optimized for mean IPAP of 26 ± 6 cmH2O, EPAP of 6 ± 2 cmH2O, RR of 17.3 ± 1.9 cpm, and O2 supplementation of 2.8 ± 01.4 l/min. After the increase in ventilatory dependence, the patients had an average daily use of 18h: 37 ± 3h: 46, mean leakage of 42 ± 11 l/min, mean RR of 19 ± 3 cpm, mean% of activated breaths of 38 ± 30%. Under prolonged ventilatory support, the patients presented mean 24-hour oximetry values of 92.9 ± 2.7% with mean % time < 90% of 17.2 ± 23.4% and PaCO2 of 50.4 ± 7.3 mmHg. The mean duration of nocturnal NIV is 71 ± 51 months and the mean duration of prolonged ventilatory support (NIV > 12 hours/day) is 32 ± 30 months. During the time of NIV, 5 patients (25%) died. During the time under NIV the emergency episodes and hospital admissions of respiratory cause were on average 4.7 ± 5.4 and 3.0 ± 4.1, respectively. Despite prolonged ventilatory support, 16 patients (80%) maintained the ability to ambulate with NIV and O2 supplementation (portable use).
Conclusions: In patients with APD with indication for dNIV, the ventilatory dependence may increase according to the disease progression and these patients have great potential for the use of prolonged ventilatory support effectively.

***Keywords**: Prolonged ventilatory support. Advanced pulmonary disease.*

CO 045. EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE. FACTORS ASSOCIATED WITH MORTALITY IN A NON-INVASIVE VENTILATION UNIT IN A PULMONOLOGY SERVICE

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Introduction: Exacerbations of Chronic Obstructive Pulmonary Disease (COPD) are associated to high mortality. The identification of factors associated with an increased risk of death allows the prognostic stratification of these patients and their management. In recent years, several papers have been published to identify these potential factors.
Objectives: To identify factors associated with higher mortality in patients hospitalized for COPD exacerbation in a Non-Invasive Ventilation Unit in a Pulmonology Service of a Central Hospital.
Methods: Retrospective study among patients admitted to the Non-Invasive Ventilation Unit of the Pulmonology Service of Centro Hospitalar Lisboa Ocidental due to COPD exacerbation during 2018. The sample was divided into 2 groups: in Group 1 (G1) were the patients who died during hospitalization and in Group 2 (G2) the surviving patients. We collected data regarding demographic characteristics, forced expiratory volume in the first second (FEV1) value, blood eosinophil count in stable phase, number of COPD exacerbations in the past year, days of hospitalization, C-reactive protein (CRP) value, pH and pCO2 value and PaO2/FiO2 ratio at admission. The APACHE II (Acute Physiology and Chronic Health Evaluation II) scale and the Charlson comorbidity index were also applied. Statistical analysis was performed to compare differences between groups.
Results: 43 patients, mean age 72 years, 64.8% men (n = 24); there were 6 deaths (14%) - G1. Comparing both groups, patients included in G1 had a lower mean FEV1 value (37.33% versus 48.67% in G2, p = 0.02), higher APACHE II mean score (19.17 versus 10.97 in G2, p < 0.01) higher Charlson comorbidity index (8.83 versus 4.04 in G2, p < 0.01) and at admission: lower pH value (7.21 versus 7.31 in G2, p < 0.01), higher pCO2 value (96.5 versus 75.64 in G2, p = 0.01) and lower PaO2/FiO2 ratio (145.8 versus 219.9 in G2, p = 0.02). There were no statistically significant differences regarding gender, age, days of hospitalization, CRP value at admission, blood eosinophil count and presence of exacerbations in the previous year.
Conclusions: Despite the reduced sampling, it was possible to identify potential factors associated with higher mortality that are described in the literature, namely FEV1 value, Charlson comorbidity index and severity of respiratory acidemia and hypercapnia. Although APACHE II scale is only validated for Intensive Care Units, its use in this context has enabled the identification of patients at higher risk of death. Contrary to what is described in the literature, there was no significant differences regarding the presence of previous exacerbations and age which we attributed the small sample size. The analyzed data are widely used in clinical practice, so the authors propose the maintenance of data collection in patients ad-

mitted to this Unit as an initial assessment tool, to be further analyzed with a larger sample.

Keywords: *Chronic obstructive pulmonary disease. Exacerbation. Mortality factors.*

CO 046. IMPACT OF NONINVASIVE VENTILATION IN STABLE COPD PATIENTS

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Introduction: There is an increasing use of noninvasive ventilation (NIV) in stable COPD patients and chronic respiratory failure with hypercapnia. However, studies have shown controversial results regarding criteria about using NIV in stable COPD.
Objectives: To assess the impact of NIV in stable COPD patients concerning different outcomes (blood gas analysis, functional respiratory parameters, and exacerbations free time).
Methods: Retrospective cohort study of COPD patients with home NIV for at least 6 month followed at our hospital in 2018. Patients with chest deformity, neuromuscular disease and Overlap syndrome with severe OSA and mild to moderate COPD (AHI ≥ 30 and post-bronchodilator FEV1 ≥ 50%) were excluded.
Results: The study included 100 COPD patients with a median use of NIV of 40 months [percentil25: 24; percentil75: 67.5]. Mortality rate was 8% (n = 8). The results are summarized in the table.
Conclusions: During follow-up there was an increase in ventilatory parameters with significant improvement of hypoxemia and hypercapnia reduction. ER admissions and hospitalizations for respiratory illness significantly decreased after institution of NIV.

Keywords: *Noninvasive ventilation. Stable COPD. Outcomes.*

CO 047. OUTLINE OF THE IMPLEMENTATION OF A NATIONAL CONSENSUS TO OPTIMIZE THE USE OF SYSTEMIC ORAL CORTICOSTEROIDS IN THE TREATMENT OF SEVERE ASTHMA IN ADULTS

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Introduction: In patients with severe difficult to control asthma, the regular use of chronic systemic corticotherapy (CSC) was often the only effective option to control patients who did not respond to standard therapeutic approaches. The current therapeutic options include the use of biologic agents, with future perspectives that CSC may be replaced by existing biologic agents and others under development. A systematic review published by Cochrane on the use CSC in asthma demonstrated that the evidence is weak to conclude whether SOC regimens with lower dose or shorter periods are less effective than those with higher doses or longer periods, or if the latter are associated with more adverse events. In view of the lack of consensus on the best practice in the use of CSC, there is a need to perform a national consensus on this subject.
Methods: To accomplish this consensus, a 3-round modified Delphi process will be conducted, which relies on a Scientific Committee of the areas of Pulmonology and Allergology and will be implemented in September 2019. After a first extended meeting with experts in this area – the PRECISION Meeting - and an exhaustive bibliographic search, the criteria to be included in Delphi were identified and then validated by the Scientific Committee, from which resulted the Delphi questionnaire, comprising three topics: (i) Chronic systemic corticosteroid therapy in asthma; (ii) Therapeutic regimens of systemic corticotherapy in acute and maintenance settings and (iii) safety and monitoring of SC in asthma, each with several statements. The panel of experts comprises more than 50 prominent personalities in the national medical community, with notorious clinical and academic relevance, ensuring an enlarged geographic distribution and heterogeneous composition both with pulmonologists and allergologists. Each expert will receive the Delphi questionnaire by email and will have 2 weeks to respond to each of the rounds, in which they will be asked to express their degree of agreement with each of the statements, on a 5 point-Likert scale (1-completely disagree, 2-disagree, 3-do not agree, nor disagree, 4-agree and 5-completely agree). The analysis of the results will be made considering the aggregation of responses given to categories 1 and 2 and Categories 4 and 5, considering a negative consensus if 75% of the answers correspond to the categories (1 + 2) and positive if 75% of the responses were in the categories (4 + 5). The stability analysis will be assessed by the proportion of experts who have varied their response between rounds and the percentual variation of the proportion of concordance between rounds will be used as an indicator of convergence.
Conclusions: With the methodology outlined in this work, consensus is expected to be gathered with regard to the following topics: Prescription of CSC in patients eligible for treatment with biologic agent; Prescription of chronic systemic corticosteroids in patients not eligible for treatment with biologic agent; How to do dose de-escalation; How to evaluate and monitor the adverse effects of the use of CSC therapy.

Keywords: *Adult severe asthma. Systemic oral corticosteroids. Delphi method. National consensus.*

CO 048. EVALUATION OF ASTHMA EXACERBATION OUTCOMES IN HOSPITAL CARE

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Introduction: EvAsthmapt was a multicentre study whose main objective was to evaluate the relationship between clinical practice, and clinical and organizational factors, with the results of asthma exacerbations that resulted in entry into the hospital emergency in Portugal. It involved the recruitment of patients in the emergency room (ER) due to asthma exacerbation, data collection and analysis of the outcome of the ER visit, and telephone follow-up at 30 and 60 days after inclusion in the ER. Three areas of improvement were identified in this study: increased monitoring, including spirometry; increase prescription for control medications and; increase access to unscheduled medical appointments. The Hospital Geral do Centro Hospitalar e Universitário de Coimbra (CHUC-HG) was one of the centres that participated in the study.
Objectives: To evaluate the results of the EvAsthmapt study for CHUC-HG and fit them into the national overview; and to evaluate the implementation of areas identified for improvement.
Methods: Analysis of EvAsthmapt study data for CHUC-HG and compare it with the national results. Telephone contact for late follow-up (2 years) of patients who participated in the initial study.
Results: For EvAsthmapt, CHUC-HG recruited 29 patients. Twelve (12; 41.4%) had a history of at least one asthma exacerbation in the previous year, and four needed hospitalization for this reason. Most patients were already being treated for asthma (n = 28; 96.6%), with emphasis on the use of ICS/LABA in 22 (75.9%) patients. At inclusion, 9 (31%) patients needed to be hospitalized due to asthma exacerbation. The outcome was favorable in all. Follow-up at 30 and 60 days was performed in 25 (86.2%) patients. Of these, 5 had at least one exacerbation at 30 days (20%) and 3 re-

quired evaluation in the ER. At 60 days, three patients had at least one exacerbation (8%) and two of them resorted to ER. No patient required hospitalization during the entire follow-up period. All patients who were followed at 60 days accepted reevaluation at 2 years. Nine (9, 36%) reported asthma exacerbations during this period, 4 of which required medical evaluation in the ER and 2 hospitalization.
Conclusions: CHUC-HG results were generally superimposed on national ones. Asthma exacerbation rates in the year prior to study enrollment and at 60-day follow-up were slightly lower in CHUC-HG than the national ones. Hospitalization rates at study inclusion and asthma exacerbations during the 30-day follow-up were slightly higher in CHUC-HG. At 2 years, there was an increase in the percentage of exacerbations compared with 60-day follow-up, with a concomitant relative increase in emergency admissions. This data may suggest that the areas of improvement identified in EvAsthmapt are not being implemented correctly. A new prospective study, adapting the original protocol, may help clarify this scenario.

Keywords: *Asthma. Asthma exacerbation. Treatment. Emergency room.*

CO 049. EPIDEMIOLOGY OF ALLERGENS IN THE ADULT POPULATION OF BEIRA INTERIOR

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Introduction: Worldwide, the rise in the prevalence of allergic diseases has continued in the industrialized world for more than 50 years. Therefore, it is urgent to know the allergic pattern of the population to prevent the aggravation of respiratory diseases and improve quality of life. The sensitization profiles vary according to genetic predisposition, geographical areas of residence and patient´s age. Currently, no studies are showing the current pattern of allergen sensitization in the interior of Portugal, specifically in Beira Interior.
Objectives: This study aims to determine a median prevalence and summarize the main allergies in the general adult population in the Beira Interior of Portugal.
Methods: Retrospective study from 2 years, where we collected the demographic data and results of Prick test made in the Hospital of Guarda, a region of Beira Interior, Portugal. Patients referred by physicians of multiple specialities for suspected allergies. Allergy skin tests were performed on all patients with positive control, negative control and thirteen most common allergens in the Beira Interior region. Papule diameters were measured and compared to identify skin reactivity. Results are presented as mean and standard deviation for continuous variables and number/percentage for categorical variables. We performed statistical analysis with the SPSS version 23 program, assuming a 95% confidence interval.
Results: We enrol 259 patients, mostly female (175/67.6%), mean age of 48.9 (± 18.2) years. The prevalence of allergy in this screened sample was 89/34.8%. The most common skin positive reactivity test was Dermatophagoides pteronyssinus and Dermatophagoides farinae (house dust mite) with 62/69.7%, followed by Olea europaea (olive tree) 32/36%, gramineae 31/34.8%, artemisia 15/16.9%, plantago 14/15.7%, trees 9/10.1%, cat and dog 5/5.6%, flowers 4/4.5% and finally fungus 1/1.1%. Among elderly patients, the most common skin reactivity remained house dust mites at 9/81.8%, followed by gramineae 3/27.3%, artemisia and olive tree 2/18.2%, dog danger and fungus 1/9.1%. Sensitization to multiple allergens was common in our patients, with 42/47.2% of the sensitized responding to at least two allergens, with statistically significant differences between ages ($p = 0.024$).
Conclusions: The high prevalence of house dust mite is concordant with the literature by being the most common allergy. Nevertheless, the allergy to the olive tree is not negligible. Although there are no significant changes in the allergic profile, however, there seems to be a decrease in sensitization within the elderly population. Polysensitization is also common in our adult population, especially in the younger ones.

Keywords: *Skin allergy tests. Sensitization allergies. Beira interior.*

CO 050. SMALL AIRWAYS IN ASTHMA: ANOTHER SEVERITY MARKER?

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Introduction: Severe asthma affects 3.8% of asthmatic patients and represents more than half of the costs associated with treating the disease. Contrary to the role established for FEV1 and FEV1/FVC ratio in the diagnosis and monitoring of the disease, the clinical utility of FEF25-75 is still poorly studied. However, there is evidence that reduced FEF25-75 values may be related to disease severity.
Objectives: To determine if there is a relationship between FEF25-75 values and asthma severity.
Methods: A retrospective study was conducted with the inclusion of adult patients followed in asthma consultation in a period of 12 months, excluding those with a smoking load > 5 PPY. In addition to anthropometric data, serum inflammatory markers (eosinophils and total IgE) and functional markers (FEV1, ITGV, RV, FEF25-75) were also recorded. Patients were classified into two groups: mild to moderate asthma (G0) and severe asthma (G1) according to the criteria defined by the 2014 ERS/ATS Taskforce. Statistical data were processed using the SPSS® program, version 24.
Results: 125 patients with a mean age of 55 (± 18) years, female predominance (75%, n = 94) and mean BMI of 29.1 kg/m^2 were included. Ninety-two (73.6%) patients were classified in G0 and 33 (26.4%) in G1. Regarding the functional markers, there was a decrease in FEV1 (%predicted) in G1 (64% vs 88%, $p < 0.001$) and FEF25-75 (23% vs 59%, $p < 0.001$) and an increase in RV in G1 (143% vs 110%, $p < 0.001$). After multivariable analysis it was found that reduced values of FEF25-75 are an independent functional marker of severe asthma (OR 0.9, $p < 0.001$). Regarding inflammatory markers, it was found that patients with total IgE ≥ 400 and peripheral eosinophilia ≥ 250 had lower mean FEF25-75 values.
Conclusions: Small airway alterations can be assessed by FEF25-75 and our results show that reduced FEF25-75 values may correlate with the presence of severe asthma, both with functional and serum inflammatory markers. Given the complexity of the management of patients with severe asthma, these data reinforce the importance of FEF25-75 as a potential functional marker in this group of patients.

Keywords: *FEF25-75. Small airways. Severe asthma. Functional marker.*

CO 051. EVOLUTION IN RESPIRATORY INHALERS PRESCRIPTION IN PORTUGAL FROM 2004 TO 2018. THE ACTION STUDY

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Introduction: The trends of physician's decision making concerning the different pharmacological classes of inhaled therapy available for the management of asthma and chronic obstructive pulmonary disease (COPD) is unknown in Portugal.

Methods: The Asthma and COPD Trends in Inhaler prescriptiON (ACTION) is a Portuguese 15-year prospective analysis, performed between 2004-2018 inclusive, of a physician's decision-making process concerning the different pharmacological classes of inhaled therapy for the management of asthma and COPD. In addition, it compares the trends on the use of dry powder inhaler (DPI) and pressurized metered dose inhaler (pMDI) devices. The study comprises data provided by IQVIA (The Human Data Science Company; information, technology and solution services for the healthcare industry). The data was collected from Base Dataview Plus (Portugal, retail), in units from 2004 to 2018, by NFC2 (New Form Codes), Prod and Pack; and corresponds to the yearly units supplied by wholesalers to community pharmacies. The analysis was done considering the timeline of changes provided by the documents GINA (Global INitiative for Asthma) and GOLD (Global initiative for chronic Obstructive Lung Disease), in the same period. The analysis considered inhalers containing four different pharmacological classes, for the management of asthma and COPD: the inhaled corticosteroid (ICS), the long-acting muscarinic antagonist (LAMA), the long-acting β2-agonist (LABA), and the short-acting β2-agonist (SABA). The monotherapies and combination of LAMA/LABA and ICS/LABA were considered. There was no way in this study to assign the prescription with the corresponding disease, asthma, COPD or other.
Results: In a 15-year analysis (2004 to 2018) we observed 64.0% increase in total inhaled therapy. The use of SABA has decreased by 10.8% in the last 15 years. In the same period, ICS (monotherapy or in combination with LABA) in absolute numbers increased by 94.2%. In a 5-year analysis (2014 to 2018) we observed 16.0% increase in total inhaled therapy. In absolute values, SABA increased by 3.5% and ICS/LABA increased by 35.3%. In 2018, ICS/LABA DPI remains preferred by 74.3% over pMDI. The ICS/LABA pMDI in absolute values showed 129.0% increase, that can be explained by the introduction of new pMDI inhalers containing new ICS/LABA formulations and by recent reimbursement of spacers (valved-holding chambers) by the Portuguese Government (Ordinance 246/2015). The decline observed both for LAMA and LABA monotherapies is in line with the 2014´s introduction of LAMA/LABA for the management of COPD patients.
Conclusions: In Portugal from 2004 to 2018, inhaled therapy increased by 64.0%. Although the use of SABA alone has decreased by 10.8% in the last 15 years, there has been a 3.5% increase in the last 5 years. The use of ICS (alone or in combination) has increased by 94.2% and 23.4% in the last 15 years and 5 years, respectively. LABA and LABA monotherapy prescription decreased from 2014 to 2018, together with the increase in the LAMA/LABA combination. In 2018, DPI were the most commonly prescribed devices, representing 63.3%, and the use of ICS (alone or in combination) represented 47.4% of the total number of prescribed inhalers in Portugal.

Keywords: *Asthma. DPOC. Respiratory inhalers. Prescription trends. SABA. ICS. LAMA. LABA. LAMA/LABA. ICS/LABA.*

CO 052. RADIOLOGICAL PHENOTYPES IN ASTHMA

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Introduction: Radiological findings in asthmatic patients, being variable, may be associated with different clinical presentations of the disease, possibly related to the underlying endotypes.
Objectives: Evaluate the existence of radiological "phenotypes" in asthma and characterize them according to clinical, biological and risk markers, namely respiratory functional parameters, eosinophilia and exacerbations.
Methods: Retrospective study, which included patients followed at the Severe Asthma/Difficult Control consultation (2014-2019), with available chest computed tomography (CT). These were grouped by radiological pattern: air trapping, bronchial thickening, bronchiectasis and no changes. Results from pulmonary function tests and blood tests were collected, on the date of the CT. COPD patients were excluded. Statistical analysis was performed through IBM-SPSS (significance level 0.05).
Results: 50 patients were included, mean age 54.7 (± 16) years and female predominance (76%; n = 38). The most frequent radiological pattern was the air trapping (n = 23). Patients without air trapping had higher serum eosinophils, RV (L,pre-BD) and RV/TLC (pre-BD)(p = 0.040;p = 0.029; p = 0.047). In these there was a higher percentage of patients with eosinophils > 150 cells/μL (p = 0.043). Patients with bronchial thickening had higher values of TLC (L,pre-BD/post-BD), RV (L, pre/post-BD) and FeNO (ppb) (p = 0.006; p = 0.003; p = 0.005; p < 0.001; p = 0.001). In this group the percentage of patients on biological therapy was higher (p = 0.014), in relation to the remaining. Patients with bronchiectasis were older and had lower FEV1/FVC (pre/post-BD), MMEF75/25 (%, pre-BD) and DLCO-SB (mmol/min/kpa/%) (p = 0.041; p = 0.005; p = 0.005; p = 0.020; p = 0.039; p = 0.048). In this group there was a higher percentage of patients with obstruction (p = 0.017). Regarding the evaluation between radiological groups: the age varied significantly between the air trapping and the bronchiectasis groups (p = 0.008); there was a higher percentage of obese in the air trapping group; the eosinophilia was higher in the thickening group; concerning the symptom questionnaires, there was a higher percentage of patients with bronchiectasis with values compatible with less disease control; the group with the largest number of patients under biological disease was the thickening group; regarding the FEV1, it was found that patients with thickening and bronchiectasis had lower values, as well as FEV1/FVC and RV/TLC; concerning RV (pre/post-BD), it was found that patients with thickening had higher values when compared to the air trapping group, with statistical significance (p = 0.023; p = 0.018); DLCO was lower in patients with bronchiectasis; patients with thickening and bronchiectasis had higher FeNO values.
Conclusions: Considering that, in the presence of air trapping, BMI was higher, obesity may be a confounding factor in the interpretation of the results. Nevertheless, assuming today as either comorbidity or as implicated in the pathophysiological mechanism of the disease, larger studies should be performed to explore this finding. Peripheral eosinophilia, linked with a higher FeNO value, was more evident in the bronchial thickening group, with a higher percentage of patients under biological treatment. Since the role of eosinophilic inflammation in airway remodelling is recognized, this radiological feature may be integrated into the established type 2 asthma phenotype, eventually more serious. Finally, patients with bronchiectasis had a higher mean age, more exuberant symptomatology and greater bronchial obstruction. A "new" asthma/bronchiectasis phenotype can be considered, to be clarified with more studies.

Keywords: *Asthma. Phenotypes. Air trapping. Bronchial thickening. Bronchiectasis.*

CO 053. CLINICAL AND DEMOGRAPHIC CHARACTERIZATION OF PATIENTS UNDER MEPOLIZUMAB USING THE SEVERE ASTHMA RECORD PORTUGAL. A REFERENCE CENTER EXPERIENCE

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Introduction: Mepolizumab (MPZ) is a humanized anti-IL-5 monoclonal antibody indicated as an adjuvant treatment for severe eo-

sinophilic asthma refractory to conventional therapy. It has shown a reduction in the number of exacerbations and systemic corticosteroid use in these patients (pts). The Severe Asthma Record Portugal (RAG) aims to improve the provision of healthcare for severe asthma in Portugal by promoting cooperation between centers and assisting the implementation of research projects. We aimed to do a demographic and clinical analysis of the pts under MPZ in our service.

Methods: Retrospective observational study with analysis of the demographic and clinical data entered in the RAG, regarding pts under MPZ of our service. All pts are in the grade 5 of asthma according to GINA guidelines, even after treatment optimization and management of comorbidities, and are (or have been) under subcutaneous MPZ at a dose of 100 mg 4/4 weeks.

Results: Twenty patients (pts) were included, of whom 14 are women, with a mean age of 53.5 ± 16.5 years (15-76 years). They were diagnosed with asthma 20 years before (on average) and severe asthma 10 years before. Fourteen pts have a BMI > 25 Kg/m^2, of which 6 are obese. None have current smoking habits but 2 are former smokers. The most common comorbidities are rhinitis (16 pts, mostly with mite sensitization), sinusitis (9 pts) and nasal polyposis (9 pts). Regarding therapy, all pts are treated with ICS + LABA and antileukotrienes, and only 3 pts are still in a low dose of systemic corticosteroids; 3 pts previously tried Omalizumab without symptomatic improvement. MPZ was started < 6 months (m) in one pt, 6-12m in 6 pts, 12-18m in 7 pts and 18-24m in 4 pts; in 2 pts it was suspended for lack of efficacy. In the remaining cases, clinical improvement was observed since 6m of treatment and continued afterwards, with an increase in the ACT score (14 to 20 at 6m and 21 at 12m), eosinophil count reduction (848 cel/L to 71 cel/L at 6 m and 64 cel/L at 12m), decreased number of exacerbations (4 to 1/year and 0 hospital admissions) and systemic corticotherapy use (3-4 cycles/year to 0-1/year). It was also noted a decrease in the work absenteeism rate and an increase in the quality of life. Concerning adverse effects, 2 pts reported myalgias that reverted with the administration of magnesium.

Conclusions: Our experience with MPZ showed a positive impact on asthma control and quality of life with a good safety profile. RAG proved to be a good working tool, facilitating the storage of the most relevant data for the demographic and clinical characterization of severe asthma pts.

***Keywords**: Asthma. Eosinophilia. Il-5. Mepolizumab.*

CO 054. SMOKING CESSATION IN THE COMMUNITY PHARMACY: DETERMINANTS FOR SUCCESS

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Introduction: Despite the increasing number of smokers wishing to quit, the success rates remain low. The Community Pharmacist have a privileged position in the society to promote smoking cessation.

Objectives: To report the pharmacist's contribution and to study the determinants for the success of smoking cessation in the Community Pharmacy.

Methods: Retrospective and longitudinal study on a sample of smokers assisting pharmacist consultations. The work reported was performed in 8 Community Pharmacies on the South of Portugal between 2009 and 2019. Participants, aged 18 or over, were selected by convenience during the usual activities of the Pharmacy. Guidelines issued by Direção-Geral da Saúde were followed. Motivation was evaluated by the Richmond test and dependence by the Fagerström test. The Pharmacist's intervention was mainly centered on motivation and behavioral approach and nicotine replacement therapy (NRT). When needed participants were referred to the physician. Smoking abstinence was evaluated at the quit day, 1st, 3rd, 6th and 12th months and confirmed by measuring CO in the exhaled air. Statistical analysis was performed using SPSS (IBM SPSS V. 25). Bivariate analysis used χ^2 and Fisher's exact tests. An error probability of 0.05 of type I (α) was considered.

Results: For ten years, 135 smokers assisted pharmacist consultations, 79 (58.5%) were male. A median age of 47.8 ± 1.21 years was registered being the majority labor active (74.1%) with a basic or secondary educational level (80.0%). Overweight and obesity (60.0%), dyslipidemia (48.9%) and anxiety (30.4%) were the most prevalent pathologies. On average, each patient declared a daily consumption of 22.5 ± 0.98 cigarettes, assisted to 3.5 ± 0.28 face-to-face consultations and received 2.81 ± 0.31 telephone contacts. The majority of smokers presented moderated motivation (53.3%) and median dependence (43.0%). In parallel with the motivation and behavioral approach, 116 (85.9%) smokers received also pharmacological therapy: 108 (80.0%) were treated with NRT and 8 (5.9%) with non-nicotine medications. From smokers on NRT, 54 (40.0%) used only oral forms, 11 (9.5%) only patches and 32 (23.7%) used a combination of patches and oral forms simultaneously. Pharmacist interventions resulted in 70 (51.9%) complying quit day, from which 59 (43.7%) were smoking abstinent at the end of the first month. Success rates reduced to 32.6%, 28.1% and 20.7% at the end of the 3rd, 6th and 12th months, respectively. Smoking cessation was more successful for the participants taking pharmacological therapies (Fisher's exact test, $p < 0.001$), target of more pharmacist's consultations ($\chi^2 = 59.994$, $p < 0.001$) and more telephone contacts ($\chi^2 = 17.845$, $p < 0.001$). Similarly, the success was also positively associated with duration of smoking habits for more than 40 years ($\chi^2 = 12.403$, $p = 0.013$) and with the presence of dyslipidemia (Fisher's exact test, $p < 0.001$). On the contrary, smokers with depression presented lower success rates (Fisher's exact test, $p = 0.018$).

Conclusions: Based on the results presented, the community pharmacist can significantly contribute for the promotion of smoking cessation. We shall note that smokers more deeply accompanied by the pharmacist show increased success rates when compared with smokers having fewer contacts with this professional.

***Keywords**: Smoking cessation. Pharmacist. Community pharmacy.*

CO 055. THE FIRST PORTUGUESE PSYCHIATRIC ACUTE INPATIENT UNIT FREE OF TOBACCO: A PIONEER EXPERIENCE

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Hospital Professor Doutor Fernando Fonseca.

The prevalence of smoking in the population with severe mental illness is significantly higher compared to the general population, and there is no single hypothesis justifying this association. Smoking is a major contributor to higher rates of severe morbidity and early mortality observed in this population and thus, it's a modifiable risk factor with significant importance that health professionals should focus on. Psychiatric hospitalization is, in itself, a unique opportunity to promote smoking cessation amongst patients, as long as it provides an environment that can help them through each step. However, the culture of smoking by patients and staff within mental health wards has been a long-standing and accepted cultural norm. In recent years, this has been challenged by the successful introduction of smoke-free policies in mental health settings in some countries. Nonetheless, in Portugal, total smoking bans have never been attempted. In fact, partial smoking bans are contemplated in the Portuguese Law for mental health services, which makes them one of the exceptions to the total smoking ban applied to places where health care is provided. Studies suggest that the main barrier for

the implementation of smoking ban policies in mental health services is the staff perception that this measure might lead to deterioration of patient's mental status, resulting in increased physical violence. Surprisingly, recent literature focusing on experiences of total smoking ban policies worldwide, prove that there is in fact a reduction in violent events after implementation. Regarding this matter, the authors aim to present the first experience in implementing a total smoking ban policy in an Acute Inpatient Psychiatry Ward, that took place in Hospital Professor Doutor Fernando Fonseca. This required a multidisciplinary approach involving mental health staff and collaboration of the pneumology smoking cessation team. To implement this project, a step-by-step approach was required, including review of the literature, focusing on experiences that took place in other countries; subsequently, and using a multidisciplinary approach, an internal protocol was designed and staff training in all psychiatry units was conducted; in order to assess the program's viability, data regarding violent events within the Acute Inpatient Unit was collected, before and after implementation of the smoking ban. Preliminary results showed that the implementation of this project was successful, with no increase in physical events, in spite of the occurrence of some violations to the ban, which has been reported in other countries. The establishment of a clear timeline and protocol, with multiple staff training sessions, appeared to be decisive to the success of this experience. This pioneer project, in the context of Portuguese health care, has set a precedent for reconceptualizing some outdated and enduring ideas concerning mental health services and patients themselves, still widespread in our society. The authors risk to say that this project is essential to reduce the existing stigma, verified even at a structural level, leading to an overall improvement on both mental and physical health of patients.

Keywords: *Psychiatric unit. Mental health. Smoking cessation. Smokefree policies. Smoking ban.*

CO 056. HOSPITAL SMOKING CESSATION ASSESSMENT NETWORKING PORTUGAL (SCANPT): A PRELIMINARY CROSS-SECTIONAL STUDY

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Introduction: Tobacco remains the main cause of respiratory diseases. Smoking cessation (SC) is the most cost-effective measure of chronic disease interventions, especially in special populations such as hospitalized patients with multiple co-morbidities. Nevertheless, tobacco cessation is not routinely implemented in healthcare. In Portugal, health services research in smoking cessation is scarce.
Objectives: To describe and compare the implementation of hospital-based smoking cessation services (SCS) in the National Health Service (NHS) in mainland Portugal.
Methods: A questionnaire-based cross-sectional study was carried during March-May 2019. The questionnaire applied a validated self-audit tool developed by a Delfi panel: the European Smoking Cessation Assessment Network (ESCAN) self-audit. The ESCAN self-audit assesses the level of implementation of SC services through eight dimensions (human resources, signage, good clinical practice, population of smokers, participation in tobacco cessation training and community activities, data gathering, evaluation and research) using an ordinal scale 0-4 from not implemented to totally implemented. Hospitals were matched by region (from NUTS II to North, Center and South). In March 2019, data gathering began via electronic mail. The coordinators of the NHS hospital-based SCS completed the self-audit-scan. A descriptive and comparative analysis was made and hospital-based SCS were compared.
Results: From 32 hospital-based SCS, 27 (84.3%) were evaluated, (55.6% from South, 25.9% from Center Portugal). The great majority of SCS are individual face-to-face programs delivered by respiratory physicians trained in SC. Nurses are not systematically involved. The mean score of good practice, signage and effort to achieve adequate human resources was around 3. In contrast, the mean score for the other items (delivery of SC to special population of smokers, participation in SC training and community activities, data gathering, evaluation and research) was around 2, $p < 0.005$. No statistically significant differences were observed among hospital-based SCS from different regions, except for participation in community activities. Community involvement was stronger in hospitals based in smaller cities.
Conclusions: there is room to improve hospital-based smoking cessation services, such as the following: delivery of group sessions, tailored programs to special populations of smokers, active involvement and training of a multidisciplinary team, and community involvement. There is a need to train and establish a smoking cessation research network.

Keywords: *Smoking cessation. Hospitals. Health services research.*

CO 057. COMMUNITY-BASED PULMONARY REHABILITATION IS AT LEAST THREE TIMES MORE EFFECTIVE THAN PHARMACOLOGICAL TREATMENT ONLY

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Despite the unquestionable benefits of pulmonary rehabilitation (PR) for people with chronic respiratory diseases, this non-pharmacological intervention, is highly inaccessible when compared with pharmacological treatments. Reasons for this lack of accessibility are not limited to but include programmes being hospital-based and directed to patients in more severe stages of the disease. Novel PR models near patients' residence and directed to less complex patients, independently of their disease severity, have been encouraged to improve accessibility. A convincing argument for policymakers to support the widespread of such initiative would be the availability of evidence about PR programmes with less specialised resources continuing to overweight the results of pharmacological treatments only. This study aimed to compare the results of community-based PR programme with pharmacological treatment only, i.e., long-acting bronchodilator (either a long-acting beta agonist or an anti-cholinergic long-acting muscarinic antagonist) in people with chronic obstructive pulmonary disease (COPD). A quasi-experimental pre-post retrospective study was conducted with people with COPD, referred by general practitioners/pulmonologists to the Respiratory Research and Rehabilitation Laboratory-Lab3R, School of Health Sciences, University of Aveiro. Experimental group (EG) was composed of those participating in a 12-week community-based PR programme. Control group (CG) was composed of those who chose not to participate in PR but accepted to be part of the study. All participants were taking pharmacological therapy. Data were collected at baseline and at 12-weeks. The following measures were collected: dyspnoea during activities with the modified medical research council–dyspnoea scale (mMRC); quadriceps muscle strength (QMS) with the handheld dynamometer; functionality with the 1-minute sit-to-stand (1-min STS); exercise tolerance with the six-minute walk test (6MWT); impact of the disease with the COPD Assessment Test (CAT) and health-related quality of life with the St. George's Respiratory Questionnaire (SGRQ). Baseline characteristics were compared between groups with t-tests, Mann Whitney U-tests and chi-squared tests as appropriated. For each measure, mean differences were calculated and differences between groups were tested with t-tests or Mann Whitney U-tests. A two-way analysis of

variance was used to determine the effects of time and time × group interaction. Established minimal clinically important difference (MCID) were plotted in the mean change graphs. Two hundred and four people with COPD participated: 110 in the EG (68.9 ± 9.1 years old; 86 [78.2%] male; BMI = 27.1 ± 4.8 kg/m²; FEV1pp = 55.4 ± 21.1; GOLD stages: A-33 [30%]; B-54 [49.1%], C-2 [1.8%]; D-21 [19.1%]) and 94 in the CG (67.6 ± 9.4 years old; 75 [79.8%] male; BMI = 27.2 ± 3.5 kg/m²; FEV1pp = 54.6 ± 23.3; GOLD stages: A-29 [30.9%], B-41 [43.6%], C-9 [9.6%], D-15 [16%]. No significant differences were found between groups for clinical characteristics or medication at baseline. After 12-weeks, differences between groups ($p \leq 0.023$) and for time × group interaction (mMRC, $p = 0.001$; FMQ, $p = 0.020$; 1-minSTS, $p = 0.009$; TM6M, $p = 0.006$, CAT, $p = 0.003$; SGRQ, $p = 0.023$) were significantly different. Improvements of the EG were at least 3 times larger than those of the CG. MCIDs were only exceeded by the EG. Community-based PR is highly effective and necessary for improvements, in people with COPD, above what has been established as minimum in fundamental outcomes. Strong efforts should continue to be taken to lead community-based PR to prosper in Portugal.

***Keywords**: Pulmonary rehabilitation. LABA. LAMA. Low-resources. COPD.*

CO 058. PULMONARY AMYLOIDOSIS. A RARE DISEASE WITH SEVERAL PRESENTATIONS

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Introduction: Amyloidosis is a rare disease characterized by abnormal proteins deposition in the extracellular matrix, resulting in disordered structure and dysfunction of the organs involved. Pulmonary amyloidosis may be localized or part of systemic amyloidosis. There are 3 different forms: nodular, diffuse parenchymal and tracheobronchial.
Objectives: To analyze the population with respiratory amyloidosis whose diagnosis or endobronchial treatment were made at our institution.
Methods: Analytical, cross-sectional, retrospective study of patients with respiratory amyloidosis whose diagnosis or endobronchial treatment were made at our institution between 1/1/2000 and 31/07/2019. We analyzed the following variables: gender, age at time of diagnosis, smoking habits, main symptoms at diagnosis, pulmonary function tests (PFTs), radiology, endobronchial abnormalities, complementary exams, treatment and follow-up.
Results: From the review of the patients submitted to bronchoscopy in this institution we found 10 patients with respiratory amyloidosis. Half of these patients were women and the average age at time of diagnosis was 58.9 ± 8.2 years old. At time of diagnosis, the main symptoms were dysphonia (n = 7) and dyspnea (n = 5) and 1 patient was asymptomatic and started the investigation because of radiological findings. In symptomatic patients the mean diagnostic delay was 18.9 ± 24.7 months since the onset of symptoms. Six patients were non-smokers, 2 were smokers and 2 were former smokers (mean of 13.0 ± 21.5 pack per year). PFTs showed obstruction in 4 patients and they were normal in 3 cases, with DLCO decreased in 3 and normal in other 3 patients. Chest CT showed: tracheal mucosa thickening (n = 4) or tracheobronchial (n = 3), tracheal mass (n = 1), bilateral pulmonary nodules (n = 1) and single pulmonary nodule (n = 1). At the bronchoscopies performed in these patients the main endobronchial changes were: infiltration with a nodular component in 6 patients, from these, 2 had a massive tracheobronchial involvement, 1 with a sessile mass and 1 patient with subglottic involvement leading to stenosis. Two patients had a normal endobronchial exam. In 9 cases the diagnosis was made by bronchoscopy and in 1 of these patients we used radial endobronchial ultrasound and an image intensifier at the same exam, to help the diagnosis. Only 1 patient needed surgery to identify amyloidosis. The most common form was tracheobronchial amyloidosis (n = 8), followed by nodular form (n = 1) and diffuse parenchymal amyloidosis (n = 1). Two patients had larynx involvement. After this diagnosis, 6 patients had bone marrow biopsy, 2 had abdominal fat biopsy and 6 had blood and urine immunofixation test, with monoclonal gammopathy of undetermined significance diagnosis in 2 patients and amyloidosis in abdominal fat biopsy in 1 patient. About the treatment, 2 patients needed surgery and 6 patients needed laser endoscopic treatment, electrocoagulation, mechanical resection, dilatation with a balloon or a prosthesis. Two patients started treatment with glucocorticoids and chemotherapy.
Conclusions: Amyloidosis at the respiratory tract is rare, with a wide range of symptoms and radiological abnormalities, making this a challenging and sometimes unexpected diagnosis. Treatment approach depends on localization, disease extension, endobronchial involvement and symptoms. For the endobronchial involvement disease, endoscopic treatment has a fundamental role to symptoms palliation.

***Keywords**: Bronchoscopy. Amyloidosis.*

CO 059. LYMPHOPROLIFERATIVE DISEASES APPROACH BY LINEAR ENDOBRONCHIAL ULTRASOUND

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Introduction: Linear endobronchial ultrasound (EBUS) is a minimally invasive procedure that allows the evaluation of adenopathies and mediastinal and hilar masses, having replaced the mediastinoscopy as the initial exam in this diagnostic search. It has high sensitivity and specificity for the diagnosis of lung cancer and some benign pathologies. However, its usefulness in the diagnosis and classification of lymphoproliferative diseases is still unclear.
Objectives: To analyze the utility of EBUS in the diagnosis of lymphoproliferative disease.
Methods: Analytical, cross-sectional, retrospective study of patients with lymphoma diagnosed by EBUS in an institution between 1/1/2015 and 12/31/2018. The exams were performed under general anesthesia and in the presence of a cytopathologist, thus allowing a quick observation of the material obtained. The following variables were analyzed: gender, age at the time of the exam, previous oncologic diagnosis, indication for the exam, imaging, endobronchial abnormalities, number of punctured targets and their location, size and number of punctures, final diagnosis and complications.
Results: During the considered period, 563 EBUS were performed, 22 of which (3.9%) because of suspected lymphoproliferative disease. Lymphoma was diagnosed in 14 patients. EBUS was negative in the remaining 8 cases with suspected lymphoproliferative disease, and subsequent examinations were negative. Patients with lymphoma were mostly males (n = 9), with a mean age at the time of the diagnostic exam of 51.1 ± 23.2 years. Nine patients had history of lymphoma, 4 had no cancer history and only 1 had history of rectal cancer. Regarding endoscopic abnormalities, 7 exams were normal, 3 had inflammatory signs, 3 had indirect signs of cancer and another had osteochondroplastic tracheobronchopathy. An average of 2.0 ± 1.1 lymph node stations were evaluated per exam and in 2 patients we identified masses attached to the airway. The most punctured lymph node stations were the subcarinal (n = 9), right inferior paratracheal (n = 6) and right hilar (n = 4). Its average size was 18.5 ± 9.9 mm, with an average of 2.6 ± 1.2 punctures per lymph node station, while masses average size was 21.5 ± 4.9 mm, with a mean of 5.5 ± 0.7 punctures. In addition to smears, flow cytometry material was also obtained in 10 patients and cytoblock in 4. Only 1 patient required a transthoracic biopsy to obtain more

material for a more accurate lymphoma classification. The histopathological diagnoses obtained were: non-Hodgkin's lymphoma in 10 patients and Hodgkin's lymphoma in 4. In one of these patients, a simultaneous diagnosis of lung adenocarcinoma was made. Lymphoma recurrence was confirmed in 9 patients and 5 new diagnoses were made. There were no complications secondary to these tests.
Conclusions: EBUS is a safe, minimally invasive test that allows, in most cases, to obtain sufficient biological material for accurate diagnosis and classification of lymphoproliferative diseases. This shows that because of the advances in molecular and genetic biology, it is now possible to make an accurate and precise diagnosis without resorting to studies with large tissue samples that allow a histopathological morphology.

Keywords: *Endobronchial ultrasound. Lymphoma.*

CO 060. WHAT IS THE ROLE OF LINEAR ENDOBRONCHIAL ULTRASOUND IN DIAGNOSIS OF INTRATHORACIC METASTASIS IN PATIENTS WITH SOLID EXTRATHORACIC TUMORS?

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Introduction: Several extrathoracic malignancies can metastasize to the lungs and mediastinal lymph nodes, changing staging, treatment strategy and prognosis. Linear endobronchial ultrasound (EBUS) is an alternative to mediastinoscopy and thoracoscopy that allows obtaining samples from several mediastinal lymph node stations and airway-related lesions, enabling the investigation of metastasis at this level.
Objectives: To analyze the utility of EBUS in staging patients with extrathoracic malignancies.
Methods: Analytical, cross-sectional, retrospective study of patients previously diagnosed with extrathoracic tumors and suspected mediastinal/pulmonary metastasis undergoing EBUS in an institution from 1/1/2015 to 12/31/2018. The exams were performed under general anesthesia and in the presence of a cytopathologist, allowing immediate observation of the material obtained. Variables analyzed: gender, age at the time of examination, basal neoplasia, imaging, endobronchial abnormalities, number of punctured targets, their location, size and number of punctures, final diagnosis, complications and follow-up.
Results: From the 563 EBUS performed during the considered period, 63 (11.2%) were performed in 61 patients with extrathoracic cancer and suspected thoracic metastasis: 55.6% were men, with a mean age at the time of exam of 65.4 ± 9.8 years. The most commonly observed extrathoracic tumors were: colon and rectum (17.5%, n = 11), breast (15.9%, n = 10) and laryngeal/piriform sinus (14.3%, n = 9). Eight patients had various cancers. Fifty exams showed no endobronchial alterations, 6 had inflammatory alterations, 3 had direct signs of neoplasia and 4 had indirect signs. A total of 111 lymph nodes stations were punctured (average 1.9 ± 1.1 per patient) and 5 tumoral masses attached to the airway. These lymph nodes had an average size of 13.1 ± 7.1 mm and were punctured 2.9 ± 1.3 times, with predominance of the right lower paratracheal (n = 33) and infracarinal (n = 28); the masses measured 24.8 ± 13.2 mm, with an average of 2.8 ± 1.1 punctures. EBUS confirmed neoplasia in 31 (49.2%) patients: 25 (39.7%) were metastases in agreement with the previous cancer, 5 (7.9%) were diagnosed with primary lung cancer and 1 patient (1.6%) was diagnosed with carcinoma without differential diagnosis possibility between metastasis and second cancer. The remaining tests had no neoplasia: in 36.5% (n = 23) only lymph node was identified, 7.9% (n = 5) had granulomatous lymphadenitis, in 4.8% (n = 3) the obtained material wasn't appropriate and in one case we identified thyroid tissue without atypia. Following these patients without cancer identification, 12 (37.5%) underwent further invasive examinations (bronchoscopy, surgery and transthoracic biopsy). The diagnosis of cancer was confirmed in 8 (66.7%), 7 of which in other target lesions other than those approached by EBUS: 4 with new primary lung cancer, 3 with metastasis consistent with the known cancer and 1 with thymoma. As a complication related to this technique there was a case of vocal cord trauma.
Conclusions: Although mediastinoscopy remains the gold standard, EBUS has gained a key role in the first line of investigation for suspected metastatic adenopathy in patients with extrathoracic malignancies as it is minimally invasive, with few complications. In our study, in 49.2% of cases, EBUS was diagnostic, without the need for more invasive diagnostic methods.

Keywords: *Endobronchial ultrasound. Metastasis. Extrathoracic malignancies.*

CO 061. ENDOBRONCHIAL METASTASIS OF MALIGNANT MELANOMA - SERIES OF 18 CASES

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Introduction: Pulmonary metastatic spread from solid extrapulmonary tumors is common in the clinical practice although the presentation as endobronchial metastasis is rare, is probably underestimated. Malignant melanoma (MM), despite its high metastatic potential, accounts for less than 5% of endobronchial metastasis. Therefore, data available concerning clinical and radiological presentation and survival of these patients is lacking, with only small series available and anecdotal cases reports.
Methods: Retrospective study from a single oncologic institution. We selected patients with endobronchial metastasis of MM from January 1991 to June 2019. The following data was collected: sex, age at diagnosis of the endobronchial metastasis, initial symptoms, radiological presentation, endobronchial localization and appearance, endoscopic treatment, primary tumour characteristics and patient vital status.
Results: We obtained a total of 18 patients, mostly of female sex (66.7%, n = 12), with mean age of 59.56 ± 12.45 years. The primary tumour originated from the skin in 72.2% (n = 13). In two patients no primary tumour was found. The most usual initial symptoms were cough (n = 12; 75%), dyspnoea (n = 9; 56.3%) and haemoptysis (n = 6; 37.5%). Two patients were asymptomatic. Pulmonary masses (n = 7) and nodules (n = 7), solitary or multiple, were the most frequent radiological presentations. Five patients had partial or total atelectasis at diagnosis. At the time of diagnosis of the endobronchial metastasis of MM most patients (n = 10; 55.6%) had metastasis in other sites besides the lung, mostly the liver (n = 6; 33.3%) and soft tissues (n = 5; 27.8%). Concerning endobronchial characterization, most lesions were unilateral (n = 10; 55.6%) and just in one site (n = 11; 61.1%). Morphologically, mostly were single vegetative lesions (n = 9). We also observed multiple vegetative lesions (n = 5), polypoid lesions (n = 2), one sessile lesion and melanotic spots (n = 2). In 7 cases (43.8%) the lesions were pigmented. Endoscopic treatment was performed in 55.6% of cases (n = 10), namely mechanical resection (n = 7), Nd-YAG laser (n = 6) and endobronchial stent placement (n = 3). The median latency between the diagnosis of the primary tumour and the occurrence of endobronchial metastasis was 43 months (interquartile range (IQR) of 47.5; minimum of 4 and maximum of 208 months). The median survival after the diagnosis of was 23.86 weeks. Poorest survival was associated with the presence of malignant pleural effusion (5.29 CI not calculable VS 29.43 CI [0-76.73] weeks; p = 0.001) and extrapulmonary metastasis at diagnosis (10.29 IC [9.84-10.73] vs 109 IC [0-223.14] weeks; p = 0.006). Patients with fever as initial symptom also had worse survival (10.14 IC [9.16-11.12] vs 49.71 IC [16.44-82.99]; p < 0.001).

Conclusions: Endobronchial metastasis of MM are rare and can occur either as an initial presentation of MM or several years after the diagnosis of the primitive tumour. The prognosis is reserved. The presence of malignant pleural effusion and of other metastatic sites besides the lung at diagnosis was associated with worse survival, as well as fever at diagnosis. However, it is not clear that fever was associated to the presence of endobronchial metastasis, reason why we can't infer that its presence clearly influenced the survival of these patients. Endoscopic treatment was a relevant element in the palliation of these patients.

Keywords: *Melanoma. Endobronchial. Metastasis. Bronchoscopy.*

CO 062. CAN PULMONOLOGISTS TREAT SPONTANEOUS PNEUMOTHORAX THROUGH THORACOSCOPY? A PORTUGUESE PULMONOLOGY DEPARTMENT 22-YEAR EXPERIENCE

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Introduction: Management of persistent or recurrent spontaneous pneumothorax continues to be debated, with growing evidence suggesting at least one technique towards a definitive treatment. Interventional pulmonology offers execution of most techniques with less invasive methods, through medical thoracoscopy. The authors present a retrospective observational study of patients with spontaneous pneumothorax subjected to different sealing methods through medical thoracoscopy.
Methods: Patients who underwent medical thoracoscopy for primary, secondary and iatrogenic pneumothorax, between 1996 and 2018, in a tertiary care hospital Pulmonology Department were selected, including patients in paediatric range. Data were extracted from medical records, until the last medical consultation or death. Statistical analysis was made with SPSS program, version 20.
Results: A total of 129 thoracoscopies was performed, in 126 patients. Pneumothorax was primary in 72% (n = 93), secondary in 25.6% (n = 33) and iatrogenic in 2.3% (n = 3) of cases. Patients were predominantly male (84.1%), with a median age of 33.2 ± 14.6 years (9 to 80), and 66.7% were active smokers at the time of diagnosis. Pneumothorax was left-sided in 51.4%. Vanderschueren classification was used to stage endoscopic findings, with the following results: 21.1% (n = 27) of patients were stage I, 16.4% (n = 21) were stage II, 46.9% (n = 60) stage III and 15.6% (n = 20) stage IV. Pleurodesis was performed in 89.2% (n = 115) of patients, of whom 85.2% (n = 98) through talc poudrage and 14.8% (n = 17) through mechanical abrasion. Resection with endostapler of blebs/bullae was performed in 39.5% (n = 51). Thoracoscopic coagulation, through use of electrocoagulation or argon plasma, was performed in 30.2% (n = 39) and 6.2% (n = 8), respectively. Relapse occurred in 9.8% (n = 9) of primary pneumothoraces and in 12.5% (n = 4) of secondary pneumothoraces, between 0.3 and 24 months of follow-up, median 1.5 months. Only 5 of these patients needed referral to thoracic surgery. Concerning different techniques, relapses occurred in 6.1% (n = 6) of the talc poudrage patients, 29.4% (N = 5) of patients subjected to pleural abrasion and 5.9% (n = 3) of patients submitted to resection with endostapler.
Conclusions: Talc poudrage had a low incidence of relapses. Resection of blebs and bullae with endostapler, performed by experienced interventional pulmonologists, also appears to be a safe and efficient way of sealing and prevention of relapses. There was a low referral rate for thoracic surgery. Most sealing techniques can be provided by experienced interventional pulmonologists, allowing management of persistent or recurrent pneumothorax without the need for surgical referral.

Keywords: *Thoracoscopy. Pneumothorax. Relapse.*

CO 063. BRONCHIAL ARTERIAL EMBOLIZATION - THE EXPERIENCE OF A RADIOLOGY SERVICE OF A TERTIARY HOSPITAL

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Introduction: Embolization of bronchial arteries plays an important role in the management of massive hemoptysis of various etiologies.
Methods: Retrospective study of patients with massive hemoptysis referred to the Radiology Service for bronchial arteriography and bronchial arterial embolization between 2015 and 2018.
Results: A total of 38 patients were identified, 21 (55%) males, with a mean age of 60.5 years (34-90 years). The main causes of hemoptysis were bronchiectasis (n = 12, 32%), idiopathic/cryptogenic (n = 9, 24%), tuberculosis sequelae (n = 6, 16%), neoplasia (n = 2) and congenital pulmonary AVM (n = 2). The less common causes were Behçet's Disease, Scimitar Syndrome, mediastinal lymphangioma, fungal infection, hemotorax, thoracic and cardiac surgeries. Bronchofibroscopy was performed in 10 cases, and the bleeding point was identified in 6 and direct signs of neoplasia in 1. Bronchial arteriography showed hypertrophy and tortuosity (n = 14, 37%), neovascularization (n = 14, 37%), vascular ectasia (n = 7, 18%), aneurysm (n = 2) and arteriovenous shunt. The changes occurred essentially at the level of bronchial vascularization: right bronchial artery (n = 11, 29%), left (n = 7, 18%) and bilaterally (n = 7, 18%). Superselective catheterization was performed by microcatheter in all cases, with placement of embospheres in 36, placement of metallic coils in 1 and unknown in 1. Only two techniques (5%) were complicated with pleuritic pain and generalized papular rash, both self-limiting. There was recurrence in 10 patients (26%): 4 cases of bronchiectasis, 4 of tuberculosis sequelae, 1 post cardiac surgery and 1 idiopathic. The mean recurrence time was 22.34 months. The cases were submitted to a new bronchial arterial embolization; in 2 cases there was hemoptocytic relapse with the need for a third attempt. In none of the cases was surgery sought. There was 1 death of a hospitalized patient for placement of mechanical mitral prosthesis and tricuspid annuloplasty in the context of rheumatic valvulopathy.
Conclusions: Embolization of bronchial arteries is a safe and minimally invasive procedure, but its recurrence rate remains high and should be considered as definitive treatment only in patients who are not surgical candidates or with bilateral diffuse and pulmonary disease.

Keywords: *Embolization of bronchial arteries. Hemoptysis. Complications. Relapse.*

CO 064. THE ROLE OF ULTRASONOGRAPHY IN THE DIAGNOSIS AND DECISION ALGORITHM FOR THE MANAGEMENT OF PNEUMOTHORAX AFTER TRANSBRONCHIAL LUNG CRYOBIOPSY: FINAL DATA OF A PILOT STUDY

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Introduction: One of the main complications of Transbronchial Lung Cryobiopsy (TBLC) is pneumothorax, which is routinely assessed with post-procedural chest X-Ray (CXR). However, chest ultrasound (CUS) is an attractive alternative, given the greater specificity and sensitivity for pneumothorax detection, with a less expensive and less time consuming exam, which is radiation free and easily performed at bedside of the patient at the bronchoscopy suite.

Objectives: To test pneumothorax diagnostic accuracy of CUS versus CXR after TBLC and to evaluate its role in the decision algorithm for pneumothorax management. Secondary objectives were to evaluate the post-procedure pneumothorax prevalence and risk factors.
Methods: Consecutive patients eligible for TBLC from September 2017 to March 2019 were included. Cryobiopsy was performed during rigid bronchoscopy in deep sedation, with fluoroscopic guidance. CUS was performed 30 min and 2h after TBLC and CXR 2h after the procedure. Pneumothorax by CUS was defined by the absence of lung sliding/lung pulse, B lines and by the presence of lung point and stratosphere sign on M mode. Clinical data, lung function tests and histology results were collected. All patients signed informed consent and the study was approved by the Ethics Committee.
Results: Sixty-seven patients were included (mean age 63 ± 9.7 years, 56.7% male). Most TLBC were performed on the right lung (64.2%), median of 3 biopsies per procedure, mostly done in single lobe (59.7%). Pneumothorax developed in 23.1% of patients. Higher pleural representation on histology was significantly higher in patients with pneumothorax (67.9% vs 28.2%; p = 0.001). Pneumothorax rate had a tendency to increase in patients with biopsies in two lobes. Final diagnosis was achieved in 79.1% of patients, with the most frequent diagnosis being hypersensitivity pneumonitis (39.4%). Considering patients with complete protocol assessment (n = 50), 42.1% of the 19 pneumothoraces detected at 2h were already present at the first CUS evaluation. For patients with at least one paired evaluation with CUS and CXR (same timing), 3 discordant results were observed (κ = 0.88, 95%CI: 0.76-1.00, p < 0.001), cases in which pneumothorax was detected only by CUS. The specificity and sensitivity of CUS were 97.5% (95%CI: 86.8-99.9) and 100.0% (95%CI: 87.2-100.0), respectively. In addition, the positive likelihood ratio was 40.0% (95%CI: 5.8-277.1) and negative likelihood ratio 0%. The proportion of CUS-determined large volume pneumothoraces that required drainage (chest tube placement, or small-bore catheter connected to a one-way Heimlich valve) was comparable to those determined by CXR methods (see table).
Conclusions: CUS is superior to CXR in detecting or excluding the presence of post-TBLC pneumothorax. It is, therefore, a useful method that optimizes time spent at the bronchology unit, allows immediate response in symptomatic patients and prevents exposure to ionizing radiation. The lung point site can reliably indicate pneumothorax size as compared to interpleural distance measured by CXR, which can be helpful in choosing optimal treatment strategies for these patients.

Keywords: *Transbronchial lung cryobiopsy. Interstitial lung diseases. Pneumothorax. Ultrasonography.*

CO 065. SHORT AND MEDIUM-TERM OUTCOMES IN THERAPEUTIC BRONCHOSCOPY FOR MALIGNANT CENTRAL AIRWAY OBSTRUCTION: A TEN-YEAR CENTRE EXPERIENCE

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Introduction: Therapeutic bronchoscopy (TB) for malignant central airway obstruction (mCAO) is performed for more than 25 years. However, little is known about contributing factors for a successful procedure.
Objectives: to find out whether there are determinants of successful airway reopening, clinical improvement and need for redo TB.
Methods: retrospective unicentre study including all patients submitted to TB due to significant and symptomatic mCAO, from January 2008 to December 2018. Significant mCAO was defined as reducing airway to 50% or less of the normal lumen. Data related to patient and lesion characteristics, endobronchial procedure and need for new intervention were collected. Short-term outcomes were defined as successful airway reopening (to > 50% of normal lumen) and dyspnoea improvement. Medium-term outcome was need for reintervention, either due to mCAO relapse or other cause.
Results: sixty-five patients were included: 42 (64.6%) male, mean age 61.8 ± 12.9 years, who had 81 procedures: 65 (80.2%) first TB and 16 (19.8%) redo TB. Previous to TB, 82.7% patients were classified as performance status 1 or less, 76.5% referred dyspnoea, 58% had atelectasis of lung parenchyma distally to the mCAO and 13.6% referred haemoptysis. Procedure was considered emergent in 12.3% cases and urgent in 22.7%. Bronchoscopic findings were classified into endobronchial tumor (64.2%), extrinsic compression (7.4%) or mixed (28.4%), and the degree of stenosis into 50-69% (21%), 70-89% (26%) or > 90% (53%). The therapeutic interventions used were argon-plasma coagulation (74.1%), mechanical debulking (59.3%), electrocautery (24.7%), balloon dilatation (21%), cryotherapy (2.5%), and/or stent placement (28.4%). In 35.8% cases there was suction of purulent secretions distally to the obstruction. Successful reopening of the airway was achieved in 58% of TB. Absence of haemoptysis (p = 0.001) and atelectasis (p = 0.013) were significantly associated with success. Stenosis < 90%, balloon dilatation and suction of purulent secretions were also significantly associated with successful airway reopening (p = 0.002, p = 0.022 and p = 0.015, respectively). Concerning dyspnoea improvement (45.7%), it was significantly associated with performance status 1 or less (p = 0.030) and was present in all patients with atelectasis reversal after TB (p = 0.003). The performance of an emergent procedure was identified as an independent risk factor for the need to redo TB, in univariate logistic regression (OR 4.385, 95%CI 1.105-17.397).
Conclusions: In this work, successful reopening was achieved in half of procedures. Moreover, we identified clinical and bronchoscopic determinants that seem to be associated with successful procedure, clinical improvement and need for reintervention; being aware of them may help us improving short- and medium-term outcomes in our daily practice.

Keywords: *Airway obstruction. Therapeutic bronchoscopy. Success. Dyspnoea. Reintervention.*

CO 066. ATYPICAL MICOBACTERIOSIS

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Introduction: The prevalence and epidemiology of non-tuberculous mycobacterial (NTM) infection is largely unknown. It is estimated that the number of NTM infections has been increasing especially with the reduction in the incidence of tuberculosis in our country. In regions with low incidence of tuberculosis, a 7-fold higher prevalence of NMT infection has been estimated. Consequently NMT infection may become frequent in our clinical practice in the near future.
Objectives: To characterize NMT infections that began treatment at the Coimbra Pulmonological Diagnostic Center (CDP-Coimbra).
Methods: Retrospective analysis of patients who started treatment for NTM between 2015 and 2019. Demographic, clinical and radiological data were collected.
Results: A sample of 25 patients was obtained with a mean age of 64.6 ± 22.7 years, 21 were female (84%). They had an average weight of 53.9 ± 17.0 kg. The most frequent profession was domestic (11 patients, 44%), followed by health professionals (4 patients, 16%). There has been an increase in the number of cases per year since 2015. In 2015 2 patients were diagnosed, 1 patient in 2016, 5 in 2017, 13 in 2018 and 4 until May 2019. Pulmonary infection was found in 23 cases (92%) and ganglionar infection in 2 (8%), both of

pediatric age. The most common mycobacterium was Mycobacterium avium complex (20 patients, 80%), followed by Mycobacterium kansasii (2 patients, 8%), Mycobacterium gordonae (2 patients, 8%) and Mycobacterium fortuitum (1 patient, 4%). The most frequent comorbidity was bronchiectasis with 60% of our sample having bronchiectasis documented by chest CT. 2 patients had COPD and 2 had a neoplastic history. 8 patients had some degree of immunosuppression, 4 being HIV positive, 3 were under systemic corticosteroid therapy and 1 under systemic corticosteroid therapy and azathioprine. Of the respiratory infections, 13 patients had only respiratory symptoms (53%), 7 patients had respiratory and constitutional symptoms (28%), 1 patient had constitutional symptoms and 2 patients were asymptomatic. The most frequent respiratory symptoms were productive cough (11 patients) and hemoptysis (4 patients). The most frequent constitutional symptoms were fever (7 patients) and asthenia (4 patients). Radiologically, 8 patients had micronodulation, 5 pulmonary cavitation, 3 mediastinal adenomegalies and 1 pleural effusion. The most commonly used diagnostic methods were culture in 2 sputum samples (10 patients), culture in bronchial aspirate (5 patients) and bronchoalveolar lavage (4 patients). The most commonly used treatment regimens were Rifampicin (R), Ethambutol (E) and Clarithromycin (68%), RE and Azithromycin (16%) and Isoniazid (H) RE (8%). In patients who completed treatment, the mean duration of treatment was 12.7 ± 1.5 months and the average time to culture negativity was 2.5 ± 1.0 months. There was recurrence of infection in 2 patients.
Conclusions: Knowing the epidemiology of NMT infection becomes increasingly important as the number of new diagnoses increases. It is an infection that is difficult to eradicate and is prolonged in treatment, so its knowledge leads to early diagnosis and improved quality of life for patients.

***Keywords**: Non-tuberculous mycobacteria. Pulmonary infection.*

CO 067. INCREASED FREQUENCY OF ISOLATION OF GRAM-NEGATIVE STRAINS IN RESPIRATORY SAMPLES

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Introduction: Knowledge of the microbiology and epidemiology of bacterial infections are formative skills of utmost relevance to clinicians. In addition, increased antimicrobial resistance poses an additional challenge in the selection of the most appropriate antimicrobial therapy for the treatment of bacterial respiratory infections.
Objectives: The main goal of this study was to identify the predominant microorganisms in respiratory samples collected in a hospital setting for 5 years (2014-2019).
Methods: Retrospective and observational study conducted between January 2014 and June 2019. The results of 1160 samples collected from respiratory products, identified in a hospital setting at a hospital, were analysed, namely: 2014 (n = 225, 19%), 2015 (n = 213, 18%), 2016 (n = 252, 22%), 2017 (n = 227, 20%), 2018 (n = 162, 14%), 2019 (n = 81, 7%). The frequency of identification of the predominant microorganisms in each year was assessed, as well as whether it was characterized as multiresistant and a producer of extended spectrum beta-lactamases (ESBL). Hospital services where bacterial microorganisms were identified were also identified.
Results: In 2014, the predominant microorganisms were: Pseudomonas aeruginosa (25%), Staphylococcus aureus (13%), Haemophilus influenzae (9%) and Streptococcus pneumoniae (7%). In turn, in 2019, the predominant microorganisms were Pseudomonas aeruginosa (26%), Klebsiella pneumoniae (20%), Haemophilus influenzae (14%) and Escherichia coli (10%). The growing importance of K. pneumoniae should be noted, whose frequency of identification evolved from 5% in 2014 to 20% in 2019, and it was currently the second most frequently identified microorganism in respiratory samples. 31% of K. pneumoniae isolates were identified as multiresistant and producers of ESBL. Escherichia coli also had a significant increase from 4% in 2014 to 10% in 2019, reinforcing the growing importance of Gram-negative isolates in respiratory samples.
Conclusions: Changes in the epidemiology of bacterial infections have an impact on clinical decisions, particularly in the selection of empirical antimicrobial therapy. The increased frequency of identification of Gram-negative bacteria in respiratory samples should contribute to a greater awareness among clinicians and to an increase in studies on the molecular characterization of these pathogens.

***Keywords**: Antimicrobials. Gram-negative bacteria. Respiratory infections. Epidemiology.*

CO 068. INFECTIONS CAUSED BY PSEUDOMONAS AERUGINOSA IN PORTUGUESE ICUS: CEFTOLOZANE/TAZOBACTAM AND COMPARATORS SUSCEPTIBILITY. STEP STUDY

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Introduction: The emergence of multidrug resistant Gram-negative bacteria has impact on the mortality and morbidity of patients admitted to intensive care units (ICU). Ceftolozane/tazobactam (C/T) is approved for complicated urinary tract infections (cUTIs), including pyelonephritis, and in combination with metronidazole for complicated intra-abdominal infections (cIAIs). C/T is also currently under revision, by EMA, for nosocomial pneumonia, including ventilator associated pneumonia. The aim of the STEP study was to assess the in-vitro activity of C/T and comparators against isolates prospectively collected from patients with cUTI, cIAIs and lower respiratory tract infections (LRTI) admitted at ICUs in Portugal.
Methods: Isolates collected in 11 Portuguese hospitals (June 2017-July 2018) from patients with cUTIs, cIAIs and LRTI admitted in ICUs, with 396 isolates of P. aeruginosa. Antimicrobial susceptibility was evaluated by standard broth microdilution for C/T, piperacillin-tazobactam, ceftazidime, cefepime, aztreonam, imipenem, meropenem, ciprofloxacin, gentamicin, tobramycin, amikacin, and colistin and interpreted using EUCAST guidelines.
Results: Isolates were recovered from cUTI (n = 90; 22.7%), cIAI (n = 80; 20.2%) and LRTI (n = 226; 57.1%). Among all the isolates, 21.2%, 23.2% and 0.8% were classified as MDR, XDR and pan-resistant, respectively. C/T was the agent with best activity for P. aeruginosa (94.7/95.5% S; MIC50/90, 1/4 mg/L), followed by amikacin and tobramycin (both 88.9% S).
Conclusions: In this study, C/T was the agent with better activity against P. aeruginosa. The activity was maintained among the dif-

ferent sources of infection (cUTI, cIAI or LRTI) and resistance phenotypes, with the exception of carbapenemase producers. These results allow a better knowledge of the national ecology and antibiotic susceptibility pattern among P. aeruginosa isolates.

Keywords: *Ceftolozane/tazobactam. Intensive care unit. Pseudomonas aeruginosa.*

CO 069. OUTBREAK IN AN AVIARY. WHAT KIND OF BACTERIUM?

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Introduction: Chlamydophila pneumoniae is an obligate intracellular bacterium that can cause atypical pneumonia characterized by an indolent illness with fever and nonproductive cough or productive mucoid sputum only. However, the emergence of outbreaks of C. pneumoniae are uncommon but with a growing importance. Serologies of C. pneumoniae have a great relevance in diagnosis of acute infection, especially in a presence of an outbreak.
Objectives: To present an uncommon outbreak of C. pneumoniae in one aviary, measures for its containment and evaluate risk factors for development of acute respiratory illness.
Methods: We identified the aviary workers that developed the acute respiratory illness caused by C. pneumoniae in December 2017 and January 2018. Diagnosis was confirmed by radiological examination and serological tests (C. pneumoniae IgG and IgM antibodies). Due to the rapid spread of disease, Public Health Unit screened the remaining workers and serological tests (IgG and IgM antibodies) were performed to detect and treat acute infection.
Results: We analysed 29 patients. Pneumonia caused by C. pneumoniae was confirmed in 13 patients: 5 radiologically only, 5 by serology only, and 5 by radiology and serology. We found evidence of previous infection of C. pneumoniae in 7 patients. Among the patients with pneumonia 8 went to the emergency room and 5 of them (mean age = 46.8 years; 3 with obesity) were hospitalized in the Pulmonology Department with a length of stay of 8 days. In most patients azithromycin associated with amoxicilin/clavulanic acid was the chosen antibiotic.
Conclusions: In some published studies has been demonstrated that outbreaks of C. pneumoniae infection appeared in closed contacts or in groups with a great social interaction. In this outbreak the rapid spread of disease forced the Public Health Unit in collaboration with the Pulmonology Department to respond quickly and contain the disease.

Keywords: *Outbreak. Atypical respiratory infection. C. pneumoniae.*

CO 070. INFLUENZA VACCINATION AT THE LOCAL HEALTH UNIT OF GUARDA: ADHERENCE AMONG HEALTHCARE PROFESSIONALS

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Introduction: Influenza (seasonal flu) is an acute viral infection that usually affects the upper respiratory tract, caused by the influenza virus. The World Health Organization (WHO) estimates that, during the autumn/winter months, influenza can affect, approximately, 20% of the WHO European region (depending on the type of circulating virus). There are two main types of seasonal influenza viruses that can infect humans: A and B. Although it usually has a benign evolution, in some individuals influenza virus can cause severe disease, particularly in vulnerable populations. Annual vaccination is safe and the most effective way to prevent the infection, and possible severe outcomes, being recommended by WHO for specific groups. According to these recommendations the Direcção Geral de Saúde (DGS) established as priority groups for influenza vaccination in the 2018/2019 season: individuals aged 65 and over, individuals with chronic diseases and immunocompromised with 6 months or older, pregnant women, health care workers and other caregivers. Vaccination of healthcare professionals is of particular importance not only because it prevents the spread of infection to patients, but also for individual protection, as these professionals, through their daily and close contact with patients, are especially exposed to respiratory pathogens.
Objectives: To study the adherence to seasonal influenza vaccination among the Guarda Local Health Unit (LHU) healthcare professionals, in the 2018/2019 season.
Methods: The data was collected by the Occupational Health Unit, who operationalizes the vaccination, and its posterior evaluation is sent to the Public Health Unit, more specifically to the Vaccination Local Coordinator Group.
Results: Following the DGS guidelines, the LHU has provided to the healthcare workers of the Sousa Martins Hospital (SMH), Nossa Sra. da Assunção Hospital and all primary care units the opportunity to be vaccinated, as of October 2018. Among the 1,553 eligible healthcare workers (medical doctors, nurses, technical assistants, operating assistants and other professionals) the vaccination coverage was 35.7%. The medical doctors were the group of professionals with the higher immunization coverage - 56.1%. At the SMH, in the Pain and Intensive Care Units, General Emergency and the medical services of Oncology, Cardiology, Gynaecology, Physiatry, Imageology and Pneumology, 100% of medical doctors were vaccinated against the influenza virus. Nurses were the least receptive professional group to vaccination, with an overall coverage of 28.4%: 59% of these professionals worked at primary care units. Technical assistants, operating assistants and other professionals achieved vaccination coverages of 32.4%, 37.4% and 40.6%, respectively.
Conclusions: Although some units and services have presented a high vaccination coverage, the proportion of influenza vaccinated healthcare professionals, in the LHU of Guarda is substantially lower than the national: 35.7 vs 52% (according to the Vacinómetro data, for the same period). Raising awareness among professionals about the importance of vaccination is needed, not only for their own health (and possible impact on work absenteeism), but also for the well-being of patients.

Keywords: *Vaccination. Seasonal flu. Influenza. Healthcare professionals.*

CO 071. CARDIAC EVENTS IN PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA ADMITTED TO A PORTUGUESE INTERNAL MEDICINE WARD

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Introduction: Community-acquired pneumonia (CAP) is a major cause of hospitalization, morbidity and mortality. There is a well-known relationship between CAP and acute cardiac events. The goal of this study was to assess the incidence, risk factors and the impact of acute cardiac complications on duration of hospital stay and mortality in patients hospitalized due to CAP in 2018.
Methods: Data on demographics, comorbidities, clinical presentation, laboratory tests, total duration of hospital stay and clinical outcomes were collected. Cardiac events were defined as new or

worsening heart failure, arrhythmias or myocardial infarction. Comparison between CAP patients with and without cardiac complications was performed using SPSS. For descriptive statistics, median, mean and standard deviation (SD) were used. Chi-square test or Fisher exact test were used to compare categorical variables as appropriate. Statistical analysis of clinical characteristics between the two groups consisted of Mann-Whitney U tests. Factors associated with incident cardiac events with a univariate significance level of $p < 0.10$ were selected and included in a multivariate binary logistic regression model and odds ratios (OR) with 95% confidence intervals (CI) were calculated for each factor. A value of $p < 0.05$ was considered statistically significant.
Results: A total of 270 CAP hospitalized patients were included, 54.4% were females. The median age was 84 years. The most common comorbidities were arterial hypertension (76.3%), chronic heart failure (40.4%) and type 2 diabetes (25.9%). Approximately two thirds of patients presented with acute hypoxaemic respiratory failure. Forty-three percent of patients developed at least one cardiac event (102 congestive heart failure (of which 15 were acute pulmonary oedema), 38 arrhythmia and 7 myocardial infarction). The mean CURB-65 score was 2.65 (SD 1.05) and 2.33 (SD 1.16) for patients with and without cardiac events, respectively. Mean duration of hospital stay was significantly higher in patients who developed cardiac complications [13.25 (SD 9.66) days vs 9.97 (SD 6.65) days; $p = 0.01$]. There were no statistically significant differences in hospital mortality between the two groups. Factors associated with the incidence of cardiac complications with a univariate significance level of $P < 0.10$ were previous history of heart failure, arterial hypertension or atrial fibrillation, blood urea nitrogen > 7 mmol/L, age ≥ 65 years, arterial blood pH < 7.35 and arterial blood $pCO2 > 45$ mmHg. CURB-65 score was significantly associated with the incidence of cardiac events in the univariate analysis (OR 1.29; 95%CI 1.04-1.61), but it was not selected to the multivariate binary logistic regression model to prevent collinearity. According to the multivariate binary logistic regression analysis, previous history of heart failure was significantly associated with the incidence of acute cardiac events [OR 2.6; 95%CI 1.5-4.6].
Conclusions: Our findings demonstrate that, in this population of CAP hospitalized patients, major cardiac complications occur in a substantial proportion of cases. Their occurrence is shown to significantly increase the duration of hospital stay, even though there is no difference in mortality between the two groups. CURB-65 score and previous history of heart failure are associated with the development of acute cardiac events.

Keywords: *Community-acquired pneumonia. Cardiac events.*

CO 072. ENDARTERECTOMY YES!!! AND THEN?

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Introduction: Endarterectomy is the first-line treatment of chronic thromboembolic pulmonary hypertension. However, persistent, residual or recurrent pulmonary hypertension (rPH) may affect up to 50% of the operated patients. This previously undervalued entity is becoming a growing concern due to the associated morbidity and mortality. Identifying patients who are at risk for this is critical so that balloon angioplasty or medical therapy can be offered the earliest possible.
Objectives: To determine parameters that permit to identify patients who are at greater risk of developing recurrent Pulmonary Hypertension (rPH) after endarterectomy.
Methods: The clinical files of the submitted to endarterectomy at the Royal Papworth Hospital (United Kingdom) between April 2016 and March 2019 were retrospectively evaluated. Those who had an immediate postoperative mean pulmonary artery pressure (mPAP) < 25 mmHg and postoperative follow-up > 6 months were selected to enter the study. From these, NTproBNP values, World Health Organization (WHO) functional class, 6-minute Walk Test distance (6MWT) and preoperative and postoperative hemodynamic parameters were collected.
Results: During this period, 31 patients underwent endarterectomy. Sixteen patients were excluded: 7 for not having the necessary data (including 1 deceased and lost for follow-up), 2 with postoperative time ≤ 6 months and 7 who presented mPAP ≥ 25 mmHg in the immediate postoperative catheterization (persistent or residual Pulmonary hypertension). Of the 15 patients included, 6 had rPH (Group 1) and 9 remained with mPAP < 25 mmHg during follow-up (Group 2). In Group 1, with a mean age of 67.3 ± 12 years, all patients were female; in Group 2, with a mean age of 51.6 ± 12 years, 33% (n = 3) were female. In Group 1, the majority of patients were in functional class III (n = 4). The walking distance of the 6MWT was 233.8 ± 58m (mean + SD), NTproBNP 596.3 ± 582 pg/mL, mPAP 43.5 ± 5 mmHg and pulmonary vascular resistance (PVR) 7.1 ± 2.9 WU. In Group 2 the patients were in functional class II (n = 5) and III (n = 4); the walking distance of the 6MWT was 417.3 ± 163m, NT-proBNP 441.4 ± 574 pg/mL, mPAP 52.1 ± 15 mmHg and RVP 10.2 ± 4 WU.The walked distance in the 6MWT was the only parameter that reached statistical significance ($p < 0.05$).
Conclusions: This study has several limitations. It is retrospective and, due to different follow-up protocols, 5 patient files (16%) did not have the required data. Although 31 patients were operated only 15 could be included. Of the included patients we found rPH in 40%. Due to the small sample size this value can be overestimated. It is, nevertheless, relevant. Despite the small sample size, the 6MWT stands out as an important parameter in determining the risk of developing HPr. The studies are scarce in effort evaluation as a sensitive and noninvasive tool for early identification of pulmonary hypertension. The authors propose to conduct a prospective study with post endarterectomy 6MWT and CPET follow up in order to determine their role in early and noninvasive detection of patients at risk of relapse after endarterectomy.

Keywords: *Relapse HTP. Endarterectomy. 6 minute-walk-test.*

CO 073. INTEGRATED RESPIRATORY CARE FOR PATIENTS ON PROLONGED HOME MECHANICAL VENTILATION: PRELIMINARY RESULTS OF THE CAI_VENT PROGRAM

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Introduction: The use of Home Mechanical Ventilation (HMV) has been steadily increasing as it actually reduces the morbidity and mortality of patients with chronic respiratory failure, particularly patients with chest wall disease, patients with severe COPD, hypoventilation-obesity syndrome and patients with neuromuscular disorders. The number of patients requiring prolonged HMV has been increasing, but home surveillance and monitoring has not been sufficient to ensure more consistent therapeutic efficacy in these patients. The CAI_Vent Program-Integrated Support Center for patients under Prolonged Mechanical Ventilation proposes a patient-centered organizational alternative for HMV with the aim of maintaining continuity of care at home, ensuring effective monitoring and accessibility to the healthcare team 24 hours a day, 7 days a week in partnership with primary health care.
Objectives: To describe the organizational aspects of the CAI_Vent program and the impact of the implementation of this hospital initiative home care program in the reduction of the use of the Emer-

gency Service (ES), the number of days of hospitalization and the number of outpatient consultations for patients under prolonged HMV included in the program.
Methods: Patients followed at the S. João University Hospital (inpatient or outpatient) living in the referral area of ACES Porto Oriental and ACES Maia Valongo with indication for prolonged HMV (> 12h day) were included in the CAI_Vent program. All patients were visited monthly by the program team and had access to a 24-hour telephone line. All monitoring was performed by frequent reading of the data provided by the ventilator memory card. Data from the first half of 2019 on the number of visits to the ES, days of hospitalization and number of outpatient visits were recorded and compared with the same data from the first half of 2018 (time period without access to the CAI_Vent program).
Results: We included 39 patients (16 women) with a mean age of 60.2 ± 14.57 years with the following diagnoses: COPD (n = 18), Neuromuscular Diseases (n = 11), Obesity Hypoventilation Syndrome (n = 4), Kyphoscoliosis (n = 4), Interstitial lung disease (n = 2), with an average HMV use of 18.6 ± 4.5 hours/day. During the 6 months of analysis (1st semester of 2019), 106 home visits and 84 telephone calls were recorded. During the analysis time, 8 patients died (6 in palliative care hospitalization). Compared to the first half of 2018, during the first half of 2019 (program implementation period) we observed a reduction in days of hospitalization (140 days versus 77 days), a reduction in the number of visits to the ES (45 episodes versus 26 episodes) and a reduction in the number of outpatient consultations (50 consultations versus 27 consultations).
Conclusions: The implementation of an integrated support program for patients with prolonged HMV allows better monitoring of ventilated patients at home, promoting patient and caregiver literacy, early therapeutic interventions, avoiding the use of hospital resources.

Keywords: *Home mechanical ventilation. Integrated respiratory care. Ventilatory monitoring.*

CO 074. MULTIDISCIPLINARY PROTOCOL FOR EPISTAXIS APPROACH IN RESPIRATORY INTENSIVE CARE UNIT

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Introduction: Epistaxis is the most common otorhinological urgency in the world, with an estimated 60% of the population having at least one episode in their lifetime. In most cases the bleeding is slight and easily manageable but can in some situations be potentially fatal. In admitted patients its incidence is not known, however, these patients are often exposed to risk factors that increase the probability of this complication and its potential severity, such as anticoagulation, nasal oxygen therapy, naso-gastric intubation, bronchofibroscopy or barotrauma secondary to noninvasive ventilation, among others. The patient with respiratory pathology in general and especially the patient in need of hospitalization in the respiratory intensive care unit certainly presents an increased risk due to the set of therapeutic interventions to which they are subjected and their most fragile state.
Methods: The authors proposed the creation of an approach protocol for the inpatient that develops epistaxis aiming at the standardization of initial evaluation and therapy in these situations and ensuring maximum patient safety. With close collaboration between the Respiratory Intensive Care Unit and the Otorhinolaryngology of our hospital unit, a sequence of procedures was developed based on the following objectives: 1. Maintain airway patency and adequate ventilation; 2. Control of bleeding by mechanical tamponade measures and/or pharmacological intervention; 3. Hemodynamic stabilization, volume replacement and/or hemoglobin if necessary; 4. Definition of the appropriate timings for more differentiated evaluation and when it is necessary or not; 5. Ensuring the devices and drugs available in the unit are suitable for the necessary therapeutic interventions. Although the application of this protocol is initially intended for the patient admitted to a particular intensive care unit, with proper adaptations it may also be extended to other areas of the hospital and even to other health facilities.
Conclusions: Ideally, epistaxis in which bleeding cannot be stopped with initial tamponade measures should be rapidly evaluated by Otorhinolaryngology. In the real world not all hospitals have this possibility 24/7 and even in those who have it the othorhinolaryngologist is not always immediately available, a set of measures is needed to stabilize patients and control bleeding assuring they can safely wait for observation or be transferred to a more differentiated unit. The elaboration and implementation of medical action protocols contributes substantially to the standardization of procedures and consequently significant risk reduction, which is why we dedicated ourselves to this project and considered its presentation relevant.

Keywords: *Epistaxis. Respiratory intensive care unit. Protocol.*

CO 075. PNEUMOCOCCI AND LEGIONELLA PNEUMONIA, A COMPARATIVE STUDY

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Introduction: Community acquired pneumonia (CAP) is one of the main admission causes in Intensive Care Units (ICU). Streptococcus pneumoniae (SP) is the commonest agent in severe CAP, motivating admission to medical ward or ICU. Legionella pneumophila (LP) is in a lot of series severe CAP second most frequent agent. It is not clear if etiological agent influences characteristics and prognosis in severe CAP.
Objectives: Comparative analysis between CAP caused by SP and LP in patients admitted to an ICU, relatively to comorbidities, organ support need and mortality.
Methods: Retrospective analysis of clinical and laboratorial data from patients with CAP caused by SP or LP (isolated on blood cultures or by urinary antigen) admitted to ICU on a 5 years period. For study purposes, organ failure was defined as need for: 1. Invasive respiratory support; 2. Vasopressor support (norepinephrine or equivalent); or 3. Need for renal replacement therapy. Hyponatremia was defined as a serum sodium level under 135 mEq/dL. Ventilator free days were calculated until the tenth day after admission.
Results: The study included 56 patients (28 with SP and 28 with LP), the majority male (SP 61%, LP 71%). SP patients had higher mean age (65.96 ± 16.8 vs 56.6 ± 12.4 years, p = 0.022) and had frequently more comorbidities (75% vs 32%, p = 0.001), including heart failure (32% vs 11%), diabetes mellitus (32% vs 18%), COPD (21% vs 4%), chronic renal failure (14% vs 0%) and human immunodeficiency virus infection (7% vs 0%). Active smoking was common on both groups (14%). Inversely, SP patients had fewer analytical alterations (leukocytosis in 75% vs 86%), lower reactive C protein levels (36.44 vs 48.62 mg/dL) and fewer hyponatremia cases (39% vs 79%), the last two with statistical significant difference. SP patients had higher need for organ support (32% vs 25%), invasive mechanical ventilation (29% vs 18%), vasopressors (29% vs 4%) and renal replacement therapy (18% vs 4%). Ventilator-free days number, alive, was low and similar in both groups (SP 7.64 ± 4.14 days; LP 8.79 ± 3, p = 0.243). ICU mean length stay (survivors) was 5.25 days in SP patients and 3.32 in LP patients (p = 0.205). The difference between mortality rates was not statistical significant, with higher mortality

in SP group (14.3% vs 10.7%, p = 0.686). The difference between mortality rates presented an Odds ratio of 6.1 (95%CI 0.24-155.7).
Conclusions: Patients with CAP due to SP had more comorbidities and higher need for organ support. Mortality was similar between both groups. Hyponatremia was more common in LP, and reactive C protein levels were considerably higher in these patients.

Keywords: *Pneumonia. Streptococcus pneumoniae. Legionella pneumophila.*

CO 076. EVALUATION OF THE NOTION OF BASIC KNOWLEDGE REGARDING THE MAIN DIFFUSE PARENCHYMAL DISEASE IN PRIMARY HEALTH CARE (PHC) IN ACES BAIXO VOUGA

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Introduction: Diffuse parenchymal disease (DPD) consists of a group of multiple entities with different relative rarity and often sharing some similarities in their clinical, functional and radiological manifestations. Although classically followed by Pulmonology, a General Practitioner (GP) is often the interface element with the clinical introduction, and a quality standard would be to undergo a dialogued follow-up along with the two health care specialties/dimensions. Among the most prevalent entities, one can find Sarcoidosis, Hypersensitivity Pneumonitis and Idiopathic Pulmonary Fibrosis (IPF). Since this is an area lacking educational intervention for GP, the symptoms of presentation are often non-specific and the patients are comorbid, this may cause important segments of delayed diagnosis, usually noticed in many of these diseases.
Objectives: Assess the level of knowledge regarding some general aspects related to the main forms of DPD - FPI, PHC, sarcoidosis, drug-induced interstitial disease, diffuse disease associated with conectivities - at the level of the PHC of AceS Baixo Vouga (BV).
Methods: Application of a multiple choice, under anonymity, to physicians from 5 AceS BV health units. Evaluation of differences by age segment between < 45 years and ≥ 45 years.
Results: A percentage of responses of 75% (33 of 44) was obtained. The mean age was approximately 43 years with a standard deviation of 14.9 and with a gender distribution of 4.5:1, with female prevalence. 832 of the 1205 questions were correctly answered, corresponding to 69% of correct answers, with no statistically significant difference between physicians below 45 years and those aged ≥ 45, except for some specific questions. Regarding the first question of the questionnaire-"I feel, as GP and for what my functions are, that I have sufficient training in relation to interstitial lung diseases"-we observed that their response that had an affirmative result in 65.5%, and interestingly, this is coincidentally with the percentage of correct answers in the questionnaire (69%). The nosological group associated with the best level of knowledge was sarcoidosis, with 94.9% of correct answers. Contrariwise, the group with the worst performance was the ILD, only with 54.0% of correct answers. Regarding questions about the semiological and anamnesic aspects important for early referral, 72.3% of correct answers were obtained.
Conclusions: A satisfactory level of knowledge was found, but with the possibility of growth, especially in the IPF area. In what is the longitudinal path of several DPD, a minimum knowledge base will be desirable for the complementarity of care between proximity of GP and the specific follow-up in pulmonology. Without prejudice to a rarer population incidence, it will be important to devote more particular attention to the targeted training of GP for some basic notions regarding DPD, which may have an impact not only on the modification of the exposure To specific risk factors (primary prevention), as well as the shortening of frequent and deleterious diagnosis delay in many of these entities, possibly with improvement of the quality of life of patients and their caregivers.

Keywords: *Diffuse parenchymal disease. Primary health care.*

CO 077. TELOMERE SHORTENING AND ITS INFLUENCE IN THE RESPONSE TO IMMUNOSUPPRESSANT THERAPEUTICS FOR IDIOPATHIC PULMONARY FIBROSIS

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Introduction: In the Panther study conducted in 2012, there was an early arm withdrawal that included patients under triple therapy (prednisolone, azathioprine and N-acetylcysteine) compared to placebo with patients and patients with N-acetylcysteine due to a significant number of hospitalizations and mortality. In a recent analysis, it was found that a significant number of these patients had telomere shortening, and it was questioned whether patients with this characteristic could have greater toxicity and an unfavorable response to these therapeutic agents. Although IPF therapy is now performed with antifibrotics, this information is relevant for other fibrosing diseases, where a percentage of patients also have telomere shortening and in which immunosuppression is still the usual therapy.
Objectives: Determine the relationship between the telomere shortening and the survival rate in patients with an IPF diagnostic under immunosuppressant therapeutics.
Methods: A sample was gathered from the patients in the diffuse pulmonary diseases consultations between 2002 and 2015, with a diagnosis of IPF and subjected to triple therapeutics. Telomere length was analysed through quantitative PCR, using DNA from venous blood leukocytes. A comparative analysis was performed between patients with and without telomere shortening regarding their demographic characteristics, smoking habits, functional study at the beginning of therapy, namely FVC, DLCO and six-minute walk test, presence of emphysema, survival rate and exacerbations (up to one year of therapy and total). Statistical analysis was performed using Microsoft Excel 2013 and IBM SPSS Statistics SPSS v.23.
Results: 37 patients were included, 24 of which had telomere shortening (64.9%). Of the 24 patients with telomeric shortening, 8 were treated with triple therapy. On the other hand, only 5 patients without telomere shortening were treated with triple therapy. In both groups there was a higher prevalence of male patients (100% in the shortened group and 80% in the non-shortened group) and a slightly lower average age in the shortened group (62 years vs 66 years; p = 0.34). In the group with telomere shortening, mean percentage values of CVF (63.4% vs 88.15%; p = 0.33) and DLCO (41.8% vs 52.64%; p = 0.76) were inferior to the group without shortening, although without statistical significance. Similar smoking habits were found in both groups, and in the shortened group 13% were active smokers, 63% were former smokers and 25% non-smokers (vs 0%, 60% and 40%, respectively). However, a higher percentage of emphysema was found in patients with shortened telomeres (50% vs 20%; p = 0.56). Survival rate was lower in patients with telomeric shortening (39.75 vs 44 months; p = 0.94), although not statistically significant.
Conclusions: A trend towards a shorter survival rate is found in patients with telomere shortening under triple therapy, although without a statistically significant association, which may be justified by the small number of analyzed patients. Given the widespread treatment with immunosuppression in several fibrotic pneumonias, clarification of this relationship evaluated in this study is necessary, thus making it urgent to investigate several cohorts with an adequate number of patients with these characteristics.

Keywords: *Telomere shortening. IPF. Immunosuppressive therapy. Survival rate. Genotype.*

CO 078. TRANSBRONCHIAL LUNG CRYOBIOPSY'S ROLE IN THE DIAGNOSIS OF HYPERSENSITIVITY PNEUMONITIS

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Introduction: In Hypersensitivity Pneumonitis (HP), there are some cases in which history, radiological pattern and bronchoalveolar lavage (BAL), evaluated by a multidisciplinary group, aren't enough for a confident diagnosis, requiring a lung biopsy. This situation is particularly frequent in chronic HP cases, where there is a significant overlap with other fibrosing interstitial pneumonias. Transbronchial lung cryobiopsy has been assuming a pivotal role as a safe and high-yield procedure in the diagnosis of diffuse lung diseases, appearing to also be a good option in the diagnostic algorithm of HP.
Methods: Retrospective analysis of demographic data and clinical characteristics of patients submitted to transbronchial lung cryobiopsy with a final diagnosis of hypersensitivity pneumonitis between 2014 and 2019 in a university hospital.
Results: Out of a total of 305 patients submitted to a cryobiopsy in this period, a final diagnosis of HP was made in 107 (35%), with a mean age of 69 ± 8.2 years. The main radiological findings in these patients were a UIP "like" pattern (n = 59), ground glass nodules (n = 30), mosaic pattern (n = 23), NSIP pattern (n = 7) and cystic disease (n = 3). With regard to lung function, most patients had normal lung volumes at the time of the biopsy (mean FVC of 87 ± 19.6%), but a diminished CO diffusion capacity (mean DLCO of 54 ± 15.3%). On average 4 biopsies were taken. Biopsies in two lobes were made in 54% of the cases. The mean length of the fragments was 5.5mm and they included pleural tissue in 50%. The most significant complication was pneumothorax, which occurred in 20.1% of the cases (n = 22). Histology wasn't conclusive in only 9 cases, out of which in 3 a surgical lung biopsy was required, while in the rest the HP diagnosis was assumed in a multidisciplinary meeting.
Discussion: In this sample, transbronchial lung cryobiopsy was a safe and high-yield procedure for the histological characterization on hypersensitivity pneumonitis, and together with a detailed expositional history, imaging exams and BAL a confident diagnosis of HP was possible in a significant number of cases.

Keywords: *Transbronchial lung cryobiopsy. Hypersensitivity pneumonitis.*

CO 079. SYSTEMIC SCLEROSIS WITHOUT TOMOGRAPHIC INTERSTITIAL LUNG DISEASE: THE ROLE OF PULMONARY FUNCTION TESTS

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Introduction: Systemic sclerosis (SSc) is a chronic autoimmune disease with microvasculopathy and fibrosis predominantly of the skin. Ninety percent of SSc patients presents with some form of lung involvement over the natural course of the disease including radiologic patterns characterized as interstitial lung disease (ILD) related to SSc (ILD-SSc).
Objectives: Determine the role of pulmonary functional tests (PFTs) for initial evaluation of SSc patients without known ILD-SSc.
Methods: A retrospective descriptive observational analysis was performed including all SSc patients referred to our respiratory function laboratory between January 2018 and February 2019. The 2013 classification criteria for SSc (ACR/EULAR) was used to confirm the diagnosis. Exclusion criteria included: patients older than 80 years, mean number of pack-years > 20, BMI > 35 Kg/m^2, pulmonary diseases such as COPD, asthma and lung cancer, history of relevant occupational air exposition, heart failure and overlap autoimmune disease. Besides PFTs results, we collected demographic data, SSc classification (diffuse/limited/sine scleroderma), dyspnea assessed by modified Medical Research Council (mMRC) scale and estimated pulmonary artery systolic pressure (ePASP) evaluated by echocardiography. With collaboration of a radiologist, thoracic CT scan of all patients were analysed and we included in our study only SSc patients without ILD-SSc.
Results: We identified 13 non-ILD-SSc, all women, with a mean age of 56 (± 11), mean BMI of 24 (± 4), five (38%) were smokers or former smokers, with less than 20 pack-years. Regarding the SSc classification, three had a diffuse subtype, 9 had a limited subtype and 1 had sine scleroderma. The majority of patients had a mMRC < 2 (11 in 13 patients). No patients had suspected pulmonary arterial hypertension (PAH). The median ePASP was 29 mmHg (22-40) two confirmed by right heart catheterisation. Concerning the PFTs results, the median values of FVC, RV and FEF 25-75% were 101% (78-132) predicted, 128% (68-162) predicted and 77 (54-164) predicted, respectively. The median RV/TLC ratio was 102% (76-134) of predicted. In terms of diffusing capacity, the median DLCO and KCO was 71% (43-98) predicted and 75% (53-104) predicted, respectively. All the 13 patients had some change in the following parameters: FVC < 80% predicted (1 patient); RV/TLC > 120% (3 patients); FEF 25-75% < 80% predicted (9 patients); and KCO < 80% (7 patients).
Conclusions: Besides the small size of our sample, these results shows the importance of performing PFTs to all SSc patients since they can provide important information for screening and monitoring lung involvement, independently of the presence of characteristic tomographic interstitial lung disease or pulmonary hypertension. We also reinforce the need for further studies in this sub-group of patients.

Keywords: *Systemic sclerosis. Pulmonary function. Autoimmunity. Interstitial lung disease.*

CO 080. INTERSTITIAL LUNG DISEASE IN AN INTENSIVE AND INTERMEDIATE CARE UNIT

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Introduction: Interstitial lung disease (ILD) includes a wide spectrum of entities with different physiopathological mechanisms of inflammation and/or fibrosis. Disease flares and infections often require hospital admission, frequently with respiratory failure.
Objectives: Understand the epidemiology, reasons for admission, and determine the risk factors for mortality of patients admitted to an intensive and intermediate care unit (ICU).
Methods: Retrospective analysis of patients admitted in the ICU with respiratory failure between the years of 2010 and 2018.
Results: A total of 64 patients with ILD were identified, 50 of which were included. Average age was 66.8 ± 11.8 years old, 62% were males and 60% non-smokers. The most frequent disease was vasculitis (24%), followed by pneumoconiosis (12%), hypersensitivity pneumonitis (12%), connective tissue diseases (10%), organizing pneumonia (8%), IPF and drug induced lung disease (6% each), and sarcoidosis and idiopathic NSIP (2% each). Nine patients were labelled as unstratified lung fibrosis. Twenty-six patients already had pulmonary fibrosis. The main reasons for admission were ILD flare/initial ILD presentation (48%), and respiratory infection (46%). The average APACHE II and SAPS 2 score was 18.8 ± 7.3 and 37.8 ± 11.6, respectively. The PaO2/FiO2 ratio at admission me-

dian was 142.5 ± 165.8. The average length of stay at the ICU and at the hospital was 6 and 17 days, respectively. Half of the patients were submitted only to non-invasive ventilation, while 36% were invasively ventilated (VMI). The ICU and hospital mortality was 28% and 44%, respectively. Non-survivors at the ICU showed lower PaO2/FiO2 ratio (122 ± 79.8 vs 157.0 ± 166.8, p = 0.025), higher APACHE II (22.9 ± 5.6 vs 17.2 ± 7.3, p = 0.011) and SAPS 2 (44.6 ± 7.2 vs 35.1 ± 11.9, p = 0.001) scores, and increased need of VMI (64.3% vs 25%, p = 0.009). Hospital non-survivors showed older age (70.5 ± 9.9 vs 63.9 ± 12.6, p = 0.047), lower PaO2/FiO2 ratio (109.5 ± 72.0 vs 187.0 ± 150.8, p = 0.047) and higher APACHE II (21.9 ± 6.7 vs 16.3 ± 6.9, p = 0.006) and SAPS 2 (43.3 ± 8.6 vs 33.4 ± 11.8, p = 0.001) scores.
Conclusions: Lower PaO2/FiO2 ratio, higher APACHE II and SAPS 2 scores and increased need of VMI were associated with higher ICU mortality. In a similar sense lower PaO2/FiO2 ratio, higher APACHE II and SAPS 2 scores, but also older age were identified as risk factors for hospital mortality. This study underlines the worth of these severity scores, also in interstitial lung disease, and shows PaO2/FiO2 ratio at admission as an indicator of bad prognosis. These results are similar to current literature. The study also shows the significant prevalence of severe infections on this population. The limitations of this study are related to the reduced number of patients included, to the wide variety of ILDs, with different treatment regimens and prognosis, and to the long period of data collection, during which the definitions and treatment of ILDs were updated several times.

Keywords: *Intensive care. ILD. Prognosis.*

CO 081. FIBROSING INTERSTITIAL LUNG DISEASE: IMPACT OF FUNCTIONAL SEVERITY ON TRANSPLANTATION SURVIVAL

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Introduction: Fibrosing interstitial disease often has a progressive nature with the deterioration of lung function being associated with higher mortality. Therefore, selected cases may be indicated for lung transplantation (TxP).
Objectives and methods: To evaluate the impact of FVC (%), DLco (%), minimum oxygen saturation (SpO2) and walked distance at the 6-minute walk test (6MWT) at baseline on survival after TxP. A retrospective analysis of patients undergoing TxP due to fibrosing interstitial lung disease was performed from 2010 to 2018. Medians of the described parameters were compared between the group of patients who died in the first year post-TxP and those with survival longer than one year. Additionally, the overall survival analysis was performed by the Kaplan-Meier method. For this analysis, patients were divided into groups of functional severity according to FVC: moderate (FVC 60-69%), moderately severe (50-59%), severe (35-49%) and very severe (< 35%). and according to Dlco: Mild (Dlco > 60%), moderate (40-60%) and severe (< 40%).
Results: We selected 56 patients submitted to TxP due to fibrosing interstitial lung disease. 30 (53.6%) males, mean age 52 years with the diagnoses of: idiopathic pulmonary fibrosis (IPF) (39%), chronic hypersensitivity pneumonitis (PNH) (50%) and connective tissue disease (CTD) (11%). 11 patients (14%) died in the first year after TxP. There was no statistically significant difference between the mean age of patients who died in the first year post-TxP and the others (49 vs 53) and the average waiting time (14 vs 12 months). In the group of patients who died in the first year there was a predominance of IPF (55% vs 27% DTC and 18% PNH) and in the group with survival over one year of PNH (58% vs 36% IPF and 6% DTC). There were no statistically significant difference between the group of patients who died in the first year after TxP and the others regarding FVC (50 vs 48%), DLco (26 vs 25%), walked distance (340 vs 316 meters) or SpO2 (76 vs 77%) at 6MWT. In total, 21 patients (27%) died in the study period. Survival was of 80% at one year and 68% at 3 years. Comparative analysis of overall survival between the functional severity groups for FVC and DLco did not show a statistically significant difference.
Conclusions: The results obtained in our population demonstrate the absence of a significant negative impact of pulmonary function parameters at the time of referral on post-TxP overall survival. Given the mortality and loss of quality of life associated with deterioration of lung function, our results support the hypothesis that TxP is a therapeutic option for this group of patients.

Keywords: *Fibrosing interstitial lung disease. Lung transplant.*

CO 082. BIOMARKERS IN CLINICAL PRACTICE: SERUM ANGIOTENSIN-CONVERTING ENZYME AND RENIN-ANGIOTENSIN SYSTEM INHIBITORS

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Introduction: Serum angiotensin-converting enzyme (sACE) is a widely used biomarker of activity and diagnosis in sarcoidosis. ACE inhibitors (ACEi) are known to decrease sACE levels, but this effect has never been studied on patients with sarcoidosis.
Objectives: To study whether ACEi and angiotensin II receptor blockers (ARB) impact sACE levels in patients with sarcoidosis.
Methods: Retrospective analysis of patients with pulmonary sarcoidosis under follow-up at a tertiary centre. Demographic, clinical, radiological and analytical data (highest sACE during follow-up) were extracted. Drug prescriptions were assessed through local and national electronic platforms. Patients with an active malignancy or under immunomodulators or steroids at first sACE dosing were excluded.
Results: Seventy-one patients were included, of which 47.9% (n = 34) were male. Mean age at first sACE dosing was 51 years. Stage 2 sarcoidosis was most frequent (n = 41). There was extrapulmonary disease in 30.9% (n = 30) of the cases. sACE in patients under ACEi was lower (9.6 ± 3.1 U/L; n = 10) than in the remaining patients (79.7 ± 41.9 U/L; n = 61), p < 0.01). sACE in patients under ARB (77.8 ± 17.7 U/L; n = 8) was not statistically different from sACE in patients under no renin-angiotensin system inhibitor (80.0 ± 44.5 U/L; n = 53), p = 0.89.
Conclusions: We conclude sACE is suppressed in patients with sarcoidosis under ACEi, but not under ARB. This should be taken into account when ordering this biomarker.

Keywords: *Biomarkers. Sarcoidosis. Angiotensin-converting enzime.*

CO 083. CONNECTIVE TISSUE DISEASE-ASSOCIATED INTERSTITIAL LUNG DISEASE: PREDICTORS OF POOR PROGNOSIS

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Introduction: Interstitial lung disease (ILD) is a common complication of connective tissue disease (CTD) that has unique management and a poor prognosis. The identification of predictors of lung disease progression would allow clinicians to identify patients who need more frequent follow-up and may benefit from earlier treatment intervention.

Objectives: To identify prognostic predictive factors in connective tissue disease-associated interstitial lung disease (CTD-ILD).
Methods: Retrospective study including patients followed up in our outpatient ILD clinic, between January 2008 and December 2018, with diagnosis of CTD-ILD. Demographics, clinical, laboratorial and radiological data was collected. The radiological patterns were evaluated by an experienced radiologist. Primary outcomes: disease progression; referral to lung transplantation; need for supplemental oxygen; death during follow-up. Disease progression was defined as presence of at least one of the following criteria: decline in FVC of at least 10% and/or in DLCO of at least 15%, in one year period. Exclusion criteria were less than one year of follow up and missing data.
Results: From a total of 83 patients, 75 were included, with an average age of 62 ± 12 years-old and 68% of patients were female. Mean time of follow up was 74.4 ± 37.3 months. Twenty-five patients (33.3%) were smokers or former smokers. Thirty (40%) patients presented rheumatoid arthritis, 18 (24%) systemic sclerosis, 8 (10.7%) polymyositis/dermatomyositis, 7 (9.3%) Sjögren syndrome, 5 (6.7%) systemic lupus erythematosus, 5 (6.7%) undifferentiated connective tissue disease, 1 (1.3%) mixed connective tissue disease and 1 (1.3%) overlap syndrome. Higher initial values of FVC (L), DLCO (L) and 6-min walk distance were associated with less disease progression (p = 0.050, 0.009 and 0.014, respectively). Of these, the only predictive factor of disease progression was the 6-min walk distance (p = 0.018) (linear regression). Symptomatic patients presented higher disease progression (p = 0.023). Furthermore, patients with positive echocardiographic findings of pulmonary arterial hypertension (PAH) were associated with higher disease progression (p = 0.021), death (p < 0.001), need for oxygen therapy (p = 0.051), as well as lung transplantation referral (p = 0.021). PAH patients presented a 26% higher probability of death (p = 0.01) (linear regression). Seven patients died during follow up (9.3%).
Conclusions: Neither gender nor age were statistically associated with worse prognosis. No association was found between radiologic pattern and disease progression, mortality, need for oxygen therapy nor referral to lung transplantation. Lung function tests (FVC and DLCO) and 6-min walk distance proved association with disease progression. However, the only predictive factor of disease progression is the 6-min walk distance. PAH patients have a 26% higher probability of death.

Keywords: *Interstitial lung disease. Connective tissue disease. Prognosis. Radiological pattern. Lung function tests.*

CO 084. ASSESSING PROGNOSIS OF CHRONIC INTERSTITIAL LUNG DISEASES WITH THE ILD-GAP MODEL

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Introduction: The gender, age and physiology (GAP) model, is a risk/prognosis predicting tool for idiopathic pulmonary fibrosis (IPF). A similar model (ILD-GAP) has been proposed for other interstitial lung diseases (ILD). This model groups patients in four indexes (0-1, 2-3, 4-5 e > 5), by ascending order of severity.
Objectives: Determine whether this tool predicts mortality accurately in ILDs.
Methods: Retrospective review of patients with a first ILD appointment in 2014 and 2015 for IPF, chronic hypersensitivity pneumonitis (cHP) and connective tissue disease associated ILD (CTD-ILD). ILD-GAP score was calculated at the date of the first appointment. Patients without lung function tests within 3 months from that date were excluded. Follow-up data was assessed for mortality at 1, 2 and 3 years. Survival statistical analysis preformed through Kaplan-Meier test.
Results: Total of 51 patients, 58.8% female and mean age of 64.1 (± 12.8) years. There were 24 patients with CTD-ILD (54.2% with rheumatoid arthritis), 19 with cHP (57.9% with aviary exposure) and 8 with IPF. Radiologic pattern of UIP was present in 24.5% of patients. The one, two and three-year overall mortality was 11.8%, 19.6% and 27.5%, respectively. The ILD-GAP showed statistically significant difference in survival between the 0-1 and the other indexes (p < 0.010), and a tendency between the 2-3 and 4-5 index (p = 0.055) and between the 2-3 and > 5 index (p = 0.051). There was no significant difference between the 4-5 and the > 5 index. The area under the curve (AUC) for predicting 1-, 2- and 3-year mortality was 0.926, 0.896 and 0.841, respectively (p < 0.001).
Conclusions: The ILD-GAP model showed good accuracy predicting survival and 1-, 2- and 3-year mortality in this study. The lack of significance in more severe stages was probably due to the low sample size. A system such as the ILD-GAP, which allows for patients to be staged according to the severity of the disease, may be useful in clinical practice and in study design, for example assessing drug-response in each prognostic group. At this moment it is only studied as an initial prognosis evaluation, however in the future it may be applied in other moments, and the inclusion of other data (p.e imaging or biomarkers) may increase its strength.

Keywords: *ILD-GAP. Prognosis. Interstitial lung disease.*

CO 085. CYTOKINE GENE POLYMORPHISMS IN PIGEON BREEDER´S DISEASE EXPRESSION

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Introduction: Exaggerated immunological response to repeated inhalation of organic or chemical dusts may lead to Hypersensitivity Pneumonitis among sensitized individuals. Only a few exposed individuals became ill and disease expression pattern is highly variable which suggest that genetic factors may play a role.
Objectives: To investigate interferon (IFN)-γ, tumour necrosis factor (TNF)-α, interleukin (IL)-6, transforming growth factor (TGF)-β, and IL-10 gene polymorphisms in a cohort of pigeon breeder's disease (PBD) patients in comparison with asymptomatic exposed controls and the association with different patterns of disease.
Methods: We evaluated 40 PBD patients and 70 exposed controls. IFN-γ, TNF-α, IL-6, TGF-β, and IL-10 polymorphisms were determined by polymerase chain reaction–sequence specific primer amplification.
Results: Polymorphism analysis of IFN-γ, TNF-α, IL-6, TGF-β, and IL-10 genotypes and allele frequencies showed no differences between patients and controls. IFN-γ T/T genotype frequency was increased among patients with chronic presentation (RR = 2.33, p = 0.047) compared with those with acute/subacute presentation. Also, chronic presenting patients had an increased frequency of IFN-γ T allele (50% vs 22.5%, RR = 1.76, p = 0.011). No differences were found in TNF-α, IL-6, TGF-β, and IL-10 genotypes neither allelic frequencies between both groups of patients. IL-6 C/C genotype was more frequent in patients who showed chronic evolution (RR = 2.54, p = 0.017), when comparing with patients with disease resolution.
Conclusions: IFN-γ T/T and the IL-6 C/C genotypes seem to play a role in PBD expression, as their frequencies are increased in chronic presentations, or in those with chronic evolution one year after the initial diagnosis, respectively.

Keywords: *Pigeon breeder's disease. Hypersensitivity pneumonitis. Cytokines. Genetic polimorphisms.*

CO 086. CONNECTIVE TISSUE DISEASE-ASSOCIATED INTERSTITIAL LUNG DISEASE: POPULATION CHARACTERIZATION

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Introduction: The connective tissue diseases (CTDs) are a group of systemic disorders characterized by autoimmunity and autoimmunemediated organ damage. Lung involvement by interstitial lung disease (ILD) promotes high morbimortality and might be the initial presentation of the CTD.
Objectives: Descriptive analysis of patients diagnosed with ILDs associated with CTDs (CTD-ILD).
Methods: Retrospective study including patients followed up in our outpatient ILD clinic, between January 2008 and December 2018, with diagnosis of CTD-ILD. Demographics, clinical, laboratorial and radiological data was collected. The radiological patterns were evaluated by an experienced radiologist.
Results: Eighty-three patients were included in the study, with average age of 62 ± 11 year-old and 66.3% (n = 55) were female. Twenty-nine (34.9%) patients were smokers (n = 12) or former smokers (n = 17). The majority of patients was referenced by rheumatology (43.4%; n = 36) and internal medicine (28.9%; n = 24). Thirty-seven (44.6%) patients presented rheumatoid arthritis, 19 (22.9%) systemic sclerosis, 8 (9.6%) polymyositis/dermatomyositis, 7 (8.4%) Sjögren syndrome, 5 (6%) systemic lupus erythematosus, 5 (6%) undifferentiated connective tissue disease, 1 (1.2%) mixed connective tissue disease and 1 (1.2%) overlap syndrome. Interstitial lung disease was the initial presentation in 15.7% (n = 13) of patients. Twenty-one (25.3%) patients were asymptomatic from the respiratory point of view, thus were referenced by radiological findings. From the symptomatic patients, the most common symptom was dyspnea (94.9%; n = 56), followed by dry cough (55.9%; n = 33), wheezing (16.9%; n = 10), bloody sputum (6.8%; n = 4), weight decrease (6.8%; n = 4) and fever (5.1%; n = 3). Thirty-nine (47.0%) patients presented NSIP radiological pattern, while 15 (18.1%) presented UIP pattern. Five (6%) patients had lung transplantation referral, while only 1 was submitted to transplantation. Ten patients died during follow-up (11.9%).

Connetive tissue disease/Radiological Pattern	NSIP	UIP	Other
Rheumatoid arthritis	13	11	13
Systemic sclerosis	10	0	9
Systemic lupus erythematosus	1	2	2
Polymyositis/dermatomyositis	8	0	0
Sjogren Syndrome	3	1	3
Mixed connective tissue disease	1	0	0
Undifferentiated connective tissue disease	3	0	2
Overlap Syndrome	0	1	0
Total	39	15	29

Conclusions: Dyspnea was the most reported symptom and interstitial lung disease was the initial disease presentation on 15% of the patients. NSIP was the most frequent radiological pattern, which comes in agreement with current literature about CTD-ILD. Rheumatoid arthritis was the most common CTD associated with ILD and 1/3 of these patients presented UIP pattern.

Keywords: *Interstitial lung disease. Connective tissue disease. Radiological pattern.*

CO 087. DIAGNOSTIC YIELD AND SAFETY OF TRANSBRONCHIAL LUNG CRYOBIOPSY AND SURGICAL LUNG BIOPSY IN INTERSTITIAL LUNG DISEASES. A SYSTEMATIC REVIEW

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Introduction: Interstitial lung diseases (ILDs) are a heterogeneous group of disorders characterized by many degrees of inflammation and fibrosis, primarily affecting the lung interstitium. A precise diagnostic is difficult to achieve and sometimes the definitive diagnosis of ILD can be established only through histopathological examination of lung biopsy specimens, either by surgical lung biopsy (SLB) or transbronchial lung cryobiopsy (TBLC).
Objectives: The aim of this review was to compare the diagnostic yield (DY) and safety of TBLC and SLB in patients with suspected ILD.
Methods: The PubMed database were used to check all studies that reported on the DY or safety of SLB or TBLC in the diagnosis of ILD published in the last 10 years. The assessment of quality of individual studies was possible using the CASP. Data were extracted on study characteristics, DY, complication and mortality rates.
Results: Of 177 citations, 28 studies were selected for inclusion in this systematic review: 17 articles focused on TBLC, 10 in SLB and 1 in both. The quality of studies goes from moderate to high quality. A total of 3,452 patients with suspected ILD were included in our review: 1,400 patients were submitted to SLB and 2052 underwent TBLC. A diagnosis was obtained in 1,323 (94.5%) patients submitted to SLB, which ranged 81-100% in different studies. In the TBLC group, a diagnosis was achieved in 1,682 (82.0%), ranging 51-93.3%. Pooled estimates of moderate to severe bleeding and pneumothorax of TBLC were 5.3% and 14.6%, respectively. Surgical overall morbidity was 11.2%. The mortality rate estimated for TBLC and SLB was 0.4% and 2.2%, respectively.
Conclusions: Our review demonstrated a higher DY in SLB in the diagnosis of suspected ILDs. However, in comparison with TBLC, SLB showed higher mortality rate.

Keywords: *Interstitial lung disease. Cryobiopsy. Surgical lung biopsy. Safety. Diagnostic yield.*

CO 088. BREATHING ORGANIC PARTICLES

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Introduction: Hypersensitivity Pneumonitis (HP) is a challenging disease which requires a high index of suspicious. It results from sensitization to inhaled antigens. Clinical course and presentation vary according to the intensity and duration of exposure to the causative agent.
Objectives: Characterize the population with HP followed at Interstitial Lung Disease appointment at Faro Hospital.
Methods: This is an analytical, cross-sectional, retrospective study of patients with HP followed at Interstitial Lung Disease appointment at Faro Hospital from 1/1/2014 to 31/12/2018. The following variables were analyzed: gender, age at diagnosis, smoking history, exposure, main symptoms, PH classification, pulmonary function tests (PFT), radiological abnormalities and other complementary exams for diagnosis, therapy and follow-up.
Results: From the 154 patients followed at Interstitial Lung Disease appointment since 2014, 37 patients had HP (24%). The majority of these patients were women (51%) and the average age at time of diagnosis was 68 years old. 60% of the patients were non-smokers, 35% were former smokers and 5% were current smokers, with a mean of 33 ± 26 pack per year. All of the patients had cough, progressive dyspnea and exposure history (most common

to birds and mold). In symptomatic patients the mean diagnostic delay was 3 ± 5 years since the onset of symptoms. 73% avoided further exposure. PFT had restriction in 53% and diffusing capacity was severely decreased in 60%. Chest CT abnormalities identified were: reticulation (60%), honeycombing (24%), centrilobular nodules (5%), mosaic attenuation (5%), head-cheese pattern (3%) and ground-glass (3%). In 57% we had bronchoalveolar lavage, from which 95% had lymphocytosis. In 51% of the cases the diagnosis was made by surgical biopsy and in 14% by cryobiopsy. 76% of HP were chronic, 16% possible HP, 5% subacute, 3% acute. Glucocorticoid were started in 97% of the patients and 46% needed another immunosuppressive therapy. During therapy there was a stabilization of diffusing capacity (43.3 vs 46.1, p = 0.72) and FVC (70.8 vs 79.6, p = 0.48). Until now, 8% already suspended therapy due to clinical improvement. Only 3% had clinical, functional and radiological complete resolution. The median survival of these patients was 43 ± 49 months and 27% died, 60% of which due to pneumonia and 30% because of progression.
Conclusions: Non-smokers women with risk exposure history and chronic HP diagnosis were prevalent. Restriction on PFT was prevalent. 65% of the diagnosis were made by surgical lung biopsy or cryobiopsy. Diffusing capacity and FVC stabilized with therapy. The median survival was 43 months.

***Keywords**: Hypersensitivity pneumonitis. Interstitial lung disease.*

CO 089. CHARACTERIZATION AND SURVIVAL ANALYSIS OF PATIENTS WITH EGFR MUTATED NON-SMALL CELL LUNG CANCER. RETROSPECTIVE STUDY

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Introduction: EGFR mutations are found in 10-12% of Caucasians with primary lung adenocarcinoma and are more frequent in non-smokers and women. Its presence predicts response to TKI's and is associated with better survival. Nonetheless the pivotal role of EGFR mutation and TKI in lung cancer, few real-life data is available evaluating the characteristics of this population.
Methods: Retrospective study. We selected all the patients with non-small cell lung cancer (NSCLC) diagnosed and followed in our institution with positivity to EGFR mutation from July 2016 to March 2019. Patients with history of other neoplasms were excluded. We collected data such as age at diagnosis, sex, smoking history, initial TNM stage and performance status and time of death. Data were inserted and analyzed in IBM SPSS statistics, version 25.
Results: 116 patients with NSCLC were tested for EGFR, 62.9% males and 46% non-smokers, mean age at diagnosis of 71.0 ± 9.0 years. EGFR mutation was found in 22 patients (19%). In this group the female sex was predominant (68.2%), as well as non-smokers (86.4%) and both had a significant association with the occurrence of the mutation (p = 0.001 and p < 0.001). Adenocarcinoma was the most frequent histologic type (90.9%) and most patients were diagnosed in stage IV (68.2%). TKI was used in 70% (n = 14) and afatinib in 78.6% (n = 11). The most common side effects were diarrhea (71.4%), mostly of CTCAE grade 1 and skin toxicity (64.3%), mostly grade 2. About half of the patients interrupted the treatment temporarily due to side effects (5 of 6 were under afatinib) and 35.7% needed a dose reduction (all under afatinib). One patient had to stop the treatment permanently due to grade 3 diarrhea. The overall median survival was 22 months, CI [11.3;32.7] and was significantly higher in the EGFR group (WT: 9.0 CI [3.9;14.1] months; EGFR: median survival not reached mean 23.2 CI [19.7;26.8] months, p = 0.002).
Conclusions: The frequency of the mutation in our population is similar to the one found in other studies. In spite of our sample size, significant differences were found in overall survival between the WT and EGFR positive groups, the latter with significant longer survival. Afatinib carried a higher rate of side effects and need for dose reduction.

***Keywords**: Lung cancer. EGFR.*

CO 090. PHARMACOGENETICS OF ADVANCED LUNG CANCER: PREDICTIVE VALUE OF FUNCTIONAL GENETIC POLYMORPHISM AGXT PRO11LEU IN CLINICAL OUTCOME

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Introduction: Lung cancer is a leading cause of cancer death worldwide, with over one million new cases diagnosed annually and with an overall 5-year survival rate of less than 15%. The AGXT gene codes for the enzyme alanine glyoxylate aminotransferase, which is involved in hepatic peroxisomal metabolism of platinum-based chemotherapeutic agents. Some studies have shown that C > T substitution at locus 32, which results in Pro-Leu substitution located at codon 11 of exon 1 of the AGXT gene (rs34116584), creates a conformational change and is therefore related to a significant decrease in its activity. This same functional polymorphism of the AGXT gene has also been shown to be related to response to platinum based chemotherapy and progression-free survival (PFS) in patients with metastatic colon adenocarcinoma. The association of this genetic variant on the clinical outcome of patients with non-small cell lung cancer (NSCLC) remains to be established.
Objectives: To evaluate the association of functional AGXT gene polymorphism in NSCLC progression, considering as primary and secondary endpoint PFS and overall survival (OS), respectively. Our secondary aim was to study the association of AGXT gene polymorphism with the response to platinum-based chemotherapy.
Methods: The gene and genetic variant were selected considering the best scientific evidence and based on bioinformatic analysis in silico. Genotyping of the AGXT rs34116584 genetic polymorphism was performed by mass spectrometry (MassArray) on DNA samples from patients with NSCLC (stages IIIA-IVB) from the Pulmonology Department of the University Hospital Center of Coimbra. Univariate survival analysis included the study of Kaplan-Meier curves with the Log-Rank test, while Cox regression was used as a multivariate analysis.
Results: We included 172 patients [65 (58.0-72.6) years old], 73% male with NSCLC (70% adenocarcinoma, 24% epidermoid and 6% others) diagnosed between January 2016 and December 2018. Univariate analysis showed that patients carrying the allele T of the AGXT rs34116584 was associated with lower OS (p = 0.017). Multivariate analysis showed shorter PFS for T carriers [HR = 2.0, 95%CI, 1.4-2.9, p < 0.0001] globally, as well as in a subgroup of patients (n = 160) treated with first line platinum-based chemotherapy [HR = 1.6, 95%CI, 1.1-2.4, p = 0.018].
Conclusions: The functional impact of the AGXT rs34116584 genetic polymorphism in decreasing the peroxisomal activity of the enzyme alanine glyoxylate aminotransferase may influence oxalate accumulation. This effect has potential implications for cisplatin metabolization, with impact on toxicity and tumor development, and is associated with worse prognosis. This polymorphism seems to have an impact on NSCLC progression, opening new perspectives for its inclusion as a pharmacogenetic predictor of response to platinum based chemotherapy.

***Keywords**: Genetic polymorphism. Pharmacogenetic. AGXT. Lung cancer.*

CO 091. OPTIMIZING T790M DETECTION IN EGFR-MUTATED ADVANCED NON-SMALL CELL LUNG CANCER

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Introduction: Disease progression in metastatic non-small cell lung cancer (NSCLC) with epidermal growth factor receptor (EGFR) mutation after treatment with 1st and 2nd generation tyrosine kinase inhibitors (TKI) is mostly due to T790M mutation. After disease progression, tumoral biopsy is the standard care for T790M evaluation; however, liquid biopsy is gaining significant importance in this context.
Methods: Retrospective analysis of EGFR-mutated NSCLC-patients submitted to re-biopsy or circulating tumour DNA (ctDNA) analysis, for the screening of T790M-mutation, between 2015 and 2019. Tumour samples were analysed by digital Polymerase Chain Reaction (PCR), and the plasma samples were analysed by digital PCR or Next-generation Sequencing (NGS). The agreement between tests was calculated with Cohen's Kappa test (SPSS® v.25).
Results: Thirty-six patients were eligible; the mean age was 65.8±11.7 years, and twenty one (58.3%) patients were women. The majority were non-smokers (n = 28, 77.8%). The most common mutations were exon 19 deletion (n = 23, 63.9%) and exon 21 L858R mutation (n = 8, 22.2%). At the time of screening of T790M-mutation, the majority presented only thoracic progression (n = 25, 69.4%), followed by local and systemic progression (n = 6, 16.7%), systemic progression (n = 3, 8.3%) and oligometastatic progression (n = 2, 5.6%). In total, ten patients underwent tumour biopsy, thirteen ctDNA analysis and thirteen underwent for both. T790M-mutation was detected in twenty-three (63.9%) patients. Seven patients underwent only tumour sampling and seven only ctDNA analysis. Nine patients underwent for both analysis, in three of these, T790M-mutation was not identified by ctDNA analysis, despite positivity in the tumour biopsy. Of the thirteen (36.1%) patients in whom the T790M mutation was not detected, four underwent both examinations. The degree of agreement was moderate (k = 0.552, p = 0.026).
Conclusions: Tumoral tissue biopsy and liquid biopsy play a key role in addressing progressive EGFR-mutated NSCLC-patients. In this sample, tumour biopsy and ctDNA analysis allowed the identification of the T790M mutation in 63.9% of patients. The use of each exam is complementary, and its real value depends on each clinical scenario.

Keywords: *T790M mutation. Liquid biopsy. EGFR mutation.*

CO 092. CLINICAL AND PROGNOSTIC CHARACTERISATION OF LEPTOMENINGEAL CARCINOMATOSIS IN LUNG CANCER

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Introduction: Leptomeningeal carcinomatosis is the result of haematogenous metastisation of lung neoplasms to the dura and arachnoid membranes of the central nervous system. Albeit a rare complication, when present, a fatal outcome nearly always ensues.
Objectives: Characterisation of the clinical and prognostic features of leptomeningeal carcinomatosis secondary to lung neoplasms in a Portuguese central hospital.
Methods: Clinical records of the patients admitted to Coimbra University Hospital diagnosed with leptomeningeal carcinomatosis (through cranial imaging, cytology or histology) as of 01/01/2000 were reviewed. Among these, the subgroup with disease secondary to a lung neoplasm was analyzed with regard to clinical features, neoplasm characteristics and staging, therapy, and survival.
Results: From the population of patients diagnosed with leptomeningeal carcinomatosis (n = 121), 8.3% suffered from a lung neoplasm. Of these, 80% consisted of adenocarcinomata, the majority of which were of mixed histology. Thirty percent of the leptomeningeal carcinomatosis diagnoses were synchronous with the diagnosis of the lung neoplasm. The remainder arose in context of disease progression from neoplasms previously staged IVb. Regardless of the time of diagnosis, leptomeningeal carcinomatosis dominated the clinical picture, the most prevalent clinical features consisting of cachexia, decreased state of consciousness and signs of intracranial hypertension. No distinctive peripheral neoplasm markers suffered a significant increase. Diagnosis was invariably supported by meningeal enhancement in cranial CT. Clarification of CT findings through cranial MRI was obtained in 60%, and 30% benefited from anatomopathological confirmation from liquor cytology or histology. Cerebral metastases were present in 30% of patients prior to the diagnosis of leptomeningeal carcinomatosis and another 30% were diagnosed concomitantly. Presentation of leptomeningeal carcinomatosis was associated with de novo cerebral hemorrhage in 20%. Every patient exhibited dependence on corticosteroids to control symptoms of cranial hypertension from the time of the diagnosis, with a prednisolone-equivalent average dose of 122 mg. Anticonvulsant therapy was required for 50%. Half of the patients was subjected to holocranial irradiation. First line chemotherapeutic regimen was platinum-based for most. The most common second line treatment involved tyrosine kinase inhibitors. Palliative surgical intervention was required in 20% of cases. Clinical deterioration inexorably progressed, the median survival time after diagnosis of leptomeningeal carcinomatosis being 33 days. Survival rates were superior for patients under tyrosine kinase inhibitor therapy.
Conclusions: Leptomeningeal carcinomatosis remains an often-terminal event in the natural history of lung cancer. Interestingly, this analysis points to an association with other life-threatening complications of the central nervous system, thus further worsening prognosis. The data also showed that acquisition of cranial imaging by MRI prevented unnecessary lumbar puncture in a subgroup, which gains particular importance in advanced neoplasms where end-of-life care is privileged. Lastly, despite the use of intensive multimodal therapeutic regimens, available chemotherapeutic agents have reduced encephalic bioavailability, therefore limiting their efficacy. Patients under tyrosine kinase inhibitor therapy exhibited greater survival rates, possibly attributed to positive prognosticators intrinsic to neoplasms treated with these agents or due to a survival benefit from the use of these drugs in leptomeningeal carcinomatosis, an area of investigation for which there are yet no randomized controlled trials.

Keywords: *Leptomeningeal carcinomatosis. Intracranial hypertension. Staging. Survival.*

CO 093. P16 RELATED BRONCHIAL EPITHELIAL HYPERPLASIA - A POSSIBLE PRE-NEOPLASTIC LESION

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Introduction: Guidelines for p16 detection in oral carcinomas and HPV infection related cervical squamous cell carcinoma might also be reflected in pulmonary carcinogenesis of epidermoid carcinoma and adenocarcinoma and respective metastasis. Viral DNA integration in host cell genome interferes with p53 (p14-MDM2-p53) and Rb (p16INK4a-cyclin D1-CDK4-RB) pathways, with downregulation of apoptosis.

Methods: Case report: 54-years-old woman with history of asthma, allergic rhinitis and heavy smoking habits with seasonal dyspnea and persistent dry cough. Thoracic CT scan: Endobronchial lesion in distal main left bronchus, biopsied during bronchoscopy.
Results: Biopsy sampling showed morphology of endobronchial squamous papilloma. Hyperplastic squamous metaplasia without significant nuclear atypia had relevant CK7, CK5 and p16 expression; TTF1 was not expressed; Ki67 presented with low rate and limited to the basal cell layers.
Conclusions: Squamous metaplasia, as an adaptative lesion, may be followed by epidermoid carcinoma in situ, a pre-neoplastic lesion of bronchial epithelium observed in response to toxic injury induced by cigarette smoke. HPV infection may be an additional agent in bronchial pre-neoplastic lesion development. In the presented case, CK7 expression might be relevant as a companion marker, whose persistence in smokers pure epidermoid metaplasia is uncommon due to pure basal cells adaptation. The final diagnosis was squamous cell papilloma with p16 expression suggestive of HPV infections. Basal cell hyperplasia with CK7 expression and low proliferation rate (Ki67), without expression of TTF1 and segmented CK5 positivity in lower cellular levels was recognized and might be the first description of a HPV related pre-neoplastic lesion, to the best of our knowledge. More studies are necessary for the definition of HPV role in lung cancer with p16 as a screening test for HPV infection and its influence in carcinogenesis/pre-neoplastic HPV related lesions.

Keywords: *P16. Bronchial epithelial hyperplasia. HPV.*

CO 094. PROGNOSTIC ROLE OF HISTOLOGICAL PATTERNS OF LUNG ADENOCARCINOMA IN PRE-OPERATIVE BIOPSY SPECIMENS

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Introduction: In 2011, a new classification for adenocarcinomas was published, based on predominant histological pattern, after which, a scale for risk stratification was proposed. Low risk adenocarcinomas include both microinvasive and in situ adenocarcinoma, while intermediate risk referred to patients with papillary, acinar or lepidic invasive adenocarcinoma patterns. At last, patients with either solid, micropapillary or mucinous patterns were included in the high risk group. The aim of this study is to evaluate the impact of the predominant histological pattern on the prognosis of patients submitted to lung adenocarcinoma resection surgery and to infer whether these patterns can be predicted pre-operatively, in lung biopsy specimens.
Methods: A retrospective study including all patients with the diagnosis of primary lung adenocarcinoma submitted to transthoracic biopsy and, subsequently, to lung resection surgery at the Centro Hospitalar Vila Nova de Gaia/Espinho between January 2014 and February 2019 was conducted. Patients whose diagnosis was confirmed through needle aspiration biopsy or bronchial lavage cytological analysis, or whose adenocarcinoma pattern was not described prior to surgery were excluded from our study. Demographic, histological and surgical data were collected from the patients' clinical files. Tumor size and staging were also assessed. Disease-free survival, recurrence and mortality rates were calculated and compared between histological risk groups. Concordance between histological patterns described in transthoracic pre-operative biopsies and surgical specimen definitive pathological analysis was determined using SPSS statistics.
Results: A total of 49 patients with a mean age of 65 were included in our study, with 3 patients within the low histological risk group, 33 with intermediate risk and 13 in the high risk group. The most frequently found histological pattern was acinar adenocarcinoma (23 out of 49 patients). Recurrence risk seemed to show a progressive increase throughout histological risk groups, although this association did not reach statistical significance when controlling for TNM staging and resection extension (lobar vs sublobar resection). The same tendency was found regarding disease-related death ($p = 0.057$). Opposingly, disease-free survival tended to decrease from low-risk ($\mu = 47$ months) to high risk groups ($\mu = 26$ months), although this could not be statistically proven. The sole existence of more than 5% of micropapillary pattern did not influence prognosis. Outcomes of patients with lepidic predominant pattern did not differ significantly from those with in situ or microinvasive adenocarcinoma. Histological pattern-related risk groups identified in pre-operative biopsies showed a good concordance with those found in definitive lung specimen analysis (kappa = 0.7).
Conclusions: No statistically significant conclusions can be achieved due to the low sample size, although, adenocarcinoma patterns may be relevant predictive factors for recurrence and mortality risk in patients submitted to surgery for lung adenocarcinoma, as larger studies have already proposed. Histological risk groups may be accurately predicted through pre-operative biopsy analysis and may eventually play a relevant role in pre-operative staging and surgical planning. Larger studies need to be conducted in order to identify whether lepidic pattern adenocarcinomas might be included in the low-risk group.

Keywords: *Adenocarcinoma. Biopsy. Histology. Pattern. Prognosis. Surgery.*

CO 095. MOLECULAR PROFILING OF LUNG ADENOCARCINOMA USING NEXT GENERATION SEQUENCING. THE EXPERIENCE OF A UNIVERSITY HOSPITAL

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Introduction: Lung adenocarcinoma is the most frequent pulmonary malignancy. Due to the development of several targeted therapies, molecular profiling of the mutations found in the tumor has become mandatory, with a very significant therapeutical and prognostical implication. Next Generation Sequencing (NGS) allows the simultaneous detection of an enlarged panel of alterations, and is one of the main methods in use for this analysis.
Methods: Retrospective analysis of demographical and clinical data and mutational study of patients whose tumors were submitted to NGS between 2017 and 2019 in a university hospital.
Results: 390 patients were included. 255 (65.4%) were male, with a mean age of 66.5 ± 10.9 years. By the time of diagnosis, 25% of patients were active smokers, 33% ex-smokers and 42% non-smokers. In 143 patients (35%) no molecular alterations were found. The most frequente mutation was in the KRAS gene, present in 106 patients (26%), followed by EGFR (n = 70, 17%) and ALK (n = 21, 5%). 78% of female patients had at least one identified mutation, while only 55% of male patients did (OR 2.94, $p < 0.005$). Female patients had EGFR gene mutations more frequently (OR 7.600, $p < 0.005$), but fewer KRAS mutations (OR 0.450, $p < 0.005$). There was no significant difference in ALK mutations between genders. When different age groups were compared (< 50 years, 50 to 70 years, > 70 years) no significant differences were found in the frequency of the most common mutations. Patients with a history of smoking had a lower odd of expressing mutations on NGS (OR 0.34, $p < 0.005$). However, KRAS mutations were more frequent in this group (OR 10.14, $p < 0.005$). It is important to notice that in 117 out of 390 patients (30%) a mutation with an available targeted therapy was found.
Conclusions: NGS in an effective method for the molecular profiling of lung adenocarcinoma, allowing to optimize the identification of candidates to personalized therapies. Certain demographic and clinical factors, like gender and smoking history, have a significant influence on the frequency of the most important mutations.

Keywords: *Lung cancer. Lung adenocarcinoma. Next generation sequencing.*

CO 096. ADVERSE EFFECTS OF IMMUNOTHERAPY IN NON SMALL CELL LUNG CANCER

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Introduction: Immunotherapy (IO) has several indications in the treatment of non-small cell lung cancer (NSCLC) and has emerged as an effective and generally well tolerated therapeutic alternative. However, its mechanism of action may cause immunomediated toxicities that are not characterized in the Portuguese population.
Objectives and methods: To characterize the adverse effects of IO in patients with NSCLC followed at Centro Hospitalar Lisboa Central since its introduction in 2016, through the review of their clinical files.
Results: We identified 67 patients, 42 male, with a mean age 65 years. All patients had previous smoking habits and none had underlying autoimmune disease. From the histological and staging point of view, 48 cases of adenocarcinoma and 19 of squamous cell cancer were identified. Most (n = 60) had early stage IV and 7 had undergone stage III chemotherapy and radiotherapy (for maintenance therapy with IO). 16 patients underwent first line with pembrolizumab; secondline with pembrolizumab, nivolumab and atezolizumab 9, 33 and 2 patients, respectively; and maintenance therapy with durvalumab 7 patients. Seven patients treated with OI were under corticosteroid therapy for other indications: spinal cord compression, bone or central nervous system metastasis. In stage IV patients, the average time of IO therapy was 4.42 months (minimum 1 and maximum 30 months). Of these patients, 3 discontinued due to toxicity, 10 discontinued due to disease progression, 18 died on treatment and 21 still have ongoing therapy (mean 4.60 months). Of the patients receiving durvalumab therapy 2 patients completed 1 year of therapy, 2 patients discontinued due to toxicity, 3 patients due to disease progression and 2 still have ongoing therapy. The most common adverse effects were asthenia (n = 21), skin changes (n = 11), thyroid dysfunction (n = 12) and intestinal transit disorders (n = 5), 40 of the symptoms being of grade 1 and treated symptomatically, without corticotherapy or immunosuppression and without interruption of treatment. The most serious adverse effects were grade 4 pneumonitis and grade 3 toxidermy to durvalumab and hyperthyroidism, asthenia and grade 3 decompensated heart failure to nivolumab. In two other cases under durvalumab and nivolumab, unconfirmed suspicion of pneumonitis was reported. These 7 cases required transient drug discontinuation and treatment with corticosteroid/immunosuppression. The case of grade 4 pneumonitis occurred in a patient under durvalumab undergoing maintenance after 3 months of therapy, which required hospitalization in an Intensive Care Unit with invasive mechanical ventilation, corticosteroid therapy and cyclosporine immunosuppression. The patient transiently improved but died within 6 months of the last IO cycle. Of other side effects, although its relationship with immunotherapy is not established, it is highlighted the occurrence of urinary tract infection in 8 patients.
Conclusions: IO is a safe and generally well tolerated treatment. A considerable proportion of patients had some adverse effects (n = 50 patients), but most were grade 1 (n = 40 episodes). Grade 3 or grade 4 adverse events requiring discontinuation of therapy occurred in 7 patients. We report 1 case of grade 4 pneumonitis with patient death.

Keywords: *Lung cancer. Non-small cell lung cancer. Immunotherapy. Adverse effects.*

CO 097. NINTEDANIB PLUS DOCETAXEL IN ADVANCED NON-SMALL CELL LUNG CANCER: THE EXPERIENCE OF ONE CENTRE

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Introduction: Immune checkpoint inhibitors (ICI) are a new standard of care in advanced non-small-cell lung cancer (NSCLC), but the optimal treatment sequence after progression on ICI and/or chemotherapy remains to be established. Nintedanib is a triple angiokinase inhibitor that has been approved by the European Agency Medicines in combination with docetaxel for the treatment of advanced NSCLC of adenocarcinoma histology, after first-line chemotherapy.
Objectives: To characterize the population of patients treated with nintedanib/docetaxel for NSCLC and evaluate its effectiveness and safety.
Methods: Retrospective analysis of clinical records of patients with NSCLC, accompanied in oncologic pulmonology and treated with nintedanib/docetaxel. Clinical, demographic and efficacy data were analyzed.
Results: Thirteen patients with advanced NSCLC were enrolled, of which 69.2% were male, and had a mean age of 62.3 years (min. 40-max. 74). Most patients were former/current smokers (69.2%) and had an ECOG performance status of 1 (53.8%). Regarding the histology, 12 patients had adenocarcinoma and 1 adenosquamous. PD-L1 expression was positive in two patients with expression of 5 and 50%. Two patients had driver mutations: 1 EGFR mutation and 1 ALK-EML4 translocation. All the patients had received first-line platinum-based doublet chemotherapy. In 3 cases, nintedanib/docetaxel was used in second-line and in 10 patients conducted in third-line setting. Regarding last 10 patients, 8 had been treated with immunotherapy (nivolumab = 6; pembrolizumab = 2) and 2 with tyrosine kinase inhibitors, previously as a second-line therapy. In the total population, the overall response rate was 36.3% and disease control rate was 63.6%. At the time of survival analysis, 9 progression-free survival (PFS) events had occurred (4 patients had disease progression and 5 died); the median PFS with nintedanib/docetaxel was 4.5 months (95%CI 1.9-6.9; range 2.3-9.2). Safety was evaluated in all 13 patients. The drug adverse events (AEs) with nintedanib/docetaxel were diarrhoea (n = 4), nausea (n = 3) and neutropenia (n = 1). Neutropenia was the only reported ≥ 3 AE and was fatal.
Conclusions: This sample, although short, is in line with previous studies suggesting the benefit of nintedanib/docetaxel as a therapeutic approach in patients with NSCLC, following disease progression under chemotherapy more or less immunotherapy. Larger studies are required to further explore the potential of this therapy.

Keywords: *Non-small-cell lung cancer. Adenocarcinoma. Nintedanib and docetaxel.*

CO 098. ADVERSE EVENTS ASSOCIATED WITH PEMBROLIZUMAB - EXPERIENCE OF AN ONCOLOGY OUTPATIENT CLINIC

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Introduction: Pembrolizumab is an IgG4 monoclonal antibody that binds to T lymphocyte programmed-death receptor (PD1) and prevents its binding to tumor cell-expressed PD-L1 ligand, thereby enhancing the anti-tumor immune response. It is indicated for the treatment of metastatic non-small cell lung carcinoma (NSCLC) if PD-L1 expression ≥ 50% as first-line therapy and as second line if

PD-L1 expression 1-49% (with no genetic mutations). Pembrolizumab is associated with immune-related adverse events which may occur at any stage of treatment, affect various organs, have several degrees of severity and in some cases may imply stopping pembrolizumab.
Objectives: To evaluate immune-related adverse events observed in patients with non small cell lung cancer receiving pembrolizumab followed at an oncology outpatient clinic.
Methods: Retrospective study conducted among patients followed at an oncology outpatient clinic receiving pembrolizumab between March 2017 and June 2019. We collected demographic data and data about the characteristics of the NSCLC and treatment with pembrolizumab by consulting clinical files. Adverse events and their severity were assessed according to Common Terminology Criteria for Adverse Events v4.0 (CTCAE).
Results: Total 24 patients, 54.2% (n = 13) male, mean age 66.7 years. 91.7% had adenocarcinoma (n = 22) and the remaining squamous cell carcinoma. In 37.5% (n = 9) pembrolizumab was used as first-line therapy. The average duration of treatment was 7.2 months (minimum < 1 month; maximum 24.7 months). Adverse effects were reported in 79.2% (n = 19). Among these, fatigue was reported in 84% (n = 16), anorexia in 21% (n = 4) and vomiting in 10.5% (n = 2). Changes in liver tests (5.2%, n = 1) and renal function (10.5%, n = 2) were also reported. One patient (5.2%) had moderate arthralgias and needed systemic corticosteroid therapy in a low dose for a period. None of these patients stopped immunotherapy. Regarding endocrinopathies, only one patient (5.2%) had diabetes mellitus and started insulin therapy. In this case the immunotherapy was temporarily suspended until normalization of glycemia. Two patients (10.5%) had dermatological changes with severe maculopapular erythema (grade 3-4). One of the patients required prolonged hospitalization for this reason, and the diagnosis was confirmed by skin biopsy. In both cases the immunotherapy was permanently discontinued.
Conclusions: Mostly of the data obtained regarding immune-related adverse events are similar to those described in the literature. Regarding endocrinopathies, no thyroid changes were reported, which are one of the most frequent manifestations of immune-related adverse effects. Regarding dermatological changes, although frequent, they are generally mild and do not imply the suspension of immunotherapy, contrary to what was found in our sample. This divergence may be secondary to the small sample size. It is critical that physicians treating these patients are familiar with the broad spectrum of possible immune-related adverse events, since they may be life threatening, although rare. Early identification and treatment are essential to limit its duration and severity.

Keywords: *Non-small cell lung carcinoma. Pembrolizumab. Immune-related adverse events.*

CO 099. ABSCOPAL EFFECT. THE BOOST OF IMMUNOTHERAPY

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Introduction: The abscopal effect refers to the antitumoral effect of radiotherapy at distant sites that are not irradiated. There is some evidence that radiotherapy stimulates the immune system, promoting a systemic antitumoral response. The combination of radiotherapy and immunotherapy can potentiate this phenomenon. The authors present 2 cases of abscopal effect in lung cancer patients submitted to palliative radiotherapy after beginning of immunotherapy.
Case reports: Case 1: 71 year-old man, smoker, diagnosed lung adenocarcinoma stage IVa (cT3N0M1a) in 04/2016. No targeting-mutations detected and PD-L1 0%. Received 4 cycles of chemotherapy - carboplatinum and pemetrexed with partial remission and, 17 cycles of pemetrexed maintenance therapy. Started nivolumab in 09/2017 due to locoregional disease progression (significant increase of the thoracic lesion). Submitted to thoracic radiotherapy 20 Gy, 5 fr, 3DRT in 11/2017 because of pain unalleviated by optimized medical therapy. Chest CT in 01/2018 showed partial remission with significant reduction of the thoracic lesion and the ipsilateral mediastinal and hilar adenopathies. Nowadays, completed 47 administrations of immunotherapy with stable disease and no significant adverse effects. Case 2: 63 year-old man, smoker, diagnosed lung adenocarcinoma stage IVa (cT1bN0M1a) in 10/2017. Mutation c.35G > A (p.Gly12Asp) in exon 2 of the KRAS gene and PD-L1 0%. Received 4 cycles of chemotherapy - carboplatinum and pemetrexed with stable disease and, 12 cycles of pemetrexed maintenance therapy. Started nivolumab in 11/2018 due to distant disease progression (brain lesions and de novo left adrenal metastasis). Submitted to whole brain radiotherapy 30 Gy, 10 fr, 3DRT in 02/2019 and antalgic radiotherapy to the left adrenal metastasis 30 Gy, 10 fr, 3DRT in 03/2019. Chest and abdominal CT in 05/2019 showed partial remission with significant reduction of the left adrenal metastasis and the left hilar adenopathies. In 08/2019, after 16 administrations of immunotherapy, the patient developed a grade 2 colitis. At this point, nivolumab was stopped and the patient was treated with corticotherapy.
Discussion: These cases exemplify the possible capacity of immunotherapy to boost the abscopal effect of radiotherapy, described more than 60 years ago. In the era of "combination therapy", the association of immunotherapy and radiotherapy has become an attractive strategy for lung cancer patients.

Keywords: *Abscopal effect. Immunotherapy.*

CO 100. THORACIC MAGNETIC RESONANCE IMAGING IN THE CHARACTERISATION PULMONARY LESIONS: INITIAL EXPERIENCE OF A TERTIARY CENTRE

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Introduction: Lung nodules (LN) or masses characterization is a major clinical need. Recent technical advancements have made Magnetic Resonance imaging (MRI) with diffusion-weight imaging (DWI) adequate for lung malignant and benign lesions differentiation.
Objectives: To evaluate the performance of MRI in differentiating benign from malignant lung lesions, using apparent diffusion coefficient (ADC), signal intensity of the lesion-to-spinal cord ration (LSR) and the presence of restriction at DWI.
Methods: Retrospective unicentre study that includes all patients submitted to lung MRI in the study of LNs or masses from July 2012 to July 2018. Data related to lesion characterisation at Computed Tomography (CT) and MRI, and final anatomopathological diagnosis was collected.
Results: Forty-four patients were included: 22 male (54.5%): mean age 62 ± 9 years. Forty-seven lung lesions underwent both chest-CT and MRI with DWI: 26 (55.3%) performed ADC; 23 (48.9%) performed LSR; and 27 (57.4%) were classified for the presence or absence of restriction. Mean lesion size was 18.5 ± 12.0 mm at CT and 20.3 ± 13.6 mm at MRI. There was a positive, statistically significant and moderate correlation ($r = 0.58$; $p < 0.001$) between lesion sizes between both methods. The final diagnosis was benign 34% and malignant in 66% cases, which 53.2% were primary lung cancers and 12.8% metastasis from a non-lung cancer. Older patients were significantly more times diagnosed with malignancy ($p = 0.001$). Concerning lesion characterization at MRI, the calculated mean ADC for benign lesions was $(0.54 \pm 0.97) \times 10^{-3}$ $mm^2.sec^{-1}$ and for malignant lesions was $(0.09 \pm 0.81) \times 10^{-3}$ $mm^2.sec^{-1}$. The calculated median LSR and interquartile range (IQR) for benign and malignant lesions was 0.66 (IQR 0.77) $s.mm^{-2}$ and 0.68 (IQR 1.185) $s.mm^{-2}$, respec-

tively. There was no significant difference between benign and malignant lesions in relation to ADC and LSR (p = 0.871 and p = 0.301, respectively). The presence of restriction was observed in 8.3% of benign lesions and 73.3% of malignant lesion, being this difference statistically significantly (p = 0.001). Trough MRI, the evaluated pulmonary lesions were correctly classified in 83% of the cases (p < 0.001). In 90% cases of malignancy and 85.5% cases of benign lesions, the MRI classification was correct.
Conclusions: In this study, the evaluation of lung lesions trough MRI showed that the presence of restriction at DWI was the only parameter associated with malignancy and may be useful for differentiating between malignant and benign lesions.

Keywords: *Magnetic resonance imaging. Benign. Malignant.*

CO 101. LUNG CANCER, 17 YEARS LATER

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Introduction: In Portugal, lung cancer (LC) remains the main cause of cancer death in males. In recent decades, several international publications have pointed to changes in demographic characteristics and therapeutic strategies of patients with LC.
Objectives: To investigate and compare the demographic and clinical characteristics of LC patients diagnosed in oncologic pulmonology unit of our center, at two different time intervals.
Methods: 500 patients diagnosed with CP between 1990-1997 (group 1) and 500 patients diagnosed between 2014-2017 (group 2) were sequentially selected. Patients were characterized according to age, gender, smoking habits, performance status (PS), histology and therapeutic approach.
Results: In both groups most patients were male, however, in group 2 there was a significantly higher percentage of female than in group 1 (27.4% vs 16%, respectively). No statistically significant differences were found in age. Smoking habits were associated with gender. The smokers and former smokers were mainly male, and the percentage of former smokers was higher in group 2 (37.8% vs 15.8%). In both groups, most non-smoking patients were female. The patients in group 2 had poor performance status at the time of diagnosis. In group 2 there are more adenocarcinoma histology (group 2: 59.2% vs group 1: 32.8%) and fewer squamous cell carcinoma (group 2: 19.8% vs group 1: 49%). In both groups, most LC were diagnosed in advanced stage (group 1: 79.4%; group 2: 80.6%). Regarding treatment, there was a significant increase in chemotherapy alone used as the first therapeutic approach (group 2: 63.4% vs group 1: 31.6%) and, proportionally, a significant reduction in the number of patients in whom the only possible treatment was the best supportive therapy (group 2: 13.6% vs group 1: 45.8%). The use of a combined treatment strategy as the first option is similar in both groups (group 1: 13.2%; group 2: 13.4%). However, the proportion of combined therapies that included surgery was higher in group 2 (6.2% vs 3.4%).
Conclusions: In recent years, the demographic characteristics associated with LC have changed slightly. By comparing the two groups, with a time interval of 17 years, we found an increase in the diagnosis of LC in women. We have seen a decrease in the percentage of smokers and an increase in former smokers. The patient's performance status represents a decisive condition in the choice of treatment. We found a higher proportion of patients with PS 0-1 in the most recent group, which may be explained by improved socioeconomic conditions and easier access to specialized centers. There was also a clear reduction in the number of patients in whom the only therapeutic option was the best supportive therapy. In both groups, approximately 80% of patients had extensive disease at the time of diagnosis, highlighting the need for more effective early diagnosis strategies.

Keywords: *Lung cancer. Epidemiology. Therapeutic approach.*

CO 102. LUNG CANCER SCREENING IN COPD PATIENTS

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Introduction: COPD patients have a high risk of developing lung cancer and represent a preferred target to be included in screening programs. The largest screening study in Europe (NELSON) demonstrated a positive association between CT scanning and reduced mortality in high-risk populations. More recently, the COPD-LUCSS score has been validated as a predictive tool capable of identifying patients with COPD and high risk of lung cancer-associated mortality.
Objectives: Analyze and compare the value of both scores in a COPD patient population and determine the incidence of lung cancer.
Methods: Retrospective study of COPD patients followed in pulmonology consultation for a period of 10 years (2008 to 2018). The COPD-LUCSS score (BMI < 25, Pack years > 60, > 60 years and emphysema) and the NELSON score (50-75 years old, smokers or former smokers (less than 10 years old) of 15 or more cigarettes per day for more than 25 years or ten or more cigarettes for more than 30 years). The lung cancer incidence rate was calculated for each of the subgroups at the end of the period (2018).
Results: A total of 84 patients were included in the study (mean age 64.3 ± 9.5 years, 88.1% male and 44% former smokers). Regarding the GOLD classification, 6% were in stage I, 40.5% in stage II, 47.6% in stage III and 6% in stage IV. Applying the COPD-LUCSS score, 42 (50%) patients were classified as high risk and 42 (50%) as low risk. Of the total patients in the high-risk group, 17 (40.5%) were diagnosed with lung cancer at follow-up in contrast to only 3 (7.1%) diagnoses in the low-risk group. Using the NELSON study criteria, 48 patients (57.1%) would be eligible for lung cancer screening. In this subgroup, during the follow-up period, 16 patients (33.3%) were diagnosed with lung cancer compared with 4 patients (8.3%) in the subgroup not eligible for screening. Cox regression analysis showed that both COPD-LUCSS and NELSON criteria were significantly associated with lung cancer incidence (COPD-LUCSS with hazard ratio (HR) of 0.15, confidence interval of 0, 43-0.51, p < 0.05 and NELSON with HR 0.32, confidence interval 0.17-0.96, p < 0.05). The area under the ROC curve was 0.73 for COPD-LUCSS and 0.65 for NELSON. There was no statistically significant difference between the values of the area under the ROC curve of the two criteria (p > 0.05).
Conclusions: The COPD-LUCSS and NELSON scores predicted lung cancer or cancer in the population studied for COPD. COPD-LUCSS does not show greater accuracy than the NELSON study to predict lung cancer occurrence.

Keywords: *Lung cancer screening. COPD.*

CO 103. CURRENT KNOWLEDGE AND IMPLEMENTATION OF IDIOPATHIC PULMONARY FIBROSIS GUIDELINES AMONG PULMONOLOGISTS IN PORTUGAL - WHERE DO WE STAND?

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Introduction: Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive fibrotic interstitial lung disease of unknown cause, predominant in male adults over 55 years and associated with a pattern of usual interstitial pneumonia (UIP) based on radiological or histological criteria. The diagnosis of IPF is a complex, multi-step process and delays in diagnosis cause a negative impact on the survival of patients. Additionally, a multidisciplinary team of pulmonologists, radiologists and pathologists is necessary for an accurate IPF diagnosis. The aim of the present study was to assess how IPF patients

are managed in Portugal and to evaluate the level of agreement of Portuguese pulmonologists with the clinical practices according to the Official ATS/ERS/JRS/ALAT Clinical Practice Guideline and the national consensus.
Methods: 78 practicing pulmonologists were enrolled (May-Aug 2019) in a survey development by IPF experts and comprising one round of 31 questions structured in three parts. The first part was related to the professional profile of the participants, the second part assessed their level of knowledge and practice agreement with national consensus and international guidelines for IPF as well as their access to other specialties as radiology and pathology for IPF diagnosis, and the third part was a self-evaluation of the guidelines' adherence for diagnosis and treatment in their daily practice.
Results: Participants represented a wide spectrum of pulmonologists from 14 districts of Portugal and autonomous regions of Azores and Madeira. The majority were female (65%), and within 5-19 years of experience (71%) and working in a public clinical center (83%). Of the total, 79% have a monthly volume > 70 of patients with any respiratory disorders. The yearly volume of IPF patients was 5-14 for 54% of the respondents. Importantly, the majority of pulmonologists follow their IPF patients (n = 43), while 22-26% referred IPF patients to other specialists in the same hospital or to another center. Within the pulmonologist that do not refer, 81% revisited their IPF patients every three months or less. Regarding the knowledge and agreement with IPF national consensus and international guidelines, 56% and 60% of pulmonologists evaluated their level as high, respectively. Interstitial Lung Diseases multi-disciplinary teams, that include radiology or pathology, were available for 40% or 29% of participants, respectively, while the majority of pulmonologists (92%) agreed or absolutely agreed multi-disciplinary discussions is recommended to accurately diagnose IPF. A pulmonary biopsy was not considered as required (99%) to establish an IPF diagnosis, but it could be considered (86%) in a context of 'possible/probable UIP'. In addition, 99% of the pulmonologists consider transbronchial cryobiopsy as a valid option to stablish an IPF diagnosis. The opinions regarding the terms probable or possible UIP are divided among pulmonologists: 9% show disagreement with the term "probable UIP" and this percentage raises for 36% with the term "possible UIP". Regarding treatment, 97% absolutely agreed or agreed that antifibrotic therapy should start once the IPF diagnosis is established. A high level of agreement was found for long-term oxygen therapy in patient with significant resting hypoxemia (94%), lung transplantation on appropriate patients (95%) and pulmonary rehabilitation for the majority of IPF patients (95%). Corticosteroid monotherapy, and combination therapy with n-acetylcysteine, azathioprine and prednisone, were not supported (92-95% disagreement). Finally, 71% stated that 6 months is the recommended time for follow-up visit in IPF patients whereas 25% answered 3 months.
Conclusions: To our knowledge, this survey represents the largest and most comprehensive assessment of the level of knowledge and acceptance of IPF National Consensus and international Official ATS/ERS/JRS/ALAT IPF Guidelines. We were able to capture a representative sample of pulmonologists (n = 78), most importantly the ones who follow a large number of IPF patients in their clinical practice (n = 43). Pulmonologists in this panel highly understand and agree with national consensus and international guidelines for IPF treatment however, their implementation in Portugal is heterogeneous, particularly in the level of assess to a specialized multidisciplinary team with experienced radiologist and pathologist.

Keywords: *Idiopathic pulmonary fibrosis. Diagnosis. Awareness. Guidelines. Consensus.*

CO 104. AROUSAL INDUCED CHANGES OF HEMODYNAMIC VARIATION DURING SLEEP

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Introduction: Obstructive sleep apnea (OSA) has been associated with non-dipping blood pressure (BP). The precise mechanism is still under investigation, but repetitive oxygen desaturation and arousal induced sleep fragmentation are considered the main contributors.
Methods: We analysed at sleep/wake transition beat-to-beat (Nexfin-HD®) the hemodynamic following parameters (HP): heart rate (HR); systolic blood pressure (SBP) and stroke volume (SV). Differences in mean HP values during wake and sleep and their standard deviations (SD) were compared between 34 controls (C) and 22 OSA patients. Statistically significance was evaluated by the student t-test for independent samples and the effect size by Cohen´s d (d). HP evolution was investigated by plotting the measured HP values against each consecutive pulse wave. A simple regression analysis was performed and the coefficient beta (SCB) was used to indicate HP evolution. In a hierarchical block regression, we investigated which variables increased the prediction for the SCB: model 1 BMI and age, model 2 + apnea/hypopnea index (AHI), model 3 + arousal index (AI) and model 4 + sleep efficiency.
Results: Between the two groups the SBP increased in OSA and decreased in C resulting in a significant difference ($p = 0.001$; $d = 0.92$). The SV demonstrated a similar development ($p = 0.047$; $d = 0.56$). The wake/sleep variation of the HP measured by the SD was higher in the OSA group: HR: $p < 0.001$; $d = 1.2$; SBP: $p = 0.001$; $d = 0.94$ and SV: $p = 0.005$; $d = 0.82$. The hierarchical regression analysis of the SCB demonstrated in SBP that the addition of AI to AHI resulted in: $\Delta R2$: + 0.163. and ΔF +13.257 ($p = 0.001$) and for SV $\Delta R2$: + 0.07 and ΔF 4.83 ($p = 0.003$). The arousal index but not the AHI remained statistically significant in the regression analysis model 3: SBP: $\beta = 0.717$; $p = 0.001$) SV: $\beta = 0.469$; $p = 0.033$).
Conclusions: In this study we demonstrated, that in OSA the physiological dipping in SBP and SV decreased, and the variation of all investigated parameter increased. Hierarchical regression analysis indicates that the addition of the arousal index increases the prediction of the HP evolution following sleep onset for both SBP and SV and may be the most important variable.

Keywords: *Arterial hypertension. Sleep apnea. Sleep fragmentation.*