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CO 001. LINEAR ENDOBRONCHIAL ULTRASOUND: EXPERIENCE OF A CENTRE

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Introduction: Linear endobronchial ultrasound (EBUS) is a minimally invasive procedure that allows the evaluation of mediastinal and hilar pathology, replacing mediastinoscopy as the initial exam in this diagnostic search.
Objectives: To analyze EBUS performance in a tertiary centre from 1/1/2015 to 31/12/2018.
Methods: Analytical, cross-sectional, retrospective study of all consecutive patients who underwent EBUS in an institution from 1/1/2015 to 31/12/2018. The exams were performed under general anesthesia and in the presence of a cytopathologist, allowing immediate observation of the material obtained. The following variables were analyzed: gender, age at the time of examination, past history of cancer, imaging, endobronchial abnormalities, number of punctured targets, their location, size and number of punctures, final diagnosis, complications and follow-up.
Results: Over the study period, 563 EBUS were performed in 542 patients. Patients were mostly males (69.3%), with a mean age at the time of the diagnostic exam of 62.4 ± 13.0 years. From these patients, 315 had past history of cancer. Main indications for the exam were: diagnosis and/or staging of suspected or confirmed lung cancer (65.2%), diagnostic of mediastinal masses and/or adenopathies without suspicion of lung cancer (34.5%), drainage of mediastinal fluid and loculated pleural fluid collection for diagnosis (0.3%). Most of the exams showed no endobronchial alterations (68.0%), 12.3% had indirect signs, 8.9% had inflammatory alterations and 6.4% had direct signs of neoplasia. A total of 1,223 lymph nodes (LN) stations were punctured (mean 2.3 ± 1.1 per patient) and 54 masses adjacent to central airways. These LN had an average size of 12.3 ± 6.4 mm and were punctured 2.6 ± 1.2 times, with predominance of the infracarinal (n = 352) and the right lower paratracheal (n = 348) stations, with a diagnostic yield of 95.7% and 94.3%, respectively. Masses average size was 35.8 ± 16.1 mm, with a mean of 3.6 ± 1.7 punctures, with a diagnostic yield of 92.6%. Malignancy was confirmed in 58.4% of the patients with tumor suspicion: most common diagnosis were adenocarcinoma (48.9%), extrathoracic tumor metastasis (18.5%) and lymphoma (7.6%). Among those patients who underwent EBUS for lung cancer staging (28.1%) the sensitivity was 89.1%, specificity was 100%, positive predictive value was 100% and negative predictive value was 91.5%. From these, 38.4% were staged as N0, 50.9% of which were confirmed by other invasive procedures. Major complication rate secondary to these tests was 0.7%.
Conclusions: Our study shows EBUS importance for diagnosis of a wide range of thoracic diseases as well as lung cancer staging, with good yield and also safety.

Keywords: *Endobronchial ultrasound. Lung cancer. Staging. Thoracic diseases.*

CO 002. RIGID BRONCHOSCOPY IN CENTRAL AIRWAY OBSTRUCTIONS - A BRONCHOLOGY CENTER' EXPERIENCE

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Introduction: Central airway obstruction is characterized by involvement of the trachea, main bronchi (BP) or intermediate bronchus (BI) and is estimated to occur in 20-30% of lung neoplasms.
Objectives and methods: Retrospective study aiming to characterize individuals with central airway obstruction of neoplastic etiology submitted to rigid bronchoscopy at Hospital Prof. Dr. Fernando da Fonseca (January 2018-July 2020). The analysis of the data, which was obtained by consulting the clinical file, was performed using Microsoft Office Excel 2013.
Results: Fifty patients with a mean age of 63.4 ± 9.1 years were studied, of which 72% (36/50) were male. The left BP was the most frequent site of disease (58%; 29/50), followed by the right BP (34%; 17/50) and BI (10%; 5/50). Eleven patients (22%) had disease extension to the distal trachea and 6 involvement of both BP. Thirty-three patients (66%) had a degree of obstruction > 80%, 16 (32%) > 50% and only one obstruction of 30%. The distal bronchial tree was per-

meable in 60% of patients (30/50), with only 16 showing no evidence of tumor infiltration downstream. 42% of intrinsic obstructions (21/50), 10% extrinsic (5/50) and 48% mixed (24/50) were identified. From the histological point of view, squamous cell lung cancer (SLC) was the most frequent (40%; 20/50), followed by lung adenocarcinoma (ADC) (24%; 12/50) and small cell carcinoma (SCLC) (18%; 9/50). One patient had carcinoid tumor and 3 unspecified non-small cell carcinoma. Five patients had histology compatible with metastatic disease of primary extrapulmonary neoplasm. Only one patient had an initial stage of the disease (IIA), and the rest were in stage III (30%; 15/50) and IV (68%; 34/50). Regarding presenting symptoms stands out dyspnea (68%; 34/50) and cough (50%; 25/50), hemoptysis sputum/hemoptysis (26%; 13/50), chest pain (22%; 11/50); and 6 patients present symptoms related to metastatic disease, without respiratory symptoms. Only 5 (10%) had no history of smoking. There was imaging evidence of luminal impairment in 84% of patients (42/50). The endoscopic therapy performed included dilation with de-bulking (54%; 27/50), balloon dilation (22%; 11/50), laser photocoagulation (60%; 30/50), electrocautery loop (4%; 2/50) and prosthesis placement (54%; 27/50). There was evidence of recurrence in 7 patients, with a mean time to first relapse of 5.36 months. Mortality was 76% (38/50), with an average survival time since intervention of 5.37 months.
Conclusions: Although ADC is the most common histological type of lung cancer, CPvC is more frequently associated with endobronchial disease, as documented in this study. We identified 98% of patients with severe obstruction (> 50%), however, the mortality in this series was lower than that previously published (76% vs 98%), with a longer survival time (5 vs 3 months). We believe that referencing as early as possible for endobronchial therapy has a strong impact on the morbidity and mortality of these clinical situations.

Keywords: *Lung cancer. Central airway obstruction. Rigid bronchoscopy.*

CO 003. FOREIGN BODY ASPIRATION IN ADULTS – EXPERIENCE OF 20 YEARS

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Introduction: The presence of foreign bodies on the airway is a rare event in adults. Its diagnosis may require a high degree of clinical suspicion, since symptoms may be very bland. Additionally, airway foreign bodies can also be the cause of obstructive pneumonia or atelectasis. Bronchoscopy allows not only the diagnosis through direct observation of the foreign body, but also to extract it, constituting a therapeutic method.
Methods: The reports of all the flexible bronchoscopies performed between the 1st of December 2000 and 31st of July 2020 on our Pulmonology Techniques Unit were retrospectively analyzed and information about all the cases in which foreign bodies were detected on the airway was collected.
Results: Of the 3,167 flexible bronchoscopies performed during the study period, 18 (0.56%) allowed the diagnosis of the presence of a foreign body on the airway. Most patients were male (n = 12; 66.7%), and the mean age was 72.28 ± 10.80 years (minimum 48, maximum 92 years old). The right bronchial tree was the most frequently involved (n = 14; 77.8%) and the two most frequent locations of the foreign bodies were the intermediary bronchus (n = 6; 33.3%) and the right lower lobe bronchus (n = 4; 22.2%). Complete removal of the foreign body was possible in 12 cases (66.7%), partial in 1 case (5.6%) and it was not possible in 5 cases (27.8%). Rigid bronchoscopy was needed for the removal of the foreign body in 5 cases (27.8%). The complication rate on this series was null (0%).
Conclusions: Foreign body aspiration is a rare event in adults. Flexible bronchoscopy is an effective and safe method in the initial approach of foreign bodies present in the airway, allowing, in many cases, to preclude the need for rigid bronchoscopy, notwithstanding its value on the management of these situations.

Keywords: *Foreign body. Aspiration. Flexible bronchoscopy.*

CO 004. FACTORS RELATED TO BAL RECOVERY RATES

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Introduction: Bronchoalveolar lavage (BAL) is considered a valuable diagnostic tool, particularly in the for interstitial lung diseases. The volume recovered after saline instillation – recovery rate (RR) – seems to affect the subsequent diagnostic tests. So far, it is not well established which factors affect or predict BAL RR.
Objectives: To explore factors potentially associated with BAL RR at a Bronchology department.
Methods: We retrospectively analysed 48 consecutive BAL procedures and collected demographic data, intra-procedural aspects, as well as lung function and lung imaging parameters. Our data were analysed using IBM SPSS Statistics v25.
Results: We observed age to have a negative correlation to BAL RR ($r = -0.4$, $p = 0.002$). Forced Vital Capacity (FVC) and Forced Expiratory Volume in the first second (FEV1) were positively correlated to LBA RR ($r = 0.521$, $p = 0.005$ and $r = 0.561$, $p = 0.002$), respectively. Chronic usage of bronchodilators also showed negative correlation to BAL RR ($r = -0.29$, $p = 0.046$). We also demonstrated the second instilled syringe recovery more accurately reflects the RR ($r = 0.959$, $p < 0.001$, vs first syringe $r = 0.852$, $p < 0.001$ and third syringe, $r = 0.93$, $p < 0.001$). We could not demonstrate an association between BAL RR and DLCO ($p = 0.085$), fibrotic aspects in CT scan ($p = 0.579$), smoking intensity in Pack-years ($p = 0.992$), and examiner's perceived patient tolerance ($p = 0.826$) or secretions quantity ($p = 0.938$). Laterality and specific segment where the BAL was performed did not significantly affect RR ($p = 0.273$ and $p = 0.287$, respectively). Finally, in a regression model, we could demonstrate that chronic bronchodilator usage was a significant negative predictor of BAL RR (beta = -0.466, $p = 0.012$), but we failed to show significant predictive power of FVC (beta = 0.547, ns), FEV 1 (beta = -0.148, ns), and age (beta = -0.259, ns). The overall model fit was $R2 = 0.509$, $p = 0.003$.
Conclusions: In line with previous works, factors related to parenchymal characteristics, either DLCO or imaging aspects, did not show association to BAL RR. On the other hand, parameters related to airways features and function, particularly FVC and FEV1, and also chronic usage of bronchodilators, seem to have a predictive value for LBA RR. A larger prospective cohort could allow for further exploratory analysis and greater understanding in this matter.

Keywords: *Broncho-alveolar lavage. Recovery rate. FEV1. FVC.*

CO 005. DIAGNOSTIC YIELD AND SAFETY OF TRANSBRONCHIAL LUNG BIOPSY COLLECTED BY FORCEPS VS FREEZING IN THE DIAGNOSIS OF DIFFUSE PARENCHYMAL LUNG DISEASE

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Introduction: Obtaining a definitive diagnosis when suspecting of interstitial lung disease is a challenge and the importance of histological confirmation has been increasing. To address this problem, less invasive techniques have gained a prominent role in the face of surgical procedures that may incur in sequelae and important functional limitation. Transbronchial lung biopsy (TBLB), namely by forceps (fTBLB) is a safe procedure, several decades in use, but has

often insufficient efficacy. Transbronchial lung cryobiopsy (TBLC) is a procedure in the process of validation and has seen increasing use in these diseases.
Objectives: Comparative assessment of diagnostic yield and safety of fTBLB and TBLC.
Methods: Retrospective analysis of the clinical records of patients undergoing TBLB from January 2016 to August 2020. Demographic, clinical, imaging and procedure-related data were collected, including its complications and profitability, as well as the final diagnosis in a multidisciplinary meeting (MDM). Patients were divided into two groups (fTBLB and TBLC) for comparative analysis. Statistical analysis was performed using SPSS Statistics v23.
Results: During the study period, 59 TBLB were performed (34 fTBLB, 25 TBLC). The patients were mostly men (59.3%) with a median age of 58 years old, presenting no differences between groups. The radiological pattern was predominantly suggestive of an alternative diagnosis to UIP (74.6%). TBLC was performed exclusively under general anesthesia, while fTBLB was performed under conscious sedation in 50% of cases. The technical yield of TBLC was 100% and that of fTBLB 85.3%. The diagnostic yield of histology in TBLC, per se, was higher (68% vs 35.3%, p = 0.013). The integration of the histological result with the other data at MDM allowed the diagnosis more often in TBLC (84% vs 50%, p = 0.007). The final diagnosis differed from the main initial hypothesis based on the result of histology in 20% of TBLC and 8.8% of fTBLB. Analyzing the subgroup of patients with suspected granulomatous disease, TBLC preserves greater yield compared to fTBLB (90.9% vs 52.4%, p = 0.049). Regarding complications, pneumothorax was identified more frequently after TBLC (16.0% vs 2.9%, p = 0.152), with rare need for chest tube insertion in both groups (4.0% vs 2.9%). The frequency of bleeding was similar between the two groups (20.0% vs 18.2%).
Conclusions: TBLC is a procedure with greater diagnostic yield than fTBLB, while preserving a similar safety profile, with the exception of a higher occurrence of pneumothorax, yet without significant differences in the need for chest tube drainage.

***Keywords**: Lung biopsy. Bronchoscopy. Insterstitial lung disease.*

CO 006. PROGNOSTIC AND SURVIVAL IN MALIGNANT PLEURAL MESOTHELIOMA

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Introduction: Malignant pleural mesothelioma (MPM) is a rare entity with poor prognosis. In most cases, is associated with previous exposure to asbestos, with a latency period of 40 years. The diagnosis with pleural biopsy by thoracoscopy is the gold standard. Chemotherapy is still the first-line treatment, but trials with immunotherapy and target therapies look promising. Only highly selected patients should be candidate for multimodal treatment with radical surgery at referral centers.
Objectives: Describe the MPM's diagnostic and therapeutic approach and analyse survival and prognostic factors.
Methods: Retrospective study of patients with MPM between January 1999 and December 2019 in two hospital units.
Results: 51 patients were included, with a predominance of males (72.5%) and a mean age of 68 ± 10 years. At diagnosis, 53.1% had a performance status (PS) ECOG of 0 and 55.6% had significant weight loss. 45.1% of patients had a record of occupational exposure to asbestos, but this may be underestimated. 31.4% had smoking habits. Diagnosis was made by percutaneous pleural biopsy (51%), medical thoracoscopy (21.6%), CT-guided biopsy (15.7%) and surgical biopsy (11.8%). The majority had epithelioid mesothelioma (72.5%). 59.1% had advanced disease at diagnosis (stage IIIB or IV). 86.4% of patients received first-line chemotherapy, usually carboplatin/pemetrexed, but only 31.9% received a second line. Radiotherapy was performed on 12 patients and 3 underwent surgery (2 pleurectomy/decortication and 1 extrapleural pneumectomy). The median overall survival (OS) was 12 months, with median progression-free survival of 11 months. The OS varied significantly with PS ECOG (Log rank p < 0.001) and weight loss (Log rank p = 0.018). Applying the Brims decision tree, a prognostic model proposed in 2016, there was a statistically significant difference in the OS of the various risk groups (Log rank p = 0.015).
Conclusions: Individual prognostic factors, such as PS ECOG and weight loss, and specific prognostic models, such as the Brims decision tree, can be important tools to guide the MPM approach from diagnosis.

***Keywords**: Malignant pleural mesothelioma. Survival. Prognosis.*

CO 007. PREDICTORS OF MALIGNANT CYTOLOGY ON PLEURAL EFFUSION

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Introduction: No reliable biochemical marker is available to aid the diagnosis of malignant pleural effusion.
Objectives: Determine which of the routine analysis of pleural fluid (PF) best predicts a positive cytology for neoplasia.
Methods: Selected all patients from August 2019 to January 2020 submitted to a PF analysis in a Pulmonology Department. Empyema and transudates were excluded. It was selected the first analysis per patient. Number of other cells defined as (total cells – total leucocytes in PF). Percentage of other cells defined as (other cells/total cells * 100% in PF). Statistical analysis was done using Student's t test and ROC curve.
Results: Included 64 patients, 54.7% men, mean age ± SD of 69.0 ± 16.6 years. Twenty six (40.6%) had a malignant cytology. The data obtained for a negative or positive cytology result for neoplasia were, respectively, as follows: glucose in PF (106.6 ± 31.3 vs 108.1 ± 46.2 mg/dL, p = 0.874), pH in PF (7.70 ± 0.21 vs 7.60 ± 0.32, p = 0.145), total proteins in PF (4.1 ± 0.8 vs 3.8 ± 0.7 g/dL, p = 0.154), LDH in PF (347.9 ± 354.7 vs 944.5 ± 1713.2 IU/L, p = 0.092), total protein in PF/total proteins in serum (0.66 ± 0.12 vs 0.64 ± 0.12, p = 0.556), LDH in PF/LDH in serum (1.65 ± 2.05 vs 2.73 ± 6.16, p = 0.318), total cells in PF (2,491 ± 4,860 vs 4,544 ± 7,810, p = 0.203), total leukocytes in PF (2,329 ± 4,683 vs 3,104 ± 5,433, p = 0.547), number of other cells in PF (162 ± 321 vs 1,441 ± 2,705, p = 0.024), percentage of other cells in PF (9.05 ± 11.53 vs 24.44 ± 18.75%, p = 0.001). When plotting a ROC curve, the percentage of other cells on PF was the best predictor for malignant cytology (AUC 0.78, 95%CI 0.66-0.90, p < 0.001) followed by number of other cells (AUC 0.77, 95%CI 0.65-0.89, p < 0.001). Sensitivity (SS) and specificity (SP) for percentage of other cells ≥ 11% were, respectively, 73% and 78%.
Conclusions: Percentage of other cells and number of other cells in PF were the best predictors for a malignant cytology in PF. Percentage of other cells in PF had the highest SS and SP.

***Keywords**: Pleural effusion. Cytology. Neoplasia.*

CO 008. MEDICAL THORACOSCOPY IN THE DIAGNOSIS OF PLEURAL EFFUSION – INTERVENTIONAL PULMONOLOGY UNIT OF LEIRIA HOSPITAL CENTER EXPERIENCE

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Introduction: The diagnosis of pleural effusions remains a massive challenge in the clinical practice. Despite the thoracentesis and the

blind pleural biopsy being the first approach, their success rate is low. Medical thoracoscopy (MT) therefore, is gaining more and more importance nowadays. The aim of this study is to characterize the patients with pleural effusion submitted to MT in our unit and assess its contribution in the approach of this pathology.
Methods: We reviewed (retrospectively) the patients submitted to MT in order to diagnose pleural effusion, between September 2016 and July 2020. The data was taken from medical records and the characteristics of these patients, their endoscopic findings, histological diagnosis, the procedure outcomes and the recurrence rate until August 2020 were analysed.
Results: In total, 58 patients were submitted to MT with biopsy. Thirty one (53.44%) were male, average age was 68.3 years old and 21 (36.8%) already had history of cancer. The MT led to a diagnosis in 84.48% of all the cases, exempting the need for further analysis, being that 91.38% of the patients have already been submitted in the past to one or more thoracentesis and/or blind pleural biopsies, without diagnosis. The most frequent diagnosis was the malignant pleural effusion (n = 36), followed by pleuritis (n = 7), pleural tuberculosis (n = 4) and empyema (n = 2). Within malignant pleural effusions, the authors highlight the lung cancer (n = 15), mesothelioma (n = 4) and the remaining 17 cases corresponding to other cancers. Twenty six (44.82%) patients were submitted to "talc poudrage", with a recurrence rate of 23%. There were post-MT infectious issues in six patients, with good response to therapy.
Conclusions: The medical thoracoscopy indisputably contributes to the diagnosis of pleural effusion. In addition, in selected cases, it allows the therapeutic approach with "talc poudrage", significantly reducing the morbidity associated with this pathology.

***Keywords**: Pleural effusion. Malignant pleural effusion. Medical thoracoscopy. Talc poudrage.*

CO 009. SPONTANEOUS PNEUMOTHORAX: A 5-YEAR SINGLE-CENTRE RETROSPECTIVE STUDY

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Introduction: Pneumothorax is a common diagnosis in clinical practice. It has been classified as traumatic or spontaneous, and the latter may be subclassified in primary (PSP) or secondary (SSP), when it occurs as a in the context of pre-existing lung disease. The most adequate treatment, the association with lung disease (such as alpha-1-antitripsin deficit) and clinical outcomes have been recently matter of discussion.
Objectives: To analyse demographical characteristics, associated lung disease, treatment, complications and recurrence of spontaneous pneumothorax.
Methods: We retrieved clinical, imagiological and laboratorial records from patients admitted to the Pulmonology department of the Coimbra Hospital and University Centre between November 2014 and November 2019. Data on age, gender, respiratory medical history (including smoking status), classification, length of stay, chest tube insertion, active drainage, imagiological findings, surgical intervention and recurrence.
Results: Records from 71 patients were obtained, 80.3% of whom were male (n = 53). Four patients were excluded due to untraceability of the first episode. Thirty seven patients had history of smoking and 7 patients had unknown smoking habits. Forty-five events (63.4%) were retrospectively classified as primary and the remaining occurred in the setting of pre-existing lung disease. Right side was the most frequently affected (54.9%, n = 39, $p > 0.05$). Median age on the first episode was 30 years and was significantly lower in patients with PSP (23 vs 57.5 years, $p < 0.001$). Median length of stay was 7.5 days (IQR 6-14 days) and tended to be lower among patients with PSP (7 vs 8.5 days, $p > 0.05$). Every patient was submitted to oxygen therapy. Among the five patients with PSP who had successful conservative treatment, 4 showed recurrence later. The remainder had chest tube insertion, 20Fr being the most frequent calibre (n = 42). Twenty-three patients needed active drainage and eight surgical treatment due to maintained air leak. Forty-two patients (59.2%) had blebs described on chest CT or surgical report, and the proportion was significantly higher among patients with PSP (68.8% vs 44%, $p = 0.042$). Twenty-eight patients had at least one episode of recurrence, which showed association with the presence of blebs ($p = 0.004$). **Conclusions:** Pneumothorax is a common respiratory event and occurs more frequently among male population. PSP occurs at lower ages when compared with SSP. Conservative treatment might be a successful approach in some patients but rate of recurrence may be high. The description of blebs in chest CT or the surgical report is more frequent in PSP and correlates with recurrence.

***Keywords**: Pneumothorax. Chest tube. Thoracic surgery. Computed tomography.*

CO 010. THE IMPACT OF THE USE OF HYDROXYCHLOROQUINE ON THE ELDERLY POPULATION INFECTED WITH SARS-COV-2

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Introduction: The COVID-19 pandemic caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus2), represents a challenge for the global public health community at the present time. The rapid spread of the disease, with significant morbidity and mortality, made the search for therapeutic interventions a priority. Hydroxychloroquine, due to its antiviral activity, was one of the therapeutic options, although adverse effects have been described, and with that came the controversy regarding its use.
Objectives: Compare morbimortality in patients who used and did not use hydroxychloroquine, also comparing the evolution of patients who used other therapies.
Methods: Retrospective study carried out at Hospital Sousa Martins, in patients hospitalized for SARS-CoV-2, between the period of March 23 to May 31, with the elderly (≥ 65 years) selected. The evolutionary difference between patients who underwent hydroxychloroquine and those who underwent other therapies or supportive therapy was analyzed. Data presented in the form of number (percentage) and median (minimum-maximum). Inferential statistics performed with SPSS® software version 26, using the t-student and qui-square test, with a 95% confidence interval.
Results: Of 84 patients, 51 elderly people were selected, median age of 85 (Min: 66, Max: 99). Regarding gender, 32 (62.7%) were female. Of these patients, 27 underwent Hydroxychloroquine (52.9%), and of these, 9 underwent only Hydroxychloroquine and 18 underwent Hydroxychloroquine + Azithromycin. Of 51 patients, 27 (52.9%) underwent antibiotherapy, of which 8 underwent only antibiotherapy without hydroxychloroquine. It was found that 14 (51.9%) of those who underwent antibiotics, had pneumonia overinfections. There were 16 patients (31.4%) who underwent only supportive therapy. Among those who did Hydroxychloroquine (n = 27), 5 died (18.5%), while among those who did not perform it (n = 24), 10 died (41.66%, $p = 0.06$). The last group includes those who underwent supportive therapy or antibiotic therapy for overinfection (without Hydroxychloroquine). Among those who performed Hydroxychloroquine vs Hydroxychloroquine + Azithromycin, there was no significant difference neither in terms of complications nor in the level of mortality (2 vs 3 deaths, respectively). There were no gender differences. In male sex (n = 19) there were 5 deaths, in female sex (n = 32) there were 10 deaths ($p = 0.761$). Regarding age, of patients aged > 80 years (n = 33), 1/3 died. Of patients aged < 80 years (n = 18), 22.2% (n = 4) died. There was also no significant

difference at this level (p = 0.527). Of the 16 patients (31.4%) who underwent only supportive therapy, 7 (43.75%) died. (p = 0.129). It was also found that of the deceased (n = 15), 13 (86.7%) were institutionalized and had comorbidities. Of the patients who died, 8 had bacterial infections and 7 underwent only supportive therapy, since due to their general condition and comorbidities, they were not candidates for invasive maneuvers.
Conclusions: In this study, performed in a group of elderly people, there was no significant difference in the evolution between those who performed hydroxychloroquine and those who did not. There was also no significant difference regarding the use of Hydroxychloroquine alone or associated with azithromycin. There were no significant differences in evolution regarding gender or age. It was found that 86.7% of deaths occur in people with several associated comorbidities. More than half of the deaths (n = 8, 53.3%), were associated with bacterial overinfections.

Keywords: *Hydroxychloroquine. Sars-cov-2. Mortality. Impact.*

CO 011. THE IMPORTANCE OF PULMONARY OBSTRUCTIVE DISEASE IN COVID19 ASSOCIATED PROGNOSIS

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Introduction and objectives: COVID19, a disease caused by SARS-CoV2 infection, has been in the center of debate and scientific investigation over the last few months. Several risk factors have been identified and comorbidities, such as cardiovascular disease like hypertension and diabetes, have been associated with worst prognosis. However, studies regarding the role of chronic respiratory disease, like asthma and chronic obstructive pulmonary disease (COPD), have shown conflicting results. Whereas some may show lower incidence of COVID19 in such patients, others claim that COPD may predict worse outcomes. Our goal is to describe the population of patients admitted with diagnosis of COVID19 in Beatriz Ângelo Hospital and compare clinical outcomes in patients with and without asthma and COPD.
Methods: A retrospective analysis of patients admitted to HBA with diagnosis of COVID19 between March and June 2020 was made. Patients were divided into two groups, according to the presence or absence of history of asthma and COPD, and their outcomes were compared. Patients with bronchiectasis were excluded, since they can be an important bias. Intensive care unit (ICU) admission, need for invasive mechanical ventilation (IMV), need for high flow oxygen therapy (HFOT) and mortality were defined as bad prognostic factors.
Results: 159 patients were included. 23 had history of pulmonary obstructive disease (12 had COPD and 11 had asthma). Male sex prevailed in both groups, with 56.5% of male patients (n = 13) in the obstructive disease group vs. 52.2% (n = 71) in the other group. In the obstructive disease group, mean age was 68 ± 13 years old (ranging from 33 and 90 years old) and mean length of stay was 12 ± 7 days (ranging from 1 and 65 days). No statistically significant differences were noticed neither in mean age (p value 0.875) or length of stay (p value 0.469). 3 patients with obstructive disease were admitted in the ICU, with no patients needing IMV and 1 needing HFOT. No statistically significant differences were observed when comparing with the results of the group without obstructive disease (p value of 0.401 for ICU admission, p value 0.723 for HFOT). Mortality rate in the group with obstructive disease was 13% (n = 3) and no statistically significant difference was noticed from the other group (p value 0.589).
Conclusions: Despite small sample size, the presence of pulmonary obstructive disease, asthma and COPD, did not came across as risk factor for worse clinical outcomes, when considering ICU admission, need for IMV or HFOT and mortality.
Larger studies are necessary for more solid evidence concerning the role of respiratory illness in COVID19.

Keywords: *COVID-19. Asthma. COPD.*

CO 012. TELECONSULTATION DURING THE COVID-19 PANDEMIC: PORTUGUESE PULMONOLOGISTS OPINION

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Introduction: The COVID-19 pandemic imposed a new reality on the "Sistema Nacional de Saúde" (SNS) regarding face-to-face consultation. It was imperative to maintain the monitoring and surveillance of patients, minimizing the infectious risk to patients and health professionals. Teleconsultation was the obvious solution to an immediate need. In Pulmonology, teleconsultation was not a widespread reality in Portugal, however, it could be a useful tool in the present and future activity of the pulmonologist.
Objectives: To analyse the opinion of pulmonologists regarding the use of teleconsultation in the SNS during the COVID-19 pandemic and to investigate the viability of teleconsultation as a regular alternative to face-to-face consultation after the pandemic.
Methods: Observational, cross-sectional study, through the application of a questionnaire addressed to doctors who work in the SNS during the COVID-19 pandemic period. Demographic data, methods and technologies used were collected, as well as doctors' opinions regarding the usefulness, advantages and limitations of teleconsultation. Analysis of the responses of the participating pulmonologists.
Results: A total of 2,452 responses, of which 101 (4.1%) were from pulmonology residents and specialists, from different hospitals, 77% female, the majority aged ≤ 45 years (65%). 91% of pulmonologists did not use to make teleconsultations prior to the pandemic, however for 98% this became a reality, both for first consultations and for subsequent consultations. Only 7% carried out teleconsultations by video call although 96% considered that they should have optional video support. 91% of doctors have always kept records in the clinical process. Some advantages were pointed out: greater flexibility in the doctor's schedule (73%) and increased user accessibility to healthcare (61%). Technical and clinical difficulties were also reported, the main ones being highlighted: impossibility to carrying out physical exam (87%), complementary diagnostic tests (65%), difficulty in transmitting information (51%) and patients' adaptation to technologies communication (49%). 51% consider that some or many teleconsultations provide health care with comparable quality to face-to-face consultation, 58% consider it does not allow an adequate doctor-patient relationship. 73% of pulmonologists would like to continue to have teleconsultations after the pandemic, but only 13% would be available to make first consultations through this way. As conditions to promote the use of teleconsultation: 75% stated that they would like a specific platform and a support team dedicated to teleconsultation, 68% that there should be a user awareness campaign and 67% the existence of adequate installation.
Conclusions: The characterization of the teleconsultation activity in Pulmonology allowed a valuable insight into the opinion of pulmonology specialists and residents about teleconsultation. This investigation seems to support teleconsultation as an alternative to face-to-face consultation on a regular basis in the pulmonologist's future practice, since most pulmonologists are available to perform subsequent teleconsultations after the pandemic. It is imperative to overcome the technical and clinical difficulties experienced by doctors and to promote conditions for teleconsultation implementation.

Keywords: *Telemedicine. Teleconsultation. Serviço Nacional de Saúde. COVID-19 pandemic.*

CO 013. COPD AND COVID-19: A PICTURE OF AN INTENSIVE CARE UNIT DURING THE PANDEMIC

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Introduction: With the new emergent severe acute respiratory syndrome coronavirus (SARS-CoV-2), the coronavirus disease 19 (COVID 19) has become a reality in intensive care units (ICUs) all around the world. Due to lung affection of this disease, mainly causing pneumonia, there is big concern about its impact in patients with chronic obstructive pulmonary disease (COPD). It has become of great importance to evaluate the risk of developing severe COVID 19 in patients with COPD, compared with other comorbidities. The different prevalence of COPD between populations and the different strategies of COVID 19 screening among countries are some of the reasons for a discrepancy between published data regarding this issue.
Objectives: Characterization of patients with SARS-CoV-2 pneumonia and COPD, and the impact of this comorbidity comparing to others.
Methods: We performed a retrospective analysis of all patients with primary diagnose of pneumonia due to SARS-CoV-2 admitted to intensive care unit between march and June of 2020. In all patients medical records were accessed for comorbidities at admittance. Also, age, gender, need for invasive mechanical ventilation (IMV) and isolation of microbiologic agents were recorded. Values obtained were analysed with chi-square test using the IBM SPSS statistics 25 software. Results are presented as mean [standard deviation].
Results: We included 121 patients. COPD was the fifth most prevalent comorbidity with 13 (10.7%) cases. The total number of cases of the most prevalent comorbidities were: Arterial hypertension 73 (60.3%), diabetes mellitus 44 (36.4%); dyslipidaemia 22 (18.2%) and obesity 20 (16.5%). The median age in patients with COPD was 12.5 higher than the other patients (75 [6.7] and 63.5 [14.1] years respectively). Among COPD patients 11 (84.6%) were men. Also 84.6% of those patients needed IMV. There was a relation between patients that underwent IMV and that had a microbiological agent isolated ($p = 0.005$) as well as between the late and death ($p = 0.021$). Among the total number of patients admitted in the ICU there was difference between the age of the group that died (73.4 [12.4]] and that survived (61.6 [13.3]) ($p = 0.001$). There was no relation between any comorbidity and death, coinfection or need for IMV ($p > 0.05$).
Conclusions: In this study the prevalence of COPD among patients with severe disease due to SARS-CoV-2 (10.6%) was inferior to the prevalence described among patients without COVID 19 (14.2% according to latest studies). In the International literature COPD seems to be a risk factor for developing severe forms of COVID 19. Our results may be justified by an underestimation of COPD among patients admitted to ICU. As expected the vast majority of COPD patients underwent IMV, and this showed direct relation with coinfection. COPD patients also revelled to be older comparing to the others, nearly the same as the group that died.

Keywords: *COVID-19. COPD. Intensive Care Unit.*

CO 014. SARS-COV2 INFECTION: RETROSPECTIVE STUDY OF 6 MONTHS IN A LEVEL II HOSPITAL

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Introduction: SARS-Cov2 infection (COVID-19) was declared as pandemic in March/2020 with a great impact on public health worldwide. Risk factors for this disease are still under study: age, cardiovascular comorbidities, diabetes and pulmonary diseases are the best analyzed.
Objectives: Description of the clinical characteristics of patients admitted to Pulmonology Service of a level II hospital, dedicated to patients with confirmed infection by SARS-CoV2 between March and August/2020.
Methods: Retrospective study from March-August/2020. Social, demographic, epidemiological and clinical data were evaluated. The infection was confirmed by RT-PCR research of SARS-CoV2 RNA in the respiratory secretions.
Results: During the study period, there were a total of 180 hospitalizations, with an average age of 61 years (minimum 18, maximum 99), 50% of whom were male. Among patients with a relevant personal history (N = 130), the majority had hypertension (72%), followed by diabetes (48%), obesity (27%) and cardiac pathology (15%). 10% had oncological disease, 8% chronic obstructive pulmonary disease, 3% asthma and 5% other respiratory diseases. Approximately 7% of patients were immunosuppressed by pharmacological therapy. Regarding the clinic, 15% were asymptomatic at the date of admission, having been transferred from other services. Of the remainder, 64% had fever, 61% cough, 24% sputum, 54% tiredness, 43% dyspnea and 30% myalgia. The less common symptoms were diarrhea (22%), headache (19%), chest pain (12%), anosmia and ageusia (6%). The average duration of symptoms at admission was 6 days. Regarding therapy, about 79% patients were treated with supportive measures and oxygen. 11% needed invasive mechanical ventilation, 6% non-invasive mechanical ventilation and 4% high flow nasal cannula. During the 6 months, there were 24 deaths (13%), with an average age of 74 (minimum 41 and maximum 93).
Conclusions: Similar to what is described in the literature, age, cardiovascular and metabolic comorbidities were present in most hospitalized patients. Although the respiratory symptoms are the most classic presentation, some had gastrointestinal symptoms. The mortality rate in our sample can be justified by the fact that these are patients with multiple comorbidities and plurimedication. Currently, data regarding hospital mortality is scarce.

Keywords: *SARS-CoV2. COVID-19. Pneumonia.*

CO 015. COPD AND SARS-COV-2: FRIENDS OR FOES?

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Introduction: Prior knowledge about the contribution of bacterial and viral infections to COPD exacerbations may suggest that these patients are at risk for severe forms of SARS-CoV-2 infection. Despite the fact that most works published to date point in this direction, there is still much to clarify about the role of respiratory disease, particularly COPD, in COVID-19.
Objectives: To characterize the population of COPD patients admitted to the Infectious Diseases Service (SDI) by COVID-19 and to compare morbidity and mortality outcomes with patients without COPD.
Methods: Retrospective review of the clinical records of patients admitted to the SDI from March to July 2020. Patients whose admission criteria were not directly related to the diagnosis of COVID-19 (social admissions, surgical cases, etc.) were excluded. A comparative analysis was carried out between the group of patients with a previous diagnosis of COPD and patients without this diagnosis.
Results: A total of 194 patients with a mean age of 65 years (min 18, max 100), 70% male, were included. The average hospital stay was 14.4 days. 169 patients (87%) were discharged from the hospital (the majority for the home, 14 for rehabilitation institutions) and there were 25 deaths (13%). Twenty-eight patients diagnosed with COPD (14% of the total), 75% male, were identified. The median age of COPD patients was significantly higher (75 vs 63 years, $p < 0.01$).

There was a high prevalence of arterial hypertension and diabetes mellitus, respectively 49.5% and 24.6% of the total number of patients, with a similar distribution between patients with and without COPD. The prescription of specific therapy (hydroxychloroquine, lopinavir/ritonavir, remdesivir and corticotherapy) was the same in both groups, changing over time, according to the most recent evidence available. Likewise, there were no differences in the prescription of antibiotics. The length of stay was the same in both groups. The probability of the patient needing invasive mechanical ventilation was 28% in patients with COPD and 21% in the others, with no statistically significant difference. Only 4 patients were treated with NIV, all of them with COPD. The patients received supportive treatment with oxygen therapy in an equal proportion between the groups, with a need for an equal maximum O2 output (3L/min IQR 3). Mortality in COPD patients was 17%, with no statistically significant difference compared to patients without this diagnosis (12%).
Conclusions: Although the sample includes few patients diagnosed with COPD, our results suggest that these patients, in the context of hospitalization in the ward, do not have an increased risk of serious illness, bacterial infection or death.

Keywords: *COPD. SARS-CoV-2. COVID-19.*

CO 016. USE OF NON-INVASIVE VENTILATION IN PATIENTS WITH SARS-COV2 INFECTION

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Introduction: In the context of the current SARS-CoV2 pandemic, the indications and criteria for initiating non-invasive ventilation (NIV) are not well established. However, the ERS/ATS guidelines recommend the use of NIV in hypoxemic acute respiratory failure (ARF) as a strategy to prevent invasive mechanical ventilation (IMV).
Objectives: Characterize patients admitted with SARS-CoV2 pneumonia with ARF and the need for ventilatory support. Identify predictive factors for NIV failure (IMV or death).
Methods: Retrospective analysis of patients admitted to the Infectious Diseases service of a Central Hospital with COVID-19 and ARF requiring NIV between March and May 2020. Clinical data, arterial blood gas analysis, duration of NIV, need for IMV and mortality were analyzed.
Results: Between March and May 2020, 252 patients with SARS-Cov2 infection were admitted to the Infectious Diseases service, of which 39 underwent NIV and were included in the study. There was a predominance of males (64.1%, n = 25), with a mean age of 76 ± 11 years. 14 patients (35.9%) had a history of smoking and 35 (89.7%) had at least 1 cardiovascular risk factor (CVRF): arterial hypertension (85%), dyslipidemia (46%) and diabetes mellitus (46%). The main symptoms were dyspnea (82%), fever (74%) and cough (74%). The median hospitalization time was 20 days (3-89 days). The median pO2/FiO2 ratio at the beginning of NIV was 106 (53-324). In terms of ventilatory parameters, the most used mode was the Bilevel ST (97%), with a mean IPAP of 18 ± 4 cmH2O and EPAP of 11 ± 2cmH2O. The median NIV duration was 5 days (1-30 days). NIV failure was observed in 30 patients (76.9%): IMV in 13 (33.3%) and death in 17 (43.6%). Patients with NIV failure had a lower pO2/FiO2 ratio at the beginning of NIV (median: 105 vs 125; p = 0.363) and a significantly lower pO2/FiO2 ratio in the hours after starting NIV (mean: 135 ± 49 vs 196 ± 63; p < 0.05). Smoking was a predictive factor of NIV failure (p < 0.05), unlike other CVRFs. In those with NIV failure, the median time to onset of IMV was 2 days (0-6 days) and the median time to death since the onset of NIV was 5 days (2-28 days). Patients in need of IMV had a mean age significantly lower than those who died (63 ± 5 vs 82 ± 8 years; p < 0.01). Despite the failure of NIV, the mortality of patients in need of IMV was 0%.
Conclusions: The severity of hypoxemic ARF is associated with an increased risk of NIV failure, demonstrating the importance of proper patient selection. In addition, these results highlight the relevance of early re-evaluation, since the lack of improvement in the first hours after the initiation of NIV is associated with their failure. The rate of NIV failure in these patients was high, which can be justified by the advanced age and the presence of several co-morbidities, which contraindicated IMV as an option. In addition, none of the patients undergoing IMV after NIV failure died, which allows a trial of NIV with close surveillance in selected patients, before initiating IMV.

Keywords: *COVID-19. NIV.*

CO 017. COVID-19 CHEST COMPUTED TOMOGRAPHY TO STRATIFY SEVERITY AND DISEASE EXTENSION BY ARTIFICIAL NEURAL NETWORK COMPUTER AIDED-DIAGNOSIS

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Objectives: To develop a computer-aided diagnosis (CAD) to quantify the extent of pulmonary involvement in COVID-19 as well as the radiological patterns referred to lung opacities in chest computer tomography (CT).
Methods: One-hundred thirty subjects with COVID-19 pneumonia that underwent chest CT at hospital admission were retrospectively studied (141 sets of CT scan images). Eighty-eight healthy individuals without radiological evidence of acute lung disease served as controls. Two radiologists selected up to four regions of interest (ROI) per patient (totalling 1,475 ROIs) visually regarded as well-aerated (472), ground-glass opacity (GGO, 413), crazy paving and linear opacities (CP/LO, 340), and consolidation (250). After balancing with 250 ROIs for each class, the densities quantiles (2.5, 25, 50, 75 and 97.5%) of 1,000 ROIs were used to train (700), validate (150) and test (150 ROIs) an artificial neural network classifier (60 neurons single hidden layer architecture). Pulmonary involvement was defined as the sum of GGO, CP/LO and consolidation volumes divided by total lung volume (TLV) and the cutoff of normality between controls and COVID-19 patients was determined with a receiver operator characteristic (ROC) curve. The severity of pulmonary involvement in COVID-19 patients was also assessed by calculating Z scores relative to the average volume of parenchymal opacities in controls. Thus, COVID-19 were classified as mild (lower than the cutoff of normality), moderate (pulmonary involvement extent between the cutoff of normality and the Z score of 3) and severe pulmonary involvement (pulmonary involvement higher or equal than the Z score of 3).
Results: Cohen's kappa agreement between CAD and radiologist classification was 81% (79-84%, 95%CI). The ROC curve of PI by the ANN presented a threshold of 21.5%, 0.80 sensitivity, 0.86 specificity, AUC 0.90, accuracy of 0.82, F score of 0.85 and 0.65 Matthews' correlation coefficient. Accordingly, seventy-seven patients were classified as having severe pulmonary involvement reaching 55 ± 13% of the TLV (Z-score related to controls higher or equal to 3) and presented significantly higher lung weight, serum C-reactive protein concentration, higher proportion of hospitalization in intensive care units, mechanical ventilation and in hospital mortality.
Conclusions: The proposed CAD aided in detecting and quantifying the extent of pulmonary involvement helping to phenotype patients with COVID-19 pneumonia.

Keywords: *COVID-19 pneumonia. Radiomics. Computer-aided diagnosis. Deep learning. Quantitative chest CT-analysis.*

CO 018. PREDICTING THE FUTURE IN IPF PATIENTS - ARE WE THERE YET?

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Introduction and objectives: Idiopathic pulmonary fibrosis (IPF) is a progressive disease with a heterogeneous clinical course. There are several ways to predict the risk of death in patients with IPF. Our goal was to compare TORVAN, which includes comorbidities, and GAP models in a group of IPF patients.
Methods: Retrospective study of patients with IPF in Hospital Beatriz Ângelo and Hospital da Luz Lisboa between January 2012 and September 2019, regarding epidemiological data, comorbidities, lung function and mortality.
Results: We studied 22 patients with diagnosis of IPF. 95.4% were male (n = 21). Mean age at diagnosis was 71 years old (± 9.2). 68.1% were smokers or former smokers. Systemic hypertension was found in 13 patients, diabetes mellitus in 10, pulmonary hypertension in 9, gastroesophageal reflux in 3 and lung cancer in 1. Mean FVC was 77.6% (± 18.1) and mean DLCO was 44.8% (± 21.7). Mean TORVAN index was 15.9 (± 5.8), with 6 in stage 1, 6 in stage 2, 8 in stage 3 and 2 in stage 4. Mean GAP index was 4.4 (± 1.4), with 6 in stage 1, 11 in stage 2 and 5 in stage 3. TORVAN and GAP index were moderately correlated ($p < 0.001$; $r = 0.697$). Regarding patients in follow-up, mean TORVAN index was 15.2 (± 5.9) – stage 2 - and mean GAP index was 4.1 (± 1.4) – stage 2. TORVAN and GAP index were moderately correlated ($p = 0.001$; $r = 0.708$). Mortality rate was 22.7% (n = 5). Amongst these patients, mean TORVAN index was 18.6 (± 5.4) – stage 3 - and mean GAP index was 5.1 (± 1.3) – stage 2. No correlation was found between TORVAN and GAP values ($p = 0.562$; $r = 0.351$).
Conclusions: In this cohort, TORVAN index at diagnosis was better at predicting mortality than GAP index. Adequate assessment and treatment of comorbidities should be regarded as a critical part of IPF management.

Keywords: *IPF. TORVAN. GAP.*

CO 019. MOLECULAR AND CELLULAR MECHANISMS OF REGULATION OF INFLAMMATION IN SARCOIDOSIS

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Sarcoidosis is an inflammatory disease of unknown etiology, characterized by an abnormal accumulation of non-caseating granulomas in several organs, namely the lungs. Although the histological landscape of granulomas in sarcoidosis is well-known, the genetic, molecular, and inflammatory factors that trigger cell aggregation, and initiate and sustain granulomatous inflammation remain to be elucidated. The humoral component of the innate immune system is constituted by molecules involved in the activation of essential immunoregulatory functions. Pentraxin 3 (PTX3) has been identified as an essential molecule for innate immunity and inflammation, playing a major role in several lung diseases. Considering the crucial role of PTX3 in inflammation, we have developed an integrative clinical approach to elucidate the associated mechanisms, which control granulomatous inflammation in sarcoidosis. By resorting to pre-clinical models and sarcoidosis patients, we have established an essential role for PTX3 in sarcoidosis. Mechanistically, PTX3 deficiency triggers the exacerbated activation of the complement system, which in turn promotes significant changes in the phenotype and function of alveolar macrophages. Under these conditions, macrophages undergo a profound metabolic reprogramming associated with an enhanced proliferative capacity, thus contributing to the promotion and maintenance of sarcoid granuloma. The pharmacological blockade of the activation of the complement system or the metabolic reprogramming of macrophages provide further support to the therapeutic potential of the manipulating of these mechanisms in human sarcoidosis. Our results may therefore contribute to innovative and personalized medical interventions in patients with sarcoidosis.

Keywords: *Granuloma. Pentraxin-3 (PTX3). Sarcoidosis.*

CO 020. PROGRESSIVE FIBROSING CHRONIC HYPERSENSITIVITY PNEUMONITIS: A TEN-YEAR COHORT ANALYSIS

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Introduction: Chronic Hypersensitivity Pneumonitis (cHP) is a heterogenous interstitial lung disease (ILD). Similarly, to others fibrosing ILD, some patients with cHP present a progressive fibrosing phenotype. The pathogenic mechanisms in fibrosing ILD with a progressive phenotype are not yet fully understood but seem to have some similarities to the mechanisms showed in Idiopathic Pulmonary Fibrosis. Recent trials have shown benefits regarding the treatment of fibrosing ILDs non-IPF, as cHP, with antifibrotic drugs. There are still important knowledge gaps regarding the characterization and prognosis of those patients.
Methods: Patients with > 18 years and the diagnosis of cHP between 2008 and 2017 were selected. The progressive phenotype was defined based on the presence of one of the following criteria over the first 24 months after diagnosis despite interventions: 1. ≥ 10% Forced Volume Capacity (FVC) decline; 2. 5%-10% FVC decline plus radiological or clinical deterioration; 3. Radiological plus clinical deterioration. Comparisons were calculated by the chi-square test or by Fisher's exact test for categorical variables and by the t-test for continuous. Multivariate analysis was performed through Binary Logistic Regression and the survival-related results were obtained using the log-rank Kaplan–Meier product-limit estimates and Cox proportional hazards.
Results: 158 patients were included, with a mean age of 66.5 ± 11.6 years and female predominance of 58.9%. 50.6% of the population matched the progressive phenotype criteria. The absence of an identifiable inducer ($p = 0.018$), a superior monocytes count (730 uL vs 620 uL; $p = 0.008$), UIP-like pattern in HRCT ($p = 0.001$), a lesser percentage of lymphocytes ($p < 0.001$), superior percentage of neutrophils and eosinophils ($p = 0.035$ and $p = 0.042$ respectively) in BAL were the baselined features associated to the progressive phenotype group. In the logistic multivariate analysis, UIP pattern in HRCT ($p < 0.001$; OR = 4.1) and absence of an identifiable inducer ($p = 0.045$; OR = 3.7) showed an independent association to this phenotype. The progressive phenotype group presented a significantly increased risk of all-cause mortality (median survival of 59.0 months vs 123.0 months, $p < 0.001$). Regarding the survival multivariate analysis, the features independently associated with all-cause mortality were older age ($p = 0.012$), unidentifiable exposition ($p = 0.008$), and UIP pattern in HRCT scan ($p = 0.031$).
Conclusions: Half of the population presented cHP progressive fibrosing profile. It was independently associated with a UIP pattern in HRCT and the absence of an identifiable inducer and presented a significant survival impact. A better understanding of the progressive fibrosing phenotype is crucial in order to have an adequate personalized therapeutic approach. In recently published trials and on-going studies, anti-fibrotic therapy stands now as an option for this phenotype, even for those without UIP like pattern.

Keywords: *Chronic hypersensitivity pneumonitis. Fibrosing interstitial lung diseases. Progressive fibrosing phenotype.*

CO 021. SILICOSIS AND AUTOIMMUNE DISEASE - IS THERE AN ASSOCIATION?

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Introduction: The inhalation of silica particles is associated with several systemic diseases, including autoimmune disease (AID), an association that has been proven through epidemiological studies. The best-established associations are with Systemic Lupus Erythematosus (SLE), Systemic Sclerosis (SS) and Rheumatoid Arthritis (RA); however, the data also points to an increased risk of developing ANCA vasculitis and Sjogren's syndrome.
Objectives: To analyze the characteristics of a population of patients with silicosis regarding the presence of autoimmune disease.
Methods: Multicentric retrospective observational study, including patients diagnosed with Silicosis in a Diffuse Lung Disease consultation from 2 hospital units. IBM SPSS statistics 23 program was used for statistical analysis. Continuous variables were expressed as median and interquartile range (AIQ); categorical variables were expressed in frequency and percentage. Mann-Whitney U test was used for comparative analysis of continuous variables. Categorical variables were compared between groups using the chi-square test. The level of significance was defined as $p < 0.05$.
Results: 126 patients diagnosed with silicosis were included, of whom 20 (15.9%) had a diagnosis of AID and 12 (9.5%) had positive antinuclear antibodies (ANA), without other clinical manifestations of AID. Patients had a median age of 59 years (AIQ = 17); when it comes to years of exposure the median was 27 (AIQ = 18). Only 3 patients were female. The autoimmune diseases identified were Rheumatoid Arthritis (RA) (n = 9), Systemic Sclerosis (SS) (n = 5), ANCA Vasculitis (n = 4) and Sjögren Syndrome (n = 2). Comparing the group with AID to the group with silicosis alone, there was a statistically significant association between active or previous smoking and the diagnosis of AID ($p = 0.001$; OR = 14.567). Smoking history presented itself as a practically unanimous exposure in the group with AID, with 14 ex-smokers, 5 active smokers and only 1 non-smoker. There were no significant differences between the groups in terms of age ($p = 0.619$), years of exposure ($p = 0.485$), symptoms ($p = 0.798$) or imaging characteristics of simple versus complicated silicosis ($p = 0.839$). Within the group with AID we found that RA patients had significantly higher FVC and DLCO SB values compared to the others ($p = 0.002$ and $p = 0.0021$, respectively). On the other hand, the group with SS showed functional values (FVC and DLCO SB) significantly lower than the remaining patients with silicosis and established autoimmunity ($p = 0.005$ and $p = 0.023$, respectively).
Conclusions: There is ample evidence to demonstrate environmental exposures as risk factors in the development of autoimmune disease throughout life, among which some of the best studied are exposure to silica and tobacco smoke. With the present study, these associations were reiterated. The prevention of these exposures becomes essential, with important implications for the development of pulmonary and systemic pathology.

Keywords: *Silicosis. Autoimmune disease. Occupational disease.*

CO 022. CHARACTERIZATION OF PATIENTS WITH LAM - EXPERIENCE OF PULIDO VALENTE HOSPITAL -

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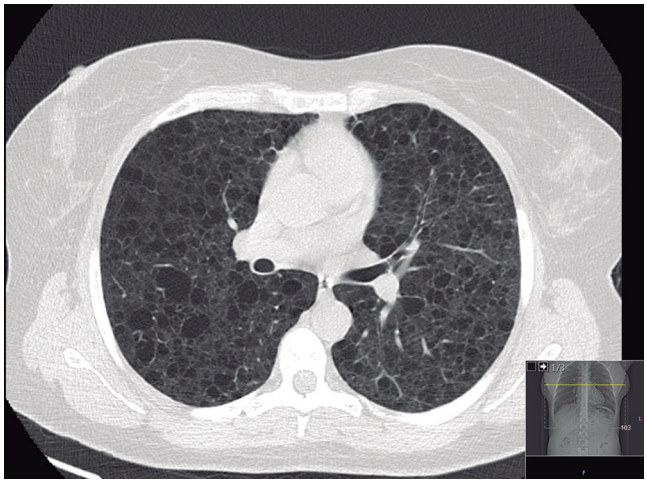
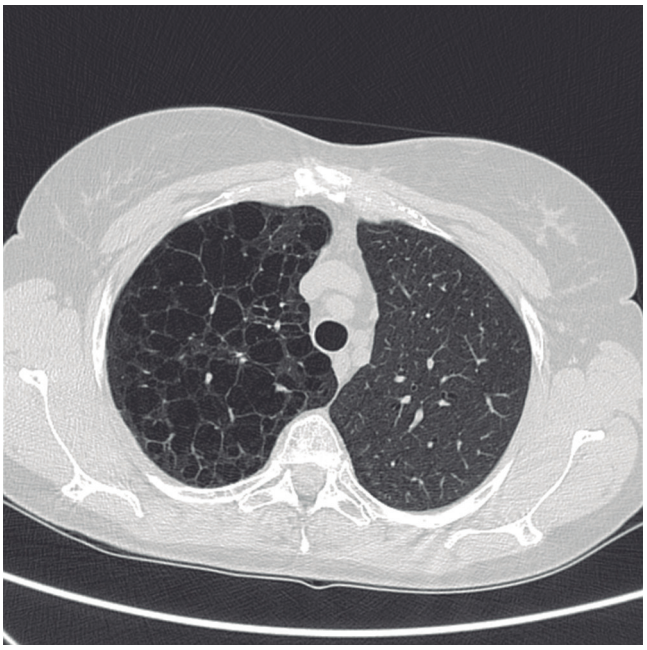
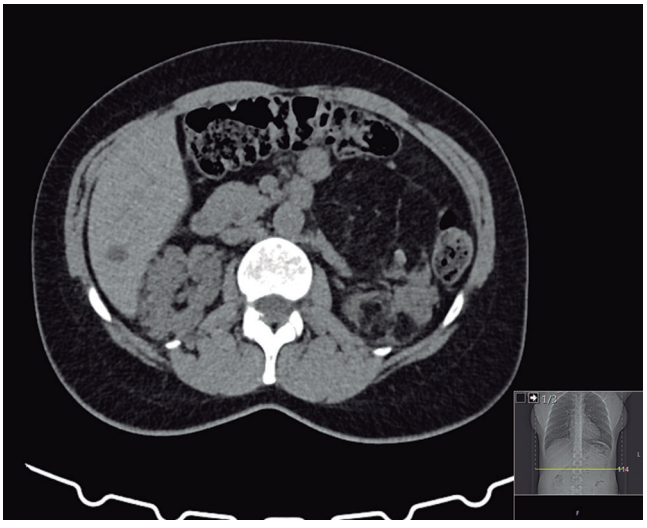
Introduction: Lymphangioleiomyomatosis (LAM) is a rare disease of unknown etiology, occurring spontaneously or associated with the tuberous sclerosis complex (CET). It usually affects young women and the diagnosis is obtained through tissue biopsy and/or a combination of history and findings on computed axial tomography (CT). Treatment includes supportive therapy with bronchodilators and oxygen therapy, use of mTOR inhibitors, treatment of complications, and lung transplantation.
Objectives: To characterize the patients with LAM followed at the Interstitial Diseases Unit.
Methods: Performing a retrospective analysis of patients followed on HPV. Analysis of the main demographic, clinical, analytical, imaging, and therapeutic data was carried out.
Results: Of the eight patients, seven had a definitive diagnosis of LAM and only one had a definitive diagnosis of CET. The mean age at onset of symptoms was 40 ± 11 years (predominantly from 25-43, only one aged 61), 75% were non-smokers and 25% had a previous diagnosis of asthma. All of them had dyspnea and tiredness. Other symptoms recorded were cough (63%), chest pain (38%), and wheezing (25%). Pneumothorax episode was documented in 25%, being recurrent in one case. All had multiple bilateral cystic involvement and, in one case, bronchiectasis. Abdominal CT was normal in only two. Of the extra-pulmonary findings, the following stand out: involvement of the central nervous system with intra-axial tubers (n = 1); renal angiomyolipomas (n = 3), renal cysts (n = 1); hepatic angiomyolipoma (n = 1), hepatic hemangiomas (n = 4), hepatic lipoma (n = 1), hepatic cysts (n = 2); recurrent chylous ascites (n = 1); retroperitoneal lymphangioma (n = 3); uterine fibroleiomyoma (n = 1), uterine fibroids or adenomyosis (n = 2); abdominal lymphadenopathies (n = 1); bone hamartomas (n = 1). Histological diagnosis was obtained in three patients (one by cryobiopsy and two by surgical biopsy). Additional surgeries were performed, such as nephrectomy (n = 1) with confirmation of renal angiomyolipoma, resection of retroperitoneal lymphangioma (n = 1), and hysterectomy + oophorectomy (n = 1). Two patients underwent pleurectomy ± pleurodesis. The measurement of VEGF-D was performed in one case, and the result was normal, although diagnosis was later confirmed by biopsy. None of the patients had criteria for pulmonary hypertension on the echocardiogram. Regarding the first recorded functional respiratory study (EFR), the FEV1 value was 1.76 ± 0.57L, FVC was 2.99 ± 0.47L and DLCO was 49.99 ± 22.65%. About 50% of patients had bronchial obstruction. Only two patients underwent ambulatory oxygen therapy. Sirolimus treatment was initiated in four patients (three on therapy for more than five years and one on therapy for three months), pending authorization in two. The FEV1 variation was positive in two of the patients under sirolimus (increase of 210 ml and 40 ml). Everolimus treatment was started in one of the transplanted patients (nine years of therapy). Four patients were referred for lung transplantation, two underwent unilateral transplantation.







Conclusions: LAM is a rare disease that can be associated with a series of extrapulmonary findings. Definitive diagnosis does not always require a biopsy. In addition to lung transplantation, sirolimus and everolimus have been used, and their long-term use is safe, allowing stabilization of the disease.

***Keywords**: Lymphangioleiomyomatosis. Sirolimus. Everolimus. Lung transplantation.*

CO 023. INTERSTITIAL PNEUMONIA WITH AUTOIMMUNE FEATURES, COMPARATIVE ANALYSIS OF AN ILL-DEFINED ENTITY

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Introduction: Patients with interstitial lung disease and autoimmune features who do not meet criteria for defined connective tissue disease are a diagnostic challenge. However, there is little information available regarding the evolution of these patients as well as prognosis when compared to other entities, as interstitial pneumonia associated with connective tissue disease (CTD-ILD).
Objectives: To compare clinical and respiratory functional evolution between patients with interstitial pneumonia with autoimmune features (IPAF) and patients with CTD-ILD and idiopathic pulmonary fibrosis (IPF) during 2-years of hospital follow-up.
Methods: Retrospective study of patients with IPAF, CTD-ILD and IPF followed at our outpatient clinic for interstitial lung disease between 2014-2018. A comparative analysis was carried out regarding the clinical and respiratory functional evolution among patients included in the different entities that had an assessment at the time of diagnosis (T0) and at 2-years of hospital follow-up (T2).
Results: The main results are summarized in the table. There was no statistically significant difference regarding survival between the three groups (p-value 0.595). During the 2-years of hospital follow-up no IPAF patient had a new diagnosis of a specific connective tissue disease.
Conclusions: The functional evolution of patients with IPAF and IPF seems to differ from patients with CTD-ILD, and the magnitude of functional decline among them appears to be similar. Regarding survival at 2 years, patients with IPAF are between patients with CTD-ILD and IPF, but this difference in survival seems to fade over time compared to patients with IPF. The reduced sample and the advent of antifibrotic drugs may justify this evolution.

***Keywords**: Interstitial pneumonia with autoimmune features. Interstitial lung disease. Connective tissue disease. Idiopathic pulmonary fibrosis.*

CO 024. ANTIFIBROTIC THERAPY FOR PROGRESSIVE FIBROTIC LUNG DISEASE NON-IPF

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Introduction: Antifibrotic therapy - nintedanib and pirfenidone - played a crucial role in altering the natural course of idiopathic pulmonary fibrosis (IPF). However, considering that about 20 - 30% of interstitial lung diseases behave as progressive fibrotic diseases, the role of antifibrotic therapy has been evaluated in different trials.
Objectives: To describe our hospital experience treating non-IPF progressive fibrotic lung diseases (non-IPF-PF) with antifibrotic therapy.
Methods: Casuistic review of patients followed at our outpatient clinic for interstitial lung disease with non-IPF-PF that started antifibrotic therapy with nintedanib or prifenidone. Description of demographic characteristics as well as clinical and respiratory functional evolution one year before (T/-12M) and 6-12 months after (T/6-12M) starting treatment (T0).
Results: Twenty patients with non-IPF-PF started antifibrotic therapy but only 10 met the inclusion criteria. The results are summarized in the table.
Conclusions: Patients with non-IPF-PF who started antifibrotic therapy were mostly overweight men with a significant impairment of respiratory function. In the first evaluation after starting antifibrotics, respiratory function remained stable. Only one patient had side effects that led to the discontinuation of therapy, despite the combination of antifibrotic and immunosuppressors. In this study, the use of antifibrotic therapy in patients with non-IPF-PF appears to be safe and potentially effective in stabilizing respiratory function.

***Keywords**: Progressive fibrotic lung disease. Antifibrotic therapy. Nintedanib. Pirfenidone.*

	IPAF 18,0 (25,0)		CTD-ILD 26,0 (36,1)		FPI 28,0 (38,9)		*p*-value
Sexo, masculino	11,0 (61,1)		13,0 (50,0)		24,0 (85,7)		**0,018***
Idade, anos	68,8 ± 12,5		68,0 ± 9,1		74,3 ± 8,9		0,053
Hábitos tabágicos, não	10,0 (55,6)		14,0 (53,8)		13,0 (46,4)		0,793
Hipertensão Pulmonar, sim	3,0 (16,7)		5,0 (19,2)		5,0 (17,9)		0,976
Índice ILD-GAP	2,0 [0,5 – 2,0]		1,0 [0,0 – 2,0]		3,0 [3,0 – 5,0]		**< 0,001***
Avaliação imagiológica							
UIP	2,0 (11,1)		13,0 (50,0)		27,0 (96,4)		-
NSIP	13,0 (72,2)		13,0 (50,0)		1,0 (3,6)		-
OP	3,0 (16,7)		0,0 (0,0)		-		-
Tratamento							
Imunossupressão (ISS)	11,0 (61,1)		20,0 (76,9)		0,0 (0,0)		n/a
Antifibrótico	1,0 (5,6)		1,0 (3,8)		24,0 (85,7)		n/a
ISS + Antifibrótico	0,0 (0,0)		1,0 (3,8)		1,0 (3,6)		n/a
Mortalidade aos 2 anos	4,0 (22,2)		4,0 (15,4)		9,0 (32,1)		n/a
	T0	**T2**	**T0**	**T2**	**T0**	**T2**	***p*-value Δ (n = 57)**
Avaliação clínica							
IMC	29,0 ± 5,7	29,1 ± 7,5	27,3 ± 4,3	27,2 ± 3,9	28,5 ± 4,2	26,5 ± 3,6	**0,010***
Dispneia, mMRC	1,0 [0,8 – 1,0]	2,0 [1,0 – 3,0]	1,0 [0,0 – 1,0]	1,0 [0,0 – 2,0]	1,0 [0,0 – 1,0]	2,0 [1,0 – 3,0]	**0,015***
Internamentos por patologia respiratória+	0,0 [0,0 – 1,0]	0,0 [0,0 – 1,0]	0,0 [0,0 – 0,0]	0,0 [0,0 – 1,0]	0,0 [0,0 – 0,0]	0,0 [0,0 – 0,0]	0,634
Avaliação funcional							
TLC (% do previsto)	85,4 ± 18,2	75,3 ± 17,2	82,4 ± 14,1	77,1 ± 14,2	81,1 ± 14,4	74,9 ± 16,9	0,981
FVC (% do previsto)	82,9 ± 19,4	76,7 ± 22,2	83,6 ± 20,4	81,5 ± 16,2	86,0 ± 17,2	81,4 ± 20,0	0,997
DLCO (% do previsto)	55,3 ± 18,5	46,3 ± 22,0	56,1 ± 17,1	54,0 ± 22,4	57,7 ± 20,9	50,7 ± 19,1	0,514
PM6M (metros)	396,6 ± 85,6	326,6 ± 97,7	451,4 ± 62,2	403,0 ± 64,7	411,5 ± 115,4	435,2 ± 111,8	**0,034***
OLD repouso	3,0 (16,7)	5,0 (27,8)	1,0 (3,8)	2,0 (8,7)	1,0 (3,6)	7,0 (26,9)	n/a
OLD deambulação	7,0 (38,9)	9,0 (50,0)	1,0 (3,8)	3,0 (13,0)	2,0 (7,1)	9,0 (34,6)	n/a

Dados apresentados como n (%), média ± desvio padrão ou mediana [percentil25–percentil75]. Δ – variação entre T2 e T0. n/a – não aplicável.

*$p < 0,05$; + Internamentos que ocorreram nos 2 anos anteriores à avaliação considerada;

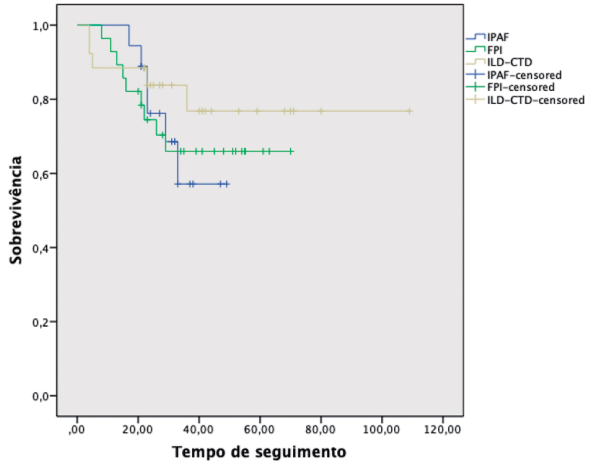

Imagem – Comparação das sobrevivências entre IPAF, CTD-ILD e FPI (*p*-value 0,595).

Figure CO 023

	DPFP não-FPI sob terapêutica antifibrótica 10,0 (100,0)			
Sexo, masculino	7,0 (70,0)			
Idade, anos	68,1 ± 6,9			
Hábitos tabágicos, não	5,0 (50,0)			
Patologia pulmonar				
Pneumonite hipersensibilidade crónica	3,0 (30,0)			
CTD-ILD	3,0 (30,0)			
Doença pulmonar intersticial inclassificável	2,0 (20,0)			
IPAF	1,0 (10,0)			
Fibrose pulmonar familiar	1,0 (10,0)			
Avaliação imagiológica				
UIP	7,0 (70,0)			
NSIP fibrótica	3,0 (30,0)			
Índice ILD-GAP	3,6 ± 1,6			
Tratamento				
o Terapêutica antifibrótica	2,0 (20,0)			
o Terapêutica antifibrótica + Imunossupressão	8,0 (80,0)			
Motivo para início de antifibrótico				
o Queda FVC (% do previsto) ≥ 10%	6,0 (60,0)			
o Queda FVC (% do previsto) entre 5-10% + agravamento de clínica respiratória	3,0 (30,0)			
o Agravamento de clínica respiratória + aumento de extensão de fibrose em TC tórax alta resolução	1,0 (10,0)			
Antifibrótico utilizado				
o Nintedanib	2,0 (20,0)			
o Pirfenidona	8,0 (80,0)			
Efeitos secundários				
Nintedanib (n=2)				
o Diarreia	1,0 (50,0)			
o Insónia	1,0 (50,0)			
o Toxicidade hepática	1,0 (50,0)			
Pirfenidona (n=8)				
o Diarreia	4,0 (50,0)			
o Anorexia	5,0 (62,5)			
o Náuseas	3,0 (37,5)			
o Insónia	2,0 (25,0)			
o Vómitos	2,0 (25,0)			
o Toxicidade hepática	1,0 (12,5)			
Necessidade de suspender antifibrótico				
o Nintedanib	0,0 (0,0)			
o Pirfenidona	1,0 (12,5)			
Mortalidade	2,0 (20,0)			
	T/-12M	**T0**	**T/6-12M**	***p*-value** **Δ**
Avaliação clínica				
IMC	29,7 ± 3,2	28,5 ± 3,4	27,9 ± 3,4	0,170
Dispneia, mMRC	1,0 [1,0 – 2,0]	2,0 [1,0 – 2,3]	3,0 [2,0 – 3,0]	0,336
Internamentos por patologia respiratória[+]	0,0 [0,0 – 0,3]	0,0 [0,0 0,0]	0,5 [0,0 – 1,0]	0,157
Avaliação funcional				
TLC (% do previsto)	64,3 ± 11,5	59,7 ± 10,7	61,4 ± 12,8	0,103
FVC (% do previsto)	64,1 ± 15,2	62,7 ± 15,2	61,3 ± 16,8	0,849
DLCO (% do previsto)	49,6 ± 11,2	40,4 ± 11,9	33,4 ± 14,7	0,876
PM6M (metros)	389,2 ± 114,9	312,3 ± 117,8	321,0 ± 77,1	0,361
OLD repouso	1,0 (10,0)	2,0 (20,0)	5,0 (50,0)	n/a
OLD deambulação	3,0 (30,0)	5,0 (50,0)	6,0 (60,0)	n/a

Dados apresentados como n(%), média ± desvio padrão ou mediana [percentil25–percentil75]. **Δ** – variação entre T0 e T/-12M ou T/6-12M e T0;
T/-12M – avaliação 12 meses antes do início da terapêutica antifibrótica; T0 – inicio de terapêutica antifibrótica; T/6-12 – avaliação 6-12 meses após inicio de terapêutica antifibrótica; n/a – não aplicável;

[*] $p < 0,05$; [+] Internamentos que ocorreram nos 12 meses anteriores à avaliação considerada;

Figure CO 024

CO 025. EFFECTIVENESS OF NON-INVASIVE VENTILATION IN ACUTE HEART FAILURE ACCORDING TO PACO2 LEVELS

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Introduction: Few data is available concerning prognosis of acute heart failure (AHF) patients with hypocapnia. The aim of this study is to analyze the effectiveness of non-invasive ventilation (NIV) in the treatment of AHF based on partial pressure of carbon dioxide on arterial blood (PaCO2) levels at NIV starting.
Methods: Retrospective and observational study, analyzing all consecutive patients admitted in an Intensive Care Unit (ICU) with AHF and treated with NIV. We excluded patients with: cardiogenic shock, immediate endotracheal intubation, and refractory ventricular arrhythmias. Patients were classified according to PaCO2 level before starting NIV in normocapnic (PaCO2 35-45 mmHg), hypocapnic (PaCO2 < 35 mmHg) and hypercapnic (PaCO2 > 45 mmHg). NIV was carried out with bilevel positive airway pressure, initiated with an inspiratory positive airway pressure (IPAP) of at least 12 cmH2O, while the initial expiratory positive airway pressure (EPAP) was 7 cmH2O. NIV failure was defined as the need for endotracheal intubation or death in ICU.
Results: We analyze 1,009 patients with AHF. According to PaCO2 levels, 158 (15.7%) patients showed normocapnia, 361 (35.8%) hypocapnia and 490 (48.5%) hypercapnia. In the normocapnia group, 59% of the patients were male with mean age 73.3 ± 10.4; in the hypocapnia group 57% of the patients were male (mean age 73.3 ± 11.2) and in the hypercapnia group 50% were female (mean age 75.6 ± 8.9). The severity, based in Simplified Acute Physiology Score II (SAPS II), was higher in hypercapnic patients (42 ± 10), than normocapnic (39 ± 10) or hypocapnic patients (38 ± 11) [p < 0.001]. Baseline PaO2/FiO2 in each group was: normocapnic 125 ± 31, hypocapnic 134 ± 30 and hypercapnic 126 ± 35 (p = 0.001). NIV failure was found in 15 (9.5%) of normocapnic, 54 (11%) of hypercapnic and 56 (15.5%) of hypocapnic patients (p = 0.07). The presence of hypocapnia when starting NIV presented an adjusted OR for failure of 3.84 (95%CI 2.03-8.28). Independent predictive variables for NIV failure by multivariate analysis were illness severity measured by different variables, SAPS II and Sequential Organ Failure Assessment (SOFA) scores during the first day, together with greater respiratory dysfunction at one hour after initiation of NIV, measured by HACOR ("Heart rate, Acidosis, Counsciousness, Oxygenation, Respiratory rate") score. Hospital mortality rate in each group was 10% (normocapnia), 14.9% (hypercapnia) and 18.8% (hypocapnia) [p = 0.036].
Conclusions: Although high PaCO2 levels were associated with higher illness severity, these patients did not show worse prognosis. In patients presenting hypocapnia, the prognosis was worse. Thus, presence of hypocapnia in the initial arterial blood gas may imply the need for closer monitoring.

Keywords: *Non-invasive ventilation. Acute heart failure. Hypocapnia.*

CO 026. EFFECTIVITY AND SAFETY OF NON-INVASIVE VENTILATION ON PATIENTS WITH ACUTE ASTHMA

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Introduction: Non-invasive ventilation (NIV) is sometimes used in patients with acute asthma and respiratory failure who did not respond to oxygen therapy. The aim of this study is to analyze the safety and efficacy of NIV in acute asthma.
Methods: Retrospective and observational study of patients admitted to an Intensive Care Unit (ICU) due to acute asthma and who received NIV, over a period of 20 years. NIV was applied in a bilevel mode of positive pressure in the airway. The indications for starting NIV were: moderate or severe dyspnea, tachypnea with respiratory rate > 30 breaths per minute, PaO2/FiO2 < 250, respiratory acidemia (PaCO2 > 45 mmHg, with arterial pH < 7.35) and/or signs of increased respiratory work, such as use of accessory respiratory muscles. Exclusion criteria were cardio-respiratory arrest, shock, ischemia or uncontrolled cardiac arrhythmia, upper gastrointestinal bleeding, lack of cooperation from the patient, inability to protect the airway, excessive respiratory secretions, and concomitant failure of at least two organs. The success of NIV was defined as the number of endotracheal intubations avoided and discharge from the ICU.
Results: Of the 120 patients analyzed, 97 (80.8%) were female, with a mean age of 57 ± 21 years. The exacerbations were mainly triggered by respiratory infection or failure to comply with the usual therapy. The respiratory rate (RR) at admission was 40 ± 6 cycles per minute, the arterial pH was 7.28 ± 0.15, the PaCO2 was 62 ± 25 mmHg and the PaO2/FiO2 ratio was 183 ± 43. The levels of inspiratory positive airway pressure (IPAP) and expiratory positive airway pressure (EPAP) initially used were 15 ± 2 and 6 ± 1 cmH2O, respectively. The maximum levels of IPAP and EPAP used during NIV were 16 ± 3 and 7 ± 1 cmH2O, respectively. After the initiation of NIV, all the parameters previously mentioned (RR, pH, PaCO2, PaO2/FiO2) improved significantly. NIV failure occurred in 16 (13.3%) of the cases. At the beginning of ventilatory support, heart rate, RR and the PaO2/FiO2 ratio showed worse values in patients with NIV failure. NIV-related complications occurred in 45.8% of patients. In-hospital mortality was 12.5% (15 patients). The independent predictive factors for NIV failure were the maximum value in the "Sequential Organ Failure Assessment" (SOFA) index (OR: 2.32, 95%CI: 1.48-3.65, p < 0.001), PaO2/FiO2 (OR for failure of 0.94, 95%CI: 0.92-0.98; p = 0.016) and heart rate (OR: 1.06, 95%CI: 1.01-1.12; p = 0.028) one hour after the beginning of NIV.
Conclusions: In the studied population, it was possible to use NIV safely in patients with acute asthma, with a high rate of success in avoiding the need for invasive mechanical ventilation. Patients should be carefully selected and monitored.

Keywords: *Acute asthma. Non-invasive ventilation. Acute respiratory failure.*

CO 027. BRONCHIAL ARTERY EMBOLIZATION IN MANAGEMENT OF HEMOPTYSIS - A RETROSPECTIVE ANALYSIS

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Introduction: Hemoptysis, a symptom common across various respiratory diseases, is self-limiting and is approached effectively with conservative management in most cases. Nevertheless, it can be massive and life-threatening in 5-15% of cases, with a mortality rate of more than 50% in these cases if not treated appropriately. First introduced in 1972, bronchial artery embolization (BAE) has emerged as an effective minimally invasive procedure that has become a mainstay to the treatment of hemoptysis. It consists of selective bronchial artery catheterisation and angiography, followed by embolization of any identified abnormal vessels to stop the bleeding. This technique has been used for treatment of different causes of hemoptysis and for all grades of hemoptysis.
Objectives: To characterise patients with hemoptysis undergoing BAE and to evaluate their outcomes.
Methods: Retrospective analysis of patients with haemoptysis admitted in the Intensive Respiratory Care Unit (IRCU) of a tertiary university hospital, from January 2012 to December 2019. Clinical features, underlying disorders, procedure details and BAE outcomes were reviewed.

Results: A total of 66 patients were submitted to BAE, 47 (71.2%) were male, with a mean age of 59.8 ± 16.6 years. Hemoptysis was considered massive in 42 (63.6%) patients. The major etiologies of hemoptysis were bronchiectasis (mostly post-infectious) in 25.8%, lung cancer in 21.2% and active infection in 21.2% of patients. Of these, six were diagnosed with pulmonary tuberculosis. BAE was performed in the left bronchial territory in 9 (13.6%) patients, right bronchial territory in 19 (28.8%) and both territories in 35 (53%). Immediate success was achieved in 57 (86.4%) patients. Despite this, during the hospital stay recurrence occurred in 17 (25.7%) of these patients. Despite BAE, surgery (lobectomy) was performed in 1 patient, and 8 patients died. Direct procedure-related complications of BAE included 3 patients who developed transient neurological events post-angiography and one who developed paraplegia due to spinal cord ischemia. The median stay in IRCU was 3 ± 6 days and 7 ± 8.25 days of total hospital stay, with a readmission rate for hemoptysis in the first 30 days of 3%.
Conclusions: Bronchiectasis and lung cancer were the major etiology for hemoptysis. Our results suggest that BAE is a safe and effective treatment for acute massive and chronic recurrent hemoptysis, supporting the current literature. However, bleeding recurrence was relatively hig, and it may be necessary to perform several BAE or even surgical treatment.

Keywords: *Hemoptysis. Angiography. Bronchial artery embolization.*

CO 028. PULMONARY ASPERGILLOSIS SURGERY: EXPERIENCE OF A CENTRAL HOSPITAL

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Introduction: Aspergilloma, also called intracavitary mycetoma or fungal ball, is the result of saprophytic colonization of a lung cavity by Aspergillus. There are several diseases that cause cavitary lung injury. Neoplasms and infection are the two most common causes in adults. The most frequent symptoms are productive cough, bronchorrhea and hemoptysis, the latter being the potentially most severe. After the formation of the fungal ball, treatment with antifungal agents is inefficient. Aspergilloma surgery is the only effective treatment in the long term, but the reported incidence of intra- and postoperative complications makes this a controversial topic.
Objectives: Analysis of the experience of a thoracic surgery center in patients with pulmonary aspergilloma.
Methods: Retrospective analysis including all patients diagnosed with pulmonary aspergilloma who underwent resection surgery over a 16-year period in an institution (January 2004-July 2020).
Results: 45 patients (32 men) were included, with a mean age of 54.0 + 15.5 years. Of these, 35.6% of the patients had smoking habits, 25% severe alcoholic habits and 64% personal history of tuberculosis. Most patients had a complex aspergilloma (76%) and 24% had a simple aspergilloma. The most frequent clinical presentation was hemoptysis (76%). The surgical procedure consisted of lobectomy in 51%, bilobectomy in 18%, atypical pulmonary resection in 16%, segmentectomy in 6% and pneumectomy in 4%. There was no operative mortality. In 40% of the patients there were complications in the postoperative period, the most frequent being atelectasis (17%), prolonged air leak (11%) and pneumonia (11%).
Conclusions: Surgery is the only effective option in the long term, as it allows the control of symptoms, prevents the recurrence of hemoptysis and increases survival. Although operative mortality rates are considerable, ranging from 0% to 34%, according to the criteria for selecting patients and lung disease. In patients who have a reasonable respiratory function, surgery makes it possible to avoid the fearsome complications and prolong survival, so referral of these patients to thoracic surgery is essential.

Keywords: *Aspergillus. Pulmonary aspergillosis. Surgery.*

CO 029. MEDIASTINOSCOPY ON INVESTIGATION OF THORACIC MALIGNANCY

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Introduction: Mediastinoscopy allows mediastinum evaluation; its major applications consist of mediastinal staging of non-small cell lung cancer, and also diagnosis of granulomatous afections, lymphoproliferative diseases and unknown lymphadenopathies.
Objectives: Review of mediastinoscopy exams performed at a reference center, analyzing their role in diagnosis and staging of intrathoracic tumors.
Methods: Retrospective analysis of clinical processes of patients submitted to cervical mediastinoscopy in period between January 2013 and august 2019.
Results: Sixty-three patients were submitted to mediastinoscopy through supra-esternal minicervicotomy, of which 74.6% (n = 47) were male. The mean age was 59.3 ± 14.3 years. More than a half of procedures (n = 36; 57.1%) were of diagnostic purpose. Main diagnostic procedures consisted in suspect of: lymphoproliferative disease (n = 18; 50.0%) and pulmonary neoplasia (n = 6; 16.6%). Mediastinoscopy resulted in a definite diagnosis in 63.8% (n = 23) of total exams performed. Of patients with a previous diagnosis of pulmonary diagnosis, with histological description (n = 18; 28.6%), mediastinoscopy demonstrated mediastinum lymph node involvement on 8 patients (44.4%). Among patients with lymphoproliferative disease suspected, mediastinoscopy examination confirmed the initial suspicion in three cases (16.6%); in remaining the following diagnosis were achieved: sarcoidosis (n = 8; 44.4%); poor differentiated carcinoma (n = 1; 5.5%); absence of specific changes in 5 (27.7%). In four patients, EBUS-TBNA had been previously performed: in three revealed itself non-conclusive, and in one identified alterations suggestive of tuberculosis. In four patients, this procedure was performed for suspected lymph node involvement of occult primary tumor, being positive in only one patient with ultimately lung adenocarcinoma.
Conclusions: Mediastinoscopy demonstrated being a surgical procedure with profitability on a well-defined fan of intrathoracic pathologies, on tumor staging. Regarding EBUS, more patients, submmited to both procedures, would be necessary to establish an adequate comparative analysis

Keywords: *Mediastinoscopy. Intrathoracic malignancy.*

CO 030. SEVERE PULMONARY HYPERTENSION - 16 YEARS OF EXPERIENCE IN A REFERRAL CENTER

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Introduction: Severe pulmonary hypertension (PH), functional classes lll and lV, is a pathology with high morbidity and mortality, and sub-group 1, pulmonary arterial hypertension (PAH), is the one that has raised more interest at therapeutic level due to its fulminant evolution in some cases. Intravenous synthetic prostacyclin analogues (iPCAs) were the first approved treatment for severe forms of PAH and are still the treatment with the best outcome in these patients. Despite its effectiveness, the management of its continuous intravenous administration implies cumulative experience of the teams, redoubled asepsis care and tight follow-up.
Objectives: Assess the long-term tolerance of iPCA therapy in a population of patients with severe PH over 16 years of consultation at a national reference center in PH.
Methods: Retrospective analysis of the clinical processes of all patients with PH medicated with iPCA through Hickman catheter at Garcia da Orta Hospital.

Results: 23 individuals with severe pulmonary hypertension were treated in the last 16 years with iPCA administration through hickman catheter. 19 women, two Black, the remaining Caucasian. 60.9% had at least one comorbidity. Mean age 44.4 years (16-81 years) and from the diagnosis to the initiation of iPCA treatment it took an average of 2.8 years (0-11 years). Regarding the etiological classification, the majority were from group 1 (n = 15), 1 from group 3, 6 from group 4 and 1 from group 5. Prior to initiation of iPCA therapy, 69.6% were medicated with endothelin receptor antagonist, 95.7% with phosphodiesterase 5 inhibitor and 4.3% with calcium channel inhibitor (group 1.5). In total, patients in did therapy for a median of 402 days (AIQ 843), (10-2059 days), patients from groups 3 and 5 were the ones who overall performed fewer days of therapy, 33 and 146 days, respectively. 26.1% of patients died from disease progression, 17.4% in group 1 and 8.7% of group 4, with a median of 144 days of iPCA (3-1,518 days) and 8.7% died from bloodstream infection, 4.4% of group 1 and 4.4% of group 4, having performed a median of 1,079.5 days of iPCA. At the end of the study, 8 patients (34.8%) were in active treatment for a median 895.5 days (AIQ 772), all Caucasian female, 7 from group 1 and 1 from group 4.

Conclusions: Median time under iPCA of more than one year, with some patients on therapy for more than 5 years shows a good overall tolerance to these drugs, especially in groups 1 and 4, despite the natural history of the disease and all the implications of administration and follow-up.

Keywords: *Pulmonary hypertension. Intravenous synthetic prostacyclin analogues. Mortality.*

CO 031. REFERRAL AND FOLLOW-UP PROTOCOL FOR PATIENTS WITH COPD AND PULMONARY HYPERTENSION

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Introduction: Group 3 Pulmonary hypertension (PH) in Chronic Obstructive Pulmonary Disease (COPD), decreases effort capacity and worsens prognosis. On the other hand, COPD in patients with PH

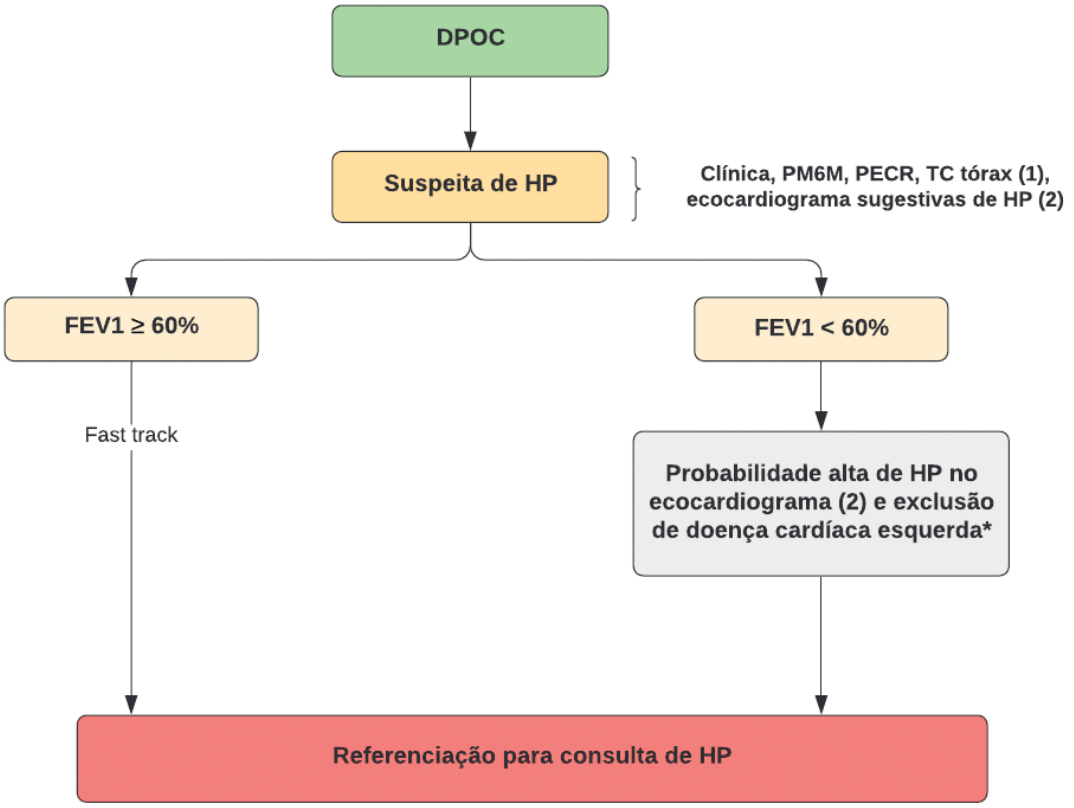

Figura 1: Referenciação de Hipertensão Pulmonar (HP) na doença pulmonar obstructiva crónica (DPOC).
FEV1: forced expiratory volume in 1 s; TC: tomografia computorizada; PECR: prova de esforço cardiorrespiratória; PM6M: prova de marcha de 6 minutos.
(1) achados sugestivos de HP incluem: 1) sintomas e sinais (dispneia desproporcional, P2 audível, sinais de insuficiência cardíaca direita, desvio direito do eixo no ECG, aumento dos níveis de peptido natriurético); 2) Provas de função respiratórias alteradas (DLCO baixa (e.g. <40% do previsto), razão %FVC/%DLCO aumentada (KCO, coeficiente de transferência do pulmão para o monóxido de carbono, baixa)); 3) achados no esforço (diminuição da distância percorrida, da saturação arterial de oxigénio ou aumento do Borg na PM6M e diminuição da reserva circulatória, reserva ventilatória preservada nos testes cardiopulmonares de exercício); 4) achados imagiológicos (extensão da doença pulmonar, aumento calibre segmentos arteriais pulmonares, razão entre os diâmetros AP/aorta >1 na TC). Qualquer decisão de tratamento individualizado deve ser orientada por alvos terapêuticos pré-definidos, parar caso os alvos não sejam alcançados num tempo pré-definido.
(2) Tabela 8A e 8B de 2015 ESC/ARS Guidelines for the diagnosis and treatment of pulmonary hypertension
*** Na ausência de avaliação da velocidade de regurgitação da tricúspide, considerar de alta probabilidade ETT com PSAP ≥ 55mmHg e sinais ecocardiográficos sugestivos de HP em doentes sintomáticos com suspeita de HP.**

Figure CO 031

group 1 increases mortality and its presence frequently delays the diagnosis with negative impact on prognosis.
PH is frequently encountered in severe patients, but the pulmonary artery mean pressure is usually less than 35 mmHg. Still we can find severe PH in patients with mild obstruction that have indication for target PH therapy.
Methods: Recognizing the need for early identification of these patients, we propose a protocol for referral and management of COPD patients on our Pulmonary Hypertension Treatment clinic in CHULN (fig.), based on the recommendations of the World Congress of PH of 2018.
Results: Diagnosis is confirmed by Right Heart Catheterization, and patients are classified in group 1 or 3. In the latter, the posterior approach is defined according to the severity of the disease and the PH.
Conclusions: The elaboration and implementation of this protocol intends to alert for the diagnosis of PH in patients with COPD, allowing their quick inclusion in the PH clinic and systematic follow-up.

Keywords: *Pulmonary hypertension. Group 3. Chronic obstructive pulmonary disease. COPD.*

CO 032. PHONE MEDICAL APPOINTMENTS FOR SLEEP-DISORDERED BREATHING IN COVID-19 PANDEMIC – USEFUL AND EFFECTIVE?

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Introduction: The World Health Organization declared the COVID-19 outbreak as a pandemic. The ability to integrate telecommunications and information systems was crucial to successfully reduce the spread of the virus, while continuing to provide medical care. The aim of this study was to evaluate the efficacy and usefulness of phone medical appointments and telemonitoring in sleep-disordered breathing (SDB) patient's follow-up.
Methods: The current study was conducted at the Sleep Lab of a tertiary university hospital in Portugal between 13th march and 31st may 2020. The patients included were ≥ 18 years old and had suspected or confirmed SDB. In the first medical appointments, a detailed clinical interview was conducted. In the follow-up telephone consultations, all patients had confirmed SDB and we assessed adherence to treatment, control of respiratory sleep events, PAP-related side-effects and changes in therapeutic strategies. Information about PAP device pressure, compliance, adherence, residual apnoea–hypopnoea index (AHI) and leaks were obtained through telemonitoring or downloaded from the patient's device by homecare respiratory (HCR) therapists.
Results: A total of 769 phone medical appointments were performed, being 149 first medical appointments and 620 follow-up ones. In first medical appointments, 109 patients answered the call. The majority of patients (n = 130) had suspected SDB and a home sleep apnea testing (HSAT) was requested, in order to be subsequently performed. In follow-up teleconsultation, most patients (89.7%) answered the call and 538 patients were under PAP-therapy. Information of the ventilatory device were available in 354 cases; median PAP use was 6.44 ± 2.35 h/day and 280 (79.1%) had a considered adequate adherence (≥ 4 h/day for ≥ 70% of nights) and 76% of patients were well controlled concerning sleep respiratory events. The most common PAP-related side effects reported by patients are nasal congestion, rhinorrhea, mucosal dryness and nosebleeds. In some patients, changes in therapeutic strategies were made: new therapeutic approaches (n = 49), change of previous therapies (N = 82), interface change (n = 44) and change of PAP-therapy parameters (n = 8). Fifteen patients (2.8%) abandoned the treatment with PAP and 25 patients were discharged from the medical appointment as they were very well controlled and well adherent to the treatment.
Conclusions: Concluding, teleconsultation and telemonitoring were effective and extremely useful, allowing medical appointment, access to data about the adherence and effectiveness of PAP-therapy, resolution of several side effects of treatment and adjustments in therapies. Our study shows that the follow-up of patients with SDB could be potentially elective situations to be performed by teleconsultation and that telemonitoring is important. Moreover, we found that teleconsultation, as the first approach to a patient with suspected SDB, allows for initial screening and the decision on which diagnostic tests to perform.

Keywords: *Teleconsultation. Telemonitoring. Sleep-disordered breathing. COVID-19 pandemic.*

CO 033. WRIST ACTIGRAPHY IN OBSTRUCTIVE SLEEP APNEA

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Introduction: Wrist actigraphy is a non-invasive method of monitoring the activity/rest rhythm through the measurement of motor activity and luminosity and is able to estimate the sleep parameters of an individual. Its usefulness has been acknowledged for several pathologies, such as circadian rhythm disorders, insomnia and hypersomnia. However, its role in obstructive sleep apnea (OSA) is yet to be defined.
Objectives: To characterize OSA patients according to wrist actigraphy sleep parameters and to compare them with polysomnography (PSG) data.
Methods: Data analysis of OSA patients submitted to an overnight PSG and 7 to 14 days wrist actigraphy. Descriptive data was performed and comparison between actigraphy and PSG parameters was made.
Results: In total, 103 patients were identified, of which 64.1% (n = 66) were male, mean age was 48 ± 15 years and mean body mass index (BMI) was 28.9 ± 5.2 kg/m^2. Only 16.5% (n = 17) of patients were shift workers. The mean value for the Epworth sleepiness scale was 15. The mean respiratory disturbance index (RDI) was 24.3 ± 20.3/h and mean oxygen desaturation index (ODI) was 10.9 ± 16.3/h. OSA was scored as mild in 45.6% (n = 47) of the cases, moderate in 27.2% (n = 28) and severe in 27.2% (n = 28) of the individuals. The mean values for the 7 to 14 days actigraphy parameters were the following: total time in bed was 524 ± 95.9 minutes, total sleep time was 412 ± 76.2 minutes, sleep latency was 20.9 ± 14.3 minutes, wake after sleep onset (WASO) was 51.6 ± 20 minutes and the sleep efficiency was 78.4 ± 10%. Patients with severe OSA had higher WASO when compared to those with mild disease (58.1 vs 47.5 minutes, $p < 0.05$) and lower sleep efficiency comparing to individuals with mild/moderate OSA (72.9% vs 79% vs 81.3%, $p < 0.05$). When comparing actigraphy and PSG data, only sleep latency showed no difference between the two techniques ($Z = -1.003$, $p = 0.316$). However, a weak correlation between the two measurements was found ($rs = 0.33$, $p < 0.05$).
Conclusions: Wrist actigraphy data showed that severe OSA patients have worse sleep quality, spend more time awake in bed, which leads to a lower sleep efficiency. This data is in line with what is usually seen in PSG reports. In these circumstances, actigraphy could be used as a severity criteria as well as a way to prioritize OSA diagnosis and treatment.

Keywords: *Actigraphy. Obstructive sleep apnea. Polysomnography.*

CO 034. THE IMPORTANCE OF TEMPERATURE ON OBSTRUCTIVE SLEEP APNOEA IN THREE DIFFERENT CLIMATE ZONES OF EUROPE – DATA FROM THE EUROPEAN SLEEP APNOEA DATABASE (ESADA)

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Introduction: Recent studies indicate that ambient temperature may modulate obstructive sleep apnoea (OSA) severity. However, study results are contradictory warranting more investigation in this field.
Methods: We analysed 19,293 patients of the European Sleep Apnoea (ESADA) database cohort with restriction to the three predominant climate zones according to the Koeppen-Geiger climate classification: Cfb (warm temperature, fully humid, warm summer), Csa (warm temperature, summer dry, hot summer) and Dfb (snow, fully humid, warm summer). Average outside temperature values were obtained and several hierarchical regression analyses were performed to investigate the impact of temperature on the apnoea-hypopnea index (AHI), oxygen desaturation index (ODI), time of oxygen saturation < 90% (T90) and minimum oxygen saturation (MinSpO2) after controlling for confounders including age, BMI, gender and air conditioning (A/C) use.
Results: AHI and ODI increased with higher temperatures with a standardized coefficient beta (β) of 0.28 for AHI and 0.25 for ODI), while MinSpO2 decreased with β: -0.13 (all results $p < 0.001$). When adjusting for climate zones, the temperature effect was only significant in Cfb (AHI: β = 0.11), and Dfb (AHI: β = 0.08) (model 1: $p < 0.001$). The presence of A/C (3.9% and 69.3% in Cfab and Csa, respectively) demonstrated only a minor increase in the prediction of the variation (Cfb: AHI: R2: +0.003; and Csa: AHI: R2: +0.007, both $p < 0.001$).
Conclusions: Our study indicates a limited but consistent influence of environmental temperature on OSA severity and this effect is modulated by climate zones.

Keywords: *Environment. Geographical impact. Sleep disordered breathing.*

CO 035. COMPARISON OF THE DIAGNOSTIC PERFORMANCE OF PERIPHERAL ARTERIAL TONOMETRY VS. LEVEL 3 SLEEP STUDY IN THE DIAGNOSIS AND STRATIFICATION OF OBSTRUCTIVE SLEEP APNEA

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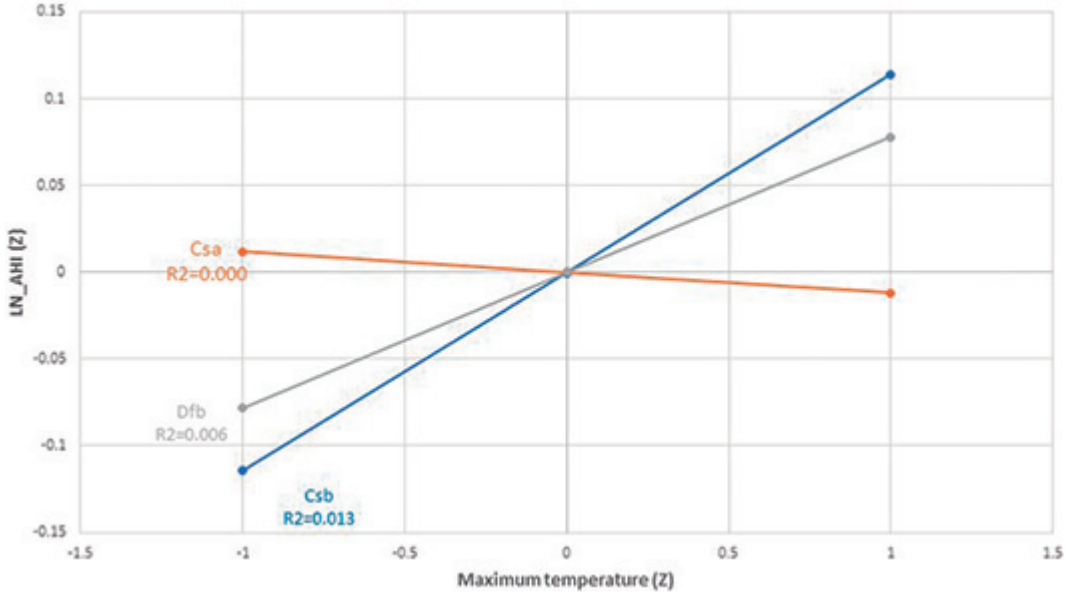
Introduction: WatchPAT (WP) technology integrates the monitoring of Peripheral Arterial Tonometry (PAT), actigraphy and peripheral oxygen saturation, using a simple device, allowing the diagnosis of some sleep disorders. Several validation studies have compared this technology to polysomnography (PSG) and have demonstrated a high correlation of AHI, RDI and high agreement in the stratification of the severity of AHI. However, the comparison of WP with the Home Level 3 Sleep Study (HL3SS) is poorly studied, as well as the predictive capacity of the STOP-BANG questionnaire applied to this device.
Objectives: To compare the WP and the HL3SS regarding the diagnostic accuracy and severity stratification of obstructive sleep apnea syndrome (OSAS) and to evaluate the predictive capacity of the STOP-BANG questionnaire for each exam.
Methods: Cross-sectional double-blind case-control study, carried out at Hospital Luz Arrábida, including adults with clinical suspicion of OSAS. The results obtained by the HL3SS and the WP200CP device were compared, simultaneously on the same night and for each individual. The results of the STOP-BANG questionnaire were also used. Correlations, agreement tests and logistic regressions were performed.
Results: 54 patients were recruited, of which 5 were excluded due to bad signal from the WP200CP. Most of the 49 patients were male (n = 35; 71.4%), the mean age was 54 ± 10 years and the BMI was 28.3 ± 4.1 Kg/m^2. 35 patients (81.6%) had at least one of the following comorbidities: smoking, DM, arterial hypertension, dyslipidemia, COPD, asthma and/or stroke/TIA. Most patients had a STOP-BANG score ≥ 3 (81.4%). Regarding the HL3SS and WP results, the median AHI was 16 (2-82) and 17.4 (2-65), respectively ($p = 0.102$). 46 patients (93.9%) in HL3SS and 43 patients (87.8%) in WP had an AHI ≥ 5 ($p = 0.453$). There was a strong correlation between the severity of AHI between HL3SS and WP (Kendall tau-b = 0.715, $p < 0.001$). For the AHI cutoff of 15 and 30, the agreement between



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HL3SS and WP was moderate (kappa = 0.669 and kappa = 0.716, respectively (p < 0.001)), and for each patient, the WP ranked higher severity more often. For an AHI cutoff ≥ 5, the STOP-BANG score ≥ 3 had a sensitivity and specificity of 82.6% and 33.3% in HL3SS and 83.3% and 21.1% in WP, respectively. Regarding the predictive capacity of the STOP-BANG score ≥ 3 for an AHI ≥ 5, the OR was 2.375 (95%CI 0.191-29.477) in the HL3SS and OR: 0.875 (95%CI 0.089-8.557) in WP.
Conclusions: In our study, WP's diagnostic performance was comparable to HL3SS. Therefore, and being a cheaper test, WP can be used to assess patients with suspected OSA, as a substitute for ES3. The sensitivity of the STOP-BANG questionnaire was similar in HL3SS and WP for the different cutoff points of the AHI, thus reinforcing its importance regardless of the test used.

Keywords: *OSA. Watchpat. Home level 3 sleep study.*

CO 036. ADHERENCE TO CONTINUOUS POSITIVE PRESSURE DEVICE TREATMENT, AT HOME, IN THE PERIOD OF CONFINEMENT BY THE COVID 19 PANDEMIC

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Introduction: Continuous positive airway pressure (CPAP) is highly effective in the treatment of obstructive sleep apnea (OSA), but user compliance limits its effectiveness. Many studies have been conducted to identify relevant factors for therapeutic adherence. The COVID-19 contingency period has been a period of changes in habits, behaviors, routines, apprehension and myths as well as the cancellation of appointments so that a different adherence of patients to the CPAP may be expected.
Objectives: Assess differences in patient compliance to home positive pressure device treatment during the COVID19 confinement period.
Methods: The first 300 patients prescribed with this equipment at the Sleep Medicine Center in 2019 (prior to the month of June) were identified. Card data were read from 1 December 2019 to 29 February 2020 ("pre-COVID-19" period) and from 1 March to 31 May ("COVID-19 confinement" period). Statistical analysis was performed by SPSS.
Results: Reports of 246 patients were obtained, 26 patients were excluded for abandonment of therapy or insufficient data. Only 3 patients abandoned therapy during the COVID-19 confinement period. 220 patients were included, 72 female (32.6%) and 149 male (67.4%). The mean age was 59.9 years (SD of 11.2). The apnea-hypopnea index at diagnosis of these patients was on average 32.5/hour (SD 19.8). A total of 27 patients (12.2%) underwent polysomnography level 1, while the remaining were submitted to cardiopulmonary domiciliary study. OSA was the most frequent diagnosis (n = 214, 96.8%), only 4 patients (1.8%) with the diagnosis of Central and Obstructive Apnea, 2 patients (0.9%) with the diagnosis of obesity hypoventilation syndrome and 1 Overlap OSA and COPD (0.5%). Most patients (n = 211, 95.5%) were under autoCPAP, 4 patients (1.8%) with servoventilation, and 3 patients (1.4%) BiPAP and CPAP each. The percentage of device use over 4h was in the "pre-COVID-19" period on average 76.4% and in the "COVID-19 confinement" period 80.6% (p < 0.001). The number of days without using the therapy was in the "pre-COVID-19" period on average 14.3 days, and in the "COVID-19 confinement" period, with an average of 10.8 days without using. The mean time of therapy use per night was 415.4 minutes (6 hours and 52 min) in the pre-COVID-19 period and 422.9 min (7 hours and 2 min) in the "COVID-19 confinement" period, without statistically significant difference. The residual AHI and the leaks showed no statistically significant difference between periods.
Conclusions: The COVID-19 containment measures implied major behavioral and social changes. However patients in this study, like others recently published, used more days and more time their CPAP. The given reasons vary between more hours spent at home, fear of contracting the disease and need to protect their airways, especially because these patients tend to gather the risk factors announced for COVID-19. Also because it is a free therapy and the monitoring is performed not only by prescribing doctors, family doctors but also by home respiratory care companies.

Keywords: *Ventilotherapy adhesion. CPAP. Autocpap. COVID19 contingency. Obstructive sleep apnea.*

CO 037. IS NOX T3 DEVICE SCORING ALGORITHM ACCURATE FOR OBSTRUCTIVE SLEEP APNEA DIAGNOSIS?

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Introduction: Obstructive sleep apnea (OSA) is prevalent and widespread. Out-of-center sleep testing (OCST) for OSA is rapidly expanding because of its sensitivity, specificity and cost effectiveness for OSA diagnosis compared to in-lab polysomnogram (PSG). Type 3 portable monitors, as classified by the American Academy of Sleep Medicine (AASM), gather data through four to seven channels including airflow, respiratory effort, heart rate, and oxygen saturation. This device also contains an algorithm for automatic scoring of events.
Objectives: We propose to study the accuracy of this device automatic scoring compared with the manually edited scoring in our population.
Methods: For five months, from October 2019 to February 2020, we performed a prospective study in our Medicine Sleep Center, based on a previous analysis with a reduced sample of patients. The patients were randomly distributed to the available OCST devices (according to the usual procedure already in place). We collected the data of patients who performed OCST with Nox T3 device and recorded the automatic generated report and the manually corrected report in a specific folder. The scoring was done according AASM practice parameters. We analyzed the data obtained using the Statistical Package of the Social Sciences (SPSS) version 23.
Results: The sample consisted of 283 participants (we excluded patients whose equipment failures prevented the correct reading of the exam). 60.1% were male, mean age of 57.1 ± 14.3 years. Average manual apnea and hypopnea index (AHI) was 23.7 ± 22.1 events/h whereas autoscored AHI was 24.6 ± 20.7 events/h. All manual scores (AHI, apnea index, hypopnea index and oxygen desaturation index) had strong correlations with their respective automated scores (r = 0.97, r = 0.89, r = 0.92, r = 0.99, respectively; p < 0.001). When compared to the automatic scores previously mentioned, the respective manually corrected values (Wilcoxon signed-ranks test) were statistically different (p < 0.001). However when considering only the cases in which the manual AHI > 15, the difference between the values of this index was not statistically different (p = 0.098). This was also true for AHI values > 30 (p = 0.454). For AHI values > 15, automatic AHI values and manual AHI values did not differ significantly, with a mean difference of 0.17 events/h. The mean differences between the AHI values measured, also did not differ significantly from zero in AHI values > 30. The observed autoscored measures were underestimated compared to the manual measures by an average of 1.23 events/h (Bland–Altman plot).
Conclusions: With this study, we tried to understand whether the values that resulted from the automatic scoring software of the Nox-T3 portable device were reproductible. When AHI is < 15, there may be a need for confirmation of automatic scores by manual editing or PSG, especially in symptomatic patients with high pretest

probability of OSA. But, for patients with AHI > 15, automatic scores seem accurate enough to diagnose OSA.

Keywords: *Obstructive sleep apnea. Level III PSG. Nox T3.*

CO 038. DAYTIME SLEEPINESS IN HEALTH PROFESSIONALS: FINDINGS OF A FIELD STUDY AT AN UNIVERSITARY HOSPITAL

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Introduction: Disturbance of the sleep/wake cycle caused by shift work and night work negatively influences both the quantity and quality of sleep. These changes may cause, among other symptoms, drowsiness during waking periods.
Objectives: To analise the levels of daytime sleepiness in health professionals at our Hospital who work in shifts (with night hours) and with fixed hours (during the day).
Methods: Cross-sectional study with application of the Epworth Sleepiness Scale (ESS) was applied to a group of professionals observed at the Occupational Health Service of the Hospital in 1 month. The statistical analysis of data was performed using SPSS and chi-square test. A significance level of 5% was accepted.
Results: 96 professionals were included in the study, most of them female (n = 72; 75%). Fifty-three (55.2%) worked in shifts with night hours and 43 (44.8%) only during day. The group of professionals with night work had more excessive daytime sleepiness (ESS score > 10) compared to the group of workers with exclusive daytime hours (45.3% vs 32.6%; p = 0.205). In the group of professionals who work in shifts, the STOP-BANG average was 2.1 and the classification in the Pittsburgh questionnaire was 7.2; in the other group with daytime hours it was 1.8 and 6.7, respectively. Most professionals drink coffee daily (n = 81; 84.4%), 48 of whom work in shifts (59.3%). There was a greater number of shift workers drinking more than 2 coffees per day compared to day workers (n = 22 vs 9 respectively; p = 0.129). Among professionals with severe levels of daytime sleepiness (ESS > 16), 88.9% (n = 8) worked in shifts and 11.1%, (n = 1) worked only during the day, with a statistically significant correlation between the two variables (p = 0.044).
Conclusions: This study showed a high prevalence of daytime sleepiness in health professionals who work at night. The presence of higher levels of drowsiness in professionals who work at night may help to corroborate the hypothesis that daytime rest in these professionals is not equivalent to a regular nighttime sleep pattern. Moreover, this situation could also negatively influence daily professional performance.

Keywords: *Sleep. Daytime sleepiness. Nigh-shifts. Health professionals.*

CO 039. ARE PAPER-BASED AND TELEPHONE INTERVIEW EQUIVALENT MODES OF ADMINISTRATING THE COPD ASSESSMENT TEST, THE FUNCTIONAL ASSESSMENT OF CHRONIC ILLNESS-FATIGUE SUBSCALE AND THE ST. GEORGE'S RESPIRATORY QUESTIONNAIRE?

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Introduction: The COVID-19 pandemic brought numerous challenges, and novel methods for monitoring symptoms and quality of life of people with chronic obstructive pulmonary disease (COPD) are now required. The COPD Assessment Test (CAT), the Functional Assessment of Chronic Illness-Fatigue-Subscale (FACIT-FS) and the St. George's Respiratory Questionnaire (SGRQ) paper-based measures are commonly applied in clinical practice. Nevertheless, it is unknown if follow-up monitoring using telephone interview is equivalent to in person paper-based forms.
Objectives: This study aimed to compare validity and reliability of follow-up monitoring using CAT, FACIT-FS and SGRQ when administered by paper-based forms and telephone interview in people with COPD.
Methods: Data from an observational 6-month prospective study including people with stable COPD followed up monthly was analysed. At follow-up six, participants answered to CAT, FACIT-FS and SGRQ questionnaires in person during a home visit and by telephone with an interval maximum of 48-hours. Participants were randomly selected to answer first to the paper version followed by telephone or vice versa. Validity was assessed with the Spearman correlation (rs). Reliability measures included Intraclass Correlation Coefficient (ICC), standard error of measurement (SEM), Bland and Altman 95% Limits of Agreement (BA95%LoA) and internal consistency with Cronbach's alpha.
Results: Twenty-one people with COPD (17 men; 65 ± 8 years; FEV1 65.1 ± 21.2%predicted) were included. Strong positive correlations (rs 0.85-0.98, p < 0.001) between the scores of CAT, FACIT-FS and SGRQ applied by both methods were found. Test-retest reliability was excellent, with an ICC of 0.94 (95%CI: 0.85-0.98), 0.99 (95%CI: 0.96-0.99) and 0.98 (95%CI: 0.94-0.99) for CAT, FACIT-FS and SGRQ total scores. The SEM showed a low level of associated measurement error, ranging between 0.40 in FACIT-FS to 4.68 in SGRQ symptoms subscale. The BA95%LoA ranged from -1.13 to 0.80, illustrating a good level of agreement between both administration modes, with no evidence of bias. The internal consistency was similar between paper and telephone versions (Cronbach's alpha of 0.72/0.71, 0.34/0.21 and 0.85/0.86 for CAT, FACIT and SGRQ total scores).
Conclusions: In a context where personal contact should be reduced, telephonic administration of CAT, FACIT-FS and SGRQ showed to be a valid and reliable alternative approach to paper-based forms

Table 1: Validity and reliability of CAT, FACIT-FS and SGRQ (n=21).

	Paper mean (SD)	Phone mean (SD)	r_s (p-value)	ICC (95%CI)	SEM*(95%CI)	BA mean difference (95%LoA)
CAT, total score	7.67 (4.78)	8.38 (4.98)	0.94 (<0.001)	0.94 (0.85;0.98)	1.22 (5.99;10.77)	-0.71 (-5.23;3.82)
FACIT-FS, total score	44.76 (4.19)	44.90 (4.00)	0.98 (<0.001)	0.99 (0.96;0.99)	0.40 (44.12;45.68)	-0.14 (-2.12;1.84)
SGRQ, scores						
Symptoms	32.44 (18.32)	32.71 (19.12)	0.85 (<0.001)	0.94 (0.85;0.98)	4.68 (28.02;37,38)	-0.27 (-17.99;17.45)
Activity	38.16 (26.75)	39.28 (26.98)	0.94 (<0.001)	0.98 (0.94;0.99)	3.82 (35.48;43.12)	-1.13 (-17.32;15.92)
Impact	13.43 (14.49)	12.62 (14.63)	0.86 (<0.001)	0.95 (0.88;0.98)	3.26 (9.34;15.86)	0.80 (-11.86;13.46)
Total score	23.86 (17.12)	23.82 (17.68)	0.89 (<0.001)	0.98 (0.94;0.99)	2.50 (21.3;26.3)	0.04 (-10.42;10.51)

SD: standard deviation; Rs: Spearman correlation; ICC: intraclass correlation coefficient; CI: confidence intervals; LoA: limits of agreement; SEM: standard error of measurement: *SEM calculated with highest SD (phone version).

Figure CO 039

for monitoring symptoms and health-related quality of life in people with COPD.

Keywords: *Chronic obstructive pulmonary disease. Assessment and monitoring. COPD assessment test. Functional assessment of chronic illness-fatigue subscale. St. George's respiratory questionnaire. Telephone interview.*

CO 040. USE OF NIV IN ACUTE COPD EXACERBATION WITH SERIOUS RESPIRATORY ACIDEMIA VS LESS SERIOUS ACIDEMIA

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Introduction: Noninvasive ventilation (NIV) is the preferred ventilation mode used in patients with acute exacerbation of COPD (AEDPOC) and acute respiratory failure, who do not present contraindications for it. NIV reduces ventilatory work and the need for intubation, decreases hospital stay and prolongs patient survival. It should be considered when pH < 7.35, pCO2 > 45 mmHg and RR > 20-24 cycles/minute is the preferred choice for patients with COPD who develop acute respiratory acidosis. There is no lower pH limit below which NIV is inadequate, however the lower the pH the greater the risk of failure.
Objectives: Compare the effect of NIV in patients with "severe acidemia" (pH < 7.25) and patients with "less severe acidemia" (pH between 7.25-7.35), hospitalized with AEDPOC diagnosis and need for NIV.
Methods: A retrospective and descriptive analysis of patients with EADPOC and acute RI and need for hospitalization under NIV was performed at the Pneumology Service of Hospital de Braga, between 2016-2019. Divide the sample into 2 groups according to the pH (pH < 7.25 and pH between 7.25 -7.35) comparing each group to each other. The variables were analyzed: demographic characteristics of the patients, evolution with new exacerbations, need for readmission at 3 months, days of hospitalization, days of need for NIV, mortality.
Results: A sample of 179 patients hospitalized for EADPOC with acute hypercapnic IR and need for NIV was obtained, 53% male, mean age 78 ± 11 years. Of the total sample, 44 patients had a pH < 7.25; 65 patients pH between 7.25-7.35 and 70 patients had pH > 7.35. Comparing the groups of patients with respiratory acidemia (pH 7.25 and pH between 7.25-7.35), it was found that both had a similar hospital stay (13 ± 8.5 days for the pH group < 7.25; 12.7 ± 7.4 for the pH 7.25-7.35). It was also found that both had similar NIV days (11.2 ± 9.1 for the group with pH < 7.25; 10.5 ± 7.7 for the group with pH between 7.25-7.35). Regarding the evolution with new episodes of exacerbation, it was found that the group of patients with pH at admission between 7.25-7.35 had a higher incidence of new exacerbations and the need for hospitalization in 3 months after the first exacerbation. In this group, 74% of patients experienced new exacerbations during the study period and 37% needed to be readmitted within 3 months. On the other hand, it was found that 30% of patients with pH < 7.25 had exacerbations in the same period of time and 16% needed to be readmitted at 3 months. It was recorded that 32% of patients with pH < 7.25 died during hospitalization, compared to 12% of patients with pH between 7.25-7.35. Thus, there was a statistically significant relationship between pH severity and patient mortality.
Conclusions: The group of patients with a pH between 7.25-7.35 had a higher incidence of new exacerbations and the need for readmission at 3 months. In turn, the group of patients with more severe acidemia (pH < 7.25) had higher mortality. However, this study demonstrated that NIV is effective in the treatment of patients with acute hypercapnic RI and severe acidemia in the context of EADPOC.

Keywords: *COPD. Non-invasive ventilation. Respiratory acidemia.*

CO 041. COPD DIAGNOSIS: PREDICTED FACTORS ACCORDING GENDER

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) results of the interaction between genetic and environmental factors. Smoking is the most well studied CODP risk factor however, other factors seem to be involved. The influence of the gender is still controverse.
Objectives: Assess gender differences regarding prevalence and predicted factors for COPD diagnosis in a sample of individuals with risk factors for COPD.
Methods: We included individuals aged ≥ 40 years with smoking habits ≥ 10 pack year (PY), who performed spirometry between September and December 2019 in a Lung Function Laboratory of Hospital da Luz Lisboa. Individuals with respiratory disease diagnosis, under bronchodilator and respiratory symptoms unknown were excluded. COPD was defined as FEV1/FVC pos-bronchodilator < 0.70. Standardized and non-standardized coefficients logistic regression models for COPD diagnosis for both genders were determined using as predictors age, body mass index (BMI), smoking status, PY and presence of respiratory symptoms in order to compare the relative importance of each regression coefficient and variables' odds ratios, respectively. A global logistic regression model was obtained also including the gender and the interaction with the other predictors. A significance level of 0.05 was considered.
Results: We included 241 individuals, 134 (55.6%) were male. No differences were found between gender regarding age (p = 0.137), presence of respiratory symptoms (p = 0.451), PY (p = 0.881) and smoking status (p = 0.282). Men had a statistically higher BMI (p = 0.020). The proportion of COPD diagnosis was 20.9% (28) within male group and 13.1% (14) within female group, without differences between gender (p = 0.156). Age was a risk factor for COPD diagnosis (male: OR 1.052; 95%CI 1.002-1.109. female: OR 1.108; 95%CI 1.021-1.216) as well as the presence of respiratory symptoms (male: OR 4.990; 95%CI 1.863-14.544. female: OR 3.818; 95%CI 1.014-17.662). Current smoker status represented a significantly greater risk of COPD diagnosis among female (OR 7.5834; 95%CI 1.545-62.870) while in male group it was inconclusive (OR 0.9317; 95%CI 0.316-2.728). For the male standardized regression model, the presence of respiratory symptoms had the higher absolute coefficient followed by BMI, age, PY and finally the current smoker status. For the female regression model, the current smoker status had the higher absolute coefficient followed by the presence of symptoms, age, BMI and finally PY. Interaction between gender and current smoker status was considered statistically significant (p = 0.048).
Conclusions: We did not find differences between gender in COPD prevalence among individuals aged ≥ 40 years with smoking habits which is consistent with recent studies. Different factors could be related with different risk for COPD diagnosis according the gender. Current smoker status seems to have higher risk for COPD diagnosis among female.

Keywords: *COPD. Diagnosis. Gender.*

CO 042. MORTALITY ASSESSMENT IN ACUTE EXACERBATIONS OF COPD

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Introduction: COPD is the third leading worldwide cause of death, often resulting from acute exacerbations of COPD (AECOPD) requir-

ing hospitalization. Thus, it is important to have scores and tools that allow us to predict the probability of in-hospital mortality. DECAF (dyspnea, eosinopenia, consolidation, acidemia, atrial fibrillation) is a score developed to assess intrahospital mortality in AECOPD. In the modified-DECAF, the "F" of atrial fibrillation was replaced by "EADPOC requiring hospitalization in the previous year". The NEWS2 score (National Early Warning Score - respiratory rate, peripheral oxygen saturation, systolic pressure, heart rate, awareness and temperature) assesses the clinical deterioration of patients in the hospital stays and classifies them according to the clinical risk and the need for monitoring. Finally, it has been described in the literature that the neutrophil-lymphocyte ratio (NLR) is associated with increased mortality in AECOPD and other pathologies. It should be noted that only the first two scores (DECAF and modified-DECAF) were developed in order to assess in-hospital mortality in AECOPD.
Objectives: To evaluate scores and tools that allow predictions of in-hospital mortality in AECOPD.
Methods: Retrospective analysis of data from patients hospitalized with AECOPD in a time interval of 16 months; the DECAF, modified-DECAF, NEWS and NLR scores were calculated and compared to assess the in-hospital mortality risk.
Results: 98 patients included, 86.7% male, with a mean age of 78 ± 8 years. The sample contains mostly GOLD D patients (63%), followed by GOLD A and B (both 14.3%) and GOLD C (7.1%). About 73.5% of patients had active or past smoking habits. The average number of days in hospital was 12 ± 11 days, with a mortality rate of 9.2% (9 deaths). About 27% of patients had 2 or more EADPOC in the year prior to admission. Regarding the year following hospitalization, 65.5% had EADPOC and 48.3% severe EADPOC in need of a new hospitalization. The ROC curves of the 4 scores were analyzed, with a greater area below the curve (AUC) in the modified-DECAF (AUC 0.854, p = 0.001), followed by NLR (AUC 0.844, p = 0.001) and DECAF (AUC 0.811, p = 0.004). The NEWS2 did not obtain statistical significance in the prediction of mortality.
Conclusions: As described in the literature, DECAF and modified-DECAF were good scores to predict mortality in this sample. The NLR, which has been described as a good tool to assess severity and mortality of patients hospitalized for various pathologies, has shown to be superimposed on the DECAF and modified-DECAF to predict mortality in AECOPD. On the other hand, NEWS2 was not a good score to predict mortality in this sample, knowing that it is a score for the classification of need for in-hospital monitoring in multiple pathologies, not designed to predict mortality.

Keywords: *COPD. AECOPD. Mortality.*

CO 043. SOCIAL USE OF FACE MASK AS A METHOD TO PREVENT SEVERE ACUTE EXACERBATIONS OF COPD – A RETROSPECTIVE SELF-CONTROLLED STUDY

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Introduction: Viral infections are known to be the main trigger for Chronic obstructive pulmonary disease (COPD) exacerbations. Face masks are acknowledged for effective viral aerosol shedding reduction and therefore are recommended for community SARS-CoV-2 spread prevention. The COVID-19 pandemic broke out in Portugal in early March 2020. The majority of the population remained confined to their homes until May 2nd (state of emergency end day).
Objectives: Evaluate the effectiveness of social face mask as a method to prevent severe Acute Exacerbations of COPD (AECOPD).
Methods: This retrospective self-controlled study enrolled 322 adult patients followed at COPD-specialised consultation in a tertiary hospital from February 2016 to July 2020, of whom 286 met inclusion criteria. Severe AECOPD events were registered from March 2020 (beginning of state of emergency) until July 2020 (end of follow-up period). In order to minimise seasonal variation, only events of severe AECOPD occurring at the same months (March to July) of previous years (2016 to 2019) were included for final analysis. Paired-samples t-tests were conducted to compare severe AECOPD events in 2020 and previous years.
Results: Most of the demographic and clinical characteristics of the patients were similar between groups that exacerbated in different years. Only 12 patients exacerbated in 2020, a number that is shorter than the mean from 2016 to 2019 (55.5 exacerbations per year). Results were consistent and statistically significant when comparing 2020 with each of previous years. Besides, results were also statistically significant when comparing 2020 with the average severe AECOPD events in previous years, with 6.97 times less events in 2020 ($p < 0.001$). When evaluating the number of events per month of follow-up, we conclude that the rate of events was similar from March to July in every year except 2020, with a consistent break of events in May. Considering only episodes between 2016 and 2019, March and April were the months with the highest average of severe AECOPD episodes (13.3 and 15.8, respectively), followed by June (11.3), May (8.0) and July (7.3). The year of 2020 followed the same trend of fewer events in July (2) and May (0), and the month with more events (June) registering only 4 severe AECOPD. Similar results were presented when assessing AECOPD episodes which required hospitalization, with 2020 registering only one or none hospitalization events per month, against up to eleven hospitalizations per month in previous years.
Conclusions: During the COVID-19 pandemic, from March to July 2020, we observed a significant decrease in severe AECOPD, even after the state of emergency ended, probably associated with confinement but also related to wearing a face mask. Considering these results, COPD patients who are frequent exacerbators should consider the use of social face mask, even after the end of the pandemic, as a method for severe AECOPD prevention.

Keywords: *COPD. Exacerbations. Face mask. Viral infections. COVID-19.*

CO 044. FUNCTIONAL STATUS IMPACT ON MORTALITY IN A COPD COHORT

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is a clinical and functional diagnosis. Although FEV1 allows for classification of severity of airflow limitation, this does not correlate directly with the patient's symptomatic status.
Objectives: Evaluation of the impact of very severe obstruction on the outcomes mortality and severe exacerbations in patients with COPD.
Methods: Retrospective study of COPD patients followed-up at Pulmonology consultation from February/2016 until July/2020. Comparison of patients with FEV1 < 30% predicted (GOLD4) with FEV1 ≥ 30% (GOLD 1 to 3), taking into account clinical and demographic characteristics and the primary (mortality in the follow-up period) and secondary outcomes (severe exacerbations in the last year).
Results: A total of 295 patients (71.5% male) were analysed, with a mean age of 69.0 years, of whom 51 (17.3%) presented FEV1 < 30% predicted. These GOLD4 patients were statistically significantly younger (64.6 ± 1.4) compared to GOLD1-3 (70.0 ± 0.7), p = 0.002. In addition, they were more symptomatic (average CAT 17.3 ± 0.9) compared to GOLD1-3 (average CAT 13.4 ± 0.5), p < 0.001. Current or past smoking habits are also more common in GOLD4 (94.1%) comparing with the remaining patients (79.5%), p = 0.013. Alpha-1 antitrypsin deficiency (AATD) was also more common in GOLD4 (15.7%) than in GOLD1-3 (7.0%) patients,

p = 0.042. GOLD4 patients presented higher mortality over the total follow-up period (15.7%) compared to GOLD1-3 (9.0%), a non-statistically significant difference (p = 0.152). In fact, 4-year survival was 86.3% for GOLD4 patients, compared to 91.0% for the remaining population. There were no statistically significant differences in FEV1 between those who died (46.9 ± 4.6) and those who survived at the end of follow-up (47.2 ± 1.1). The incidence of acute exacerbations of COPD (AECOPD) in the last 12months of follow-up was greater in GOLD4 patients (56.9%) comparing with GOLD 1-3 (34.8%), p = 0.003. There was no statistically significant relationship between exacerbations in the last year or mortality and the RV/TLC ratio. When comparing mortality between different clinical groups, we found statistically significant differences (p < 0.001) with mortality of 26.6% in Group D, against 5.4% in Group B, 3.8% in Group C and 1.6% in Group A. Calculating averages of survival time between groups, we also found statistically significant results (p < 0.001), with a survival of 3 years and 11 months in group D, against 4 years and 5 months in the second group with the worst mortality (B).

Conclusions: GOLD4 patients were younger, more symptomatic and with higher prevalence of AATD. These patients had higher severe AECOPD incidence in the last year and tended to higher mortality, although the latter without statistically significant results. In fact, clinical allocation to group D remains the factor with the greatest impact on these patients' mortality, reinforcing the importance of patients' previous symptoms and exacerbations in his outcome, rather than his functional status.

Keywords: *COPD. FEV1. Exacerbation. Mortality.*

CO 045. BODY MASS INDEX IMPACT ON ESTIMATED SURVIVAL OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS WITH HOME NON-INVASIVE VENTILATION

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Introduction: Home non-invasive ventilation (HNIV) is a supportive therapy frequently used on chronic obstructive pulmonary disease (COPD) patients with sustained hypercapnia. BODE index (body mass index, airflow obstruction, dyspnoea, exercise capacity) remains the gold-standard to predict mortality on patients with this pathology. There are studies suggesting that forced expiratory volume in the first second (FEV1) is more relevant than body mass index (BMI) at predicting survival of COPD patients.

Objectives: To evaluate BMI impact on estimated survival of COPD patients with HNIV.

Methods: Retrospective study of patients with follow-up in an outpatient clinic named "Pneumologia – VDNI" of a tertiary hospital until August 2020 with COPD diagnosis and HNIV. Patients that refused or suspended HNIV for intolerance were excluded. Patients were divided into 3 groups: BMI < 21, 20-30 and > 30 kg/m^2. The estimated survival is described in the Kaplan Meier curves.

Results: In total, 172 patients were analysed. The characteristics by groups are presented in the following table: The estimated survival according to FEV1 severity (FEV1 < 35%; 35-50% and > 50%) did not find statistically significant difference between groups.

		BMI			
	Kg/m m^2 N(%)	<21 15(8,7)	21 a 30 68(39,5)	>30 89(51,7)	*p-value*
Age	Mean ± SD	67,87 ± 9,4	69,10 ± 9,68	66,87 ± 9.33	0.344
Gender	Male	11 (73.3%)	51 (75%)	55 (61.8%)	0.089
Smoking	Smoker or former smoker	11 (73.3%)	49 (72.1%)	50 (56.2%)	0.192
FEV1 previous to HNIV	Median ± IQR	24 [21; 30]	35 [25.3; 46]	47.4 [33; 60]	**<0.001**
FEV1/FVC previous to HNIV	Median ± IQR	36.1 [28.3; 46.1]	43.7 [33.6; 55.9]	56 [47.8; 64.8]	**<0.001**
Estimated survival	Months	44	139	166	**<0.001**

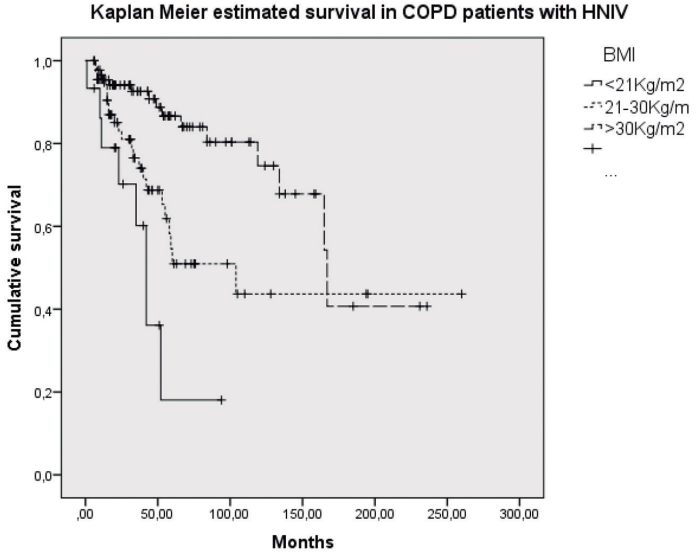

Figure CO 045

Conclusions: This study demonstrates the importance of BMI on estimated survival of COPD patients with HNIV. A BMI lower than 21 kg/m^2 is associated with inferior survival of COPD patients with HNIV and this seems more relevant than the absolute value of FEV1 previous to HNIV.

Keywords: *BMI. CPOD. HNIV. Survival.*

CO 046. OBSTRUCTIVE SLEEP APNEIA IMPACT ON ESTIMATED SURVIVAL OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS WITH HOME NON-INVASIVE VENTILATION

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Introduction: Obstructive sleep apneia (OSA) and chronic obstructive pulmonary disease (COPD) are diseases that frequently coexist. Patients with high body mass index (BMI), peripheric edema and respiratory pathology more related to chronic bronchitis than emphysema is the CPOD phenotype that is usually associated with OSA. There are studies suggesting that the presence of both pathologies does not signficantly increase mortality comparing to COPD patients.
Objectives: To evaluate the impact of OSA severity on estimated survival of COPD patients with home non-invasive ventilation (HNIV).
Methods: Retrospective study of patients with follow-up in an outpatient clinic named "Pneumologia-VDNI" of a tertiary hospital until August 2020 with COPD diagnosis and HNIV. Patients that refused or suspended HNIV for intolerance were excluded, as well as those without a sleep study. Patients were divided into 4 groups according to the apnea-hypopnea index (AHI): COPD without OSA (AHI < 5/h), COPD with mild OSA (AHI 5 to < 15/h), COPD with moderate OSA (AHI 15 to > 30/h) and COPD with severe OSA (AHI ≥ 30/h). The estimated survival is described in the Kaplan Meier curves.
Results: In total, 79 patients were analysed. The characteristics by groups are presented in the table.
Conclusions: There is a high prevalence of OSA in COPD patients with HNIV. The presence of this syndrome and its severity does not seem to impact the survival of these patients.

Keywords: *OSA. COPD. HNIV. Survival.*

CO 047. CHANGES IN SMOKING HABITS DURING COVID-19 PANDEMIC CONFINEMENT: RESULTS FROM A POPULATION-BASED SURVEY IN PORTUGAL

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Introduction: The state of emergency and compulsory confinement due to COVID-19 pandemic in Portugal caused a profound change in the population habits and a potential impact in the use of tobacco and related products.

		COPD				
	N(%)	Without OSA 14(14,7)	Mild OSA 25(31,6)	Moderate OSA 15(19)	Severe OSA 25(31,6)	*p-value*
Age	Mean ± SD	61,07 ± 8,77	69,04 ± 8,14	68,07 ± 8,35	65,8 ± 8,41	0,062
Gender	Mae: n (%)	9(64,3)	17(68)	10(66,7)	20 (80)	0,675
BMI	kg/m^2: Median [IQR]	29,55 [22,8; 32,8]	30,5 [28,6; 37,88]	32,87 [30,30 ;40,70]	37,4 [32,50; 42,50]	**0,003**
FEV1 previous to HNIV	Median [IQR]	26,5 [22; 46,8]	45 [34; 54,2]	42,7 [39; 55]	55 [48,6; 62]	**0,003**
FEV1/FVC previous to HNIV	Median [IQR]	32,8 [29,4; 48,75]	56,54 [46,18; 64,94]	56,5 [45,43; 64.31]	61,02 [56,96; 69]	**<0,001**
Survival estimates	Months	-	152	115	212	0,223

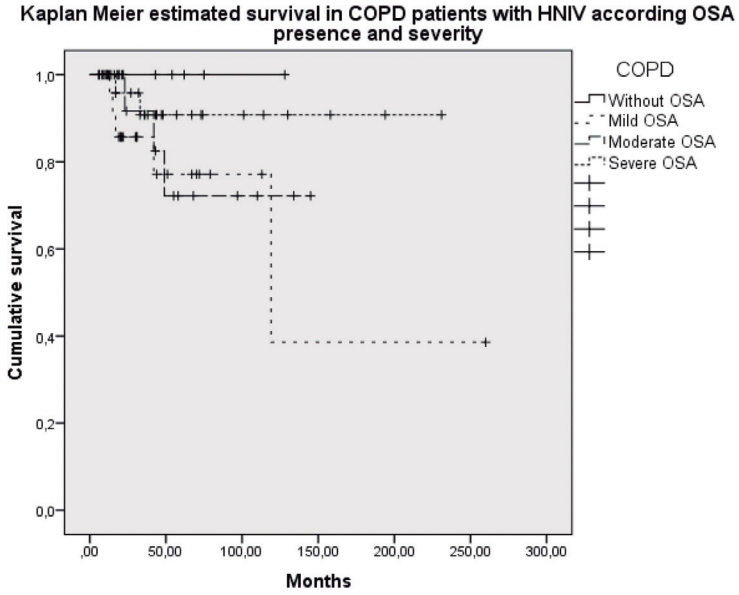

Figure CO 046

Objectives: to determine the impact of confinement in the use of tobacco products in a sample of the Portuguese population.
Methods: open, anonymous population survey disseminated through electronic media, between May 15th and July 7th 2020, referring to the state of emergency period (March 19th to May 2nd), including demographic data, characteristics of tobacco use and changes during confinement, reasons for quitting or reduction and type of help used.
Results: sample with 1010 valid questionnaires (68.2% female, mean age 45.1 years ± 12.9), with national distribution and predominance in the districts of Lisbon, Porto, Setubal and Azores; 60.4% had higher degree education. At the moment of inquiry, 67.1% were current smokers, most frequently using cigarettes (81.4%), followed by heated tobacco (14.3%) and electronic cigarette (4.7%); 5.1% had dual use. During confinement, 27.8% of participants increased use of tobacco products, 35.6% had no change in use, 19.5% reduced use, 12.8% quitted any products and 3.1% relapsed; 1.2% mentioned changes in the type of product used, most frequently from cigarettes to heated tobacco. Around 43.5% attempted to quit and 63% intended on doing so in the near future. The main reason for quitting was the will to improve healthy lifestyle (60.1%), followed by the fear of COVID-19 infection (28.7%) and home confinement (26.4%). Only 4.2% of participants asked for medical support; 13.5% used approved medications (more frequently oral nicotine – 23.5%, or transdermal – 18.4%); 15.7% searched for other type of support (online information in 34.6%, cell phone apps in 14.5% and non-conventional therapies in 12.6%); 47.9% intended to maintain cessation after the confinement. Concerning relation between smoking and COVID-19, most participants (66%) considered smoking increases the risk of serious illness or death, 21.4% believes smoking increases the risk of acquiring the infection and 19.3% that it neither positively nor negatively influences COVID-19.
Conclusions: Despite the uncertainty associated with this period, it is significant that around one third of participants had a positive evolution in its smoking habits, even with scarce use of medical and pharmacological therapy. The pandemic is a window of opportunity to intervene in smoking cessation and this should be included in priority public health measures, facilitating access to medical support to those who quitted or intend to quit and raising awareness in the general population to the risks associated to COVID-19 in smokers.

Keywords: *Smoking. COVID-19. Smoking cessation.*

CO 048. MUCINOUS CARCINOMA OF PLEURAL PRIMARY ORIGIN - A PRESENTATION SIMILAR TO PLEURAL MESOTHELIOMA

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Case report: 24 year old female, non-smoker, without personal relevant diseases, known allergies or previous medication. She is admitted in the Emergency Department for 3 weeks evolution of progressive dyspnea and pleuritic pain, with worsening in the past 2 days. At general observation she had no fever, respiratory rate of 32 cycles per minute, oxygen saturation of 96% and lung auscultation with almost abolition of breath sounds in the inferior two thirds of the left hemithorax. Analysis revealed D-dimers of 5,213 and CRP of 27. Thorax radiography showed a homogeneous opacity compatible with an extensive pleural effusion of almost the entire hemithorax. It was performed a diagnostic thoracentesis, with serofibrinous fluid, compatible with a lymphocytic exudate and normal ADA. Pleural biopsies and cytology of the pleural fluid were negative for neoplastic cells. Chest CT showed diffuse thickenings of the mediastinal and parietal pleura, of nodular appearance in the left pulmonary base, and so, a transthoracic aspiration biopsy was conducted, which revealed infiltration for mucinous carcinoma (immunohistochemistry: CK7+, CK20+, CDx2 focally +, TTF1-, GATA3-, favoring the diagnostic hypothesis of primary lung, pancreas, stomach, ovary or small intestine tumour). EGFR mutation was negative. Due to worsening of the chest pain, it was performed an Angio CT scan without any other changes. She performed an abdominopelvic MRI revealing the left pleural known infiltration and extensive diffuse bone changes suggestive of tumoral infiltration of the bone marrow. Blood tests showed a normocytic normochromic severe anemia, with the need of multiple blood transfusions weekly. The other abdominopelvic organs such as pancreas, small bowel and ovaries were normal. She was accessed by gynecology that excluded primary gynecologic origin of the tumor. PET scan confirmed pleural malignant and bone infiltration. The case was discussed with Medical Oncology of IPOL for therapeutic guidance of occult primary tumor. Chemotherapy with carboplatin and paclitaxel was suggested, which was initiated after informed consent and will of the patient, despite of severe bicytopenia (anemia and thrombocytopenia) due to bone marrow infiltration. The patient performed only 2 cycles of chemotherapy due to clinical worsening, being posteriorly admitted to a Palliative Care Unit, were she passed away.
Discussion: Authors present this case because of the rarity and aggressivity of this tumor, being only described in literature a dozen cases of mucinous carcinoma of pleural primary origin and only 3 with a presentation similar to pleural mesothelioma.

Keywords: *Mucinous carcinoma of pleural primary origin. Pleural mesothelioma.*

CO 049. ATEZOLIZUMAB AS SECOND LINE TREATMENT IN LUNG CANCER

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Introduction: In non-small cell lung cancer we have more therapeutic options to offer our patients nowadays. For those in an advanced stage, studies show that immunotherapy with atezolizumab is effective and safe as second-line therapy, regardless of the expression of PD-L1 (programmed death-ligand 1).
Objectives: To evaluate patients undergoing second-line treatment atezolizumab, in order to understand their characteristics (demographic and associated with the tumor), their clinical course and the side effects associated with therapy.
Methods: We selected all patients with lung cancer undergoing second-line treatment atezolizumab followed in our Oncological Pulmonology clinic, with collection of data from clinical files and subsequent descriptive statistical analysis.
Results: 22 patients were included, with a mean age of 67 years (min: 42; max: 78), 72.7% male, 81.8% with previous exposure to tobacco smoke and the majority (68.2%) with performance status (ECOG) of 1. Histology was of adenocarcinoma in 17 patients and squamous cell carcinoma in 5 patients. All were in stage IV at the beginning of treatment with atezolizumab. PD-L1 expression was negative in 10 patients (45.5%), unknown in 5 patients (22.7%), less than 5% in 4 patients (18.2%) and greater than or equal to 5% in 3 patients (13.6%). Prior to the beginning of treatment with atezolizumab 15 patients (68.2%) had undergone therapy with platinum and pemetrexed, 4 patients (18.2%) with carboplatin and paclitaxel and 3 patients (13.6%) with carboplatin and vinorelbine. On average, patients started immunotherapy 8 months after starting the 1st line platinum doublet, and the mean time of therapy with atezolizumab was 6 months. Regarding the response to therapy, we found that 2 patients (9.1%) showed partial response (with PD-L1 of 10% in one case, being

unknown in the other), 7 patients (31.8%) maintained stability and in 6 patients (27.3%) progression occurred. In the remaining patients, it was not possible to assess the response for several reasons - initiation of recent therapy, still without imaging re-evaluation (3 patients), death prior to its performance (3 patients) and suspension of therapy due to side effect (1 patient). Four patients (18.2%) had immune related side effects: mastitis, subclinical hyperthyroidism, reactivation of Epstein-Barr virus infection and acute interstitial nephritis.
Conclusions: Despite limitations related to population size and duration of therapy, preliminary data from our experience with second-line atezolizumab show favorable disease control with a good safety profile.

Keywords: *Lung cancer. Imunotherapy. Atezolizumab.*

CO 050. MUCOEPIDERMOID CARCINOMA - A CASE SERIES

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Introduction: Mucoepidermoid carcinoma of the lung is a rare entity, representing 0.2% of lung tumors. It has a similar distribution between men and women and is more frequent in young people, with about 50% of cases occurring before the age of 30. They typically develop from the submucosal glands of the main trachea or bronchi and usually have an endobronchial involvement. Less often, they may have a more peripheral location. Macroscopically they are oval, with well-defined boundaries. Histologically they are divided into two subtypes: low and high grade, the latter being more infiltrative and less frequent. The treatment of choice is complete surgical resection, and there may be an indication for chemotherapy in cases where the surgery is not complete, the disease is advanced or in high-grade subtypes. The prognosis is variable according to low or high grade histology.
Methods: In this work, 8 cases of mucoepidermoid carcinoma followed at the Hospital de Dia Oncológico do CHULN are presented. Most are women, with a predominance of ages between 40-70 years. Five of them are high-grade mucoepidermoid carcinomas and 5 of them had a more central location for their diagnostic presentation. All underwent surgery, 3 underwent chemotherapy (QT), 2 immunotherapy and one of them was proposed for radiotherapy. The chemotherapy regimens used were as adjuvant QT platinum/vinorelbine and as first-line QT carboplatin/paclitaxel and metronomic vinorelbine. In cases where immunotherapy was performed, these were atezolizumab and pembrolizumab.
Conclusions: The treatment of this type of tumors is still a challenge in the sense that there is controversial and little experience with regard to QT regimens, since it is a rare type of tumor. Further studies are needed to choose the most effective scheme. Surgery is the standard treatment for this type of lung tumor.

Keywords: *Mucoepidermoid carcinoma. Lung cancer.*

CO 051. DIFFERENCES BETWEEN PATIENTS WITH LUNG CANCER IN EVER-SMOKERS AND NON-SMOKERS

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CHVNG/E.

Introduction: Lung cancer in non-smokers is not yet well characterized but appears to be different from lung cancer in smokers.
Objectives: To evaluate the clinical, histopathological and molecular differences in the diagnosis of lung cancer in ever-smokers vs non-smokers patients.
Methods: Retrospective observational cohort study of patients diagnosed with lung cancer in the Pneumology-Oncology consult in 2017/2018.
Results: 356 patients were included, of whom 251 (70.5%) were male, average age of 67 ± 11 years (y). Most were smokers (n = 142; 39.9%) or former smokers (n = 122; 34.3%) but a considerable percentage were non-smokers (n = 92; 25.8%). We present on Table 1 the comparison between ever-smokers and non-smokers patients with lung cancer.
Conclusions: There are several differences between smokers and non-smokers with lung cancer, both in terms of age, sex, histological type and staging at diagnosis. The mutational profile is also considerably different. As non-smoking patients are not covered by

Table 1. Comparison of ever-smokers vs non-smokers patients with lung cancer

	Ever-Smokers(264)	Non-Smokers(92)	P Value
Age (mean+-SD)-y	66+-11	69+-13	**0.026**
Female (n;%)	31;11.7%	74;80.4%	**<0.001**
Histological type			
Adenocarcinoma	134;50.8%	65;70.7%	**0.001**
Squamous cell carcinoma	75;28.4%	8;8.7%	**<0.001**
SCLC	31;11.7%	2;2.2%	**0.006**
Stage(n;%)			
I	37;14.0%	23;25.0%	**0.017**
II	17;6.4%	4;4.3%	0.453
III	50;18.9%	9;9.8%	**0.039**
IV	152;57.6%	54;58.7%	0.917
Pleural metastasis	38;14.4%	22;23.9%	**0.040**
NGS			
EGFR	11;4.2%	37;40.2%	**<0.001**
ALK	7;2.7%	7;7.6%	0.185
KRAS	46;17.4%	5;5.4%	**<0.001**

Figure CO 051

potential lung cancer screening, it is important to understand how we can detect them in a timely manner.

Keywords: *Lung cancer. Smoking.*

CO 052. LUNG CANCER WITH A EXTREMELY RARE PARANEOPLASTIC SYNDROME

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Introduction: Paraneoplastic syndromes are defined as symptoms or laboratory abnormalities, which are not caused directly by the local tumor or metastases, but by indirect effects on the body such as anomalous production of substances or immunological reactions. Although well known, they are very rare phenomena in patients with solid tumors.
Case report: 62 years old, male. History of high blood pressure, smoking (100 Pack-year). Went to Hospital Divino Espírito Santo (HDES), with dry cough and dizziness, with 3 weeks of evolution. In the imaging exams, a suspicious lung injury was identified and he was hospitalized. BATT was performed, which identified lung adenocarcinoma, with a molecular study with PDL1 slightly positive. In the staging exams, liver and brain metastases were identified, and treatment with dexamethasone was started. 3 weeks after the hospitalization at HDES, he went to Hospital of Faro with asthenia, hematuria, constipation and jaundice. Analytically with 4.2 g/dL hemoglobin, elevated inflammatory parameters and liver enzymes. A blood sample wast sent for evaluation by Immunohemotherapy, considering the presence of aprobable autoimmune hemolytic anemia due to cold agglutinin syndrome. The patient was admitted to the Pulmonology Service for 3 weeks, starting antibiotics, in addition to corticotherapy and IV immunoglobulin on 2 consecutive days, with subsequent transfusion in a total of 4 units of heated erythrocyte concentrate. Blood and urine cultures subsequently identified Staphilococcus aureus (MSSA). After 2 weeks, he resorted to SU again with asthenia, anorexia and joint pain. There was a new isolation of MSSA in blood culture and a thrombosed abdominal aortic aneurysm was identified on abdominal CT, suspecting a possible lodging for the bacteria. After 2 cycles of antibiotics, blood cultures were negative and hemoglobin values were stable after 1 more blood transfusion, starting chemotherapy with Carboplatin and Pemetrexed during hospitalization and later being discharged. Two days later he returned to the ER due to sudden pain and swelling in his left leg. Bilateral echo-Doppler identidied thrombi in the deep veins bilaterally, causing subtotal obliteration on the right and complete on the left. He was hospitalized again and started treatment with Enoxaparin. Analytically, he presented pancytopenia, requiring a new transfusion under steroid therapy and IV immunoglobulin. After 5 weeks of hospitalization and sustained clinical improvement, chemotherapy, changing to Vinorelbine, administering the 1st cycle during hospitalization. He would return to the SU 1 month later, due to anuria and prostration. He showed signs of multiorgan failure and there was a progressive deterioration in his general condition, eventually passing away the next day.
Discussion: Cold agglutinin syndrome is a type of rare autoimmune hemolytic anemia, produced by antibodies that react at low temperatures with the patient's own erythrocytes, destroying them. It can be secondary to infections, other autoimmune diseases and lymphoproliferative diseases, with few cases of this disease being described as a manifestation of lung cancer. In this case, the appearance of this syndrome resulted in 4 hospitalizations with frequent complications and degradation of the patient's general condition, making the approach and treatment of the neoplasia very difficult.

Keywords: *Lung cancer. Paraneoplastic syndrome. Cold aglutinin. Anemia. Transfusion.*

CO 053. PROGNOSTIC IMPACT OF PD-L1 EXPRESSION IN PATIENTS WITH NSCLC TREATED WITH EGFR AND ALK-TKIS

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Introduction: Tyrosina kinase inhibitors (TKI) are the first-line treatment for patients with NSCLC with EGFR mutations and ALK translocations. However, the effectiveness of TKIs in NSCLC within these driver mutations and high expression of PD-L1 remains uncertain.
Objectives: Investigate the relationship between PD-L1 expression levels and the efficacy of first-line EGFR or ALK-TKIs.
Methods: Restrospective study of patients with advanced lung adenocarcinoma with EGFR mutation or ALK translocation followed at our center in the period between 2016 and 2018.
Results: A total of 21 patients diagnosed with stage IV lung adenocarcinoma with EGFR mutation (71.4%) or ALK translocation (28.6%) were included in the study. The average age was 66 years (42-87 years), with 61.9% of the patients being female and 38.1% male. All patients received EGFR or ALK-TKIs as first-line therapy. Of the total number of patients analyzed, 57.1% had PD-L1 < 1%, 19% PD-L1 from 1-49% and 23.8% PD-L1 ≥ 50%. There was no association between the patient's clinical and pathological characteristics (gender, age, smoking habits) and the stratified PD-L1 level. Of the total number of patients analyzed, 66.7% showed partial response to EGR or first line ALK-TKI, 19% stability and 19% progression. Patients with PD-L1 ≥ 50% had a significantly greater chance of primary resistance to first-line TKI compared to patients with PD-L1 < 50% (OR 21, 95% CI 1.4–314, $p < 0.05$). The mean progression-free survival (PFS) of first-line ALK or EGFR-TKI in the total of patients studied was 13.4 months (2-32 months). The comparison of the three groups stratified according to the level of PD-L1 revealed that PFS tended to decrease as the level of PD-L1 increased, being the patients with PD-L1 ≥ 50% those with a PFS significantly lower among the 3 groups (PFS was 16.2, 14.5 and 6 months for PD-L1 levels of < 1%, 1-49% and ≥ 50%, respectively, $p < 0.05$).
Conclusions: In the population of patients with advanced stage adenocarcinoma with EGFR mutations or ALK translocation surveyed, a substantial proportion had PD-L1 expression ≥ 1%. Our retrospective analysis revealed that high PD-L1 expression was associated with limited responses to first-line EGFR and ALK-TKIs, as well as poorer PFS.

Keywords: *NSCLC. EGFR. ALK. PD-L1.*

CO 054. LONG-TERM SURVIVAL WITH IMMUNOTHERAPY: ANOTHER STEP TO THE CURE?

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Introduction: In the recent years, immunotherapy has changed the paradigm for the treatment of advanced NSCLC. The application of immune checkpoint Inhibitor as a second-line treatment and, more recently, as a first-line treatment in patients with PD-L1 expression ≥ 50% has shown to improve the response to the disease, progression-free survival (PFS) and overall survival.
Objectives: Investigate the clinical efficacy and safety of immunotherapy.
Methods: Retrospective study of patients with NSCLC treated with immunotherapy for 2 years in first or second line from January 2016 to August 2020.

Results: Sixteen patients treated with immunotherapy for 2 years were included in the study, of which 75% received treatment with pembrolizumab and 25% with nivolumab. The average age was 62.6 ± 11 years, the majority were male (87.5%) and smokers (56.2%) or former smokers (37.5%). Non-squamous histology represented the majority of cases (87.5%). When stratifying patients by the level of expression of PD-L1, 50% had PD-L1 ≥ 50%, 31.3% PD-L1 1-49%, 6.3% PD-L1 < 1% and 12.5% unknown PD-L1. Of the total number of patients included in the study, 81.2% received platinum-based therapy prior to immunotherapy and 18.8% received first-line immunotherapy. Demographic data were similar between the two groups (p > 0.05). This study noted that the majority of patients who received the immunotherapy in subsequent line still have a response after 2 years exceeding 35 months (23-53). This approach has allowed the patients to achieve a survival time from the date of lung cancer diagnosis that already exceeds in 44 months on average, ranging from 28 to 86 months. Only 2 patients (12.5%), which received the immunotherapy in subsequent line, died exhibit a PFS of 24 and 35 months which allowed survival since the diagnosis of 35 and 66 months, respectively. Among those who received immunotherapy as a first line for 2 years, only one patient had progression for now (PFS of 24 months), while the remaining patients still have a PFS that exceeds 31 months (25-35). In the totality of patients, the proportion who experienced some type of immune related toxicity was 31%, most of them grade 1-2, with the exception of a patient who developed grade 3 colitis. The occurrence of side effects was similar between pembrolizumab and nivolumab (p > 0.05).
Conclusions: Among patients who received 2 years of treatment with immunotherapy, more than 62% have already achieved a survival since the date of diagnosis of lung cancer of 3 years, 31% of 4 years, 18.8% of 5 years and one patient presents a survival that already exceeds 7 years. The results of this study clearly demonstrate that the use of immunotherapy during the treatment journey of advanced NSCLC without driver mutations leads to unprecedented survival, both in naïve treatment and in previously treated patients. These results combined with the good tolerance of immunotherapy findings lead to the creation of a new profile of patients with advanced lung cancer: the patients with long survival and excellent general condition.

Keywords: *NSCLC. Immunotherapy.*

CO 055. HISTOLOGIC TRANSFORMATION OF NON-SMALL CELL LUNG CANCER AS A RESISTANCE MECHANISM TO TREATMENT WITH TYROSINE KINASE INHIBITOR

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Introduction: Histologic transformation is one of the mechanisms of resistance to treatment with tyrosine kinase inhibitor (TKI) in patients with non-small cell lung cancer (NSCLC) with an epidermal growth factor receptor (EGFR) sensitizing mutation, occurring in 5-10% of cases.
Case report: 70 years old male, ex-smoker, with multiple comorbidities and ECOG 1. Diagnosed in october 2017 with lung adenocarcinoma cT3N2M1b – staging IVA – with single cerebral metastasis, treated radically with radical chemoradiotherapy and cerebral radiosurgery. Progression of disease (cerebral and non-cerebral) in july 2018. Due to sensitizing mutation to EGFR (exon 21– L858R) it was started on palliative systemic treatment with Osimertinib in september 2018, with excellent tolerance and ECOG 1. Partial response as best response and complete regression of cerebral metastasis. Symptomatic progression of disease in october 2019. Re-biopsy of progressive lung lesion for study of resistance mechanisms to Osimertinib with identification of histologic transformation into SCLC in november 2019. It was started on palliative chemotherapy (CT) with Carboplatin and Etoposide in december 2019 with symptomatic improvement and partial response documented after 3 cycles, and palliative holo-cranial radiotherapy. Symptomatic and functional decline after fourth cycle of CT in relation with progression of disease, reason why it was considered that there would be no benefit in subsequent oncologic treatment. Exclusive symptomatic treatment was maintained until the patient passed away in June 2020.
Discussion: Our case emphasizes the importance of studying the resistance mechanisms in patients undergoing treatment with TKI of EGFR. We stress the relevance of tissue biopsy in early identification of histologic transformation in NSCLC, with impact on prognosis and therapeutic orientation.

Keywords: *Adenocarcinoma. EGFR. Histologic transformation. Small cell lung cancer.*

CO 056. EXPERIENCE WITH LORLATINIB IN THE TREATMENT OF NON-SMALL CELL CANCER ALK AND ROS1 POSITIVE

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Introduction: Lorlatinib is a third generation irreversible inhibitor of tyrosine kinase (TKI), highly selective in the treatment of non-small cell lung cancer (NSCLC) with anaplastic lymphoma kinase (ALK) and/or c-ros-1 oncogene kinase (ROS1) rearrangement. This selectivity associated with good brain penetration has justified its increasing use in clinical practice.
Objectives: Share our experience with Lorlatinib in the treatment of the patient with ALK and/or ROS1 rearrangement, after treatment with first and/or second generation TKI.
Methods: We included all patients undergoing treatment with Lorlatinib, followed by the Oncological Pulmonology Unit (General Hospital) of Centro Hospitalar e Universitário de Coimbra. Demographic, clinical and anatomopathological data were collected and subsequently processed in Microsoft Excel and SPSS.
Results: To date (September 2020), we have treated 7 patients, with a median age of 64 years (45 to 82 years), with the majority being female (71.4%). All of them had a performance status of 0-1. Non smokers accounted for 71.4% with the remaining being ex-smokers. All had a histological diagnosis of adenocarcinoma, six of which had an ALK rearrangement and one had ROS1 rearrangement. At the time of diagnosis, the majority were T1 (42.9%), N2 (71.4%) and M1 (85.7%), with bone and adrenal metastasis being the most frequent. Prior to treatment with Lorlatinib, four patients were treated with chemotherapy. All were treated with Crizotinib, which was abandoned due to progression (six patients) or toxicity (one patient). The treatment with second generation TKI was distributed between Ceretinib (four patients) and Alectinib (three patients). The progression, aimed at six patients and toxicity in the other, justified the use of a new TKI. Two patients went on treatment with Brigatinib and five went directly to treatment with Lorlatinib. The two patients on Brigatinib transitioned to Lorlatinib after progression. Five patients treated with Lorlatinib had known brain metastasis at the time the treatment started, with a significant reduction in brain damage in four patients and stability in the other case. Overall, we found an objective response in five cases. The remaining two showed stability. Five patients continue treatment with Lorlatinib, with an average treatment time of 11 months. Two suspended due to toxicity. All patients treated with Lorlatinib developed hyperlipidaemia (hypercholesterolemia and/or hypertriglycyridemia) as side effects. Four patients manifested neuro-psychiatric (cognitive and mood changes) and cardiac toxic-

ity. In two cases, it was found necessary to suspend the treatment due to severe toxicity.
Conclusions: Lorlatinib has shown, in line with clinical trials, to be an effective treatment and an asset in the sequential approach of our patients with ALK and/or ROS1 rearrangement. The growing knowledge and experience in handling of the side effects will allow the increasing use of this innovative drug.

Keywords: *Lorlatinib. NSCLC. ALK. ROS1.*

CO 057. COMMUNITY PHARMACISTS AND INHALATORY THERAPY – ASSESSMENT OF KNOWLEDGE PRE AND POST EDUCATIONAL INTERVENTION

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Introduction: Incorrect use of inhaler devices (ID) has a proven negative impact in the clinical control of chronic respiratory diseases such as asthma and COPD. Patient´s education on the correct inhalation technique is of paramount importance and every encounter with a health-care provider should be sought as such. In this realm, community pharmacists can represent a valuable ally, provided they are properly educated and trained on this subject.
Objectives: We aim to ascertain the degree of knowledge of local pharmacists regarding proper inhaler technique and the knowledge level achieved after an educational intervention on a correct inhalation technique.
Methods: In this study, we evaluated local community pharmacist's knowledge on correct inhalation technique of four ID (pressurized, single and multi-dose dry powder, and soft mist), both before and after a formative session, repeating the evaluation after 3 months. The participants were evaluated according to a 4-step checklist that included device activation, previous expiration, inspiration technique and end respiratory pause. Errors made during the activation step were considered critical errors for an effective inhalation. Demographic and previous professional experience data were collected in all participants.
Results: We evaluated 45 pharmacists, including 36 women (80%) and a mean age of 37.6 years (± 9.5), working at 8 community pharmacies between July 2019 and January 2020. The main reported struggles regarding education on inhalation technique were the patient's lack of interest (71%, n = 32) and shortage of placebo ID available for demonstrations (67%, n = 30). Only 31% (n = 14) reported previous professional training in correct use of ID. In our first evaluation we registered a total of 207 errors performed during the four ID demonstrations, while in the second evaluation, after the formative session, 42 errors were observed, and only 11 in the final evaluation. The performance improvement was statistically significant between first and following evaluations ($p < 0.05$), for each tested ID. Considering all 3 evaluations, the most common critical error occurred with the pressurized ID, as participants forgot to shake the inhaler (49%, n = 43) before use. This error was only statistically significant for the first evaluation, when compared to other inhalers. Regarding inhalation technique, the most common error in all ID was forgetting the final respiratory pause (60%, n = 80).
Conclusions: This study reveals that community pharmacists, although often called accountable for patient's education on inhalation technique and ID manipulation, may not be properly skilled and is crucial that they have frequent professional training on the subject. Practitioner's education is showed to be as important as patient's education and a tight cooperation between doctors and pharmacists is needed to improve therapeutic adhesion and effectiveness.

Keywords: *Inhalation technique. Inhaler devices. Community pharmacists. Education.*

CO 058. MRSA – SCREENING RELEVANCE IN AN INTERNAL MEDICINE SERVICE

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Introduction: Methicilin Resistant Staphylococcus aureus (MRSA) was one of the first pathogens described, still being one of the main ethiology agents of infection in humans. Recent studies revealed that around 20% of individuals are persistent nasal carriers and 30% are intermittent carriers, with a greater prevalence in atopic patients. This colonization works as a reservoir to the pathogen, increasing significantly the chances of infection. Despite initially being only associated with hospital infections, evidence regarding MRSA becoming a community agent started to show in 2003, when the first isolate with the gene associated to community transmission was obtained (PVL).
Objectives: General: To diagnose the situation in terms of MRSA colonization and infection in the Internal Medicine Service of ULS Guarda, considering the norms established by the Portuguese Health General Direction. Specific: To determine the number of hospitalized patients in the Internal Medicine Service with criteria to MRSA colonization active screening; To verify the number of patients who, effectively, were submitted to that evaluation.
Methods: A transversal study with a randomized sample composed of all the patients hospitalized in the Internal Medicine Service on 28th February 2020 was made, based on the consultation of clinical records in the Alert® and SClinico® systems with collection of sociodemographic and clinical variables, validated for MRSA nasal screening. Inclusion Criteria: being hospitalized in the Internal Medicine Service on 28th February 2020. Exclusion Criteria: no clinical records regarding the variables in study.
Results: In this study, a total of 61 patients were evaluated, of which 28 were men and 33 women, with an average age of 76.64 years. Identified criteria for screening: antibiotherapy in the last 6 months (42.6%, n = 26), previous institutionalization (37.7%; n = 23), at least 1 hospitalization in the last 6 months (24.6%; n = 15), transference from another hospital with a permanence ≥ 48h (18%; n = 11), presence of invasive device (6.6%; n = 4) and presence of chronic ulcers (3.3%; n = 2). None of the patients was under hemodyalisis.
Conclusions: MRSA associated with health care remains one of the main causes of multiresistant hospital infections, being a hard to treat infection because of the multiresistencies that it presents, with not only logistical but also financial impact and being, naturally, associated with a high morbimortality. Considering the literature, from all the patients hospitalized on 28th February 2020, 77% had formal recommendation for nasal swab, having been verified an effective screening of 15%. In that sense, it's considered relevant the implementation of a systematic screening protocol.

Keywords: *MRSA. Screening.*

CO 059. SIX MINUTE WALK TEST AND AIR TRAVEL HYPOXAEMIA IN RESPIRATORY PATIENTS

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Introduction: Individuals with respiratory disease are at risk of hypoxaemia during air travel. Several methods have been used, however, the hypoxic challenge testing (HCT) is nowadays the preferred method to predict it. The six-minute walk test (6MWT) is a simple test that can be promising in the simulation of the stress of additional hypoxaemia during a flight.
Objectives: Assess the correlation between PaO2 on HCT and 6MWT.

Methods: Included respiratory patients who performed LFT between January 2016 and May 2020 at Hospital da Luz Lisbon and 6MWT. HCT was performed and analysed according to British Thoracic Society recommendations (2011) and 6MWT according American Thoracic Society statement (2002) in 10 meters corridor. Median (me) and interquartile range (IQ) were shown. The correlation between PaO2 on HCT and distance (meters and percentage), minimum oxygen saturation (minSpO2), difference between initial and final oxygen saturation (dSpO2), postwalk Borg dyspnoea and overall fatigue levels on 6MWT were assessed using Spearman correlation (r). p value ≤ 0.05 was considered significant.
Results: Nineteen respiratory patients were included: 8 chronic obstructive pulmonary disease, 2 interstitial lung disease, 2 asthma, 2 tuberculosis sequels, 2 pulmonary resection, 3 other respiratory diseases. The me ± IQ was 69.0 ± 12 years old and 11 (57.9%) patients were female; The HCT were positive (PaO2 < 50 mmHg) in 6 patients (31.6%). There was not significant correlation between PaO2 on HCT(mmHg) (me:50.0; IQ:5.0) and 6MWT distance (meters) (me = 318; IQ 180; r = 0.419, p = 0.074), 6MWT distance (%) (me = 66.5; IQ = 37; r = 0.393; p = 0.107), minSpO2 6MWT (%) (me = 90.0; IQ = 5; r = 0.315; p = 0.189) and postwalk Borg dyspnea level (me = 0.25; IQ 4; r = -0.275; p = 0.270). The PaO2 on HCT was a positive correlation with dSpO2 (me = -3.00; IQ 6; r = 0.482; p = 0.037) and negative with postwalk Borg overall fatigue (me = 4.0; IQ 4.63; r = -0.504; p = 0.033).
Conclusions: In this sample of respiratory patients, there was a significant correlation between PaO2 on HTC and dSpO2 and postwalk Borg overall fatigue. The 6 MWT can help to predict PaO2 on HCT, however, HCT remains an essential tool to evaluate if respiratory patients need in-flight oxygen. More data are needed.

***Keywords**: Air travel hypoxaemia. Six minute walk test.*

CO 060. AIR TRAVEL HYPOXAEMIA IN RESPIRATORY PATIENTS

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Introduction: Individuals with respiratory disease are at risk of hypoxaemia during air travel. Several methods have been used, however, the hypoxic challenge testing (HCT) is nowadays the preferred method to predict it. The relation between air travel hypoxaemia, baseline lung function tests (LFT) and arterial oxygenation has been studied with discrepant data.
Objectives: Assess the correlation between PaO2 on HCT and LFT, resting sea level PaO2 and SpO2.
Methods: Included respiratory patients who performed HCT between January 2016 and May 2020 at Hospital da Luz Lisboa with LFT available. If more than one HCT is available, we selected the first result. HCT was performed and analyzed according to British Thoracic Society recommendations (2011). Median ± interquartile range (me ± IQR) was shown. Spearman correlation (r) was used. The relation between resting sea level SpO2 cut-off of 95% and oxygen requirement (PaO2 on HCT < 50 mmHg) was assessed by Fisher's Test. p value ≤ 0.05 was considered significant.
Results: Thirty-eight respiratory patients were included: 13 chronic obstructive pulmonary disease, 7 obstructive sleep apnea and/or obesity hypoventilation syndrome, 6 asthma, 4 interstitial lung disease, 3 pulmonary resection/pneumectomy and 5 other respiratory diseases. Ten patients (26.3%) had a positive HCT. A moderate positive correlation was observed between PaO2 on HCT (me ± IQR = 51.0 ± 11.3) and resting sea level PaO2 (mmHg) (me ± IQR = 70.0 ± 11.0; r = 0.546, p = 0.004) and sea level SpO2 (%) (me ± IQR = 95.0 ± 3.0; r = 0.630, p = 0.000). A weak correlation was documented between PaO2 on HCT and FEV1 (mL) (me ± IQR = 1,770.0 ± 962.5; r = 0.419, p = 0.014) and FVC (mL) (me ± IQR = 2295.0 ± 1842.5; r = 0.340, p = 0.049. None significant correlation was observed between PaO2 on HCT (mmHg) and FEV1 (%) (me ± IQR = 72.0 ± 33.7; r = 0.293, p = 0.075), FVC (%) (me ± IQR = 89.0 ± 37.8; r = 0.154, p = 0.363) and DLCO (%) (me ± IQR = 60.0 ± 28.9; r = 0.175, p = 0.299). We did not reveal any statistical significance relation between in-flight oxygen requirement and sea level SpO2 (%) cut-off of 95% (p = 0.144).
Conclusions: In this sample of respiratory patients, there was a moderate correlation between PaO2 on HTC and baseline oxygenation (resting sea level PaO2 and SpO2). A weak correlation or none significant correlation was found between LFT (FEV1, FVC and DLCO) and PaO2 on HTC. Previous proposed cut-off of SpO2 (%) was not useful to predict in-flight oxygen required HTC is an essential tool to evaluate if respiratory patients need in-flight oxygen.

***Keywords**: Hypoxic challenge testing. Lung function.*

CO 061. PALLIATIVE MEDICINE IN ADVANCED PULMONARY DISEASE: CHALLENGE IN INTEGRATION OF CARE

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Introduction: Palliative Medicine constitutes an area of deep interest in holistic approach of patient with disabling, chronic illness of limited prognosis. The patient with progressive respiratory disease, including advanced neoplastic one, often lacks management of symptoms that negatively affects quality of life. In this context, it is desirable early integration of palliative care in disease trajectory.
Objectives: Evaluate the activity of Palliative Medicine Department on symptoms management and therapeutic measures of patient without healing potential, chronic respiratory disease – oncological and non-oncological ones.
Methods: Retrospective analysis, over a two-year period, of in-hospital supportive palliative care team (EIHSCP), regarding evaluation of patients in pulmonology ward. Demographic data, referral timing, pulmonary condition type, symptoms that required more attention, and prognosis were evaluated.
Results: Interventions by EIHSCP, at Pulmonology Department, represented 14.9% of total activity of internal consulting. In this context, 58 patients were evaluated, of which n = 45 (77.6%) were male. Mean age was 67.4 ± 10.6 years (minimum: 43; maximal: 87). The ECOG performance status, at first evaluation, was, in average, 2.9 ± 1.0. Referral to EIHSCP occurred, in average, at 8.8 ± 10.9 days of in-hospital admission. Oncological disease (of pulmonary and/or pleural origin) was the most often diagnosis (n = 50; 86.2%), followed by non-malignant pulmonary/respiratory conditions (n = 8; 13.8%). Symptoms and/or problems more prevalent in the sample were: dyspnea (n = 35; 60.3%); pain (n = 28; 48.3%); asthenia and/or anorexia (n = 16; 27.6%), and depression/anxiety (n = 13; 22.4%). Neurocognitive signs were present in 25 individuals (43.1%): of which 23 with advanced pulmonary neoplasia. Twenty-four patients died during hospitalization (n = 6 patients died after more than 30 of hospitalization).
Conclusions: These results demonstrate diversity of symptoms that need management and optimization among patients with advanced pulmonary disease. This study highlights the significative prevalence of cognitive and neurological problems among patients with primary pulmonary tumors. The substantial difference between number of patients with oncological versus non-oncological disease reflects the frequent association of palliative medicine to oncological conditions, knowing that chronic pulmonary disease also occurs with significative morbidity and mortality. This reality could mean that referral of these patients – which disease is progressive – is still less than expected.

***Keywords**: Palliative care. Symptoms. Chronic respiratory disease.*

CO 062. PALLIATIVE CARE IN A PULMONOLOGY WARD – A FOUR-YEAR EVOLUTION

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Introduction: Palliative Care has a fundamental and growing role on the management of chronic respiratory patients during hospital stay, both oncologic and non-oncologic.
Objectives: Review of the palliative care team (PCT) consultations at a tertiary hospital pulmonology ward and a four-year evolution analysis.
Methods: Retrospective analysis of PCT consultations to inpatients at a tertiary hospital pulmonology ward between January 1st 2016 and December 31st 2019. Demographic characteristics, main diagnosis, reasons for referral and mortality are described.
Results: There were 279 PCT consultations in this period, corresponding to 6.9% of admissions. In 2019 there was an increase of 2.5 times the number of consultations regarding 2016. Population descriptive analysis, main diagnosis, reasons for referral, symptoms needing control and mortality data may be found in the next table. The diagnosis proportion was year-independent and the median of time since the referral to death in 2016 was not significantly different from 2019.
Conclusions: Over the past four years, PCT support has been growing, which may be a reflection of patients in an advanced stage of disease, both oncologic and non-oncologic, and an increasing awareness of respiratory physicians on this topic.

Keywords: *Palliative care. Chronic respiratory patients.*

CO 063. COMPARISON OF DIFFERENT 6-MINUTE WALKING TEST REFERENCE EQUATIONS IN A PORTUGUESE HOSPITAL POPULATION

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Introduction: The 6-minute walking test (6MWT) is a simple and practical exam that allows the evaluation of the response to exercise in daily life, with special relevance in patients with chronic respiratory disease. Following the development of the first reference equations based on a Portuguese population, it became pertinent to compare the different reference equations that already exist.
Objectives: Check and validate which reference equation are best suited to the population that performs 6MWT at Hospital da Luz de Lisboa.
Methods: A retrospective descriptive-comparative study of 976 individuals, aged between 19 and 95 years old, who underwent 6MWT at the Respiratory Function Laboratory at Hospital da Luz Lisboa, between January 2018 and March 2020. Anthropometric data and heart rate (HR) were measured before the start of the walk (in a 20-meter runner). Distance covered and maximum heart rate (HRMax) were recorded at the end. These variables were used to calculate different predicted distances based on different reference equations and compared to the distance covered as well as the performed work.
Results: In this study, 976 individuals were studied, 54.5% female, with an average age of 69.65 ± 11.8 years and an average body mass index (BMI) of 27.80 ± 5.14 kg/m^2. The mean HR at rest was 75.5 ± 14.0 bpm and the mean HRmax was 107.7 ± 18.5 bpm. The average

	2016 (n 45)	2017 (n 46)	2018 (n 72)	2019 (n 116)	TOTAL (n 279)
Gender (M:F)	2:1	2:1	3:1	4:1	3:1
Age (mean)±SD	65,7±1,9	69,5±1,5	69,2±1,4	67,6±1,2	68,0±0,7
Main diagnosis					
Lung cancer	29	29	52	69	**179 (64,2%)**
Suspected lung cancer	10	10	9	14	**43 (15,4%)**
Chronic obstructive pulmonary disease	3	2	7	17	**29 (10,4%)**
Interstitial lung diseases	0	3	2	7	**12 (4,3%)**
Others	3	2	2	9	**16 (5,7%)**
Main reason for referral					
Symptom control	32	24	46	72	**174 (62,4%)**
Care organization	7	15	24	40	**86 (30,8%)**
Discharge planning	4	3	2	3	**12 (4,3%)**
Decision making	2	4	0	1	**7 (2,5%)**
Symptoms needing control					
Dyspnea	20	20	31	68	**139 (49,8%)**
Pain	10	17	27	35	**89 (31,9%)**
Anorexia	11	10	10	11	**42 (15,1%)**
Delirium	6	6	15	12	**39 (14,0%)**
Nausea or vomiting	2	2	2	5	**11 (3,9%**
Dysphagia	3	6	5	0	**14 (5,0%)**
Others	15	14	8	10	**47 (16,8%)**
Intrahospital mortality	26 (57,8%)	24 (52,2%)	42 (58,3%)	53 (45,7%)	**145 (52,0%)**

Figure CO 062

distance covered was 368.3 ± 122.4 m with an average speed of 1.02 ± 0.34 km/h. The average work performed was 27,109.5 ± 10,988.2 m.kg. When all the reference equations for the population were compared, it was found that the equation by Oliveira et al is the one that best suits the distance covered, with a Pearson Correlation value of 0.974, followed by Gibbons et al (0.971), Chetta et al (0.964), Brito et al (0.958), Casanova et al (0.926), Enright et al (0.835) and Trooster et al (0.785). Each of these studies used different methodologies and protocols, highlighting the number of participants, age spectrum, length of the corridor and number of repetitions. Thus, the age range of the study population, the length of the corridor and the number of repetitions required to finish the exam are limitations to be taken into account when analyzing the data obtained. Using the cut offs that have a predictive value for mortality in COPD, both at distance (350m) and at work (2500 m. kg), a comparison of the ROC curves of the different equations was made, being the equation by Oliveira et al the one with the best results (AUC: 0.991 and AUC: 0.919, respectively).
Conclusions: There are reference equations best adapted to the population studied, compared to those used by the Laboratory (Casanova et al). Oliveira's equations stand out for the best demographic correlation and Gibbons equations for the best methodological correlation.

Keywords: *6 minute walking test. Reference equations. Portuguese population.*

CO 064. EXTRAPULMONARY MANIFESTATIONS ON CHRONIC PULMONARY DISEASE: EDMONTON ASSESSMENT

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Introduction: Obstructive airway diseases and interstitial lung pathologies constitute progressive evolutive conditions, with significative clinical and functional impact. Besides respiratory symptoms, they carry out extrapulmonary/systemic manifestations, being agents of distress to patient and his/her family. Edmonton Symptom Assessment Scale (ESAS) was elaborated to identify and quantify marked non-respiratory symptoms, with applicability on that population.
Objectives: To assess prevalence and intensity of extrapulmonary/systemic manifestations in patients with chronic pulmonary conditions. To evaluate the association between estimated ESAS score with mortality occurrence.
Methods: Retrospective analysis of patients with chronic pulmonary conditions, in follow-up at Palliative Care Unit, evaluating the type of chronic disease, the functional status by Karnofsky Index; estimating symptom intensity through ESAS.
Results: Thirty-four individuals with defined characteristics were identified, of which 52.9% (n = 18) were male, with a mean age of 78.9 ± 10.9 years (minimum: 53; maximal: 93). Chronic pulmonary conditions identified were: Chronic Obstructive Pulmonary Disease (COPD) (n = 31); sleep respiratory disturb (n = 5); pulmonary emphysema secondary to alfa-1 antitripsin (n = 1); bronchiectasis (n = 1); idiopathic pulmonary fibrosis (n = 1). Among COPD cases, primary lung tumour coexisted in 4 patients (21.1%). Karnofsky index was, in average, 47.4 ± 12.1% (0-100%). Total ESAS score, evaluated in COPD patients, was 23.2 ± 8.9; in patients with COPD and, simultaneous, lung tumor (n = 4) this score was 17.5 ± 11.9. In average, patients reported high levels of fatigue (score 4.7); low well-being (score 4.2) and breathlessness (score 3.1). Symptoms of sadness and anxiety were also presented, although with a less expression. Patients already deceased (n = 16; 47.1%) presented a mean ESAS score of 22.1 ± 9.1 (minimum: 5; maximal: 41), without a statistically significant difference in comparison to alive patients.
Conclusions: Edmonton Symptoms Assessment Scale constitutes a useful tool, allowing contemplate of signs and symptoms not evaluated by other scales. The fact that COPD and lung cancer patients did present a ESAS score lesser than patients with only COPD was unexpected, which can be explained by the difference of individuals of both subgroups. ESAS score did not reveal superior in died individuals; this is a tool mainly related to quality of life and not indicative of prognosis. Allied to conventional pulmonary function measures, patients do benefit from this tool as an assessment instrument of clinical evolution, in the perspective of holistic approach.

Keywords: *Extrapulmonary symptoms. Chronic pulmonary conditions. Edmonton.*

CO 065. INHALABLE THERAPY OF TUBERCULOSIS: MATCHING THE DELIVERY ROUTE WITH THE INFECTION ROUTE

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Introduction: Tuberculosis remains a global disease, 80% of the cases being of pulmonary tuberculosis. Considering the severe side effects of conventional oral antibiotherapy, new therapeutic strategies are urgently needed. The infection establishes after inhalation of Mycobacterium tuberculosis-containing droplets by individuals, which is followed by bacteria accumulation in the alveolar macrophages. It seems logical, then, to propose the direct delivery of the adequate antibiotics to the site of primary infection, i.e. the lung. Additionally, macrophage surface receptors could be used as drug targets. These include the mannose receptor, which can be actively targeted using mannose-containing materials. Some gums and other plant-derived polysaccharides comprise mannose units, rising their interest as matrix materials of inhalable antitubercular drug carriers.
Objectives: This work proposes matching the route of delivery of antitubercular drugs with that of the infection, which is considered an opportunity to reduce the doses and the systemic side effects. To do so, polysaccharides containing mannose residues (locust bean gum - LBG, konjac glucomannan - KGM) were used to develop drug-loaded inhalable microparticles. These were tailored to meet the required aerodynamic properties to reach the alveoli, where macrophages hosting bacteria are located. This will provide the co-localisation of drugs and bacteria, with potential therapeutic benefits.
Methods: Inhalable LBG and KGM microparticles loaded with a combination of isoniazid and rifabutin were produced by spray-drying (Büchi B-290 mini spray-dryer) at polymer/isoniazid/rifabutin mass ratio of 10/1/0.5. Microparticles were characterised for morphology, size, aerodynamic parameters and drug association. The cytotoxicity of materials/formulations was determined in A549 cells (alveolar epithelium) and macrophage-differentiated THP-1 cells by MTT assay, at concentrations up to 2 mg/mL during 24h. Polymers were fluorescently-labelled and the uptake of corresponding microparticles by macrophage-like THP-1 cells upon 2h incubation was assessed by flow cytometry. The therapeutic efficacy of LBG microparticles was tested in vivo in mice infected with M. tuberculosis H37Rv. For two weeks, microparticles were inhaled 3x or 5x/week and the results compared with oral delivery of free antibiotics.
Results: Microparticles of convoluted aspect were obtained, which successfully associated isoniazid (> 90%) and rifabutin (> 74%), with LBG presenting the most favourable results of association (94% and 100%, respectively). Aerodynamic diameters varied between 3.0 and 5.8 μm. Cell viability of > 60% was observed and the uptake of microparticles varied between 90% and 100%, the highest value being registered for LBG microparticles. The inhalation of these 5x/

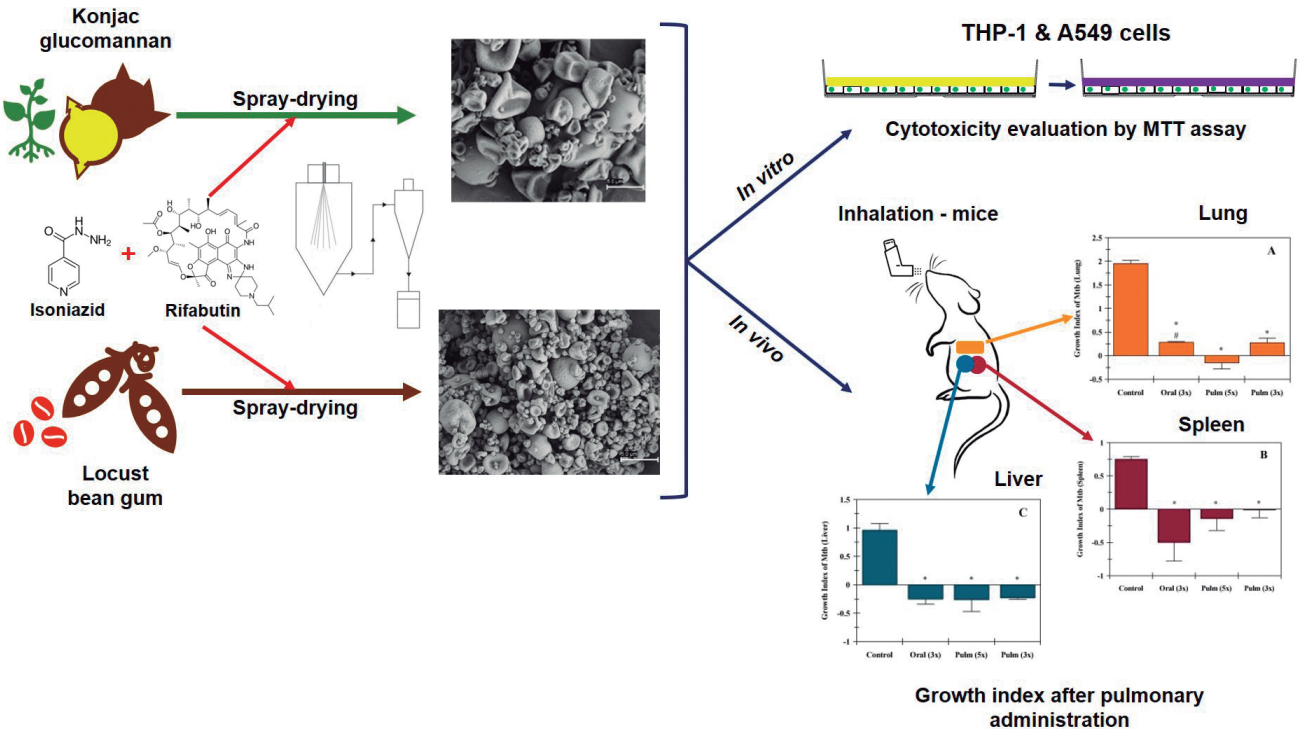

Figure CO 065

week was the only treatment schedule resulting in negative growth index values in liver, spleen and lungs.
Conclusions: Polysaccharide microparticles suitable for inhalation demonstrated high interaction with macrophages and in vivo results provided a good indication on the potential of the designed strategy for inhalable treatment of tuberculosis. Using a much lower dose compared to that of the free oral antibiotics, similar or even higher therapeutic effect was achieved in terms of bacterial loads in lungs, for mice inhaling drug-loaded LBG microparticles.
Acknowledgements: This work was supported by FCT - PTDC/DTP-FTO/0094/2012, UID/Multi/04326/2019.

Keywords: *Inhalation. Microparticles. Polysaccharides. Tuberculosis.*

CO 066. COVID-19 MASKING TUBERCULOSIS – A DIAGNOSIS NOT TO FORGET IN PANDEMIC TIMES

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Introduction: COVID-19 can present with bilateral pneumonia and severe hypoxemic respiratory failure needing respiratory support. In patients requiring mechanical ventilation or prolonged admission, the risk of nosocomial infection is greater, and many patients have been developing bacterial superinfections. Nevertheless, when an infection is refractory to extended spectrum antibiotics, it is important to think of differential diagnosis with less common infections in this context, like tuberculosis. We report a case of an unexpected diagnosis of tuberculosis during a prolonged admission due to SARS-CoV-2 pneumonia.
Case report: Male, 46 years-old with past medical history of hypertension, dyslipidaemia, type 2 diabetes mellitus, former smoker, obese and right hemicolectomy and adjuvant chemotherapy for colon adenocarcinoma, whose last cycle was on 27th of April 2020. On May 8th, he was evaluated for fever and prostration in emergency department and presented a SARS-CoV-2 positive test. He was then admitted because he also had a hyperosmolar hyperglycaemic coma. On thoracic computerized tomography (CT), there were multiple bilateral ground-glass opacities and a discrete consolidation in left upper lobe apex. At 4th admission day, he was transferred for the intensive care unit (ICU), due to respiratory failure in increasing oxygen supplementation needs. He was started on high flow nasal canula, however his clinical status deteriorated, and he was canulated to veno-venous ECMO in spontaneous ventilation. No direct therapy to SARS-CoV-2 was done. Due to apparent bacterial respiratory superinfection, he did 2 courses of extended spectrum antibiotics, not having any bacterial growing in the sputum exams. On thoracic CT, he presented with consolidations with air bronchogram, with upper lobe predominance and some micronodules with random distribution in lower and middle lobes, which were interpreted in the context of a bacterial infection. On June 29th, about a month and half of admission in the ICU, he was decannulated from ECMO and transferred to an intermediate care unit. During this period, he kept having periods of fever apart from each other and fatigue. On re-evaluation CT, centrilobular micronodules with tree in bud pattern and areas of consolidation with cavitation in the upper lobes were documented. A Mycobacterium tuberculosis was identified in sputum, with negative molecular resistance test. The patient was transferred to pulmonology ward, where he started anti-mycobacterial therapy. He was discharge at 14 days of admission in ward, 75 in total, with the respiratory failure resolved.
Discussion: This case pretends to illustrate the importance of microbiological study of respiratory samples, including mycobacterial culture and acid nucleic amplification tests. The diagnostic delay in these situations is challenging, especially in patients potentially bacilliferous (like in non-ventilated ECMO patients) which share common spaces. COVID-19 with severe ARDS develops an exuberant systemic inflammatory syndrome which can cause a certain degree of immunodepression, associated with that one secondary to recent chemotherapy, could be causes of tuberculosis reactivation.

Keywords: *Tuberculosis. COVID-19. Mycobacterium tuberculosis. SARS-CoV-2.*

CO 067. TUBERCULOSIS IN PEDIATRIC AGE IN THE REGION OF LISBOA E VALE DO TEJO - RETROSPECTIVE ANALYSIS OF ONE YEAR OF APPOINTMENTS

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Introduction: Tuberculosis (TB) is the most lethal infectious disease globally. It is estimated that 1/4 of the world population is infected. WHO aims to reduce the incidence to < 100/million by 2035. Unfortunately, there has not been a decrease as sharp as desirable, partly due to the increase in migratory movements. Moreover, as a consequence of the COVID-19 pandemic, socio-economic difficulties are expected to worsen, especially in groups with a higher prevalence of TB, which will have implications in its spread.
Objectives: Pragmatic studies are fundamental for decision-making and policies, so the objective of this study was to characterize the results of a reference center for childhood tuberculosis.
Methods: Retrospective analysis of the processes of children referred between 8/1/2019 and 7/31/2020 to the Pneumological Diagnostic Center Dr. Ribeiro Sanches. This center serves the entire pediatric population of Lisboa e Vale do Tejo (LVT) since October 2018, under the responsibility of a pediatric pulmonologist. Descriptive analysis of the results.
Results: 304 children were seen, 51% male. The average age was 6 years (± 4.3). 20% are foreigners, from 10 different countries: Angola, Syria, Brazil, Guinea, Cape Verde, Iraq, India, Bangladesh, Nepal and Sudan - in decreasing order of prevalence. Regarding the reason for consultation, 79% comes for contact screening, 6% for refugee screening, 5% for symptoms, 5% for changes in pre-BCG screening, 1% for imaging changes without associated symptoms, 0.3% for screening pre-biotechnological medication, and 0.3% for screening after a diagnosis of HIV infection. Of the 242 patients referred for contact screening, the average time between diagnosis of the index case and the consultation was 2 months. The degree of kinship of the contacts was the following: 37% parents, 16% uncles, 16% grandparents, 8% brothers, 6% cousins and 17% others. After the exams, latent TB was diagnosed in 80 patients and active TB in 24. In 158, screening was negative and 42 are awaiting results. 74% of children with TB (active and latent) live in 5 of the 50 municipalities of LVT: Sintra, Lisbon, Loures, Amadora and Odivelas. Of the patients with latent TB, 23% are foreigners. Of the patients with active TB, 42% are foreigners (Angola, Guinea, India, Brazil and Cape Verde in decreasing order). In addition to the 80 patients being treated for TB infection and the 24 for TB disease, there are 10 under chemoprophylaxis (exposure and age less than 5 years or immunocompromised).
Conclusions: This study shows that in just 1 year more than 300 children were followed, reflecting the importance of this consultation in the LVT region. We found, as expected, a high prevalence of foreign children, especially among those infected. The time between the diagnosis of the index case and the consultation must still be reduced, namely by improving the communication with the hospitals and raising the population's awareness of the importance of post-contact screening. We think it is important to conduct similar studies periodically to monitor the trend in TB numbers in the region, which may have implications for national recommendations.

Keywords: *Pediatric tuberculosis. Lisbon. Epidemiology.*

CO 068. THE COMPLEXITY OF TUBERCULOSIS: FROM DIAGNOSIS TO DISEASE COMPLICATIONS AND TREATMENT ADVERSE REACTIONS IN A PROLONGED HOSPITAL STAY

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Hospital Prof. Dr. Fernando Fonseca.

Introduction: Tuberculosis continues to amaze with its associated complications, due to the disease itself or its treatment. The authors present a case admitted to the Pulmonology Department in April 2020, still in the hospital, that stands out for its diagnostic complexity and medical complications.
Case report: 47-year-old male, from Cabo Verde, house-builder, with known alcoholism and perianal abscess. He went to the emergency department complaining about having dyspnoea, cough with purulent and hemoptoic expectoration, weight loss and fever in the previous three weeks. On medical examination hepatomegaly and lower limbs oedema were noted. Lymphocytopenia 400/uL, PCR 7.68 mg/dL, hyponatremia 127 mmol/L, and a negative HIV test were revealed. The X-ray showed bilateral micronodular and consolidative opacities, mainly on the left hemithorax, where a large cavity stood out. Tuberculosis was confirmed by expectoration bacilloscopy and PCR M. tuberculosis, treatment was started. Due to respiratory insufficiency he was admitted to the Pulmonology Department. Owing to recurrent haematochezia a colonoscopy was performed with biopsies in right colonic ulcers that were PCR M. tuberculosis positive. A diagnosis of disseminated tuberculosis was made. Urinary, cardiac (through echocardiogram) and central nervous system involvement (lumbar puncture and MRI) were excluded. The patient developed serious progressive pancytopenia (Hb 7.3 g/dL, leucocytes 2,500/uL, platelets 20,000/uL). Tuberculous medullary involvement was considered but due to the thrombocytopenia a myelogram was not performed. In the meantime, he had an increase in hepatic enzymes with hyperbilirubinemia (AST 168 U/L, ALT 52 U/L, FA 780 U/L, G-GT 320 UI/L, bilirubin total 4 mg/dL). We interrupted the tuberculostatic treatment after 23 days; its gradual reintroduction identified pyrazinamide as the culprit. Treatment continued with rifampicin, isoniazide and ethambutol (HRE). Days after, he complained about burning pain on his foot and thighs, reported only on the 33rd day of HRE. B1, B2, B6, folate, B12 and HbA1c levels were normal and an electromyography showed moderate, symmetrical, axonal sensitive-motor neuropathy. Autoimmune and metabolic disorders were excluded. We considered a likely toxicity to isoniazid, suspended and replaced by levofloxacin. Since levofloxacin introduction, he is presenting worsening thrombocytopenia that is being investigated. The hospital stay has been marked by multiple complications. On admission he had a left pneumothorax, with immediate thoracic tube placement, that maintained a fistulae airflow. CT revealed inumerous cavitations in superior lobes, predominantly on the left lung, the larger with 10 cm. After an accidental removal of a fifth tube, he maintained a moderate air chamber with pleurocutaneous fistulae through one of the toracosthomy orifices, that closed spontaneously. Due to inaugural ascites with liquid suggestive of portal hypertension, with negative bacilloscopy and PCR M. tuberculosis, chronic hepatic disease was diagnosed, with possible tuberculous involvement. The following complications also stand out: esophageal candidiasis and nosocomial SARS-CoV-2 pneumonia, causing worsening of respiratory failure.
Discussion: This case highlights the plurality of complications secondary to the tuberculous multiorgan involvement and its potential treatment effects. We underline the nosocomial SARS-CoV-2 infection, that could have dictated the worst outcome of a so intricate case itself.

Keywords: *Disseminated tuberculosis. Pneumothorax. Cavitation. Tuberculostatic drugs.*

CO 069. COVID-19 AND TUBERCULOSIS – CASE REPORT

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Introduction: We are yet to know the incidence and prognosis of SARS-CoV-2 and Mycobacterium tuberculosis complex (MTC) coinfection.

Case report: 39-year-old woman, melanodermic, with a medical history of sickle cell disease, degenerative osteoarticular pathology, splenic atrophy, steatohepatitis, depressive syndrome and obesity. She developed a 3-months progressive cough with occasional hemoptoic expectoration, asthenia and dyspnea (beginning in February 2020). Initially the patient was medically observed at the Primary care clinic and treated with several cycles of antibiotics and systemic corticosteroids, without improvement. A RT-PCR SARS-CoV-2 was requested, which became positive and a chest CT revealed a bilateral alveolar pattern with air bronchogram with a cavitation image. She was referred to the Emergency Department and sputum smears were positive. She was admitted to the Infectious Disease Service with the diagnoses of COVID-19 and cavitated pulmonary tuberculosis. She started empiric treatment to active Tuberculosis with Isoniazid, Rifampicin, Ethambutol and Pyrazinamide (HRZE) at 01/05/2020, with initial good tolerance. Because of COVID-19 infection and bacterial overinfection without na isolated agent, she completed a hydroxychloroquine cycle (5 days) and empiric antibiotic treatment with ceftriaxone and azithromycin. HIV and HCV serologies were negative. She repeated chest CT at admission, which showed aspects consistent with pulmonary tuberculosis, and changes were also identified, namely in both inferior lobes, attributable to COVID-19. She was discharged to her home (11/05/2020) with positive RT-PCR SARS-CoV-2 (8/5) and positive sputum smears (4/5). The patient was referred to the Pneumological Diagnosis Center (CDP) of the area of her residence, awaiting cultural mycobacteriological and first line anti-tuberculosis drugs sensitivity test. The monitoring from CDP was carried out by regular teleconsultations. Repeated searches for RT-PCR SARS-CoV-2 (18/5 and 28/5) were negative. Posterior sputum smears (3/6) were also negative. After 3 months of first line antibacillaries with HRZE we changed the treatment to the maintenance phase with HRE because of the absence of sensitivity test to first line antibacillaries, but the presence of the necessary conditions to start this phase. She is currently in the fourth month of antibacillary therapy, with no record of major toxicity and a sustained clinical improvement.
Discussion: Our case report aims to alert to the presence of two infectious diseases with preferential pulmonary affliction, the difficulty of its differential diagnosis and the importance of telemedicine in the follow-up of patients with infectious-contagious pathologies, which was driven by the current pandemic.

Keywords: *Tuberculosis. COVID-19. Telemedicine.*

CO 070. CHARACTERIZATION OF PATIENTS WITH MULTIDRUG-RESISTANT TUBERCULOSIS AND HIV INFECTION IN THE REGION OF LISBON AND VALE DO TEJO TREATED AT THE REGIONAL REFERENCE CENTER BETWEEN 2012 AND 2019

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Introduction: Currently the incidence of multidrug-resistant tuberculosis (TB-MR) and HIV co-infection appears to be on the rise in Europe.
Objectives: To characterize patients with MR-TB and HIV infection treated at the Regional Reference Center for Multidrug-Resistant Tuberculosis (CRRMR) in Lisbon and Vale do Tejo (LVT) between 2012 and 2019.
Methods: Retrospective study that included the analysis of the clinical process of all individuals treated in CRRMR-LVT with the diagnosis of HIV and TB-MR. Demographic aspects, comorbidities, type of drug resistance, evolution and treatment success were evaluated.
Results: Of the 86 patients with drug resistant tuberculosis followed in the CRRMR between 2012-2019, 28 (32.6%) had HIV coinfection. Of these patients, 78.6% (n = 22) were male, with a mean age at diagnosis of 44 years, the majority (71.4%) had Portuguese nationality. Of the foreign individuals, the majority (62.5%) had been living in Portugal for more than 2 years at the time of TB-MR diagnosis. 50% were unemployed; among the employed people 50% worked in construction. Liver disease was the most frequently observed comorbidity in 17.9% of patients. Among the total number of patients, 46.4% had a history of previous tuberculosis diagnosis submitted to treatment with antibacillaries, and in 28% of these cases, the treatment was previously abandoned. The average delay between the onset of symptoms and the diagnosis of tuberculosis was 74 days. On average, for each case of disease, 4 close contacts were selected for screening. The lung was the main location of tuberculosis in 75% of cases, of which 47.6% had cavitated disease. In 65% of cases, a rapid drug resistance test was performed, with 83% showing resistance to Isoniazid and Rifampicin. The phenotypic study revealed that 34% of cases corresponded to extensively drug resistant tuberculosis (TB-XDR) and 66% to multidrug-resistant tuberculosis (of these, 33% were pre-XDR). All patients followed the Directly Observed Taking (DOT) regimen, with no fatal toxicity recorded. The average duration of treatment was 20 months. The majority of patients (59.4%) completed the treatment successfully. Of the remainder, 6.3% were under treatment at the time of the study, 18.7% died without completing treatment, 12.5% requested transfer or emigrated and 3.1% abandoned treatment.
Conclusions: This study aims to describe a subgroup of patients with tuberculosis who may be at greater risk of therapeutic failure and adverse reactions to antibiotics, which might affect adherence to treatment. It was found that the majority of cases of TB-MR and HIV co-infection in RLVT in recent years have been found in patients with Portuguese nationality or living in the country for > 2 years (not appearing to be import cases) and that almost half of the resistant strains appeared after Tuberculosis recurrence/retreatment. This highlights the importance of guaranteeing adherence to treatment in any case of tuberculosis, namely with the TOD regime, in order to prevent the emergence of these strains. The delay in diagnosis is also noteworthy, highlighting the importance of trying to promote health literacy in this risk group and raising awareness among clinicians about the persistence of tuberculosis, especially in risk groups.

Keywords: *Tuberculosis. HIV. Multidrug-resistant tuberculosis.*

CO 071. CUTANEOUS TUBERCULOSIS – RETROSPECTIVE ANALYSIS OF 7 YEARS OF A PNEUMOLOGY DIAGNOSIS CENTRE OF THE METROPOLITAN AREA OF LISBON

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Introduction: Cutaneous tuberculosis is not common, representing 1-1.5% of extrapulmonary tuberculosis cases. It is an infectious disease mainly caused by the Mycobacterium tuberculosis, which represents different dissemination mechanisms on the skin (exogenous and endogenous) and different bacillary loads (paulibacillary and multibacillary forms). The clinical presentation is varied and dependent of the inoculation method, bacillus virulence and the host's immune state.
Objectives and methods: To characterize the adult individuals with the diagnosis of cutaneous tuberculosis between 2012-2019 in a Pneumology Diagnosis Centre (PDC) of the metropolitan area of Lisbon. Retrospective and descriptive study. All the adults directed to the PDC within this period were included, and the ones who did the treatment due to confirmed cutaneous tuberculosis, probable or possible. Demographic aspects, comorbidities, medical manifestations, extra-cutaneous involvement, results of microbiological, molecular and immune exams, presence of preliminary treatments and their success were evaluated.

Results: Between 2012-2019 a total of 2,596 adults initiated the follow-up at PDC with active tuberculosis, mostly male (60.4%; = 1,567), with an average age in the diagnosis of 47.3 years, being 62.6% (n = 1,626) of Portuguese nationality. From these patients, 17 (0.65%) presented the diagnosis of cutaneous tuberculosis. The majority was female (88.2%; n = 15), Portuguese nationality (76.5%; n = 13), with an average age in the diagnosis of 55.5 years. Two patients (11.8%) were health professionals. 17.6% (n = 3) presented diabetes mellitus, 5.9% (n = 1) HIV and 5.9% (n = 1) active neoplasia. Two patients (11.8%) presented a history of prior diagnosis and treatment of cutaneous tuberculosis. The average delay between the beginning of symptoms and the diagnosis was 8.6 months. The most frequent forms of presentation found were paucibacillary forms: 47.1% (n = 8) presented erithema induratum de Bazin, being observed the detection of acid alcohol resistant bacillus in one patient in the biopsy; 29.4% (n = 5) presented nodular erythema. All patients with paulibacillary forms presented a positive IGRA test and, in the majority of cases (76.9%; n = 10), the treatment was initiated by a probable cutaneous tuberculosis, based on medical, anatomopathological findings and results of the immunity tests; in the remaining 23.1% (n = 3) no biopsy was conducted. Regarding the patients with multibacillary forms (23.5%; n = 4): 17.6% (n = 3) presented cutaneous abscesses, obtaining a cultural isolation of the complex M. tuberculosis in two patients and, in the third case, acid alcohol resistant bacillus; 5.9% (n = 1) presented themselves with scrofuloderma in the axillary area, in the context of ganglionic tuberculosis with cutaneous extension, obtaining a cultural isolation of the complex M. tuberculosis. A favourable response of the cutaneous lesions in every patient was verified with the beginning of the antibacillary treatment, the majority concluded the treatment (94.1%; n = 16) with no relevant toxicity, with one case of withdrawal.
Conclusions: As outlined in the literature, the cases of cutaneous tuberculosis represented a minority of the patients with active tuberculosis followed in the PDC in the evaluated period. The objective of this research was to alert about this rare form of tuberculosis presentation, with a multiplicity of possible presentations, namely paulibacillary forms which hinder and delay the diagnosis. It is also emphasized that the patients with cutaneous tuberculosis presented distinct demographic characteristics from most patients referenced to the PDC.

Keywords: *Tuberculosis. Cutaneous tuberculosis. Paucibacillary. Multibacillary.*

CO 072. TRACHEOESOPHAGEAL FISTULA: A RARE COMPLICATION OF PULMONARY TUBERCULOSIS

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Introduction: Acquired benign bronchoesophageal fistula (BEF) is an exceptional condition and most cases have a traumatic origin. Some infectious diseases can also lead to BEF and, among them, tuberculosis is one of the rarest. We report a case of BEF associated with tuberculosis.
Case report: A 20-year-old male was admitted in the Vila Nova de Gaia/Espinho Hospital with a one-month long history of asthenia, anorexia, odynophagia, cough and fever. The patient was diagnosed with human immunodeficiency virus (HIV) 2 weeks before at Primary care and had not started antiretroviral treatment yet (CD4+ count of 10 cells/μL at admission). On examination, the patient was polypneic, his temperature was 38.8ºC and he presented bilateral crepitations. Chest X-ray was suggestive of pulmonary miliary tuberculosis, later confirmed by polymerase chain reaction in bronchoalveolar lavage fluid positive for Mycobacterium tuberculosis. Chest CT scan revealed miliary tuberculosis, mediastinal lymphadenopathy, bronchial fistula, pneumomediastinum and tracheoesoph-

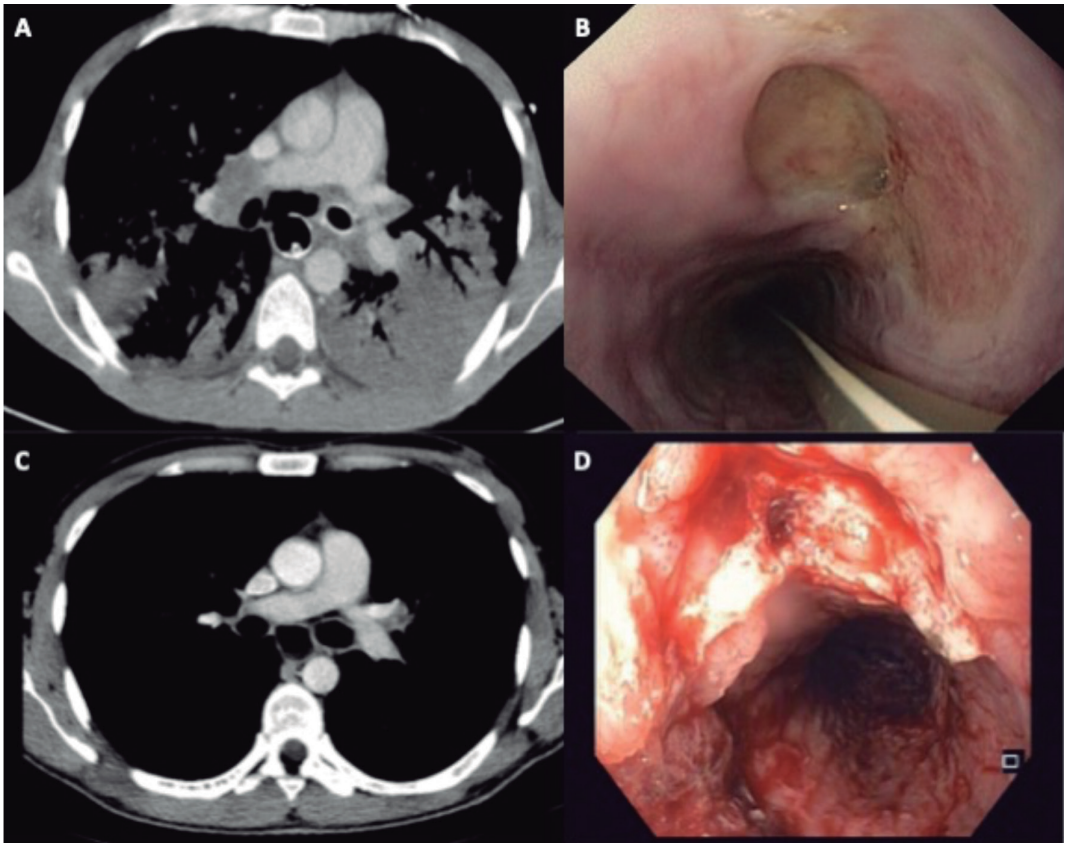

Figure CO 072

ageal fistula with perforation (fig. 1A). An upper gastrointestinal endoscopy revealed massive esophageal candidiasis and a large esophageal ulcer with a fistulous opening suggestive of a tracheo-esophageal fistula (fig. 1B). An esophageal prosthesis was placed. Histological examination of the esophagus and bronchial biopsy specimens revealed non necrotic granulomas. Patient received systemic corticosteroids and antituberculosis treatment (rifampicin, isoniazid, ethambutol and pyrazinamide) and, two weeks later, he started antiretroviral treatment. Endoscopy examination after prosthesis removal after 6 months of tuberculosis treatment showed normal bronchial lumen with disappearance of the fistulous tract (fig. 1D). Chest CT scan also showed almost complete resolution of lung lesions (fig. 1C).
Discussion: This case illustrates an atypical and rare complication of a still frequent disease in our country, tuberculosis, most often seen in immunocompromised patients, such as HIV positive, which presented a favorable outcome after diagnosis and directed therapy. When HIV is diagnosed, it is important to screen for tuberculosis as soon as possible to detect active or latent tuberculosis and manage it accordingly.

Keywords: *Bronchoesophageal fistula. Miliary tuberculosis. HIV.*

CO 073. THE DELAY IN THE DIAGNOSIS OF TUBERCULOSIS IN THE WESTERN REGION: A COMPARATIVE STUDY BETWEEN MUNICIPALITIES

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Introduction: Early diagnosis and immediate initiation of treatment are essential to break the chain of transmission of Tuberculosis. Several individual factors for a late diagnosis of tuberculosis are described in the literature, including female gender, acid-fast bacilli (AFB) negative smear and smoking. Likewise, factors unrelated to the individual are also identified as impeding factors for a quick and effective diagnosis. The WHO defines these factors as the time to reach the health facility; seeking care from non-specialized individuals; and visiting more than one health care provider before diagnosis. The misinformation of patients and health professionals regarding the recognition and valuation of symptoms, as well as some obstacles of an organizational nature, are other factors that influence this delay.
Objectives: Quantify and compare the average delay between symptom onset and diagnosis in municipalities with differences in hospital access; public awareness of tuberculosis; quick access to diagnostic image tests; observation by an expert.
Methods: A retrospective study with data collected from patients with a confirmed diagnosis of Pulmonary Tuberculosis, followed by the CDP –TV 2012-2020. The t-Student test was used to compare the average delay between municipalities and adjusted to confounding factors (described in the literature) using the Chi-square test. Made in SPSS v24.
Results: 51 patients were included, 24 from the municipality of Torres Vedras and 27 from the other municipalities on the west region. The mean of symptoms until diagnosis in Torres Vedras was 54 days (median 45 days) and in the remaining counties, it was 86 days (median 62 days). The T-student test for independent samples showed a correlation between the municipality of origin and the average delay until diagnosis, with a p-value = 0.04. Chi-square tests were applied to possible confounding variables (sex, smoking, negative AFB smear, HIV) and showed homogeneity in the sample (p-value > 0.05). We can infer similar populations in different municipalities.
Conclusions: The average delay in the municipality of Torres Vedras was statistically lower than the average delay in other municipalities. Easier access to specialized health care, health professionals' awareness of pulmonary tuberculosis and access to chest imaging in primary care are possible factors of shorter time from symptom onset to diagnosis.

Keywords: *Tuberculosis. Delay. Municipalities.*

CO 074. TUBERCULOSIS DISEASE IN PAEDIATRIC AGE IN THE LISBON AND VALE DO TEJO AREA OVER A 1-YEAR PERIOD

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Introduction: Tuberculosis is responsible for a worldwide high death rate. The growing migratory flow from endemic countries to non-endemic countries, occasionally without access to sanitary conditions and the local health system, may result in poor control of transmission prevention and early diagnosis of the disease. Pulmonary tuberculosis is the most common form of tuberculosis during childhood, being ganglion and pleural tuberculosis the most frequent extrapulmonary forms (20-30% of all cases).
Objectives: Characterize individuals with tuberculosis disease from a paediatric age tuberculosis reference consultation in the Lisbon and Vale do Tejo area (LVT).
Methods: Paediatric age tuberculosis disease cases (≤ 14) were analysed, referenced and evaluated in the period between 1.8.2019 and 31.7.2020, in childhood tuberculosis reference consultation in the LVT area at the Centro de Diagnóstico Pneumológico (CDP).
Results: During this period, 24 children with tuberculosis disease were followed, 14 (58.3%) of which were females and 10 (41.7%) males. The average age was 6.4 years old, being 14 patients (58.3%) 5 years old or younger. 42% of all patients were foreigners, born in Angola, Guinea, India, Cape Verde and Brazil. 14 children (58.3%) were vaccinated with BCG and 10 children (41.7%) were not immunized. Referral to consultation was mainly due to the presence of symptoms (62.5%), followed by diagnosis in the context of contact screening (20.8%) and presence of alterations in radiological exams (16.7%). Sixteen patients (69.6%) were referred for consultation by the hospitals where the diagnosis was made. The remaining patients (30.4%) were diagnosed in the context of contact screening. All patients started or continued treatment at the 1st consultation at the CDP, except three patients who started therapy at the 2nd consultation: 2 patients in the context of contact screening and one due to the presence of symptoms, awaiting diagnosis. Extrapulmonary tuberculosis had a higher incidence (12 cases - 50%). Ten children were diagnosed with pulmonary tuberculosis, of which 8 were non-cavitated and 2 were cavitated. Only 4 patients were diagnosed with pulmonary tuberculosis alone. Four patients had pulmonary and ganglionic tuberculosis, one had pulmonary and bone tuberculosis and the other one had pulmonary and pleural tuberculosis. Of the remaining diagnoses of extrapulmonary tuberculosis, one patient with meningeal tuberculosis and another with ganglion and pleural tuberculosis stand out.
All those who were isolated of Mycobacterium tuberculosis were multi-sensitive, except for one case whose resistance profile was positive for isoniazid. There were no serious adverse effects, abandonment of therapy or registration of associated mortality.
Conclusions: The results of the study allow to characterize tuberculosis disease in paediatric age in the LVT area. The results of the study allow to characterize tuberculosis disease in paediatric age in the LVT area. Therefore, we will be able to adapt and create measures to optimize resources in the prevention, early diagnosis, treatment and follow-up of possible sequelae resulting from this

pathology, as well as improving the articulation between services (Public Health, ACES, Hospitals).

Keywords: *Tuberculosis disease. Childhood tuberculosis.*

CO 075. SAFETY PROFILE OF MEPOLIZUMAB IN THE PORTUGUESE REAL-WORLD SETTING: A RETROSPECTIVE ANALYSIS

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Introduction: Mepolizumab 100 mg SC is approved for severe eosinophilic asthma based on the efficacy and safety results from randomized clinical trials (RCTs). Real world clinical practice may differ from RCTs, being important to assess the drug´s effectiveness and safety on that setting.
Objectives: To describe the safety profile of mepolizumab in clinical practice in Portugal since market launch based on spontaneous safety reports.
Methods: Retrospective description of the spontaneous reports captured in the GSK safety database related to the use of mepolizumab in Portugal since market launch (December 2016) until August 2020. These reports include but are not limited to adverse events (AEs) as also reports related to other human safety information (HSI) without AEs are captured (eg: off label use, lack of efficacy, exposure during pregnancy). The reported AEs in the GSK safety database were descriptively reviewed in the context of the safety information stated in the Summary of Product Characteristics (SmPC). As in most reports related to HSI the drug action taken is recorded, either from spontaneous reports from HCPs (or other sources) or captured by the GSK external facing staff, the discontinuation rate related to this HSI reported was estimated. To do that, the number of patients treated with mepolizumab was based on internal sales reports – number of units sold adjusted to the expected dosage frequency. This is an estimate and may not represent the total discontinuation rate.
Results: The total number of cases were 58 (corresponding to 94 events). Most patients were female (67%) and aged 18-64 (28%). The age was not specified in 59% of the cases. The most frequent adverse events reported were arthralgias, headaches and worsening of asthma. Most reported AEs belonged to the System Organ Class (SOC) groups "General disorders and administration site conditions" and "Respiratory, thoracic and mediastinal disorders". 13 out of the 58 cases were considered serious (22%) and 45 were non-serious (78%). In 8 out of the 58 cases (14%) the reporter considered the event related to mepolizumab; 7 of those were classified as non-serious and 1 as serious (reported directly by the patient to INFARMED and not validated by the attending physician, being the associated events malaise, nausea, headache and anxiety). 25 events included MedDRA terms belonging to the Important Medical Event (IME) list (1) ; of those there were 3 deaths (causality assessed by the physician as "not related"), 2 malignancies (1 glioblastoma and 1 non specified oncological complication – causality assessed by physician classified as "unknown"), 1 infection by herpes zoster (causality assessed by physician classified as "unknown"). No cases of anaphylaxis or parasitic infections reported. Estimated number of patients based on internal sales and dosage frequency was 379. The estimated discontinuation rate associated with reported HSI was 5.5%, being the most frequent reasons "adverse event" and "potential lack of efficacy". This may not represent the total discontinuation rate.
Conclusions: This data from spontaneous reports does not suggest deviations from the well characterized safety profile established by RCTs and summarized in the SmPC.
Funding: GSK.

Keywords: *Severe asthma. Mepolizumab. Real life. Safety. Pharmacovigillance.*

CO 076. SELF-ADMINISTRATION OF BIOLOGICAL TREATMENT IN SEVERE ASTHMA: THE PATIENT'S PERSPECTIVE

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Introduction: In the very recent years, several biological agents for the treatment of severe asthma have been approved for self-administration on an outpatient basis. However, little is known about the prospects of the patient with severe asthma regarding this kind of administration.
Objectives: To evaluate the perspective of patients with severe asthma regarding self-administration of biological treatment.
Methods: Observational study based on the application of a questionnaire with multiple choice questions to a population of convenience, followed at the Pulmonology Day Hospital of a central hospital and undergoing treatment with a biological agent for asthma.
Results: Thirty-nine patients participated in this study, 59% female and with a mean age of 49.5 ± 18.3 years (18-77). Most patients (67%) were receptive to self-administration of biological treatment at home, while 20% were unfavorable and 13% assumed a neutral position. Among the participants who denied the possibility of self-administration, the majority (88%) was also unavailable for administration by third parties/another person (for example family members) or by the nurse at their Health Center (63%). Patients aged 35-64 years showed the highest acceptability rates (85%), followed by younger adults (18-34 years) with 63% ($p < 0.05$). In the group of patients over 65 years, availability was lower, at only 36.4%. There were no gender differences. When analyzing the data according to the profession, professionally active patients were the most available for this new form of administration (88%) followed by student patients (57%) ($p < 0.05$). The type of biological agent used, the interval of administration and the time of treatment were not influential factors in the patient's response ($p > 0.05$). The main advantages of self-administration mentioned were the need for less visits to the hospital (56%), time saving (28%) and cost savings (26%). For the majority of patients, the possibility of self-administration at home would save 1-5 hours in each treatment (67%), avoid the job/school loss of > 10 days/year (50%), and save > 10 € in each treatment (68%). A considerable part of the respondents did not mention any concerns about the self-administration (44%), but 26% stated fear of side effects, 15% of error in self-injection and 28% of forgetfulness of the administration. With regard to the features of the support, about half of the patients (49%) considered the initial kit with several information materials useful and a smaller proportion (23%) expressed the desire for individual training.
Conclusions: Most of the patients questioned were in favor of self-administration of biological treatment at home, especially younger patients (35-64 years) and professionally active. From the patient's perspective, the reduce visits to the hospital, and consequently the time and cost saved are the main advantages of the self-administration of treatment.

Keywords: *Self-administration. Biological treatment. Severe asthma.*

CO 077. EXHALED NITRIC OXIDE: PREDICTOR OF ANTI-IL5R RESPONSE? A NON-ANSWERED QUESTION

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Introduction: Fraction of exhaled nitric oxide (FeNO) together with the number of eosinophils are validated biomarkers of inflammation in type 2 asthma that involves the mediation of type 2 interleukins

(IL) like IL-5, 4 and 13. Several studies also state its value in monitoring the disease, being a predictor of exacerbations. Benralizumab, an anti-IL5R, suppresses eosinophils and is expected to influence the entire type 2 immunoinflammatory cascade, decreasing the values of the respective biomarkers. In our clinical experience, FeNO behavior after the introduction of anti-IL5R therapy is not always consistent with this rationale, which is why we are concerned about its interpretation.
Case reports: Case 1: 43 year-old male patient with severe uncontrolled eosinophilic asthma. He started therapy with benralizumab with good clinical response (GETE 4, reduction in exacerbation rate, use of OCS, improvement in CARAT, ALQ and EuroQoL). Similarly, the initiation of this treatment resulted in a clear functional improvement (FEV1 post-BD before treatment started: 48.8%/2.01L; FEV1 post-BD after 2 years of treatment: 72%/3.01L). Peripheral eosinophil count decreased from 1,200 cell/μL before benralizumab to 90 cells/μL after 8 months and to 140 cells/μL after 12 months of treatment, which was maintained for 2 years of treatment. On the other hand, the FeNO level increased from 300 ppb before the initiation of benralizumab to 513 ppb at 4 months, 1,024 ppb at 8 months and 1,026 ppb at 12 months of administration of this biological treatment. Case 2: 71-year-old female patient with severe uncontrolled eosinophilic asthma. She started therapy with benralizumab with good clinical response (GETE 4, reduction in exacerbation rate, use of OCS, improvement in CARAT, ALQ and EuroQoL). The peripheral eosinophil count decreased from 1030 cells/μL before benralizumab to 0 cells/μL at 4 months, and maintained at 8 and 12 months of treatment. Conversely, the level of FeNO increased from 50 ppb before the treatment to 80 ppb after 4 months of administration of this biological treatment, a value that it maintained for 12 months of treatment.
Discussion: We present two paradigmatic cases of patients treated with anti-IL5R in which the increase in the level of FeNO accompanied a good therapeutic response and a significant decrease in the level of eosinophils in the blood. These cases demonstrate that we should be cautious when using FeNO to monitor patients being treated with anti-IL5R. Contrary to what one would expect, the FeNO increasing was not related to the poor therapeutic response. This finding should be further investigated, as well as the underlying immunopathological mechanisms.

Keywords: *Exhaled nitric oxide. Anti-IL5R. Severe asthma.*

CO 078. MEPOLIZUMAB IN CRITICAL ACUTE ASTHMA - A SUCCESSFUL OFF-LABEL USE

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Introduction: Eosinophilic asthma is a clinical phenotype of asthma, based on the pattern of inflammatory eosinophilic infiltrate in the airway, and characterized by recurrent exacerbations and poor disease control. Pharmacological agents targeting inflammatory mediators, namely IL-5 are widely used in different stages and subgroups of asthmatic patients, since IL-5 plays a major role in the inflammatory pathway of these patients.
Case report: We report a case of compassionate off-label use of mepolizumab in a patient with a life-threatening asthma attack admitted to a respiratory intensive care unit, refractory to high dose steroids and adjuvant therapy. The patient had history of allergic asthma, poorly controlled, having abandoned bronchodilator therapy years ago, and with symptomatic aggravation in the weeks before admission. The acute asthma attack reached a critical point with refractory respiratory distress, respiratory acidemia with pH 6.8, and subsequent mechanical ventilation and ICU admission. The laboratory results showed a blood eosinophilia of 11%, corresponding to 2,680/nl absolute count. Later, Rhinovirus was isolated in upper respiratory secretions. Difficult ventilation persisted in the first days despite high systemic corticotherapy doses, so we decided to administer mepolizumab 100 mg subcutaneously in the 4 th day of mechanical ventilation, addressing an eosinophilic asthma diagnosis based on initial eosinophils count, as an off-label attempt to full recovery of critical ventilatory state and overcome corticotherapy refractoriness. Great improvement was observed in the following days, leading do extubation in the 10th day. The patient recovered very quickly from the ICU acquired weakness and was later discharged home in the 19th day. One month after discharge, we assessed symptomatic control through validated quality life questionnaires related to rhinitis (SACRA) and asthma (mini AQLQ), in which great significant improvement clinical and of quality of life was verified from the weeks that preceded the acute asthma attack.
Discussion: To our knowledge this is the first successful case of off label mepolizumab use in a patient with refractory critical asthma attack and supports future prospective studies to evaluate this potential indication for mepolizumab.

Keywords: *Asthma. Critical care. Nearly fatal asthma. Severe asthma. Mepolizumab. Orotracheal entubation. Mechanical ventilations. Corticosteroids.*

CO 079. NEBULIZING SYSTEMS AT PEDIATRIC AGE: DOMICILIARY USE IN SÃO MIGUEL ISLAND

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Introduction: Respiratory diseases are a major cause of morbidity and high health costs in pediatrics. For many years, nebulizing systems were considered the first line devices for inhalation therapy in children. Nowadays, new, more efficient and less harmful devices have supplanted them. Recently, specific guidelines for the use of nebulizers emerged with very concrete indications. Nevertheless, studies seem to show that an overuse of nebulizers still exists, as well as an incorrect maintenance of them.
Objectives: To investigate the reality of domiciliary use of nebulizing systems in pediatric age in São Miguel island.
Methods: Descriptive and cross-sectional observational study, with target population children aged 0-7 years who have health surveillance at local Primary Care Units. A significant sample of 380 children was calculated (95% confidence interval). Survey application in the form of a questionnaire addressed to target population caregivers' in order to assess acquisition, use and maintenance contexts of nebulizers. Statistical analysis was performed using SPSS®.
Results: Participation of 387 healthcare users, with an average age 2.5 years. 46% of participants reported they had a nebulizer and 20.1% a simple inhaler device. Acquisition and use of nebulizers without medical prescription rates were 68.6% and 81.0%, respectively. The majority of unsupervised use was due to nasal obstruction (76.2%) and cough (46.5%). Saline solution application was the most reported treatment. For 46.8% of participants, the cost of the nebulization system purchasing was 80-150 euros.
Conclusions: The present study shows an excessive, unsupervised and inappropriate use of nebulization systems. This attitude can lead to serious health consequences. Domiciliary use of nebulizers in the pediatric population have never been studied in São Miguel island. The present investigation becomes, therefore, pertinent, and should encourage the promotion of the use of simple inhaler devices, by educating users, caregivers and prescribers, aiming to improve local health practice.

Keywords: *Nebulizers. Domiciliary use. Pediatric age.*

CO 080. BENRALIZUMAB IN EOSINOPHILIC LUNG DISEASES: DIFFERENT DOSES FOR DIFFERENT FORMS OF THE DISEASE?

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Introduction: Eosinophilic pneumonia is an idiopathic pathology characterized by the infiltration of eosinophils in the lung parenchyma and alveoli and treated with systemic corticotherapy. Benralizumab is a safe and effective monoclonal antibody, which acts against the α receptor of IL-5 allowing the apoptosis of eosinophils by an antibody-dependent cellular cytotoxic effect. The authors describe the case of a patient with severe asthma and chronic eosinophilic pneumonia, whose therapy with benralizumab was not sufficient to control the disease when the usual treatment schedule for severe asthma was applied.

Case report: A 40-year-old woman, non-smoker, with history of severe asthma, hypersensitivity to NSAIDs, recurrent eosinophilic nasal polyposis after polypectomy, chronic eosinophilic pneumonia diagnosed in 2015 (after excluding other differential diagnoses), with clinical, functional, radiological improvement and reduction of peripheral eosinophils after therapy with prolonged systemic corticotherapy. In September 2017, she presented to our emergency department with dyspnea and wheezing; had 21.2% of eosinophils in peripheral blood, with no radiological changes. Two months later, she returned to the emergency room due to clinical worsening after exposure to fire smoke; she presented hypoxemic respiratory failure, new radiological infiltrates and 1.3% of eosinophils in peripheral blood. The patient was hospitalized and systemic corticosteroid therapy was started. During hospitalization, she underwent bronchial biopsy and cytology of the bronchial aspirate - both compatible with eosinophilic pneumonia. In August 2019, following a new relapse of eosinophilic pneumonia, with clinical worsening and systemic corticosteroid therapy restart, the patient was proposed for benralizumab. At the time, she presented 14% of eosinophils in peripheral blood.

She was started on benralizumab in November 2019, with clinical and functional improvement, and reduction of peripheral eosinophilia. However, in April 2020, at the time of benralizumab interruption for bimonthly intervals as recommended in the treatment of severe asthma, the patient relapsed and returned to emergency department. She had new radiological infiltrates and 8.3% eosinophils in the peripheral blood. Benralizumab regimen and a short cycle of systemic steroids were maintained, with good clinical response. In June 2020, in a Day Hospital unit appointment, before taking benralizumab, she presented 23% of eosinophils in the peripheral blood and reported clinical worsening from the seventh week after biological treatment. Five days after taking benralizumab, she showed 8.6% eosinophils, and the administration interval was reduced to monthly. So far, the patient remains disease-free and with almost complete suppression of eosinophils between monthly therapeutic administrations (previous blood count analysis she had 2.4% eosinophils).

Conclusions: Benralizumab recommended dose for severe asthma is 30mg every 4 weeks for the first 3 doses, and then every 8 weeks. In this patient, with overlapping eosinophilic pneumonia, the dosing schedule is insufficient. As with other anti-IL5 biological agents, for severe eosinophilic lung diseases other than asthma, therapeutic regimens may need to be adjusted according to available biomarkers and clinical progress. Results of the ongoing randomized controlled trials are not yet available.

Keywords: *Eosinophilic pneumonia. Benralizumab. Monoclonal antibody. Eosinophilic lung diseases.*

CO 081. ASSESSING PULMONARY RECRUITABILITY WITH POSITIVE END-EXPIRATORY PRESSURE INDUCED CHANGES IN DRIVING PRESSURE IN SARS-COV-2, ARDS AND OBESE PATIENTS

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Introduction: The positive end-expiratory pressure (PEEP) that maximizes pulmonary aeration reducing hyperdistended and collapsed areas has been pursued in clinical practice. The question of

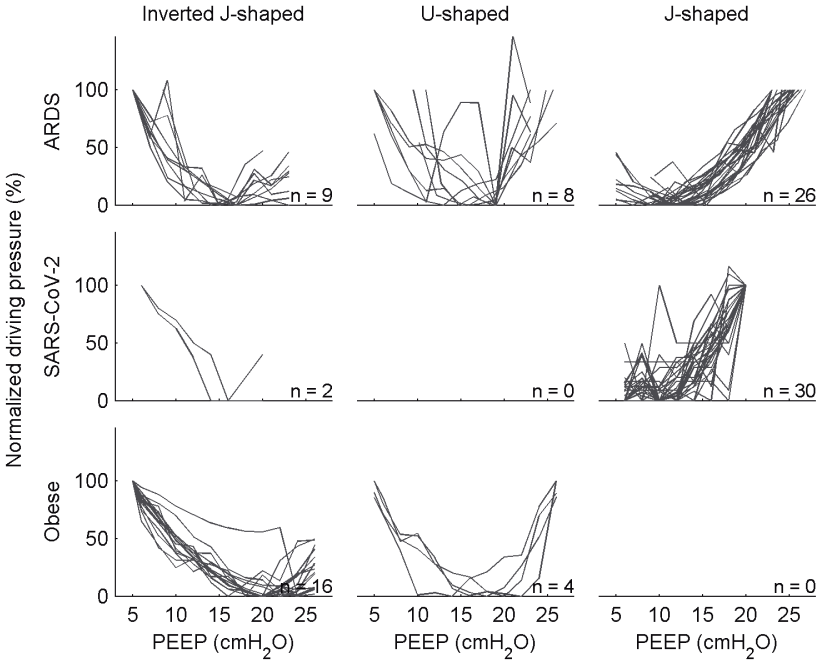

Figure CO 081

which patients benefit from higher PEEPs (PEEP responders) is still under debate even more with the severe acute respiratory syndrome by coronavirus-2 (SARS-CoV-2). We aimed to propose a method to evaluate PEEP-related driving pressure (dP) changes as a tool to identify lung recruitability during a decremental PEEP trial.
Methods: Retrospective data from decremental PEEP trials of twenty obese patients with pneumoperitoneum for bariatric surgery, forty-three patients with ARDS, and thirty-two patients with SARS-CoV-2 confirmed by real-time polymerase chain reaction (real-time PCR) were analyzed. Protocols were approved by institutional review boards (CAAE 047.2009, 31050420.8.1001.5259 and 513.205, Clinical Trials NCT02056977, and 51623015.9.0000.5252, Brazilian clinical trials: U1111-1220-7296). All subjects were ventilated in Volume-Controlled Ventilation (VCV), tidal volume (VT) between 4-8 ml/kg (IBW), plateau pressure ≤ 30 cmH2O, FIO2 to keep SPaO2 > 90% and respiratory rate to maintain PaCO2 between 35-60 mmHg (Baseline). In both ARDS and SARS-CoV-2 patients PEEP was adjusted based on ARDSNet low-PEEP table whereas for obese patients a PEEP of 8 cmH2O was initially applied. PEEP was stepwise decreased from 20 to 6 cmH2O in SARS-CoV-2, from 25 to 5 cmH2O in ARDS, and from 26 to 6 cmH2O in obese patients. The average dP from the last three cycles was plotted against PEEP and the PEEP of minimum dP was determined from its lowest value in the titration. Each dP vs PEEP curve was classified in three categories according to the difference between the minimum dP and the dP at the lowest (ΔdPlow) and highest (ΔdPhigh) PEEP. If ΔdPlow < 0.5xΔdPhigh, the curve was classified as J-shaped; if ΔdPhigh < 0.5xΔdPlow, the curve was classified as inverted-J-shaped; otherwise, the curve was U-shaped. The largest variation in dP during decremental PEEP titration was also computed.
Results: SARS-CoV-2 were older than ARDS and obese subjects. At baseline, obese subjects presented higher dP and PaO2/FIO2 ratio and lower Crs compared to SARS-CoV-2 and ARDS patients. The PEEP of minimum dP was positively correlated with BMI (R2 = 0.34; r = 0.58; p < 0.001) being lowest in SARS-CoV-2 and highest in obese patients (p < 0.01). In SARS-CoV-2 and ARDS, most subjects were classified as J-shaped with dP starting taking off in PEEPs higher than 10 to 14 cmH2O (26/43 in ARDS and 30/32 in SARS-CoV-2, fig. 1), while obese subjects had mostly inverted-J profiles (16/20, fig. 1), usually requiring higher levels of PEEP (interquartile range 18-22 cmH2O). Titrated PEEP was different from those before PEEP titration in ARDS (13 [10 - 15] vs 10 [8-11], p < 0.01) and in obese (20 [20-22] vs 8, p < 0.001) but not in SARS-CoV-2 (10 [9-12] vs 10 [5-20], p = 0.08).
Conclusions: The profile of variation of dP with PEEP could be useful to identify patients who would possibly benefit from higher PEEP levels and help to select individualized PEEP in artificially ventilated patients. Clinical outcomes of such PEEP individualization strategy need to be assessed.

Keywords: *Peep titration. Driving pressure. Lung recruitability. SARS-CoV-2. ARDS.*

CO 082. IMPACTS OF ANTHROPOMETRIC AND DEMOGRAPHIC VARIABLES ON THE COMPUTED TOMOGRAPHY-BASED PHENOTYPING OF COVID-19 PNEUMONIA

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Introduction: Computed tomography–estimated lung volume (CTLV) has been used to assess pulmonary involvement (PI) extent, and computed tomography–estimated lung weight (CTLW) has been used for COVID-19 phenotyping. Both depend on demographic and anthropometric variables and PI severity. We assessed whether PI should be adjusted to the predicted computed tomography–estimated lung volume (pCTLV) and whether PI is associated more strongly with CTLW in grams or adjusted to the predicted computed tomography–estimated lung weight (pCTLW).
Methods: Chest computed tomography data from 103 patients with confirmed COVID-19 and 86 healthy controls without pulmonary opacification were examined retrospectively. Two radiologists selected up to four regions of interest (ROI) per patient (totaling 1,475 ROIs) visually regarded as well-aerated (472), ground-glass opacity (GGO, 413), crazy paving and linear opacities (CP/LO, 340), and consolidation (250). After balancing with 250 ROIs for each class, the densities quantiles (2.5, 25, 50, 75 and 97.5%) of 1,000 ROIs were used to train (700), validate (150) and test (150 ROIs) an artificial neural network classifier (60 neurons single hidden layer architecture). PI extent was calculated as the percentage of affected lung volume divided by CTLV or pCTLV.
Results: CTLW was related to age (p = 0.011), sex (p = 0.015), and height (p < 0.0001; R2 = 0.6, p < 0.0001); CTLV was related to sex (p = 0.0002) and height (p < 0.0001; R2 = 0.57, p < 0.0001). An optimal threshold of 20% pCTLV (sensitivity 0.81, specificity 0.86, area under the curve 0.91, positive predictive value 0.87, negative predictive value 0.80) was identified by analysis of receiver operating characteristic curves of pulmonary opacity in controls and patients. PI adjusted to CTLV correlated moderately with CTLW (r = 0.57, p < 0.001); PI adjusted to pCTLV correlated very strongly with CTLW adjusted to pCTLW (r = 0.85, p < 0.001).
Conclusions: COVID-19 PI adjusted to predicted CTLV was associated very strongly with predicted CTLW and should be preferred for phenotyping COVID-19 pneumonia severity.

Keywords: *Computed tomography. COVID-19 pneumonia. Deep learning. CT-estimated lung volume. CT-estimated lung weight.*

CO 083. NON-INVASIVE VENTILATION FOR THE MANAGEMENT OF COVID-19 ASSOCIATED RESPIRATORY FAILURE – THE EXPERIENCE OF A PULMONOLOGY DEPARTMENT

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Introduction: The SARS-CoV2 associated disease (COVID-19) has a broad clinical spectrum. In hospitalized patients the rate of respiratory failure (RF) is high, with ARDS associated mortality rates that vary from 13-73%. In case of conventional oxygen therapy failure, non-invasive ventilation (NIV) may avoid mechanical ventilation (MIV) if case selection and failure criteria are well defined.
Objectives: Analyze the results of the appliance of a NIV protocol in COVID-19 associated RF in Pulmonology Department inpatients.
Methods: The clinical records of COVID-19 patients treated with NIV between 16th March and 5th of Augusto of 2020 were examined. NIV was initiated in acute partial RF (CPAP modality) if patients had at least one of the following: a) Need for an FiO2 FiO2 ≥ 28% and < 60%; b) Signals of respiratory distress with FiO2 < 60%; In patients with global RF (acute or chronic acutely ill) Bi-level (BiPAP) therapy was chosen. The main exclusion criteria were: neurologic dysfunction, signs of severe respiratory distress, hemodynamic instability and inability to protect the upper airway. In MIV candidate patients failure criteria were the following upon 1-2h of NIV: worsening/maintenance of respiratory distress, appearance/worsening of hypercapnia or a PaO2/FiO2 ratio < 150.
Results: There were 186 COVID-19 patients admitted, of whom 90 (48.4%) initiated NIV, with a mean age of 65.5 years (28-91), 61.8% of male gender. CPAP was the method chosen in 79 patients (87.8%) and the mean start of NIV was upon 9th day of symptoms. An history of tobacco consumption was confirmed in 21.1% of patients; 24 (26.7%) had prior respiratory illness, specifically: 10 obstructive sleep apnea (11.1%), 8 COPD (8.8%), 5 asthma (5.5%), 3 obesity-

hypoventilation syndrome (3.3%). Other illnesses referred were systemic arterial hypertension in 43.3%, diabetes in 30% and cardiopathy in 14%. Mean duration of NIV was 8.5 days (3-25, expect for immediate failure). In 62 patients the NIV trial was successful (68.9%), and in the subset of patients MIV candidate (78.9%) the success rate was 73.2% (n = 52). RF progression was the main cause for NIV failure, in 24 of 28 patients; 19 were submitted to MIV (21.1% of the study population, 26.6% if we only consider MIV candidate patients), for a mean of 13 days and mortality rate of 21% (n = 4). Global mortality rate of NIV submitted patients was 14.4% (N = 13), 5.6% (n = 4) in patients candidate for MIV. Global department mortality was 16.6% (n = 31).
Conclusions: NIV was successfully applied in COVID-19 associated RF, allowing the thesis for a positive protective effect on prevention of MIV and mortality reduction. The mortality rate in these patients with severe RF with NIV criteria was similar to the best mortality rates worldwide for COVID-19 associated ARDS.

***Keywords**: NIV. COVID-19. Respiratory failure.*

CO 084. COVID-19 CLINICAL PROFILE AND OUTCOMES IN A SINGLE HOSPITAL FROM THE GREATER LISBON

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Introduction: SARS-CoV2 pandemic is challenging due to the rising demand for hospitalization, severity and uncertainty about its best approach. Clinical evolution and outcomes differ in several published series. Regional demographic differences, access and organization of health care can affect disease prognosis. Despite the exponential growth of the COVID-19 knowledge, Portuguese data are scarce.
Objectives and methods: The main aim is to describe the clinical presentation, evolution and outcomes of the adult population admitted with COVID-19 in a single Hospital from Greater Lisbon. Retrospective, transversal and descriptive study, which includes all the 153 patients admitted between March 12th and April 27th 2020. Multidimensional, demographic and clinical data were collected and analyzed.
Results: The studied sample had a mean age of 64.7 ± 17.8 years, mainly men (58.8%). The most frequent comorbidities were hypertension (43.8%), diabetes (30.1%), obesity (17.6%) and chronic renal disease (9.2%); 30.7% had a smoking history (6.5% current smokers). In 21.5% the admission was due to other cause than COVID-19. Median early warning score was 10 (IQR 7-12). Concerning severity signs at admission, 32% had fever, 19% respiratory rate > 24 cpm and 23% heart rate > 100 bpm. Median PaO2 was 67.7 (IQR 61-79) mmHg and median PaO2/FiO2 ratio was 304 (IQR 257-353). Laboratory showed lymphopenia in 49% of patients ($0.8 \pm 0.23 \times 10^9$/L), median C-reactive protein of 8.6(IQR 2.4-14.3) mg/dL, median ferritin of 666 ng/mL (IQR 320-1,366.5) and median procalcitonin of 0.16 (IQR 0.07-0.38) ng/mL. Most patients (71.9%) showed bilateral infiltrates on chest X-ray and, in the 44 who underwent computed tomography, 86.4% showed changes suggestive of COVID-19. The rate of bacterial superinfection with an isolated agent was 13.1%. Two patients had co-infection with Influenza type B. Median FiO2 was 0.28 (IQR 0.21-0.40). Non-invasive ventilation (NIV) was used in 20.9% of patients (CPAP mode in 16.3%, median pressure 10 cmH2O), with failure and need for invasive mechanical ventilation (IMV) in 7 cases; there was one death in this subgroup. In 17% of patients IMV was needed, 50% of which underwent NIV post-extubation. Hydroxychloroquine was used in 76.5% of patients (median 8 days, toxicity in 12.8%), lopinavir/ritonavir in 37.3% (median 6 days, toxicity in 35.1%); 18.3% took corticosteroids and 2% tocilizumab. Thrombotic events occurred in 7.8% of patients. Median time of hospitalization was 14 (IQR 8-25) days and time until cure was 19.6 ± 9.1 days; 58.2% were discharged fulfilling cure criteria and 19% with SARS-CoV-2 PCR still positive. Readmission rate was 4.6%. Global mortality was 22.9%, peaking at the decade of 71-80 (40%).
Conclusions: This series represents the approach to the pandemic first wave, at a time when little was known about this disease, thus justifying some therapeutics used. We emphasize the high proportion of patients who underwent NIV, with low failure rates. The clinical presentation was similar to other series. Despite severity, mortality was lower than in other European countries. The knowledge of local and national experiences allows the optimization of strategic planning and clinical guidance in order to avoid catastrophic scenarios.

***Keywords**: COVID-19. Clinical. Outcome. Pneumonia.*

CO 085. OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS) AND COVID-19: IS OSAS A RISK FACTOR FOR SEVERE COVID-19?

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Introduction: Advanced age, male gender and obesity are risk factors shared by severe sleep apnea syndrome (OSAS) and severe COVID-19. OSAS, by predisposing to cardiovascular events and promoting a pro-inflammatory state, may facilitate the occurrence of unfavorable events in patients hospitalized for COVID-19. It is possible, therefore, that OSAS contributes to a greater severity of COVID-19.
Objectives: To estimate the prevalence of OSAS in patients admitted for COVID-19 and to compare the evolution and outcome of hospitalizations of these patients with those with COVID-19 without OSAS.
Methods: We performed a retrospective analysis of the clinical records of all patients admitted to our institution between 01/03/2020 and 06/30/2020 due to COVID-19. Demographic, clinical, analytical, radiological and polysomnographic data were collected. The patients were divided into 3 groups: patients with OSAS, obese patients without OSAS and patients without OSAS or obesity. The severity of COVID-19 was defined based on clinical criteria as mild, moderate, severe or critical. Statistical analysis was performed using IBM® SPSS® Statistics 25.
Results: In the analyzed period, a total of 221 patients, 108 (48.9%) men and 113 (51.1%) women, were admitted by COVID-19. Mean age was 77.5 (± 17.5) years. Eleven (11; 5%) patients had OSAS, 25 (11.3%) were obese without OSAS, and 185 (83.7%) did not have any of these pathologies. The mean length of hospital stay was 20 (± 20.3) days, with no statistically significant differences between patients with OSAS, the obese and the rest (15.6; 23; 19.9; p = 0.584, respectively). Regarding the severity of COVID-19, among patients with OSAS, 6 (54.5%) were considered serious and 2 (18.2%) were critical; in the obese, there were 10 (40%) severe and 8 (32%) critical; in the remainder, 86 (46.5%) were severe and 13 (7%) were critical. There was no statistically significant association between the presence of OSAS and the severity of COVID-19, unlike for the obese patients or those without any of these pathologies (respectively, p = 0.674; p < 0.01; p < 0.01). The overall mortality rate was 32.1% (n = 71). Intra-group mortality was 36.4% for patients with OSAS (4/11), 8% for obese (2/25) and 35.1% for the rest (65/185), with statistically significant differences in the proportion of deaths in the 3 groups (p = 0.023). However, when only patients with OSAS were analyzed, there was no association between the presence of OSAS and mortality (p = 0.49). Mean AHI at the diagnosis of patients with OSAS was 47.8/h (± 13.1). There was no statistically significant correlation between this parameter and mortality (r = 0.729; p = 0.63).

Conclusions: In our cohort, OSAS had a prevalence of 5%. There was no association between its presence and mortality, nor with the severity of COVID-19. The small number of patients with OSAS may have conditioned the analysis. OSAS is an underdiagnosed and clinically undervalued disease, which makes it difficult to perceive its real effect on the outcome of hospitalizations due to COVID-19. Future prospective studies that address this issue, with a greater number of patients, should be considered.

Keywords: *OSAS. COVID-19. Severity. Critically ill patient.*

CO 086. EVALUATION OF THE EFFECTIVENESS OF MEDICAL APPOINTMENTS AT HOME DURING THE COVID-19 PANDEMIC

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Introduction: COVID-19 was declared by the WHO as a pandemic in March 2020. Health Services implemented strategies to reduce the risk of individual transmission and spread in the population. Elective services and procedures were more often managed without face-to-face interaction. However, face-to-face medical appointments for some patients have become essential. Taking into account the hospital safety strategies implemented and patient safety, medical appointments at home of patients who, due to a medical decision, were considered as urgent, were performed. This study aims to evaluate the effectiveness of medical appointments at home during the COVID-19 pandemic in patients with chronic respiratory failure (CRF) and neuromuscular diseases.
Methods: Retrospective assessment of home medical appointments performed between June and August 2020 by healthcare providers from the Sleep and Non-Invasive-Ventilation Unit of CHUSJ, Porto. we assessed demographic and clinical data, motor and cognitive limitations, dyspnea (mMRC) and respiratory functional parameters of patients. From home consultations, we analyzed the procedures performed, including medical physical examination, pulse oximetry, transcutaneous carbon dioxide (TcCO2) monitoring, spirometry, arterial blood gas (ABG) and changes regarding therapeutic strategies.
Results: There are 22 home medical appointments. Thirteen patients (59.1%) were female, mean age 63.32 years (SD 17.96). The main diagnoses were neuromuscular disease (n = 8), COPD+CRF (n = 7) and multifactorial CRF (n = 7). Most patients had motor dysfunction (n = 17) and some of them had cognitive impairment (n = 6). For patients with COPD and multifactorial CRF (n = 14), they presented dyspnea with a mMRC grade 2 (n = 1), grade 3 (n = 3), grade 4 (n = 10); hypoxemic CRF (n = 1) and hypercapnic CRF (n = 13). They were under NIV (n = 4), LTOT (n = 1), NIV+LTOT (n = 6) and high-flow nasal oxygen (n = 1). Medical doctor evaluation and pulse oximetry were performed for all patients. Spirometry was performed in 9 cases (mean of FEV1 34.33 ± 9.27%) and GSA in 10 cases (mean of PaCO2 46.10 ± 9.05 mmHg). Regarding patients with neuromuscular disease, most had motor (n = 6) and bulbar (n = 5) impairment. Three patients were NIV-dependent, with a mean use of 21.31 ± 3.07 h/day. Clinical evaluation and pulse oximetry were performed for all patients. In 7 cases, transcutaneous CO2 monitoring was performed (mean TcO2 37.57 ± 3.46 mmHg) and vital capacity and peak cough flow were measured in 6 patients (mean CV 2,508 ± 1,557 ml and mean PFT 206 ± 149 L/min). In general, medical appointments at home allowed decisions regarding therapeutic strategies in most patients, namely pharmacological changes (n = 10), change in ventilatory parameters (n = 7), indication de novo for NIV (n = 5), indication for PEG (n = 1) and indication for tracheostomy (n = 1).
Conclusions: Home medical appointments were effective, allowing the clinical and pulmonary function assessment of priority patients, as well as the change and implementation of new therapeutic strategies. It should be noted that patients were strictly selected, favoring home visits to patients with motor dysfunction, cognitive impairment and poor respiratory function, whose hospital displacement could be harmful

Keywords: *Home medical appointments. Effectiveness. Pandemic. COVID-19.*

CO 087. CHARACTERIZATION OF HOSPITALIZATIONS DUE TO COVID-19 IN A CENTRAL HOSPITAL - RISK FACTORS AND FINAL OUTCOME

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Introduction: The emergence of a new infectious agent presents important challenges at the clinical level, due to the lack of knowledge of the patients' clinical behavior. COVID-19, caused by infection with SARS-CoV-2, has a variable clinical spectrum, from asymptomatic infection to severe pneumonia that requires invasive mechanical ventilation. The identification of risk factors for adverse outcomes and the best approach for these patients is essential for better guidance for a second wave of the disease.
Objectives: To characterize the evolution and outcome of hospitalizations in our institution due COVID-19, during the first wave of the disease.
Methods: A retrospective analysis of the clinical records of all patients admitted between 1/3/2020 and 6/30/2020 to our institution due to COVID-19 was conducted. Demographic, clinical, analytical and radiological data were collected. The severity of COVID-19 was defined based on clinical criteria as mild, moderate, severe or critical. Statistical analysis was performed using IBM® SPSS® Statistics 25.
Results: In the analyzed period, a total of 221 patients, 108 (48.9%) men and 113 (51.1%) women, were hospitalized due to COVID-19. Mean age was 77.5 (± 17.5) years. Sixty-one (61; 27.6%) patients were considered to have mild disease, 35 (15.8%) moderate, 102 (46.2%) severe and 23 (10.4%) critical. Overall, mean hospital stay was 20 (± 20.3) days: mild cases lasted an average of 28.2 (± 26.7) days, moderate 13.7 (± 12.6), severe 15.3 (± 15.3) and critical 29.5 (± 19.7). There were statistically significant differences in the average length of hospital stay ($p < 0.01$). Overall, almost one third of patients died (71, 32.1%). Intra-group mortality was 6.6% for mild patients (4/61), 25.7% for moderate (9/35) and 51% for severe (52/102) and 26.1% for critics (6/23), with statistically significant differences in the proportion of deaths in the 4 groups ($p < 0.01$). One tenth of the patients (23; 10.3%) were admitted to the Intensive Care Unit (ICU). The mortality rate among these patients was 21.7% (5/23). There was no significant association between mortality and ICU admission ($p = 0.347$). Regarding laboratory findings, the mean C-reactive protein was 12.6 mg/dL (± 8.47), the high-sensitivity cardiac troponin I of 193.8 ng/L (± 630), the d-dimers of 1,578.3 ng/mL (± 644.5) and ferritin of 1600.5 ng/mL (± 959). There was only a positive correlation between the increase in d-dimers and mortality ($r = 0.283$; $p = 0.003$). We found no uniformity in the requests for blood tests between patients.
Conclusions: The mortality rate was high, about 1/3 of the patients. As expected, the highest mortality was found in the most severe and elderly patients. Only the increase in D-dimers was related to mortality, but differences in laboratory orders between patients limit the analysis. In addition, the lack of a clear definition of the severity of COVID-19, with several proposed models, hampers the comparison. Greater uniformity of action and a better and clearer definition of the criteria for disease severity will help us, in the future, to better characterize patients with COVID-19.

Keywords: *COVID-19. Intensive care unit. Critically ill patient.*

CO 088. INFLUENZA: CASE SERIES OF A TERCIARY CENTE IN THE WINTER OF 2018-2019

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Introduction: According to the Portuguese Influenza Epidemiologic Vigilance Report (Boletins de Vigilância Epidemiológica da Gripe), the peak incidence was registered in the first nine weeks of 2019, mostly affecting pacients aged 19 to 64 years. In the winter of 2018-2019, excluding intensive care units, only up to 2 pediatric wards were included in the national vigilance of influenza in hospitals, and none of adult patients.
Objectives and methods: To describe the population, epidemiologic context and outcome of patients with influenza, admited in an adult terciary center, from 12/18/2018 to 02/28/2019. Retrospective observational study, through consultation of discharge reports. Patients admitted in the intensive care unit were excluded.
Results: 351 patients were admitted with influenza, 44.7% of which were female. The average age was 70 years, ranging from 31 to 98 years old. The average duration of hospital stay was 10 days, ranging from 1 to 60 days. Virus influenza A was identified in all patients. 17.7% of patients acquired the infection during the hospital stay, the remaining at the community. The most frequent comorbidities were obesity in 34.2% of cases, followed by arterial hypertension in 28.5% and type 2 diabetes mellitus in 25.7%. All patients were treated with oseltamivir. 22 patients died (mortality rate 6.25%), all of which were more than 65 years old, and 10 of whom were more than 85 years old; all had at least one modifiable vascular risk factor. None of the patients who acquired the infection during the hospital stay died.
Conclusions: The influenza epidemiologic vigilance includes mostly data from primary care centers and laboratory data collected from admissions at the emergency department. The adult patients admitted with influenza lack representativeness, and so the influenza activity and its complications may be underestimated. The patients admitted at our center had an advanced average age, and there was a high prevalence of modifiable vascular risk factors. However, the mortality rate was low. A significant number of patients contracted the infection during the hospital stay, which demonstrates the importance of the preventive measures at the hospital.

***Keywords**: Influeza. Adult patients. Hospital.*

CO 089. CHRONIC PULMONARY ASPERGILLOSIS AND THE EFFECT OF CORTICOSTEROID THERAPY

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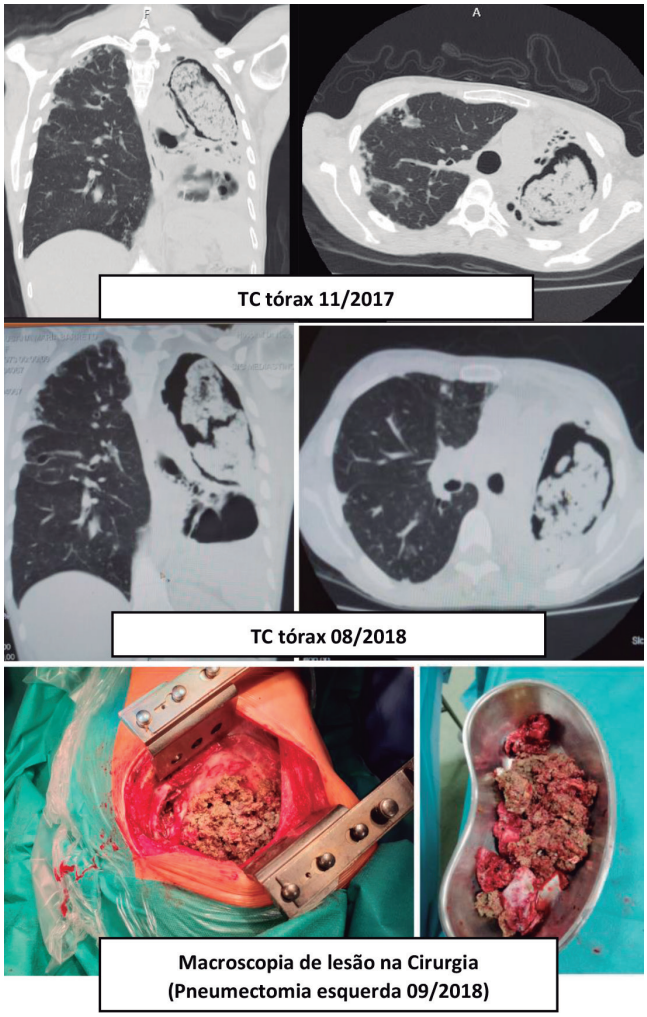
Introduction: Chronic pulmonary aspergillosis (CPA) is rare, usually affecting patients with some underlying lung disease, leading to the formation of air cavities in the middle of lung parenchyma. The most common form of CPA is chronic cavitary pulmonary aspergillosis, which presents as a single or multiple pulmonary cavities with thickened walls and with or without an aspergilloma. If not treated properly, it can progress into chronic fibrosing pulmonary aspergillosis, which is characterized by an extensive reduction in lung volume. These forms of aspergillosis, in contrast to invasive pulmonary aspergillosis, occur in patients who are not immunosuppressed, but can progress to subacute invasive aspergillosis if the patient is exposed to an immunosuppressant (as is the case of corticosteroid therapy).
Case report: We report the case of a 44-year-old woman with a personal history of bronchiectasis due to whooping cough in childhood. Followed in Pulmonology appointments since 2012, she had severe obstructive ventilatory alterations with forced expiratory volume in one second of 49%. In 2017, she is referred to an autoimmune diseases consultation due to a vasculitis in the lower limbs, whose study turned out to be negative except for the investigation of anti-neutrophil cytoplasmic antibodies (ANCAs - atypical pattern) of 1/160. She started steroid therapy in considerable doses, with a poor response, so she was submitted to pulses of Methylpredinolone 500 mg in the same context. Radiologically, there was an evolution of the chronic aspergillosis cavities and the patient started with intermittent fever, marked weight loss and progressive asthenia. Due to the isolation of Aspergillus fumigatus in several sputum samples and taking into account the clinical evolution, she started therapy with Itraconazole 200 1id in November 2017, which she maintained for six months. Despite the therapy, there was a clear worsening of the lesions with complete destruction of the left lung, so she was proposed for left pneumectomy. At the surgery, filling of the left pleural cavity with brown necrotic material with a foul smell was observed. There was no evidence of the existence of any pulmonary parenchyma. Pathological anatomy identified surgical fragments lined with epithelium corresponding to a re-epithelized cavitated lesion associated with the presence of fungal structures of the Aspergillus type. The microbiology of the surgical specimen identified Aspergillus fumigatus, as well as multiple bacterial strains (Klebsiella oxytoca, Staphylococcos aureus, Enterobacter cloacae).



Discussion: With this clinical case, the authors intend to revisit the clinical forms chronic aspergillosis can take. The same patient may evolve between several aspects of it, especially if there is an association with new immunosuppression status, as was the case of the patient we present in this case.

***Keywords:** Aspergillosis. Corticosteroids. Bronchiectasis.*

CO 090. ETIOLOGY, EVALUATION AND TREATMENT OF PATIENTS ADMITTED DUE TO HEMOPTYSIS AT A UNIVERSITY HOSPITAL

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Introduction: Hemoptysis causes vary according to the series and geographic location. The relative prevalence of causes is changing over time, therefore the evaluation and assessment of these patients is necessary. A conservative treatment is used in most cases, however bronchoscopy, angiography and surgery may be used in selected cases. We aimed to evaluate the causes, workup and treatment of patients admitted to hospital due to hemoptysis.
Methods: A retrospective cohort study was conducted at a central, teaching, university hospital. Patients admitted from 1st October 2012 to 30 September 2017 were evaluated. A total of 50 patients were excluded for reasons including: elective admission to perform arteriography, patient transferred from other patients for bronchoscopy/angiography, small volume hemoptysis not related to the cause of admission. The protocol was approved by the hospital's Ethics Committee.
Results: A total of 247 patients were evaluated. From the patients included (n = 197), 63.5% were male (n = 125), with a mean age of de 63.7 ± 17.0 years. Relating to medical history, 18.8% had COPD, 25.9% bronchiectasis, 15.7% tuberculosis sequelae, 18.8% heart failure and 11.2% atrial fibrillation. 42.6% were non-smokers, 33.5% former smokers and 23.9% active smokers. It was the first hemoptysis episode in 58.6% of cases (n = 111), on the other hand 12.2% (n = 24) had previously performed angiography with arterial embolization. Relating to potential risk factors, 23.9% were being treated with anti-platelet therapy (n = 44) and 14.4% with anti-coagulants (n = 28). Eighty-one patients (41.1%) described hemoptysis as medium volume, 40.6% (n = 80) as small volume and 15.7% (n = 31) as large volume. The main causes for hemoptysis were: bronchiectasis (28.9%), lung neoplasm (12.2%), pulmonary tuberculosis (10.0%), aspergillosis (10.0%) and iatrogenic (10.0%). Thorax CT scan was performed in 74.5% of patients (n = 144) and allowed to define the bleeding site in 41.5% of cases. The most frequent lobe affected by hemorrhage was the right upper lobe (RUL). Out of the 94 patients with identification of bleeding site, lung lobes were affected as follows: RUL (n = 25), left lower lobe (n = 24), right lower lobe (n = 21), left upper lobe (n = 20) and middle lobe (n = 8). Bronchoscopy was performed in 46.2% of patients, allowing bleeding site confirmation in 76.0% of cases. Most patients needed medical treatment only, 34.2% (n = 66) were submitted to bronchial angiography, which lead to arterial embolization in 78.8% of cases. Patients were discharged after 11 days (1-91), while 3.6% (n = 7) died during the hospital stay. There was recurrence on the first year of follow-up in 27.0% of cases.
Conclusions: The main causes of hemoptysis were bronchiectasis and lung neoplasm. More than 25% of patients were being treated with anti-coagulants or anti-platelet drugs. Mortality is reduced, however there is a high recurrence rate.

***Keywords**: Hemoptysis. Bronchiectasis. Lung cancer.*

CO 091. PNEUMONIA AND BRONCHOPNEUMONIA IN SUDDEN RESPIRATORY DEATH – THE STUDY OF A SERIES

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Introduction: Cardiovascular diseases are the most frequent etiology reported in sudden death. Yet, respiratory causes also play an important role. Thus, and because pneumonia remains the third leading cause of death in Portugal, the need to investigate its occurrence in a sudden and unexpected way of death emerges as a relevant issue.
Objectives: To identify the context of sudden death due to pneumonia and bronchopneumonia in a postmortem series.
Methods: A retrospective study of autopsies, consecutively executed during a 7 year-period in a Portuguese Institution, was performed; a selection of those cases in which anatomopathological study determined the presence of acute lobar pneumonia or acute neutrophilic bronchopneumonia was done. Consequently, the circumstantial and clinical data, provided by the request form for anatomopathological examination, was analyzed.
Results: From 737 patients who underwent autopsy, 342 (46.4%) presented with pneumonia and 395 (53.6%) bronchopneumonia. The mean age was 63.87 ± 19.8 years (range: 3 weeks to 97 years old). In the 521 male group, 251 had pneumonia and 270 bronchopneumonia diagnosis; in the 216 females, we counted 91 pneumonia cases and 125 bronchopneumonia cases. There was a higher prevalence of natural death etiological context (91.0%) when these pulmonary infections were acquired in the community versus a higher prevalence of acquired pneumonias at the hospital (82.1%) underlying violent etiological circumstances of death ($p < 0.001$). In this series, natural death was more frequent and occurred suddenly and unexpectedly, both in the pneumonia group (46.2%) and in the bronchopneumonia group (49.6%).
Conclusions: The substantial number of victims from sudden natural death due to pneumonia and bronchopneumonia provides a new dimension to non-cardiovascular causes and reinforces the importance of preventive measures to limit exposure to risk factors, control comorbidities, improve respiratory health of the Portuguese population and alert clinicians and citizens for early diagnosis and treatment.

***Keywords**: Sudden death. Pneumonia. Bronchopneumonia. Postmortem study.*

CO 092. GOOD PRACTICES FOR PREVENTION AND INFECTION CONTROL IN NON-INVASIVE VENTILATION ON HOSPITAL ENVIRONMENT

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Introduction: There is a lack of studies about implementation of Good Practices for Prevention and Infection Control in Non-Invasive Ventilation (GPPIC-NIV).
Objectives: To identify the knowledge and needs not covered of healthcare professionals within the scope of the GPPIC-NIV.
Methods: A nationwide self-administered questionnaire was conducted in Portugal through an electronic platform among health professionals between October and November 2019.
Results: 126 individuals answered, 71% female, mostly nurses (63%) and physicians (25%). Work in Public Hospitals (60%), Primary Health Care (18%) and Continued Care Units (14%). 57% belong to Prevention and Infection Control structures. 32% report that no exist written procedures or are unknown (33%). Most professionals never had training in GPPIC-NIV (57%), they are unaware of how often the interface is decontaminated (51%), the circuit (55%) or the ventilator (51%) and the products used in their cleaning. The bacteriological filter is always used for 70% of the inquiries, although 19% are unaware of the filter usage and 10% report that only some departments use filters. The filter change occurs with a high variability among the hospitals: each new patient (52%), every week (30%) or daily (11%). All individuals (100%) have considered the publication of recommendations about Good Practices for Prevention and Infection Control in Non-Invasive Ventilation on Hospital environment useful.
Conclusions: A significative variability and lack of knowledge in the practices of cleaning and decontamination of the devices used in NIV was identified. Specialized training should be promoted along with the publication of recommendations of GPPIC-NIV on Hospital Environment.

***Keywords**: Infection prevention. NIV. Respiratory infections.*

CO 093. DISEASE PROGRESSION IN F508DEL HOMOZYGOUS PERSONS WITH CYSTIC FIBROSIS TREATED WITH LUMACAFTOR/IVACAFTOR: INTERIM RESULTS OF A LONG-TERM SAFETY STUDY USING DATA FROM THE US CF FOUNDATION PATIENT REGISTRY

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Objectives: This ongoing 5-year safety surveillance study evaluates cystic fibrosis (CF) disease progression in F508del homozygous (F/F) persons with CF treated with lumacaftor/ivacaftor (LUM/IVA) in the real-world setting.
Methods: This interim analysis focused on 2,287 F/F persons with CF in the US CF Foundation Patient Registry treated with LUM/IVA for an average of 2.9 years (range: 1.2 to 4.0 years) by the end of Study Year 3 (2018). Outcomes were compared to a concurrent comparator population of 3,527 phenotypically similar persons with CF (genotype F508del/minimal function) with no prior history of CFTR modulator use. Outcomes included percent predicted FEV1 (ppFEV1), body mass index (BMI) and pulmonary exacerbations (PEx). Means and percentages were compared between LUM/IVA and comparator cohorts as appropriate; for continuous outcomes, change from pretreatment baseline in 2014 through 2018 was calculated.
Results: Mean change from baseline (95% confidence interval [CI]) in ppFEV1 was smaller in the LUM/IVA vs comparator cohort (-3.7 percentage points [pp] [-4.2 to -3.3 pp] vs -6.9 pp [-7.2 to -6.5 pp], respectively). Among those < 18 years old, BMI percentile increased by 1.7 pp (95%CI: 0.5 to 2.8 pp) in LUM/IVA but declined by 3.8 pp (95%CI: 2.9 to 4.7 pp) in the comparator cohort. Among adults, BMI (95% CI) increased more in the LUM/IVA vs comparator cohort (+0.8 kg/m^2 [0.7 to 0.9 kg/m^2] vs +0.2 kg/m^2 [0.1 to 0.3 kg/m^2], respectively). The percentage of LUM/IVA persons with CF with at least one PEx remained stable (≈37%) but increased among the comparator cohort (39.8% in 2014 to 48.3% in 2018). The mean number of PEx/year/person also remained stable among the LUM/IVA cohort (≈0.6) but increased among the comparator cohort (0.7 in 2014 to 1.0 in 2018).
Conclusions: This interim analysis identified no new safety concerns with LUM/IVA and showed that, relative to the untreated comparator cohort, LUM/IVA persons with CF had favourable changes over time in lung function, BMI and PEx. These data support the potential for LUM/IVA to modify CF disease progression with long-term use.
Funding and acknowledgements: Ana Ordaz is a non-author and will present on behalf of the authors. This study was supported by Vertex Pharmaceuticals Incorporated. Medical writing assistance was provided by Amos Race, PhD, of Articulate Science, and editorial assistance was provided by Beatrice Vetter-Ceriotti, PhD, of Complete HealthVizion, funded by the study sponsor.

Keywords: *Cystic fibrosis. F508del homozygous. Lumacaftor. Ivacaftor. CFFPR.*

CO 094. PREDICTIVE FACTORS IN THE RESPONSE TO NON-INVASIVE VENTILATION, IN AN EMERGENCY CONTEXT, IN A CENTRAL HOSPITAL

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Objectives: Identification of predictive factors in the outcome of patients undergoing non-invasive ventilation (NIV) in an emergency setting, in a central hospital, with the primary and secondary endpoint, the clinical status at discharge and at 6 months, respectively.
Methods: Retrospective observational study that included patients ventilated non-invasively by Pulmonology or with its support, in the different wards of the hospital, from 12/2016 to 05/2018. For the quantitative variables, the Student t test for independent samples or the Mann-Whitney test was applied to compare the values regarding the result at discharge and at 6 months, according to whether there was a normal distribution. Statistical significance was considered for a value of $p < 0.05$.
Results: Ventilation support was provided for 117 patients, with a predominance of males (59%; n = 69), mean age 72.4 ± 11.4 years. The most frequent comorbidities were arterial hypertension (HT) (62.4%; n = 73) and dyslipidaemia (41%; n = 48). About 37.4% (n = 44) were active smokers. It is noteworthy that some patients did not have complementary studies that allowed respiratory failure affiliation, so the reasons for ventilation were grouped into: acute on chronic respiratory failure (ACRF), exacerbation of COPD (COPD), acute lung oedema (ALO), pneumonia in immunosuppressed, palliative, weaning ventilation, neuromuscular disease (NMD) and trauma, with a predominance of the first 3 (34.2%, 23.9%, 17.1%, respectively). Most had type 2 respiratory failure (92.3%), with respiratory acidosis (75.2%). At discharge, 71.8% (n = 84) improved and the rest died (n = 33); at 6 months 53.6% (n = 45) were stable and the rest died (unknown in 16). In the comparison analysis of outcomes according to the presence of comorbidities, it was found: regarding the presence of hypertension, at discharge, 58 patients improved and 15 died; at 6 months 34 patients were stable and 28 died (p 0.021 and p 0.013 respectively); in the subgroup of patients with BMI > 25, at 6 months, 24 were clinically stable and 15 died (p 0.008). Regarding the reason for ventilation, at discharge, 22 patients with COPD, 30 with ACRF and 9 with NMD improved while 6 with COPD, 10 with ACRF and none with NMD died (p 0.002). At 6 months, the trend continued, except for NMD (p 0.032). At discharge, patients who had type 2 respiratory failure, compared to type 1, 82 improved and 26 died (p 0.002). In blood gas analysis prior to NIV, 75 patients with higher HCO3 values improved, with the remainder dying; the trend remained at 6 months (p 0.012 and p 0.021, respectively). There were no statistically significant differences in the remaining parameters evaluated.
Conclusions: High mortality is highlighted, which we associate with comorbidities and clinical severity. There was a better clinical response at COPD, ACRF, NMD and type 2 respiratory failure, in detriment of the others. Hypertension comorbidity was associated with improvement, possibly due to the effects of NIV on hemodynamic, allowing greater tolerability to it, just as high HCO3 was associated with improvement, favouring chronic conditions, findings to be explored later.

Keywords: *Non-invasive ventilation. COPD. Acute lung oedema. Respiratory failure.*

CO 095. EFFICACY OF LABORATORY ADAPTATION TO NON-INVASIVE VENTILATION PERFORMED ON PATIENTS WITH CHRONIC RESPIRATORY FAILURE IN AN OUTPATIENT SETTING

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Introduction: It is expected that the number of patients on chronic non-invasive ventilation (NIV) will continue to increase in the coming years. The adjustment of NIV parameters will have to take into account the delicate balance between the ability to provide adequate ventilatory support and the maintenance of comfort and the consequent therapeutic compliance of the patient. It is essential to have a hospital organization that allows these patients to be introduced to this ventilatory therapy in an outpatient setting, in a monitored environment and capable of providing a safe, effective adaptation and with the guarantee of acceptable therapeutic compliance.

Objectives: To evaluate the effectiveness of home NIV and therapeutic adherence in patients with chronic respiratory failure adapted to ventilatory parameters in a hospital ventilation laboratory in an outpatient setting.
Methods: Retrospective study that included all patients adapted to NIV (in assisted/controlled pressure cycling mode), at the ventilation laboratory of the University Hospital of São João during 2019 and who had a home NIV reassessment consultation up to 3 months after adaptation.
Results: Sample of 111 patients, 57.7% male and aged between 22 and 89 years. The average time of daily use of NIV was 6.75 ± 3.08 hours and the average time expressed as a percentage of days of use was 88.59 ± 20.19%. The following statistically significant differences were observed in the evolution of parameters between the time of final adaptation to NIV (t1) and the reevaluation consultation (t2): respiratory rate (15.90 ± 2.27 cpm versus 18.47 ± 4.50 cpm) (p <.001), nighttime SpO2 (87.06 ± 4.83% versus 92.15 ± 2.40%) (p <.001), AHI (33.50 ± 28.63 versus 4.75 ± 6.85) (p <, 001) and nighttime SpO2 < 90% (61.38 ± 36.42% versus 19.45 ± 26.44%) (p <, 001). There was no statistically significant difference in the evolution of TcCO2 (41.25 ± 8.01 mmHg versus 43.93 ± 7.69 mmHg) (p =, 106). 32 patients showed a need for ventilatory adjustment in the reevaluation (PS adjustment, increased number of NIV hours, adjuvant oxygen therapy or interface adjustment), most of whom had good adherence.
Conclusions: The strategy of ventilatory adaptation in a hospital ventilation laboratory in an outpatient setting allowed for adequate therapeutic adherence and a significant improvement in physiological parameters in patients with chronic respiratory failure. This study confirms the maintenance of ventilatory efficiency over time.

Keywords: *Adhesion. Effectiveness. NIV. Adaptation. Outpatient.*

CO 096. HOME NON-INVASIVE VENTILATION: WHAT CHANGED IN 5 YEARS?

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Introduction: Home non-invasive ventilation (HNIV) in patients with chronic respiratory failure is an evolving treatment over the past few years. With broadening of the criteria for ventilation initiation, there has been an increase of specialized appointment referrals.
Objectives: Casuistic review of the population followed up in "Pulmonology-HNIV" appointment in 2014 and 2019.

	2014 n=169	2019 n=364
Male gender n(%)	96 (56,8%)	190 (52,1%)
Mean age in years±SD	68±12	71±11
Follow-up time (median in months [IQR])	33 [41]	36 [43] Under HNIV 42 [51]
Main diseases responsible for ventilation		
COPD	61 (36%)	157 (43%)
OHS	40 (24%)	86 (24%)
Chest Wall disease	30 (18%)	60 (16%)
Neuromuscular disease	26 (15%)	41 (11%)
Others*	16 (9%)	19 (5%)

* Interstitial lung disease, Congestive heart failure, pneumonectomy and others
COPD - Chronic obstructive pulmonary disease; OHS - Obesity hypoventilation syndrome

Methods: Retrospective analysis of the population followed up in "Pulmonology-HNIV" appointment of a tertiary hospital in 2014 and 2019. Demographic characteristics, main diseases responsible for the need of ventilation and mortality in each year are described.
Results: In 2014, 510 appointments were performed, corresponding to 211 patients followed up, 80% of whom under HNIV; in 2019, 936 appointments were performed, corresponding to 425 patients followed up, 83% under HNIV. Regarding non-ventilated patients, around half of them did not have criteria for initiating HNIV, both in 2014 and 2019; 19% and 18% refused HNIV; and 7% and 8% were not ventilated due to poor tolerance, in 2014 and 2019 respectively. The mortality of patients under HNIV was 15% in 2014 and 12% in 2019. The following table describes the characteristics of ventilated patients:
Conclusions: In the last 5 years, there has been an increase in the number of patients being followed up in a specialized appointment and also chronically ventilated (having more than doubled) in all groups of diseases, particularly in COPD.

Keywords: *Home non-invasive ventilation.*

CO 097. CHEST WALL DISEASE- PROGNOSTIC FACTORS IN PATIENTS UNDER NONINVASIVE VENTILATION

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Introduction: Noninvasive ventilation (NIV) is used to treat chronic respiratory failure due to Chest wall diseases (CWD) because data indicate the relief of hypoventilation symptoms and prolonged survival. Factors such as $pCO_2 \geq 50$ mmHg after starting NIV and comorbidities appear to be poor prognosis factors.
Objectives: Clinical and functional characterization of patients with CWD and assessment of variables associated with the morbimortality of patients under home NIV.
Methods: Retrospective and descriptive study of patients with CWD followed-up in outpatient appointments over a ten-year period.
The statistical analysis was performed by appropriate methods using SPSS version 22.0.
Results: The sample included 38 patients with CWD under NIV with a mean age at diagnosis of 60.6 years, of which 50% were females. 65.8%, 31.6% and 2.6% had kyphoscoliosis, sequelae of pulmonary tuberculosis and fibrothorax, respectively. In these patients, NIV was started with a mean age of 63.8 and 44.7% in the context of acute respiratory failure. In functional characteristics, 52.6% and 42.1% had a restrictive and mixed ventilatory pattern, respectively. The average FVC and FEV1 were 45.6% and 40.3%. Patients with kyphoscoliosis had a lower mean age at diagnosis (56.1; $p < 0.01$) and more restrictive ventilatory patterns (64; $p = 0.043$) than patients with sequelae. After 10 years of follow-up, 9 patients had died (23.7%), 8 of which from respiratory causes and 1 from neoplasia. Patients who did not survive after 10 years had a higher mean age at diagnosis (70.1; $p = 0.045$) and at the beginning of NIV (74.3; $p < 0.01$) and a higher Charlson Index (3; $p < 0.01$) than surviving patients. No differences were found in terms of sex, underlying disease (kyphoscoliosis and PT sequelae), smoking habits, context of onset and mode of NIV, ventilatory pattern and functional and gasometric data and number of hospitalizations. Comorbidities measured using Charlson index and the use of NIV influence survival time. The risk of death increases about 2.12 times for each increase in the Charlson index and 6.80 times if the use of NIV is irregular.
Conclusions: The distribution of CWD was similar according to gender and more than half had kyphoscoliosis. Few studies have focused on the long-term effect of NIV as an effective treatment for respiratory failure in CWD and factors associated with mortality. Patients who did not survive after 10 years of age were older at diagnosis and at onset of NIV. Comorbidities and the use of NIV proved to be major prognostic factors in this study.

Keywords: *Noninvasive ventilation. Chest wall disease.*

CO 098. RELATIONSHIP BETWEEN SPIROMETRY PARAMETERS AND RESULTS OF NONSPECIFIC BRONCHOPROVOCATION IN PEDIATRIC AGE

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Introduction: Nonspecific bronchoprovocation tests allow the assessment of bronchial hyper-responsiveness to direct or indirect non-allergic stimuli, usually when there is clinical suspicion of asthma and normal spirometry (including absence of documented reversibility through bronchodilator test). It is known that the fractional exhaled nitric oxide(FeNO) test may predict the result of the nonspecific inhalation challenge test(NICT) with methacholine, but it is not universally available.
Objectives: Analyze whether spirometry parameters, although normal, differ depending on the positivity of NICT and whether it is possible to identify threshold values for spirometry parameters predictive of NICT positivity.
Methods: Retrospective study including all NICT with methacholine (N = 88) and respective baseline spirometry, performed on pediatric patients in a University Hospital Center, between March/2017 and March/2020. The computer program IBM® SPSS® Statistics was used for statistical analysis: Student's t-test, Mann-Whitney test, chi-square test, Fisher's exact test and analysis of Receiver Operating Characteristic(ROC) curves; significance (alpha) = 0.05.
Results: Amongst all the analyzed NICT, assuming PD20 (provocative dose of methacholine that causes a 20% decrease in FEV1) ≤ 0.96 mg as a criterion for positive NICT, 58% (n = 51) were negative (group 1, G1) and the remaining were positive (group 2, G2). Male patients: G1 = 27.5% (n = 14), G2 = 37.8% (n = 14) (p = 0.302). Mean age (years): G1 = 14.0, G2 = 13.8 (p = 0.721). Average body mass index (kg/m^2): G1 = 22.3, G2 = 20.3 (p = 0.039). Main clinical contexts: asthma (G1 = 41.2% [n = 21], G2 = 67.6% [n = 25], p = 0.014), rhinitis (G1 = 72.5% [n = 37], G2 = 75.7% [n = 28], p = 0.742), conjunctivitis (G1 = 9.8% [n = 5], G2 = 16.2% [n = 6], p = 0.516). In patients who underwent skin tests to common aeroallergens (44 patients in G1 and 35 patients in G2), there were no significant differences in sensitization to aeroallergens between G1 and G2. Both groups did not differ in the proportion of NICT performed in the Spring-Summer/Autumn-Winter seasons (in the Spring-Summer season, G1 = 47.1% [n = 24], G2 = 54.1% [n = 20], p = 0.517). In all the baseline spirometry parameters which were analyzed, all patients presented higher values than the lower limit of normal, according to reference equations of the Global Lung Function Initiative, GLI. No patient had a history of a positive bronchodilation test. All analyzed spirometry parameters were significantly lower in patients with positive NICT(G2) vs negative NICT(G1) - mean/median of spirometry parameters (values in percentage in FEV1/FVC and FEV1VC MAX parameters and percentage of predicted for the remaining values): FEV1 (G1 = 110.9%, G2 = 101.9%, p = 0.018); FVC (G1 = 108.9%, G2 = 102.4%, p = 0.006); VC MAX (G1 = 109.4%, G2 = 103.2%, p = 0.012); FEV1/FVC (G1 = 89.9%, G2 = 87.1%, p = 0.009); FEV1/VC MAX (G1 = 89.4%, G2 = 86.0%, p = 0.003); MEF 75 (G1 = 113.9%, G2 = 104.0%, p = 0.036); MEF 50 (G1 = 124.0%, G2 = 100.0%, p = 0.002); MEF 25 (G1 = 119.5%, G2 = 95%, p < 0.001); MMEF 75/25 (G1 = 111.0%, G2 = 90.9%, p = 0.001); PEF (G1 = 110.3%, G2 = 99.0%, p = 0.001). Among all these parameters, MMEF 75/25 showed the best discriminative performance of positive vs. negative NICT (area under the curve = 0.762, p < 0.001; MMEF 75/25 < 92.75% predicts a positive result in NICT with a sensitivity of 64.7% and specificity of 89.4%).
Conclusions: Despite the fact that the majority of patients undergoing NICT have a normal spirometry, we found that it is important to pay attention to small variations in its values, since they can predict positive results in NICT with methacholine. MMEF 75/25 was the parameter that showed the best ability to predict a positive NICT.

Keywords: *Bronchial hyperreactivity. Asthma. Spirometry. Nonspecific bronchoprovocation.*

CO 099. THE USE OF DIFFERENT EQUATIONS IN THE FUNCTIONAL ASSESSMENT BEFORE HEMATOPOIETIC CELL TRANSPLANTATION AND ITS IMPACT ON THE CALCULATION OF HEMATOPOIETIC CELL TRANSPLANTATION - SPECIFIC COMORBIDITY INDEX (HCT-CI)

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Introduction: Spirometry is an essential respiratory function test for the diagnosis and monitoring of ventilatory changes and for the assessment of pulmonary decline. Its interpretation results from comparing the values obtained with the values predicted for each individual according to reference equations. Hematopoietic cell transplantation despite its healing potential is associated with numerous complications. There are several risk scores capable of supporting the clinician in considering the risks and benefits of this therapeutic strategy. The HCT-CI is a widely used score. The presence and/or severity of lung disease is a criterion included in this score considering the predicted value of FEV1 or DLCO of the individual.
Objectives and methods: Retrospective study, which included all individuals who underwent spirometry as a functional pre-transplant evaluation of hematopoietic cells in the period between 2013-2019 in the respiratory function laboratory of a central hospital in the metropolitan region of Lisbon. Compare the predicted FEV1 values according to the ECSC and GLI equation using the t-test for paired samples and complemented with the Pearson correlation coefficient calculation. And assess the impact on the criterion called lung disease present in the HCT-CI score.
Results: Sample of 154 patients aged between 19 and 82 years old, mean of 54.26 years old (SD = 12.98), 86 (55.8%) male and mostly Caucasian (n = 137, 89, 0%), 16 (10.4%) African-Americans and one (0.6%) Asian. The global average height was 165.82 cm (SD = 10.27). The global mean value of FEV1 (pre-bronchodilation (BD)) was 2.79L (SD = 0.86). There was a statistically significant association between the values of% FEV1 (pre BD predicted according to the ECSC equation) and the values of% FEV1 (pre BD predicted according to the GLI equation), assessed by the Pearson correlation coefficient as very high (r =, 890; p <, 001) suggesting the existence of a linear association between the results of both equations. However, the values of% FEV1 (pre BD predicted according to the ECSC equation) were on average higher values (M = 97.25%; SD = 19.89), compared to the values of% FEV1 (pre BD predicted according to the GLI equation) (M = 92.49; SD = 15.58), with statistical significance, t (149) = 6.40 (p < 0.001). Applying the HCT-CI score (namely the criterion called presence and/or severity of lung disease) the prevalence of patients without lung disease in our sample was 80.5% by the ECSC equation and 77.3% by the GLI equation. Moderate lung disease had a prevalence of 9.1% using the ECSC equation and 13.6% using the GLI equation. Finally, severe lung disease represented 7.8% of the distribution using the ECSC equation and 8.4% of the distribution using the GLI equation.
Conclusions: By comparing the ECSC and GLI equations, it is demonstrated that the choice of the equation used can affect the criterion called lung disease, consequently having an impact on the HCT-CI score obtained and ultimately influencing the clinical decision.

Keywords: *Reference equations. ECSC. GLI. %FEV1. HCT-CI. Hematopoietic cell transplantation.*

CO 100. FORCED EXPIRATORY FLOW IN DIFFERENTIAL DIAGNOSIS OF IDIOPATHIC PULMONARY FIBROSIS AND CHRONIC HYPERSENSITIVITY PNEUMONITIS

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Introduction: Idiopathic Pulmonary Fibrosis (IPF) and Chronic Hypersensitivity Pneumonitis (HP) are severe diffuse lung diseases that arise in the population with similar demographic, imagiological and clinical characteristics. Its differential diagnosis can be challenging, often involving lung biopsy, which implies risks to the patient.
Objectives: To evaluate differences in ventilatory parameters of patients accompanied in Interstitial Lung Disease consultation, with the diagnoses of IPF and HP. Determine functional values with high specificity and sensitivity to the differential diagnosis between these pathologies.
Methods: Retrospective analysis of demographic parameters and respiratory function of patients with IPF and PH. Statistical analysis of the data using the IBM SPSS Statistics® software.
Results: 49 patients were analyzed, 25 with IPF and 24 with PH. The average age was 71.8 years at FPI and 70 years at HP. The majority of patients with IPF were men (88%, n = 22), compared to 54.2% (n = 13) with PH. The values of %FEV1 (85.7% vs 86.9%), %FVC (77.3% vs. 84.7%) and FEV1/FVC (0.86 vs 0.82) were not significantly different between the pathologies. On the other hand, DLCO (39.4% vs 67.7%) was significantly different in IPF vs. HP ($p < 0.001$), as well as KCO (61.2% vs. 91.8%, $p = 0.001$). Forced expiratory flows (FEF) proved to be differentiating variables between FPI and HP. FEF at 25% of forced vital capacity (7.2L/s vs 5.7L/s, $p = 0.007$), 50% (3.9 vs. 2.8 L/s, $p = 0.006$) and 25% (0.81L/s vs 0.59L/s, $p = 0.031$) were different between IPF and HP. The intermediate expiratory flow 25-75% was also different (2.6L/s in IPF vs 1.8L/s in PH, $p = 0.008$). The FEF50/FEF25 ratio, on the other hand, did not appear to differ between the pathologies.
Conclusions: In a patient with pulmonary fibrosis, in which differential diagnosis between IPF and HP can be challenging, forced expiratory flows may be a determinant parameter in establishing a definitive diagnosis, leading to earlier initiation of specific therapy, and thus improving the prognosis. HP appears to run at lower forced expiratory flows. On the other hand, DLCO appears to be lower in IPF, which is in line with what was previously described for these pathologies.

Keywords: *Forced expiratory flow. Lung fibrosis. Lung function.*

CO 101. 6 MINUTE WALK TEST EQUATIONS - THE IMPACT OF A NEW EQUATION DERIVED FOR THE PORTUGUESE POPULATION

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Introduction: The 6 minute walking test (6MWT) is widely used to assess exercise tolerance in patients with cardiopulmonary disease. The walking distance measured in the test, as it primary outcome, reflects the capacity to undertake day-to-day activities. Numerous reference equations were calculated throughout the time to predict and assess normality in different groups of individuals, in which its determinants are mainly independent variables such as age, sex, weight, height and body mass index. Recently, Oliveira et al. published the first equation derived from a group of healthy Portuguese individuals aged 18-70 years old, which is a first step to standardize an equation for all Portuguese population. Our study aims to test this equation in a group of multicomorbidity real-world cohort and compare its results with other different and popular equations.
Methods: We conducted a retrospective analysis in 302 multicomorbidity subjects that performed the 6MWT from January to July, 2019 in a Lisbon respiratory physiology laboratory, and compared its performance in the walking distance under Enright et al., Casanova et al. and Oliveira et al. equations, for different groups of pathologies.
Results: Oliveira et al. equation consistely predicted greater distances for both men and women. The mean 6MWDpred was 581 meters (SD = ± 36) in men and 523 meters (SD = ± 45) in women which represented an overestimation of, respectively 63 and 31 meters when compared with the Casanova 2001 equation, and 130 and 67 meters when applied the Enright 2003 equation. Subsequently, the predicted distance ratio under Oliveira et al equation was consistely inferior to the other equations, reaching statistical significance in the subgroup of men, with average values of less 8% and 19% of predicted distance ratio, under confidence intervals, respectively to the Casanova et al. and Enright et al. equations. These differences were also significative when applied in the subgroup of men with COPD, reaching averages of less 9% and 23%, when comparing the same equations.
Conclusions: It is widely known that different equations, standardized for different groups of population, tend to result in a significant variability in the predicted walking distance, and therefore, in the assessment and categorization of functional impairment. The results of this study show how the new Portuguese equations were representative of an aggravation in functional impairment previously determined by other equations, especially in the subgroup of men. This study addresses the need to standardize these equations for laboratories that have the same demographic basis, in order to stratify severity and disability under the same spectrum.

Keywords: *6 minute walk test. Casanova. Oliveira. Enright. Walking distance. Predicted distance.*

CO 102. METHACHOLINE BRONCHIAL CHALLENGE TEST– IMPACT OF THE DIFFERENT CALCULATION METHODS AND CLASSIFICATION

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Introduction: The Methacholine Bronchial Challenge Test (MBCT) assess the presence and degree of airway hyperresponsiveness. MBCT is appropriate to confirm a suspected diagnosis of asthma if there is no demonstration of reversible airflow obstruction and to evaluate the response to therapy. The MBCT protocol has been changing over the years, since the use of methacholine concentration (PC20) from 1999 ATS guideline and further actualization upon the delivered dose of methacholine (PD20), which could be calculated from different equations. Additionally, different severity classifications have been published, making it difficult to standardize the results.
Objectives: 1) Characterization of positive MBCT population; 2) Analysis of the impact of the PD20 calculation according to the ATS_1999/ERS_2017 logarithmic and Juniper EF et al. non-logarithmic formulas; 3) Analysis of the impact of the use of the cumulative vs effective methacholine dose; 4) Categorisation of airway response to methacholine according to the different published classifications (Neuparth N. e ERS_2017).
Methods: Retrospective analysis of positive MBCT (FEV1 fall ≥ 20% compared with basal FEV1), performed in Unidade de Fisiopatologia Respiratória of HSM from 2016 to 2018. Antropometric (gender, age, height, weight) and functional (baseline FEV1(L), after saline diluent and after the 5 protocol doses - ATS_1999) characterization.

Severity Classification (%)	ATS_1999/ERS_2017		Juniper EF *et al.*	
	Neuparth N.	ERS_2017	Neuparth N.	ERS_2017
Normal	-	46	-	50
Very Mild/ Borderline	33	28	37	28
Mild	31	17	31	15
Moderate	30	9	27	7
Marked	6	-	5	-

Table I. Categorisation of airway response to methacholine according to Neuparth N. and ERS_2017 Severity Classifications and according to logarithmic (ATS_1999 / ERS_2017) and non-logarithmic (Juniper EF *et al.*) calculation formulas.

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Statistical analysis were performed with Excel® and GraphPad Prism5®.

Results: 1) 200 positive MBCT were included, 67% from females, mean age of 37.3 ± 14.4y (min 15, max 90), mean BMI of 26.4 ± 5.8 (2% low weight, 47% normal, 28% overweight, 15% obesity I, 6% obesity II, 2% obesity III) and baseline FEV1 of 3.2 ± 0.7L (min 1.45, max 5.5). Challenges were positive at the 4th or 5th methacholine dose in 54% of times; 2) PD20 calculation using the non-logarithmic and logarithmic formula showed no statistically significant difference (2.6 ± 2.3μmol vs 2.4 ± 2.2μmol, respectively); 3) A significantly higher PD20 value was obtained with the cumulative dose compared to the effective dose, either with the application of the ERS_2017 equation or the equation of Juniper EF (p = 0.024 and p = 0.022, respectively), with no difference, however, in the severity classification; 4) Compared to the Neuparth classification, the application of the ERS_2017 classification results in less severity (Table), with only 4% of the MBCT maintaining the degree of hyperresponsiveness determined by the Neuparth N. classification and 46% of the MBCT were now classified as normal.

Conclusions: Regarding the different points under analysis, in this study: 1) there was no significant difference in the PD20 values obtained using the ATS_1999/ERS_2017 and Juniper EF equations; 2) Despite higher PD20 values using the cumulative dose, this difference did not determine a difference in the severity classification; 3) The application of the ERS_2017 classification, compared to the Neuparth N. scale, significantly reduced the severity and number of positive MBCTs (according to PD20 and not the drop in FEV1). In summary, the authors conclude that given the major value of MBCT in excluding a diagnosis of current asthma, the choice and interpretation of the classification scale must be judicious and mentioned in the report, since it has an important clinical impact.

***Keywords**: Methacholine. Airway hyperresponsiveness. PD20.*

CO 103. METHACHOLINE BRONCHIAL CHALLENGE TEST- EVALUATION OF POST-DILUENT VARIABILITY

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Introduction: The Methacholine Bronchial Challenge Test (MBCT) assess the presence and degree of airway hyperresponsiveness. MBCT present a high negative predictive value is appropriate to confirm a suspected diagnosis of asthma if there is no demonstration of reversible airflow obstruction and to evaluate the response to therapy. The MBCT protocol has been changing over the years, The PBM protocol has changed over time according to technological developments. Spirometry should be performed after nebulization with diluent/saline solution prior to methacholine, to ensure there is no excessive airway hyperresponsiveness. ERS 2017 recommendations indicate that if a patient presents a post-diluent FEV1 decreased by 10–20%, could be considered too unstable to continue the challenge and should be rescheduled. Nevertheless, there is no consensus to what attitude to adopt.

Objectives: 1) Characterization of the subpopulation with positive MBCT with a post-diluent/saline solution FEV1 decrease ≥ 10%; 2) PD20 calculation using the logarithmic formula and interpretation according to ERS_2017.

Methods: Retrospective analysis of positive MBCT (FEV1 fall ≥ 20% compared with basal FEV1), performed in Unidade de Fisiopatologia Respiratória of HSM from 2016 to 2018. Antropometric (gender, age, height, weight) and functional (baseline FEV1(L), after saline diluent and after the 5 protocol doses - ATS_1999) characterization. Statistical analysis was performed with Excel® and GraphPad Prism5®.

	Gender	Age	BMC	Baseline FEV1 (L)	FEV1 fall after saline solution (%)	PD20$_{ERS2017}$	Severity Classification$_{ERS2017}$
1	f	21	25	3,37	10	0,35	Mild
2	m	41	27	2,81	11	0,58	Borderline
3	f	58	24	2,61	10	5,09	Normal
4	f	64	30	2,03	12	0,09	Moderate
5	f	50	46	2,35	12	0,43	Mild
6	f	30	20	2,99	10	0,55	Borderline
7	m	39	31	3,81	11	2,14	Normal

Table I. Anthropometric and functional description of MBCT with a drop in FEV1≥10% after saline solution.

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Results: 1) There was a decrease in FEV1 ≥ 10% after saline solution in 7 out of 200 (3.5%) positive MBCT, 5 were females (Table I). Mean age of 43.3 ± 15.2 years (min 21, max 64), mean BMI of 29 ± 8.4 (2 normoponderal, 2 overweight, 2 obesity I, 1 obesity III) and baseline FEV1 of 2.9 ± 0.6L (min 2.03, max 3.81). The drop in FEV1 after saline was 10.86 ± 0.9% (min 10, max 12). The end of the challenge occurred in the 2nd dose in 1 individual, in the 3rd dose in 4 individuals, in the 4th dose and in the 5th dose in 1 individual. 2) Through the calculation using the logarithmic formula, an average PD20 of 1.32 ± 1.8 μmol was found, interpreted according to the ERS_2017 categorization as: normal, borderline and mild in 2 individuals and 1 moderate in 1 individual.

Conclusions: The number of individuals presenting a decreased of FEV1 ≥ 10% after saline solution is similar to the published in the literature. Despite the limited number of individuals, we found that this subgroup presents an average age and a BMI slightly higher than that observed in the population of 200 individuals with positive PBMs and a lower value of PD20, with an earlier end of the challenge. There were no complications during the procedure.

Keywords: *Methacholine. Airway hyperresponsiveness. PD20. Saline solution.*