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CO 001. IMPACT OF PERCUTANEOUS ENDOSCOPIC GASTROSTOMY AND NON-INVASIVE VENTILATION ON THE SURVIVAL OF AMYOTROPHIC LATERAL SCLEROSIS PATIENTS

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Introduction: Percutaneous endoscopic gastrostomy (PEG) and non-invasive ventilation (NIV) are part of the respiratory management of amyotrophic lateral sclerosis (ALS) patients. The best time for its initiation, in order to have the greatest impact on survival, is under investigation.
Objectives: To evaluate the impact of PEG and NIV in ALS patients' survival.
Methods: Post-mortem review of the medical records of ALS patients.
Results: A total of 24 patients, most with spinal presentation (15; 62.5%), were evaluated. Median diagnostic delay, defined as time elapsed between symptom beginning and ALS diagnosis, was 12 (IQR 17) months; and median survival, defined as time between diagnosis and death, was 26.5 (IQR 38) months. A PEG-tube was inserted in 11 individuals (45.8%). There was a non-significant correlation between PEG and survival ($r = 0.145$; $p = 0.498$); but a statistically significant moderate negative correlation between delay in PEG and overall survival ($r = -0.645$; $p = 0.044$). Twenty-two (22) individuals were treated with NIV (91.7%), all with bi-level positive pressure. There was a non-significant correlation between NIV and survival ($r = 0.316$, $p = 0.132$); but a statistically significant strong negative correlation between time until NIV and overall survival ($r = - 0.932$; $p < 0.05$). There were no statistically significant group differences between spinal and bulbar patients regarding age at diagnosis and death, diagnostic delay, survival, and PEG and NIV usage (respectively, $p = 0.653$; $p = 0.619$; $p = 0.379$; $p = 0.926$; $p = 0.113$; $p = 0.511$).
Conclusions: The small sample limited our analysis, but our results suggest that early PEG and NIV could have a potential benefit in ALS patients' survival.

Keywords: *Amyotrophic lateral sclerosis. Percutaneous endoscopic gastrostomy. Non-invasive ventilation. Survival.*

CO 002. IMPACT OF VENTILATORY SUPPORT ON THE BURDEN OF INFORMAL CAREGIVERS OF PATIENTS WITH AMYOTROPHIC LATERAL SCLEROSIS

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Introduction: Amyotrophic lateral sclerosis (ALS) is a rare neurodegenerative disease that affects motor neurons, often culminating in the patient's total physical dependence on his informal caregiver (IC). This, in turn, ends up exposing the IC to various risks and potential causes of stress. The absence of ventilatory support (VS) that these patients need can represent a potential burden for their caregivers.
Objectives: To evaluate the burden of ICs of patients with ALS and how ventilatory support influences this burden.
Methods: Cross-sectional descriptive study of a consecutive series of patients with ALS and their ICs, observed in home ventilation appointments from the Pulmonology service of a district hospital, between December 2020 and May 2021. Two questionnaires were applied: Zarit Burden Interview and a sociodemographic/technical questionnaire.
Results: Of the 28 patients with ALS, only 2 didn't have IC (7%). 50% of ICs reported being professionally active and none of them has informal caregiver status. Only 15% of ICs reported no burden, while 39% moderate burden, 42% moderate to severe burden and 4% severe burden. The advanced age of ICs was an indicator for greater burden ($p = 0.029$). No statistically significant differences were found between groups regarding the presence of VS ($p = 0.386$). About 86% of patients had respiratory therapies at home, and all ICs considered them an asset in their daily lives, agreeing that there was an improvement in respiratory symptoms after the outset of respiratory therapies (100%). After the initiation of VS, 39% of the ICs did not report more tiredness than usual, 45% said they slept the same way, however, they felt safer to provide care at home (61%).
Conclusions: In this study it was found that 46% of ICs of ALS patients have moderate to severe or severe overload. Nevertheless, there was no association between the degree of this burden and the need to provide ventilatory support care.

Keywords: *Amyotrophic lateral sclerosis. Informal caregiver. Ventilatory support.*

CO 003. FOLLOW-UP OF PATIENTS WITH CHRONIC RESPIRATORY FAILURE DURING THE COVID-19 PANDEMIC – EXPERIENCE OF TELECONSULTATION IN A NIV UNIT

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Introduction: Patients with chronic respiratory failure are at high risk of contracting severe forms of SARS-CoV2 infection. The COVID-19 pandemic was a challenge to find models that ensure the adequate follow-up of chronic patients, avoiding travel to hospitals.
Objectives: To evaluate the activity performed by teleconsultation in the NIV Unit of a Pulmonology Service of a University Hospital during the first year of the Covid-19 pandemic.
Methods: Retrospective cohort study based on consultation of the clinical files of patients evaluated by teleconsultation in the NIV Unit during the first year of the Covid-19 pandemic.
Results: A total of 636 telephone consultations were carried out at the NIV Unit. Patients were mostly male (58.2%; n = 370) with a mean age of 73.6 ± 11.5 years. Regarding the pathologies that contributed to the need for ventilation therapy, most were OSAS (63.7%; n = 405), followed by COPD (26.3%;n = 167), heart failure (20.9%; n = 133), central apnea syndrome (18.4%;n = 117) and HOS (9.3%; n = 59).Regarding the therapy performed, 41% (n = 261) performed CPAP, 39.3% (n = 250) performed BPAP and 19.3% (n = 123) performed servo ventilation. The vast majority of patients had no complaints at the time of the teleconsultation (83.3%; n = 530).The most common complaints were tiredness/aggravated dyspnea (4.9%; n = 31), followed by lack of motivation (3.1%; n = 20), high leakage (2.8%; n = 18), poor adaptation to the mask (1.3% ;n = 8), anxiety (0.9%;n = 6), pressure intolerance (0.9%; n = 6) and dryness of the oral mucosa (0.9%;n = 6). It should be noted that 1.1% (n = 7) refused to maintain ventilation therapy. In all teleconsultations, the adherence and efficacy report was requested, with most patients having good adherence, longer than 4 hours (95.9%; n = 610). In all consultations, the need for adherence was reinforced. Night oximetry was scheduled in 20.7% of cases (n = 189), interface changes were performed in 5.3% (n = 34) and humidification adjusted in 1.1% (n = 7).
Conclusions: The teleconsultation allowed for close monitoring of patients in need of NIV, without exposing them to the inherent risks of the hospital environment. It also allowed adjustments to be made to ventilation therapy in order to improve patient adaptation and comfort. Teleconsultation can be a consultation model that is here to stay.

***Keywords**: Chronic respiratory failure. COVID-19 pandemic. Teleconsultation.*

CO 004. BRONCHIECTASIS AND NEUROMUSCULAR DISEASES - A CHALLENGING ASSOCIATION

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Introduction: Bronchiectasis is an irreversible condition characterized by dilation of bronchi. The cardinal symptom of bronchiectasis is chronic cough and the treatment goal is to prevent exacerbations, reduce symptoms, improve quality of life and stop disease progression. On the other hand, in neuromuscular diseases, especially progressive ones such as Amyotrophic Lateral Sclerosis (ALS), the dysfunction of the respiratory muscles is inevitable and it can cause respiratory failure, pneumonia, sleep disordered breathing and death.
Objectives: Description of 5 patients followed on the pulmonology outpatient clinic with 2 concomitant diseases: bronchiectasis and a neuromuscular disease with respiratory involvement.
Methods: Retrospective analysis. Analytical data were collected from January/2020 to June/2021. The Peak Cough Flow (PCF), Vital Capacity (VC), the use of air-stacking manoeuvres, the use of cough-assist (CA) and the use of Non-Invasive Ventilation (NIV) were evaluated.
Results: 5 patients were included (3 females, 2 males) with a median age of 53.2 years-old (minimum 24, maximum 72). The table 1 shows the clinical features of the patients. All patients have different neuromuscular diseases: Multiple System Atrophy Coalition (MSA-C), Multiple Sclerosis, ALS, Severe axonal neuropathy and Paraneoplastic myopathy. The most common bronchiectasis etiology is sequelae from previous TP infection (2 patients), one patient has cystic fibrosis, one patient has Common variable immunodeficiency and one patient doesn't have a definitive etiology. Chronic infection was present in two patients with MSSA isolate in sputum of one patient and *K. pneumoniae* and *P. aeruginosa* in the other one. The mean PCF measured was 207.5 L/min (excluded one patient due to lack of cooperation). The two patients that had PCF less than 270 L/min (mean 115 L/min) started air-stacking manoeuvres and we measured PCF in maximum inspiratory capacity (MIC) with a mean of 200 L/min. One of these two patients is also using mechanical insufflation-exsufflation 2 times daily (+40/-40 cmH2O) with clinical improvement and functional stability. The Forced Vital Capacity (FVC) was also measured with a mean of 1,987,5 mL (one patient was excluded due to lack of cooperation). The two patients with air-stacking manoeuvres were also measured in their MIC with a mean of 3,250 mL, showing a 173% improvement in one patient and 258% improvement in the other. We also evaluated the use of NIV and one patient didn't adapt to BiLevel S/T, two patients use nocturnal BiLevel S/T and one patient is dependent on NIV 24 hours of the day (nocturnal BiLevel S/T and diurnal MPV with mouthpiece).
Conclusions: For our knowledge, there are very few case-reports of bronchiectasis patients that also have neuromuscular diseases. The management of these two concomitant conditions is a great challenge. Airway clearance techniques, a key feature in treating bronchiectasis, will be compromised due to the inevitable strength loss of the respiratory muscles associated with some Neuromuscular Diseases, and increasing ventilatory dependence will impair pulmonary toilet.

***Keywords**: Bronchiectasis. Neuromuscular diseases. Cough-assist. Non-invasive ventilation.*

CO 005. THE S3-NON-INVASIVE VENTILATION QUESTIONNAIRE IN VOBESITY-HYPOVENTILATION SYNDROME PATIENTS WITH HOME MECHANICAL VENTILATION

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Introduction: The S3-non-invasive ventilation (S3-NIV) questionnaire comprises 11 items, 5 referring to respiratory symptoms, 2 referring to sleep and 4 referring to adverse effects related to non-invasive ventilation (NIV). It ranges from 0 (highest impact of disease/treatment) to 10 (smallest impact of disease/treatment). It is a simple and easy-to-use questionnaire for evaluating patients under NIV, in daily clinical practice.
Objectives: The aim of this study was to evaluate the respiratory symptoms, sleep and side effects of patients with obesity-hypoventilation syndrome (OHS) under NIV through the application of the S3-NIV questionnaire.
Methods: The S3-NIV questionnaire was applied to patients with stable OHS under NIV for more than 1 month, followed in an outpatient clinic of a tertiary hospital.
Results: A total of 64 patients with OHS were included. The patient's characterization is summarized in Table 1, while the results of the S3-NIV questionnaire are documented in Table 2.

Male	18 (28.1)
Age, years	68.6 ± 12.9
Body mass index, Kg/m^2	42.9 ± 8.1
Months with HMV	27.5 [14.0-67.5]
Adhesion to HMV, hours/day	7.5 [6.0-9.0]
$PaCO_2$, mmHg	41.9 (4.1)
HCO_3^-, mmol/L	26.4 (3.5)
FEV1, % predicted	72.0 [59.0-85.0]
FVC, % predicted	73.0 [63.0-84.5]
IPAP, cmH_2O	21.5 [18.0-24.0]
EPAP, cmH_2O	8.0 [8.0-10.0]
Back up respiratory rate, cpm	15 (1.6)

Table 1. Characterization of patients with obesity-hypoventilation syndrome and their non-invasive ventilation parameters. Results are presented as n (%), mean ± SD, or median [interquartile range]. Abbreviations: FVC, forced vital capacity; FEV1, forced expiratory volume in one second; HMV, home mechanical ventilation; EPAP, expiratory positive airway pressure; IPAP, inspiratory positive airway pressure.

Figure CO 005A

	S3- NIV questionnaire - total score	Respiratory symptoms subscore	Sleep & NIV related side effects subscore
Obesity-hypoventilation syndrome	7.6 [6.6-8.6]	7.5 [6.0-9.2]	7.7 [6.7-9.2]

Table 2. Results of the S3 questionnaire for non-invasive ventilation (S3-NIV) for patients with hypoventilation-obesity syndrome. Results documented as median [interquartile range].

Figure CO 005B

Conclusions: The majority of patients with OHS under NIV show high adherence to treatment. When analyzing the results of the S3-NIV questionnaire, we found that both the total score and the score for the different dimensions are high (≥ 7.5), demonstrating that patients recognize the subjective benefits of home mechanical ventilation and have controlled side effects.

Keywords: *S3-non-invasive ventilation questionnaire. Non-invasive ventilation. Obesity-hypoventilation syndrome.*

CO 006. PATIENT REPORTED OUTCOME MEASURES IN HOME NON-INVASIVE VENTILATION – ARE THERE SEX DIFFERENCES?

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Non-invasive ventilation (NIV) has numerous benefits widely documented, but not always easy to monitor. The S3 questionnaire for NIV (S3-NIV) is an objective tool that assesses respiratory symptoms, sleep and side effects of NIV. The aim of this study is to look for differences in adaptation to NIV, determined through the S3-NIV, between individuals of different sexes with the same underlying disease. The S3-NIV ranges from 0 (highest impact of disease/treatment) to 10 (lower impact of disease/treatment). The S3-NIV was applied to stable patients under NIV for ≥ 1 month, followed up on an outpatient clinic at a tertiary hospital. A total of 234 patients were included, 126 (53.8%) of whom were male. The patients' characterization is documented in the tables, while the results of the S3-NIV, described according to the underlying disease and sex, are illustrated in figures. Adherence to NIV is high in all groups (although it is lower in interstitial lung disease). Male patients had higher S3-NIV scores, reflecting a lower impact of the disease and/or treatment, except for the group with chronic obstructive pulmonary disease. The differences are mainly based on the results in the dimension "sleep and side effects of NIV", which alerts to the importance of managing these problems during adaptation to NIV, that, in our population, are more evident in females.

Keywords: *Non-invasive ventilation. S3-niv questionnaire. Sex.*

Table 1. Patients' characteristics and their compliance to non-invasive ventilation.

Categories	OHS (n=64)	COPD (n=62)	COPD+OSAS (n=51)	CWRD (n=38)	NMD (n=15)	ILD (n=4)
Male sex	18 (28.1)	39 (62.9)	37 (72.5)	23 (60.5)	7 (46.7)	2 (50.0)
Age, years	68.6 ±12.9	71.6 ±8.6	69.6 ±7.9	68.0 ±12.7	63.7 ±14.7	73.8 ±4.6
BMI, Kg/m²	42.9 ±8.1	27.4 ±5.0	34.8 ±6.1	25.3 ±6.3	28.9 ±6.7	25.0 8.2
Time on NIV, months	27.5 [14.0-67.5]	38.0 [10.5-60.5]	36.0 [15.0-96.0]	57.0 [19.5-82.5]	18.0 [7.5-47.3]	20.0 [4.0-52.5]
Compliance, hours/day	7.5 [6.0-9.0]	8.5 [7.0-10.1]	8.0 [6.4-9.0]	8.0 [6.0-9.0]	8.5 [6.2-11.0]	4.3 [3.0-6.8]

Abbreviations: OHS, obesity hypoventilation syndrome; COPD, chronic obstructive pulmonary disease; OSAS, obstructive sleep apnea syndrome, CWRD, chest Wall restrictive disease; NMD, neuromuscular disease; ILD, interstitial lung disease; BMI, body mass index; NIV, non-invasive ventilation.

Data are presented as n (%), mean ± DP or median [interquartile range].

Figure CO 006A

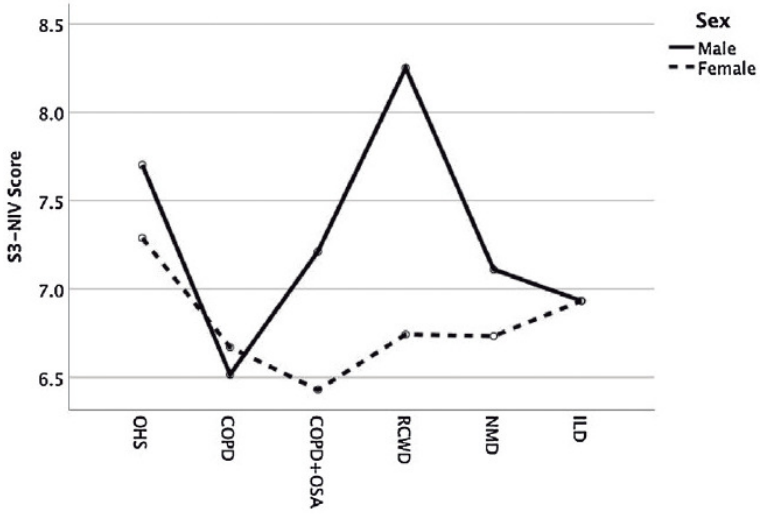

Figure 1. Differences in S3-NIV total score according to disease groups and sex.

Figure CO 006B

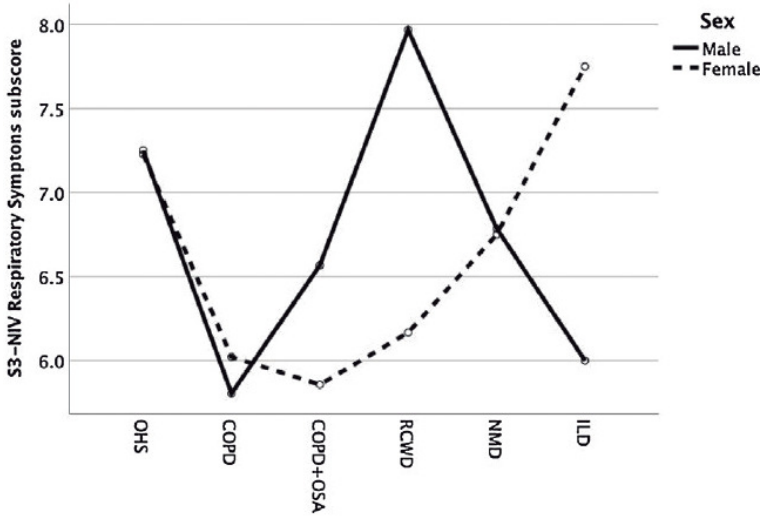

Figure 2. Differences in S3-NIV respiratory symptoms subscore according to disease groups and sex.

Figure CO 006C

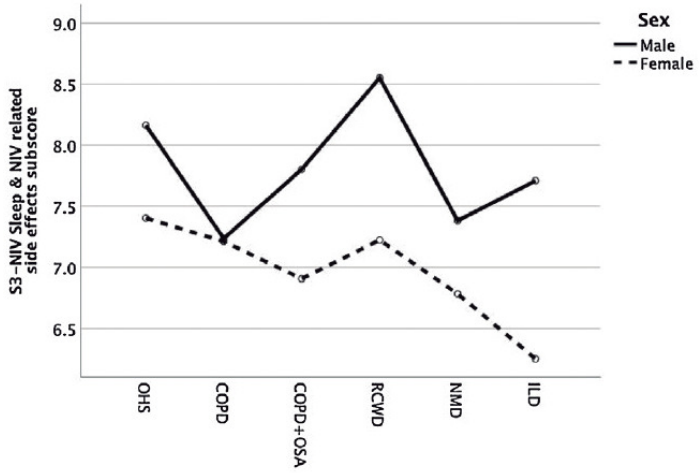

Figure 3. Differences in S3-NIV sleep & NIV related side effects subscore according to disease groups and sex.

Figure CO 006D

CO 007. HOME MECHANICAL VENTILATION IN NEUROMUSCULAR DISEASE – EXPERIENCE OF AN ADULT PULMONARY NEUROMUSCULAR CLINIC

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Introduction: Neuromuscular diseases have varied clinical behaviors and cause progressive muscle atrophy and weakness, with possible repercussions on the respiratory muscles and, thus, respiratory functional compromise with the need for complex home mechanical ventilation and assisted coughing. The Pulmonary Neuromuscular Clinic(PNC) of the Integrated Responsibility Center for Sleep and Non-Invasive Ventilation of the University Hospital Center of São João(CRI Sono/VNI CHUSJ) has a long experience in the follow-up of respiratory neuromuscular patients.
Objectives: To characterize the PNC of CRI Sono/VNI CHUSJ regarding the patients under follow-up and evaluation protocols.
Methods: Retrospective review of information in the electronic clinical records of all the patients with at least one PNC consultation in 2020 (N = 231). For each patient analyzed, the clinical situation at the time of the last PNC consultation of 2020 was considered. The research project was approved by the Ethics Committee of the CHUSJ.
Results: In the patients under follow-up, there was a predominance of men (57.6%, n = 133) and a mean age of 51 years (minimum 17, maximum 83). The most frequently found neuromuscular diseases are: amyotrophic lateral sclerosis (ALS) (26.4%, n = 61), myopathies (12.6%, n = 29), Steinert's myotonic dystrophy (10.8%, n = 25) and myasthenia gravis (5.6%, n = 13). There is overlap with obstructive sleep apnea in 24.2% of patients (n = 56). Patient referrals mainly come from Neurology (54.1%, n = 125), Pediatrics/Pulmonology (9.1%, n = 21) and General Pulmonology (6.5%, n = 15) outpatient consultations and from the Neurology ward (8.7%, n = 20). Patients are evaluated under a protocol by a doctor and a respiratory physiotherapist; non-invasive functional assessment methods are preferred. In the first consultation: symptom inquiry; spirometry (sitting + lying down); measurements of peripheral oxygen saturation (SpO2), transcutaneous capnography (tcCO2) and peak cough flow; cardiorespiratory polygraphy. Subsequent visits: symptom inquiry; measurements of SpO2, tcCO2, slow vital capacity and peak cough flow (the latter two also in maximum insufflation capacity (MIC) if the patient performs air stacking); analysis of ventilator and in-exsufflator adhesion data. The frequency of patient surveillance is decided according to the behavior and the clinical/functional evolution of the underlying neuromuscular disease. Patients are adapted to mechanical ventilation in an outpatient laboratory. In 2020, 124 patients (53.7%) were under mechanical ventilation and 8 patients under continuous positive pressure at night. The ventilation modes in use were: pressurimetric (79%, n = 98), volumetric (4%, n = 5), hybrid (1.6%, n = 2), pressurimetric + volumetric (in different periods of the day) (14.5%, n = 18) and servoventilation (0.8%, n = 1). 25 patients (10.8%) were ventilated for > 16 hours/day (of which 15 in daytime volumetric + night pressurimetric, 4 in day/night pressurimetric[of which 2 in invasive mechanical ventilation], 3 in day/night volumetric, 2 in day/night hybrid (AVAPS) and 1 in day volumetric+night hybrid (AVAPS). 15 patients (6.5%) performed intermittent mouthpiece ventilation. 23 patients (10%) had percutaneous gastrostomy (PEG). 37 patients (16%) were under mechanical in-exsufflation (assisted cough). 9 patients were tracheostomized (diseases: ALS = 4 patients; mucopolysaccharidoses = 2 patients; remaining: nemaline myopathy, hereditary congenital muscular dystrophy, post-acute respiratory failure with orotracheal intubation). In the 2015-2020 period, 95 patients had at least one respiratory hospitalization (average of 2.9 admissions/patient, with average duration = 15 days). By the end of 2020, there were 16 deaths.
Conclusions: In this study, it was possible to document the complexity of the respiratory management of neuromuscular patients being followed up by the PNC team of the CRI Sono/VNI CHUSJ, which requires a highly differentiated multidisciplinary care by experienced and dedicated health professionals.

Keywords: *Mechanical ventilation. Mechanical in-exsufflation. Neuromuscular disease. Amyotrophic lateral sclerosis. Myopathies. Sleep respiratory pathology. Percutaneous gastrostomy.*

CO 008. TREATABLE TRAITS AND ITS RESPONSIVENESS TO PULMONARY REHABILITATION IN PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND INTERSTITIAL LUNG DISEASE

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Introduction: Chronic obstructive pulmonary disease (COPD) and interstitial lung disease (ILD) are complex respiratory diseases showing heterogeneous clinical manifestations. Recognising their treatable traits, known as identifiable and measurable characteristics that are

clinically relevant and potentially treatable, may be a first step to individualise care and improve clinical outcomes in these individuals. Pulmonary rehabilitation (PR) is a non-pharmacological, multidisciplinary and multicomponent intervention, which provides a unique opportunity to address multiple treatable traits at once and to implement personalised treatments. However, research on this topic is still scarce. This study aimed to identify candidate treatable traits in people with COPD and ILD and to assess its responsiveness to PR.

Methods: Data from two observational prospective studies were analysed. Individuals were eligible if medically diagnosed with ILD or stable COPD, and had participated in a 12-week community-based PR programme. Sociodemographic and anthropometric data were collected to characterise the sample. The number of acute exacerbations, peripheral oxygen saturation, dyspnoea, cough, sputum, impact of disease, anxiety and depression symptoms, fatigue, health-related quality of life, exercise capacity, functional status, quadriceps and inspiratory muscle strength, balance status and physical activity were collected to establish candidate treatable traits. The instruments used to assess each outcome measure and the parameters defining treatable traits are described in Table 1. Minimal clinically important differences (MCID) or clinically relevant cut-offs of each measure were used to assess responsiveness to PR. Prevalence of treatable traits and the proportion of people who achieved MCIDs or surpassed the clinically relevant cut-offs after PR, were compared between people with COPD and ILD.

Results: One-hundred and forty-four individuals were included (90 people with COPD: 70 ± 8 years, 79% men, 49.9 ± 17.8 FEV1 %predicted, 78.3 ± 19.9 FVC %predicted; and 54 people with ILD: 64 ± 12 years, 37%men, 54.7 ± 17.5 DLCO %predicted; 80.1 ± 18.7 FVC %predicted). Five pulmonary and 13 extrapulmonary candidate treatable traits were identified before PR (table). Generally, the prevalence of these traits was similar in both populations. Nevertheless, people with COPD showed a significantly higher prevalence of impact of sputum (43.9% *vs.* 23.3%, p = 0.028) and cough (34.8% *vs.* 16.3%, p = 0.034) and disease impact (81.1% *vs.* 31.1%, p = 0.008) than people with ILD (table). Both populations showed improvements above the MCIDs or the relevant cut-offs following PR in all candidate treatable traits (fig.). Moreover, after PR, a significantly higher number of people with COPD showed improvements in health-related quality of life (81.0% *vs.* 63.3%, p = 0.026), impact of the disease (87.7% *vs.* 69.7%, p = 0.025) and quadriceps muscle strength (65.0% *vs.* 31.3%, p = 0.044), compared to people with ILD, who instead showed a significantly higher reduction in fatigue (74.3% *vs.* 49.2%, p = 0.015).

Conclusions: The candidate treatable traits seem to be similar in people with COPD and ILD and PR is indeed a highly effective treatment for addressing them in both populations. Further research validating treatable traits in respiratory diseases and exploring the most adequate person-centred interventions to tackle the different traits is needed to promote precision medicine.

Keywords: *Treatable traits. Pulmonary rehabilitation. Precision medicine. Chronic obstructive pulmonary disease. Interstitial lung disease.*

Table 1: Candidate treatable traits identified before pulmonary rehabilitation in people with chronic obstructive pulmonary disease (COPD) and interstitial lung disease (ILD) (n=144).

Treatable traits identified, n (%)	COPD (n=90)	ILD (n=54)	p-value*
PULMONARY			
Exacerbation history			
2 or more acute exacerbations or 1 acute exacerbation with hospitalization last year [1]	23 (25.6)	9 (16.7)	0.327
Oxygen desaturation			
SpO_2<88% in 6MWT [1]	15 (17.2)	7 (13.0)	0.496
Dyspnoea			
mMRC≥2 [1][2][3]	59 (65.6)	32 (59.3)	0.448
Presence of sputum			
Sputum symptoms (CASA-Q) total score <70% [4]	34 (51.5)	19 (44.2)	0.454
Sputum impact (CASA-Q) total score <70% [4]	29 (43.9)	10 (23.3)	**0.028**
Presence of cough			
Cough symptoms (CASA-Q) total score <70% [4]	34 (51.5)	18 (41.9)	0.324
Cough impact (CASA-Q) total score <70% [4]	23 (34.8)	7 (16.3)	**0.034**
EXTRAPULMONARY – symptoms and health status			
Anxiety symptoms			
HADS-A score ≥8 points [5]	27 (37.5)	18 (51.4)	0.171
Depression symptoms			
HADS-D score ≥8 points [5]	34 (46.6)	14 (40.0)	0.520
Fatigue			
FACIT-FS total score <43 points [6]	67 (80.7)	35 (76.1)	0.535
Health-related quality of life impairment			
SGRQ≥25 points [1]	78 (86.7)	45 (83.3)	0.583
Impact of disease in daily life			
CAT≥10 points [1][7]	73 (81.1)	33 (31.1)	**0.008**
EXTRAPULMONARY – physical status			
Exercise capacity intolerance			
6MWT<70% predicted [8]	21 (23.6)	10 (18.5)	0.475
Functional status impairment			
1STS repetitions<70% predicted [9]	45 (51.1)	32 (59.3)	0.346
Quadriceps muscle strength impairment			
HHD of quadriceps <70% predicted [10]	21 (23.3)	16 (29.6)	0.403
Inspiratory muscle strength impairment			
MIP<70cm/$H_2$0 in women; <80cm/$H_2$0 in men [11]	40 (48.2)	22 (41.5)	0.445
Balance impairment			
Brief BESTest total score <16.5 points [12]	39 (46.4)	20 (42.6)	0.669
EXTRAPULMONARY – behavioural factors			
Overweight/obesity			
BMI>30 kg/m² [13]	19 (21.1)	20 (37.0)	**0.037**
Physical inactivity			
BAAPT total score ≤3 points [14]	75 (83.3)	30 (85.7)	0.744

Legend: mMRC: modified British medical research council dyspnea questionnaire; SpO2: peripheral oxygen saturation; CASA-Q: cough and sputum assessment questionnaire; CAT: COPD assessment test; HADS: hospital anxiety and depression scale (anxiety component-HADS-A; depression component-HADS-D); FACIT-FS: functional assessment of chronic illness therapy-fatigue subscale; SGRQ: St. George's respiratory questionnaire; 6MWT: six-minute walk test; 1STS: one-minute sit-to-stand test; HHD: hand-held dynamometry; MIP: maximal inspiratory mouth pressure; Brief BESTest: brief balance evaluation systems test; BMI: body mass index; BAAPT: brief physical activity assessment tool; [1] GOLD Report, 2021; [2] Hul et al. ERJ Open Res., 2020; [3] Spruit et al. Sports Med, 2020; [4] Crawford et al. Respir Med., 2008; [5] Zigmond et al. Acta Psychiatr. Scand., 1983; [6] Cella et al. Cancer, 2002; [7] Kon et al. Lancet Respir Med, 2014; [8] Koolen et al. J. Clin. Med., 2019; [9] Bohannon et al. J. Cardiopulm. Rehabil. Prev., 2019; [10] Bohannon et al. Arch. Phys. Med. Rehabil., 1997; [11] Laveneziana et al. Eur Respir J, 2019; [12] Jácome et al. Phys Ther, 2016; [13] Guo et al. Medicine, 2016; [14] Marshall et al. Int J Sports Med, 2005; *p-value for the differences between 2-groups (COPD and ILD) using chi-square test.

Figura CO 008A

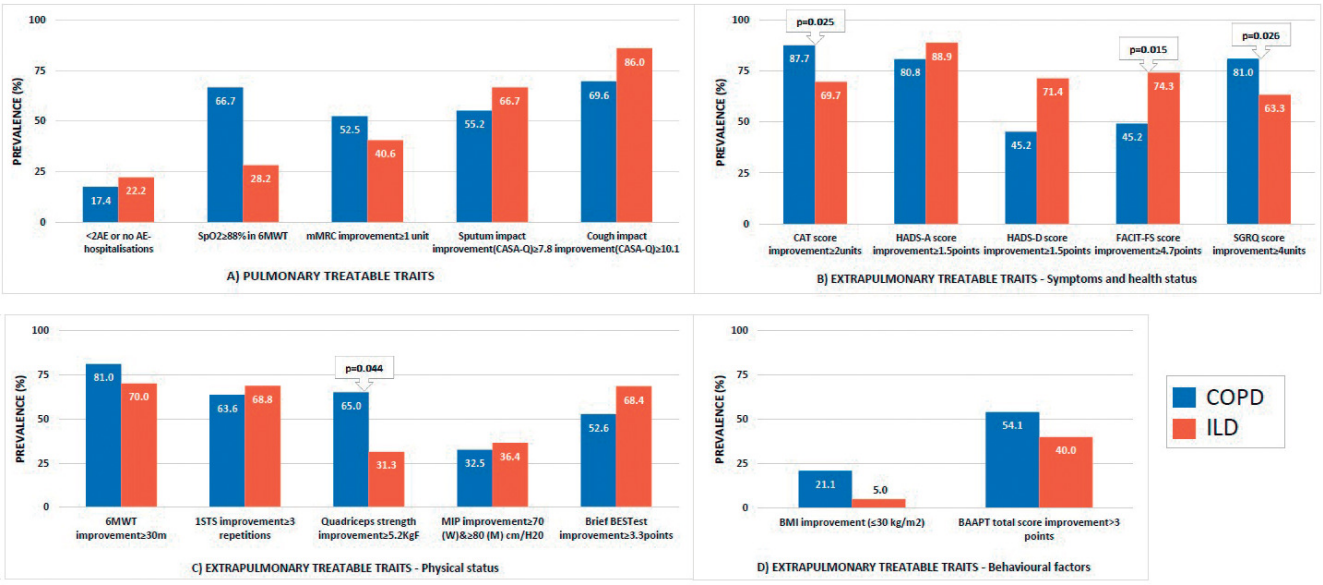

Figure 1: People with chronic obstructive pulmonary disease (COPD) and interstitial lung disease (ILD) who achieved minimal clinically important differences, or surpassed clinically relevant cut-offs, in candidate treatable traits following pulmonary rehabilitation.
Legend: AE: acute exacerbation; SpO2: peripheral oxygen saturation; mMRC: modified British medical research council dyspnea questionnaire; CASA-Q: cough and sputum assessment questionnaire; CAT: COPD assessment test; HADS: hospital anxiety and depression scale (anxiety component-HADS-A; depression component-HADS-D); FACIT-FS: functional assessment of chronic illness therapy-fatigue subscale; SGRQ: St. George's respiratory questionnaire; 6MWT: six-minute walk test; 1STS: One-minute sit-to-stand test; MIP: maximal inspiratory mouth pressure; W: women; M: male; Brief BESTest: brief balance evaluation systems test; BMI: body mass index; BAAPT: brief physical activity assessment tool *p-value for the differences between 2-groups (COPD and ILD) using chi-square test; p-values were only presented for statistically significant differences (p<0.05).

Figura CO 008B

CO 009. NEW DATA ON TELEMONITORING PHYSICAL ACTIVITY AND THERAPEUTIC IMPLICATIONS

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Introduction: Pulmonary rehabilitation is based on a thorough patient assessment, which include functional exercise capacity and physical activity. For this purpose, it is important to appropriately monitor peripheral oxygen saturation (SpO2) and heart rate (HR) at rest and exertion individual responses, as relevant inputs to consider when optimizing oxygen therapy and designing exercise-based interventions. To understand whether exercise-field tests identify patients who desaturate (SpO2 < 90%) during physical activities, this study compared the six-minute walk test (6MWT) and daily-life telemonitoring.
Methods: Cross-sectional study including 100 patients referred for pulmonary rehabilitation. The 6MWT was performed in hospital with continuous assessment of SpO2, HR, walked distance and calculated metabolic equivalent of tasks (METs). Patients were also evaluated in real-life by SMARTREAB telemonitoring, a combined oximetry-accelerometery with remote continuous assessment of SpO2, HR and METs. Differences between the means in 6MWT and SMARTREAB telemonitoring were assessed with paired-sample t-tests. Mean differences between patients who only desaturated in the SMARTREAB telemonitoring and those who also desaturated in the 6MWT were assessed with independent sample t-tests. A p-value of less than 0.05 was considered statistically significant.
Results: Convenience sample of 100 patients referred for pulmonary rehabilitation, 50% male, with a mean age of 66.1 ± 9.8 years and diagnosis including 41% chronic obstructive pulmonary disease, 22% interstitial lung disease, 15% idiopathic pulmonary fibrosis, 15% asthma, 10% bronchiectasis and 12% other. SMARTREAB telemonitoring identified 24% more desaturators compared with the 6MWT. Moreover, there were significant mean differences between 6MWT and SMARTREAB telemonitoring in lowest SpO2 of 7.2 ± 8.4% ($p < 0.0005$), in peak HR of -9.3 ± 15.5% ($p < 0.0005$) and in activity intensity of -0.3 ± 0.8 METs ($p < 0.0005$). Considering SpO2 profile, there were 6% non-desaturators, 3% only 6MWT desaturators, 27% only SMARTREAB desaturators and 64% both methods desaturators. The 85% peak HR was surpassed by 11% of patients in the 6MWT and 32% of patients with SMARTREAB telemonitoring. About activity intensity, 2.5 METs intensity was surpassed by 56% of the patients in the 6MWT, and 77% of the patients with SMARTREAB telemonitoring. Moreover, SMARTREAB telemonitoring, further detected a median of 2 to 9 daily episodes with SpO2 < 90% and longest period of desaturation of 25 to 33 minutes per patient desaturator. Because of this, intraday SpO2 fluctuations must be considered when algorithms of telemedicine assistance are determined by telemonitoring applications merely based on a daily SpO2 spot check. Also, as 27% of patients do not desaturate on a 6MWT but are daily desaturators, ambulatory oximetry preciseness should be applied for oxygen titration purposes. Furthermore, a comprehensive regular assessment of physical activity with oximetry and accelerometery is recommended, as it provides combined perspectives of quantity (duration), intensity (METs), modality (type) and quality (SpO2 and HR) of patient's daily living.
Conclusions: The 6MWT underestimates the proportion of patients with exercise-induced oxygen desaturation compared to real-life telemonitoring. These results help defining oximetry-guided interventions, such as telemedicine algorithms, oxygen therapy titration and regular physical activity assessment in pulmonary rehabilitation.

Keywords: *Telemonitoring. Physical activity. Continuous oximetry. 6MWT.*

CO 010. PULMONARY TELEREHABILITATION EMERGED DURING PANDEMIC: PROGRAMS ADAPTATIONS AND PATIENT EXPERIENCE

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Introduction: With health systems overwhelmed by the increasing demand of coronavirus disease 2019 (COVID-19), pulmonary telere-

habilitation emerged to respond to inaccessibility reported by 79% European rehabilitation services with partial or even complete disruption. As self-efficacy reduces the detrimental impact on mental and physical health caused by COVID-19 imposed isolation and social distancing, this outcome was selected to support a shift from standard of care to pulmonary telerehabilitation. The aim was to evaluate the impact of cancelled face-to face pulmonary rehabilitation interventions due to COVID-19 on programs adaptation and patient experience.
Methods: This was a quasi-experimental prospective field study with 2 telephone surveys on the beginning of COVID-19 outbreak and at 4-month follow-up. Participants were people with respiratory disease with ambulatory pulmonary rehabilitation suspended. The Pulmonary Rehabilitation Adapted Index of Self-Efficacy (PRAISE) was applied on the first survey as a screening tool to rank self-efficacy, together with questions about breathing exercises (BE) and physical activity (PA) routines. Patients with potential gain by program maintenance shifted from face-to-face to telerehabilitation (group A) and those who had accomplished the main previously established goals of the program were discharged (group B). The second survey extended the first assessment by also including questions about telerehabilitation communication features, patient's perceived experience and future model of care preference. Data analysis included descriptive and inferential statistics with PRAISE as primary outcome.
Results: Participants were pulmonary rehabilitation outpatients (n = 100; 90% of response rate to the telephone surveys), 51% male, with mean age of 64.5 ± 13.1 years. Diagnosis included chronic obstructive pulmonary disease (32%), bronchiectasis (21%), interstitial lung disease (16%), lung cancer (14%), asthma (9%) and others (8%). As a screening tool on the first survey, self-efficacy ranged from 28 to 60 PRAISE score with a mean of 48.3 ± 6.9. At this first emergency lockdown 77% of patients reported BE and 64% PA routines, with self-efficacy significantly associated with PA ($\rho = 0.333$; $p = 0.001$), with a mean difference on PRAISE of -3.87 ± 1.39 (95%CI, -6.64 to -1.10) between active and sedentary patients. At the follow-up survey, 66% of patients suspended BE, 47% discontinued PA, and self-efficacy did not decrease on at least 70% of patients. Among reported patient experience, «no need for time or means of transportation» and «sense of not being forgotten or left behind» were described as positive aspects, whereas «self-execution of the exercises», «appropriateness of home area» and «lack of equipment for exercise» were difficult aspects mentioned. Overall, in group B there were 49.2% interest in telerehabilitation in the future, and in group A we found 40% preferring a mixed program on a pandemic-free future.
Conclusions: Highest priority follow-up during COVID-19 outbreak should be to sedentary patients with lower self-efficacy, focusing on self-management to increase PA levels. Patient experiences within current rehabilitation transition pandemic scenario are important to take in consideration when upgrading programs with telerehabilitation, a key innovative shift to successful pulmonary rehabilitation delivery and accessibility.

Keywords: *Telerehabilitation. Physical activity. Breathing exercises. Self-efficacy. Patient-experience.*

CO 011. PULMONARY HIPERTENSION IN CHRONIC LUNG DISEASE

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Introduction: Classification of Pulmonary Hypertension (PH) classifies this disease into groups that include entities with clinical presentation, pathological findings, hemodynamic profile, and similar therapies. Chronic respiratory diseases constitute Group 3 and include COPD, Interstitial Pulmonary Disease, respiratory pathologies of sleep, alveolar hypoventilation disorders, chronic exposure high altitude, pulmonary developmental diseases and others with mixed pattern, with COPD and Interstitial Lung Disease being most frequent culminating in PH. Although PH often appears late in the natural history of CKD, it is not often hemodynamically severe. Patients with CKD and severe pulmonary hypertension may benefit from more specific approach aimed at pulmonary vascular disease. However, scientific evidence is sparse. Correct identification of patients and their referral to reference centers for the treatment of pulmonary hypertension is essential, as well as the development of research in this area. Objective: to evaluate population characteristics and response to vasodilator therapy in patients with severe PH and chronic lung disease followed in PH Consultation at CHULN.
Methods: Retrospective study based on computer record. Inclusion criteria: patients classified as belonging to group 3, with PmAP > 35 mmHg at the date of diagnosis; Who have undergone vasodilator therapy for a period equal to or greater than 6 months; Who have hemodynamic evaluation after starting vasodilator therapy.
Results: Of the 41 patients in the computer record with a diagnosis of PH group 3, 32 were excluded. Of these, the reason for exclusion was, mostly, death during the initial assessment or before 6 months of treatment (n = 8). The remaining six had PmAp < 35 mmHg, two had been under treatment for less than 6 months, two the classification was revised as group 2 or group 1, three had a diagnosis of PTE during follow-up; the remainder were excluded for reasons many. For the 9 patients undergoing hemodynamic treatment and reassessment: 3M and 6W, mean age 62.7 (min. 24, max. 84). In 4 patients the functional pattern was obstructive (emphysema predominance), in 5 it was restrictive (interstitial pathology). Vasodilator therapy: monotherapy in 1 patient, double therapy in 5, triple therapy in 3; 1 of these patients was included in a multicenter protocol with innovative therapy. In 7 patients there was hemodynamic improvement. There was functional improvement in 4 patients. The inexistence of moderate and severe adverse effects to vasodilator therapy should be highlighted, namely with regard to worsening of hypoxemia.
Conclusions: The referral of patients with CPP to pulmonary hypertension consultation is late, as can be concluded by the number who died during diagnosis or in the first 6 months of treatment. On the other hand, the appearance of pulmonary hypertension is a poor prognostic factor in chronic respiratory disease. In some patients, functional benefit was observed with vasodilator therapy; we emphasize the absence of relevant adverse effects in any patient. During this period, only one patient was included in an international multicenter protocol specifically aimed at this group. Studies that include this population of patients are needed in order to better understand their characteristics and which patients to select for the targeted treatment of pulmonary hypertension.

Keywords: *Pulmonar hipertensão. Chronic lung disease.*

CO 012. BRONCHOALVEOLAR (BAL) NK CELLS IN CHRONIC HYPERSENSITIVITY PNEUMONITIS (CHP) ASSOCIATE WITH A FAVORABLE RESPONSE TO AZATHIOPRINE (AZA) – AN EXPLORATORY ANALYSIS

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Introduction: Chronic Hypersensitivity Pneumonitis (CHP) has a broad spectrum of clinical courses, often presenting as an irreversible and progressive disease, but there is still no evidence supporting the clinical decision regarding the implementation of immunosuppressive and/or antifibrotic treatment. In a recent retrospective study, we observed the benefit of AZA in the long-term treatment

of CHP, as well as the association of BAL lymphocytosis with a favorable response. On the other hand, patients with HP have significantly higher numbers of BALF NK cells, particularly those with a restrictive pattern in lung function tests. Starting from this retrospective study of AZA treatment in CHP, we aimed to investigate if a particular BAL lymphocyte subset at diagnosis associates with a favorable response at 12 months.
Methods: BAL immunophenotyping in 41 CHP patients with lymphocytic alveolitis (≥ 15 %) at diagnosis, evaluating B (CD19+), NK (CD3-16/56+), NKT (CD3+16/56+), T (CD3+), T-helper (CD4+) and T-cytotoxic (CD8+) lymphocytes. We compared the relative and absolute values of lymphocyte subpopulation in "responders" (n = 22) and "non-responders" (n = 10) groups after 12 months of AZA treatment, as defined by a multidisciplinary team independently of BAL immunophenotyping data.
Results: As in the initial CHP cohort "responders" sub group had significantly higher % of BAL lymphocytes Median (P25-75) - 48.4% (37.8-61.3) *vs.* 27.9% (26.2-50.9), p = 0.01. Regarding lymphocyte subsets only NK cells were significantly higher in patients with the better AZA response, both in BAL absolute and relative counts, and as percentage within BAL lymphocytes - 1.6% (1.4-4.3) *vs.* 0.7% (0.53-1.5), p = 0.01).
Conclusions: In this exploratory study we found that, in addition to BAL lymphocytosis, a high BAL NK lymphocyte count in CHP seems to associate with a superior clinical response to AZA, suggesting the potential use a biomarker of its response to immunosuppression. Further prospective studies are needed to explore this hypothesis.

Keywords: *Azathioprine. Bronchoalveolar lavage. Immunosuppression. Chronic hypersensitivity pneumonitis. Nk cells.*

CO 013. DISTINCT TNF-ALPHA AND HLA POLYMORPHISMS ASSOCIATE WITH FIBROTIC AND NON-FIBROTIC SUBTYPES OF HYPERSENSITIVITY PNEUMONITIS

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Introduction: Hypersensitivity Pneumonitis (HP) usually results from an immune-mediated reaction caused by an inhaled antigen in susceptible individuals. Recent guidelines suggest the classification of the disease as fibrotic or non-fibrotic. The underlying mechanisms related to the heterogeneity of HP presentation and evolution are not fully understood. Polymorphisms in genes that regulate the immune response may be involved.
Objectives: To investigate HLA-A, -B, -DRB1 and TNF-α -308 gene polymorphisms among fibrotic and nonfibrotic HP patients due to avian exposure, also in comparison with asymptomatic exposed controls.
Methods: A prospective observational single-center case-control study was performed. Forty patients with HP due to avian exposure and seventy asymptomatic individuals exposed to avian antigens, genotyped for HLA and cytokine polymorphisms were included. Patients included in the case group had: 1) avian exposure, 2) consistent clinical and radiological characteristics of HP, 3) bronchoalveolar lavage (BAL) lymphocytes > 40%, 4) in patients with an HP diagnosis not established by clinical, radiological and BAL, a surgical lung biopsy was performed. Patients were classified as fibrotic and non-fibrotic/inflammatory HP, based on the presence or absence of radiological and/or histopathological fibrosis, respectively. HLA and TNF-α polymorphisms were determined by polymerase chain reaction–sequence-specific primer amplification.
Results: There were 40 HP patients, 15 (37.5%) classified as fibrotic and 25 (62.5) as nonfibrotic/inflammatory, and 70 exposed controls. No significant differences were found regarding demographic and clinical characteristics between the groups of patients with fibrotic and non-fibrotic HP, except for BAL eosinophils which were higher in fibrotic patients (1.8% *vs.* 0.8%; p = 0.045). The control group and the HP group showed no significant differences concerning sex and median avian exposure time, but there was a statistically significant difference in median age, controls being younger than HP patients (34.3 *vs.* 51 years; p < 0.001). HLA alleles were not associated to HP susceptibility, but fibrotic HP patients showed increased frequencies of HLA A*02 (46.7% *vs.* 25.7%; OR = 2.53, p = 0.02) and HLA DRB1*14 (10.0% *vs.* 0.7%; OR = 15.44, p = 0.02) alleles when compared to exposed controls, although the association was not statistically significant in the multivariate analysis. TNF-α G/G genotype (associated with low TNF-α production) frequencies were significantly increased among the non-fibrotic/inflammatory HP patients comparatively to fibrotic patients (88% *vs.* 60%; RR = 0.44; p = 0.04) and controls (88% *vs.* 63%, OR 4.33, p = 0.037). Also, these patients had a significantly increased frequency of the G allele (94.0% *vs.* 73.3%, RR = 0.44, p = 0.01), while fibrotic HP patients predominantly presented the A allele (26.7% *vs.* 6.0%, RR = 2.28, p = 0.01).
Conclusions: Our results support the hypothesis that fibrotic and non-fibrotic HP subtypes exhibit a distinct profile of TNF-α and HLA polymorphisms, which may be relevant to predict disease course and better define treatment strategies.

Keywords: *Hypersensitivity pneumonitis. Fibrotic and non-fibrotic subtypes. Genetic polymorphism.*

CO 014. DIAGNOSTIC YIELD AND SAFETY OF TRANSBRONCHIAL LUNG CRYOBIOPSY AND SURGICAL LUNG BIOPSY IN INTERSTITIAL LUNG DISEASES – A SYSTEMATIC REVIEW

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Introduction: Interstitial lung diseases (ILDs) are a heterogeneous group of disorders characterized by many degrees of inflammation and fibrosis, primarily affecting the lung interstitium. Surgical lung biopsy (SLB) has been frequently considered the gold standard method to establish the histopathologic pattern in ILDs, but is associated with significant morbidity and appreciable costs. Transbronchial lung cryobiopsy (TBLC) is increasingly being used as an alternative for SLB, but its diagnostic usefulness and safety remain unclear.
Objectives: The aim of this systematic review was to assess the diagnostic yield (DY) and safety of TBLC in patients with suspected ILD, and compare it with video-assisted thoracoscopic surgery (VATS).
Methods: The PubMed and Embase databases were used to check all studies, published from October 2010 to October 2020, that reported on the DY or safety of VATS or TBLC in the diagnosis of ILD. The quality of individual studies was assessed using the Critical Appraisal Skills Programme (CASP) checklists. Random-effects models were used to calculate pooled estimates of diagnostic yield and complication rates.
Results: Of 933 citations, 43 studies were selected for inclusion in this systematic review: 27 articles focused on TBLC, 13 in VATS, and 3 in both (2 evaluated TBLC and VATS sequentially on the same patient). A total of 4,550 patients with suspected ILD were included in our review: 2,824 patients were submitted to TBLC, and 1814 underwent VATS. In total, forty-two studies evaluated the DY in TBLC or VATS. Twenty-eight studies evaluated the DY of TBLC, with a pooled DY of 77.3% (95%CI, 72.1-81.7%). Fourteen studies have studied the use of VATS in the diagnosis of ILD, and pooled DY was 94.0% (95%CI, 89.5-96.7%). Forty-one studies reported procedure related complications. In TBLC, pooled incidences were the following: 9.9% (95%CI, 6.8-14.3%), for significant bleeding, 5.6% (95%CI, 3.8-8.2%) for pneumothorax treated with chest tube, and of 1.4% (95%CI, 0.9-2.2%) for acute exacerbation of ILD after the technique. Regarding VATS,

pooled incidence rate of complications was: 5.5% (95%CI, 2.5-11.4%) for pneumothorax recurrence; 3.4% (95%CI, 2.0-5.8%) for thoracic pain; 2.1% (95%CI, 0.3-13.9%) for pneumonia or empyema; 2.0% (95%CI, 1.3-3.1%) for ILD acute exacerbation; and 1.8% (95%CI, 0.8-4.0%) for prolonged air-leak. Thirty-day mortality was reported in twenty-nine studies. Mean mortality rate was 0.6% (range 0-3.2%) and 1.7% (range 0-6.7%) in TBLC and VATS, respectively.
Conclusions: TBLC has a good DY, although not less than VATS. TBLC also demonstrated an acceptable safety profile and lower mortality rate than VATS. The best results for TBLC are obtained from centers with more experience.

Keywords: *Interstitial lung diseases. Transbronchial lung cryobiopsy. Vats. Diagnostic yield. Safety.*

CO 015. FIBROUS LUNG DISEASE: A RETROSPECTIVE STUDY OF THE PROGNOSTIC IMPACT OF ACUTE EXACERBATIONS

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Introduction: Fibrous pulmonary diseases (FPD) have a high mortality associated with hospitalization for exacerbation. With this work, the authors analyzed predictive factors for mortality and the need for non-invasive mechanical ventilation (NIMV) in patients hospitalized for exacerbation of FPD.
Methods: A retrospective study of patients admitted to the Pulmonology Department of a University Hospital for FPD exacerbation was carried out between January 2019 and December 2020. These were classified as: Idiopathic Pulmonary Fibrosis (IPF), Fibrous Hypersensitivity Pneumonitis (PHf) and other DPF. Continuous and categorical variables were analyzed using the One-Way ANOVA and Chi-Square tests, respectively. Predictive factors for mortality and use of NIMV during hospitalization were determined using univariate and multivariate binary logistic regression. Statistical analysis was performed using SPSS 26.0. Values of $p < 0.05$ were considered statistically significant.
Results: 73 patients were included: 15 (20.5%) had IPF, 15 (20.5%) had PHf and 43 (58.9%) had other DPF. Thirty-one patients (42.5%) were under immunosuppressive therapy and 8 (11.0%) were under antifibrotics. It was found that IPF is significantly associated with a longer hospital stay compared to PHf and other DPF, mean of 20.93 days (95%CI: 14.69-27.18) *vs*. 11.8 days (95%CI: 1.05-17.22, p = 0.023) *vs*. 12.23 days (95%CI 2.06-15.34, p = 0.007)] and that there was no difference in mortality between the 3 groups (p = 0.631). In the multivariate analysis, we found that the use of NIMV during hospitalization is an independent predictor of mortality OR = 5.8 (95%CI 1.1-30.1), p = 0.036 and that, for each increase of 1 mmHg in PaO2 on admission, there is protection for the death event OR = 0.9 (95%CI 0.89-0.99, p = 0.020). Cardiac pathology (n = 33, 45.2%) and obstructive sleep apnea (n = 10, 13.7%) were independent predictors of the need for NIMV (OR = 5.6, 95%CI 1.2-26.2, p = 0.029; OR = 12.5, 95%CI 2.4-63.8, p = 0.002).
Conclusions: Exacerbation of FPD is a poor prognostic factor, being associated with high mortality. This study demonstrated that IPF, compared to PHf and other DPF, is associated with longer hospital stays, probably due to its progressive course despite the institution of corticosteroid therapy in the exacerbation. The need to use NIMV proved to be an independent predictor of mortality, demonstrating the severity of respiratory failure, which, by itself, represents a poor prognostic factor. Cardiac pathology and obstructive sleep apnea were predictive factors for the use of NIMV, so we can assume that these comorbidities condition cor pulmonale decompensation with consequent greater severity in terms of respiratory failure, also constituting worse prognostic factors in exacerbation.

Keywords: *Interstitial lung disease. Exacerbation. Mortality.*

CO 016. GENETIC TESTING IN FAMILIAL PULMONARY FIBROSIS – PROPOSAL OF A CLINICAL GUIDELINE

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Introduction: Knowledge on genetic variants associated with fibrotic pulmonary disease has greatly evolved in the last years, impacting both diagnostic and therapeutic approaches. Familial Pulmonary Fibrosis (FPF) associated genes can be grouped according to the underlying physiological mechanism: telomere biology (25-30%), surfactant homeostasis (3-5%) and syndromic forms (3-5%). Currently, there are no specific recommendations for genetic testing of patients with suspected FPF, as its application varies according to each center's experience and resources. The aim of this study was to define criteria for genetic testing in adult patients with suspected monogenic FPF.
Methods: A search on PubMed/MEDLINE database was performed. The query included the following keywords: "familial pulmonary fibrosis", "monogenic pulmonary fibrosis", interstitial lung disease genetics" and "telomeropathies"; both as exact phrases and a combination of broad subject headings. After exclusion of duplicates and abstracts, two authors from different fields (Pulmonology and Clinical Genetics) independently screened full-text papers to include the most relevant on the topic. Thereafter, a clinical guideline was formulated proposing criteria for genetic testing and guidance on genetic counseling and clinical assessment of patients with FPF and family members at risk. This guideline was presented and validated in a joint meeting of Pulmonology and Genetic departments and, subsequently, submitted to the hospital's Ethics Committee.
Results: Genetic testing should be limited to patients with a higher likelihood of monogenic FPF and, therefore, applied in the following scenarios: 1) signs of pulmonary fibrosis at an early age (< 50 years); 2) two or more first degree relatives with fibrotic pulmonary disease; 3) clinical signs suggesting telomere dysfunction or other syndromic diseases with an increased risk of pulmonary fibrosis. Genetic testing using molecular study based on next generation sequencing of a panel of 33 genes associated with FPF is recommended. In cases where a pathogenic variant is identified, the patient should be referred to genetic counseling and screening of asymptomatic relatives at risk. Clinical assessment by a pulmonologist should be offered to all carriers of pathogenic familial variants, to carriers of variants of unknown significance and to patients with suspected FPF without molecular confirmation. A high-resolution chest CT is recommended for relatives with clinical signs of pulmonary fibrosis, otherwise at 40 years of age or 10 years prior to symptom onset of the index case in asymptomatic relatives. In the absence of radiological abnormalities suggestive of pulmonary fibrosis, CT scan should be repeated 5 years later.
Conclusions: Identification of FPF-associated genetic variants will contribute to a better patient care, an increased knowledge of the disease course, the possibility of precision medicine, an improved follow-up and clinical trial readiness.

Keywords: *Familial pulmonary fibrosis. Genetic testing. Genetics. Interstitial lung disease.*

CO 017. TGF-β EXPRESSION: A BIOMARKER FOR PULMONAR INTERSTITIAL DISEASES MEDICAL TREATMENT AND REHABILITATION

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Fibrosis is the most feared histopathological marker observed either in pulmonary biopsies and in clinical/imagiology interstitial lung diseases diagnosis. Clinical treatment and respiratory rehabilitation

depend on the grade of alveolar volume loose to postpone pulmonary transplant. TGF-β expression may become a first appoach marker to determine the status and evolution of pulmonary fibrotic diseases, since the very beginning installment, without concern with disease classification. The authors searched for the expression of TGF-β in a series of surgical biopsies concerning bronchiolitis, in order to understand its role in the development of peribronchiolar and peripheral early fibrosis. A series of 45 cases was divided in two control groups concerning 5 cases of normal looking pulmonary parenchyma/11 cases of Chronic Bronchiolitis without other associated histopathological diseases, observed in spontaneous pneumothorax surgical biopsies, to be compared with Respiratory Bonchiolitis (15 cases) and Bronchiolitis Obliterans (14 cases) surgical biopsies. TGF-β expression was compared in the identified clinical groups organized according with adulthood age over 40 years old. TGF-β expression was demonstrated in all cases with particular diferences: while in the 5 normal looking pulmonary parenchyma cases there was an only endotheluial septal face demonstration, in the other groups, there was bi-linear expression, either in endothelial and epithelial alveolar faces, after CK7 companion epithelial expression control. Chronic Bronchiolitis cases presented with discrete double expression while in 8/11 cases of Bronchiolitis Obliterans and in 10/15 cases of Respiratory Bronchiolitis, the bi-linear expression was clear. This small series might be a trigger study to validate TGF-β expression as a routine bio – marker to follow up interstitial lung diseases. Understood as the regulator of fibrosis, beyond its epitelial – mesenchimal transition comitment in either epitelial and mesenchimal remodelation together with cell proliferation, TGF-β is also targeted in clinical therapy and its demonstration in biopsies may also integrate rehabilitation programs before pulmonary transplant after advanced respiratory volumes loose. This biomarker deserves further studies after this possible basic study to be integrated in pathology routine of transthoracic biopsies and cryobiopsies.

Keywords: *TGF-β. Prognostic biomarker. Therapy decision.*

CO 018. DIFFUSE ALVEOLAR HAEMORRHAGE – THE IMPORTANCE OF THE UNDERLYING MECHANISM

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Introduction: Diffuse Alveolar Haemorrhage (DHA) is characterised by an accumulation of red blood cells in the alveolar spaces due to microvascular injury. It is a diffuse clinical syndrome and can have several causes, which can be divided according to the underlying mechanism - immune and nonimmune.
Objectives: Casuistic review of patients undergoing bronchoscopy, with evidence of DAH on the bronchoalveolar lavage (BAL) and comparison between immune and nonimmune causes.
Methods: Retrospective analysis from January 1st 2017 to December 31st 2019 of patients submitted to bronchoscopy who had DAH. Demographic characteristics, motive for exam execution and causes of DAH are described. Patients with immune and nonimmune cause were compared.
Results: During this period, 47 patients had evidence of DAH on BAL, 68% male and a mean age of 65 years (± 13.8). Nineteen patients had no smoking history, 16 were prior smokers and 12 smokers. Nonimmune causes were the most frequent, namely heart disease (n = 19), idiopathic (n = 10) and anticoagulant and/or antiplatelet therapy, isolated, with no other associated cause (n = 8). It should be noted that a total of 24 patients were medicated with an anticoagulant and/or an antiplatelet. Regarding the motive for exam execution, DAH was suspected in only 36% of patients; the exam was performed on the remaining patients due to radiological abnormalities suggestive of interstitial pathology (n = 25), adenomegaly (n = 4) and lack of response to the ongoing antibiotic therapy (n = 1). On the next table demographic characteristics, clinical presentation and GOLDE score are described, according to the underlying mechanism. Between immune and non-immune causes there was a statistically significant difference regarding the need for hospital admission and the presence of haemoptysis.
Conclusions: Nonimmune causes accounted for the majority of DAH cases as described in the literature. However, patients with an immune cause, had a higher percentage of haemoptysis on admission and the need for hospital admission, reinforcing the importance of underlying mechanism distinction, as they may imply different diagnostic and therapeutic approaches.

Keywords: *Diffuse alveolar haemorrhage. Diffuse lung disease.*

CO 019. FAMILIAL INTERSTITIAL PNEUMONIA: NEXT-GENERATION SEQUENCING ON GENETIC ALTERATIONS RESEARCH

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Introduction: Familial interstitial pneumonia (FIP) is defined by the diagnosis of interstitial lung disease (ILD) in 2 or more relatives. Genetic studies carried out in families with FIP identified mutations in several genes or associations with genetic polymorphisms.
Objectives: To analyse the genetic alterations detected through next-generation sequencing in patients with suspected FIP.
Methods: A retrospective observational study was conducted in patients followed in ILD outpatient clinic, with a family history of ILD in at least one first or second-degree family member, who performed genetic testing between 2017 and 2021. Demographic data, number and kinship of affected family members, clinical, functional, radiological, and histopathological data, genetic testing results, multidisciplinary diagnosis, and therapeutic approach were recorded.
Results: Genetic tests were performed on a total of 20 patients; in 13, an alteration was detected in at least one gene of the total of genes analysed with known association with familial ILD. The results are summarized in the following table.
Conclusions: We observed clinical-radiological heterogeneity, in which the same mutation resulted in different phenotypes; this suggests the importance of genetic-environment interaction in the manifestation of the disease. Patients with more than one mutation detected were observed. Most variants were classified as a variant of uncertain significance. Four heterozygous likely pathogenic variants were detected in genes with autosomal dominant transmission mode. One patient had alterations in a gene with an autosomal recessive transmission mode with probable compound heterozygosity. In 7 patients, no genetic alterations were detected; thus, it is highlighted those genetic tests only analyse the most common mutations and there may be pathogenic variants or genes that yet remain to be discovered, or there may be variants that could not be analysed.

Keywords: *Familial interstitial pneumonia. Genetic.*

CO 020. APPLICABILITY OF TRANSBRONCHIAL LUNG CRYOBIOPSY IN THE HISTOLOGICAL DIAGNOSIS OF HYPERSENSITIVITY PNEUMONITIS: A PRELIMINARY EXPLORATORY ANALYSIS

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Introduction: Hypersensitivity Pneumonitis (HP) is a diffuse lung disease (DLD) that results from an exacerbated immunological reac-

tion to repetitive antigen inhalation. International guidelines addressing its diagnosis were recently published, suggesting its classification in fibrotic or non-fibrotic. HP diagnosis frequently requires histological evaluation, when clinical and radiological findings do not suffice. Transbronchial lung cryobiopsy has been recognized as useful in the diagnosis of DLD, but its role in the diagnosis of HP is not yet established.
Objectives: Preliminary exploratory analysis of the histological findings of specimens obtained through transbronchial lung cryobiopsy in patients with HP and its correla-tion with clinical findings.
Methods: Analysis of transbronchial lung cryobiopsy specimens from HP patients diagnosed between 2014 and 2018 was performed. Survival analysis was performed through Kaplan-Meyer method. The medians were compared with Mann-Whitney test and the frequencies using chi-square test.
Results: A total of 93 patients were included, 52.7% (n = 49) were males, with a median age of 67.0 (min-max 35.0). Histological samples were obtained of two lung lobes in 57.0% (n = 53) of all cases, and its median length and extension were 5.5 (min-max 9.0) mm and 20 (min-max 31.5) mm^2, respectively. 50.5% (n = 47) had pleural representation. Regarding histologic classification, 90.3% (n = 84) were classified as fibrotic HP (indeterminate: 6; probable: 53; definitive: 25), and 9.7% (n = 9) as non-fibrotic HP (indeterminate: 3; probable: 3; definitive: 3). Honeycombing pattern and fibroblastic foci were found in 30.1% (n = 28) and 52.7% (n = 49), respectively. Patients with HP and honeycombing pattern identified in transbronchial lung cryobiopsy specimens had inferior values of FVC (p = 0.027), TLC (p = 0.008), RV (p = 0.017) and DLCO (p = 0.050), less cellularity in bronchoalveolar lavage (p = 0.029) and were more frequently associated to peribronchiolar metaplasia (p < 0.001). Patients with fibroblastic foci in transbronchial lung cryobiopsy showed less cellularity in bronchoalveolar lavage (p = 0.043), more often interstitial fibrosis (p = 0.007), bridging fibrosis (p = 0.015), peribronchiolar metaplasia (p = 0.014), honeycombing (p = 0.05) and were more frequently associated with fibrotic HP (p = 0.009). Median survival was not reached; thus survival analysis was unattainable.
Conclusions: Guidelines for the diagnosis of HP systematize its histological features and allow a more objective classification. Its application in transbronchial lung cryobiopsy specimens is feasible. The presence of honeycombing is associated with worse lung function and lung parenchyma distortion and the presence of fibroblastic foci relates to the fibrotic activity of the disease.

Keywords: *Hypersensitivity pneumonitis. Lung cryobiopsy. Diffuse lung disease.*

CO 021. ROLE OF PRIVATE MEDICINE IN THE COVID-19 PANDEMIC – EXPERIENCE OF A CENTER

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Introduction: In order to meet the multiple demands and challenges imposed by the COVID-19 outbreak and seek to provide an integrated and standardized response to the assessment and follow-up of post-infection COVID-19 patients, the Pulmonology Department of Hospital da Luz Lisboa, in collaboration with others specialties, developed a protocol based on the most recent international recommendations, which was extended to other units of the group.
Methods: We conducted a retrospective longitudinal study that included patients evaluated between November 2020 and May 2021. Demographic, clinical, functional and imaging data were collected using the electronic clinical file.
Results: We evaluated 536 patients, with a mean age of 58.5 ± 15.7 years (minimum 18, maximum 93), 51.1% male. The mean time between diagnosis and evaluation was 73 (± 53.8) days (minimum 8, maximum 424). The most frequent comorbidities were hypertension (27.1%), obesity (20.1%), dyslipidemia (18.3%), diabetes mellitus (DM) (9.1%) and heart disease (8.6%). 98 patients (18.3%) had a history of respiratory disease: 3.2% (n = 17) COPD/emphysema, 15% (n = 81) asthma and 6.5% (n = 35) obstructive sleep apnea (OSA). 199 (37.2%) patients were current (10.3%) or former (26.9%) smokers. Regarding disease severity, 59.5% had mild or asymptomatic infection, 12.3% moderate, 22.6% severe and 5.6% critical disease (according to WHO classification). The mean age was higher in the subgroup of patients with severe/critical disease (64 ± 1.1 years *vs.* 48 ± 0.7 years, p = 0.012). There was a statistically significant relationship between disease severity (severe/critical *vs.* non-severe/critical) and the presence of hypertension (p = 0.00), DM (p = 0.00), obesity (p = 0.04), heart disease (p = 0.00), OSA (p = 0.017) and asthma (p = 0.036). Smoking habits were also significantly related (p = 0.00) with disease severity. In hospitalized patients (n = 152), the mean length of stay was 16.4 ± 13.2 days. The respiratory support was oxygen therapy in 60.5%, high-flow oxygen therapy in 8.6%, noninvasive ventilation in 10.5% and invasive mechanical ventilation in 19.7%. The most common symptoms at the first assessment were dyspnea (69.4%), mMRC ≥ 2 in 22.6% (n = 121) of patients; fatigue (44.2%) and cough (25.9%). There was a statistically significant relationship between disease severity and dyspnea (mMRC ≥ 2 in 43% of severe/critical illness cases *vs.* 14.5%, p = 0.00). The average score obtained in the EQ-5D-3L questionnaire was 5.69 (± 0.89). The most common findings on chest-CT were ground-glass opacities (46.7%) and ground-glass opacities with consolidations (42.5%). Regarding the impact on pulmonary function, the most frequent change was a DLCO impairment (less than 80% of the predicted values) in 52.4% of the cases, with a statistically significant relationship with disease severity (p = 0.00). In the 6MWD, the mean distance was 456.5 (± 119.4) m, in 89.3% of cases with T90< 0%. There was a negative correlation between DLCO and desaturation (p = 0.001).
Conclusions: Private medicine can be an important resource in the evaluation of patients infected with SARS-CoV-2. The emphasis of our study was the sample size and the inclusion of different spectrums of disease severity and the possibility of its characterization, in particular of the non-severe/critical disease, usually less explored in the studies, what might be a contribute to a better knowledge of the disease.

Keywords: *Pós-COVID-19. Evaluation. Comorbidities. Chest CT. Pulmonary function.*

CO 022. CLINICAL, FUNCTIONAL AND RADIOLOGICAL FEATURES 3 MONTHS AFTER HOSPITALIZATION DUE TO COVID-19: A PROSPECTIVE STUDY

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Introduction: Post COVID-19 sequelae and factors associated to a worse outcome are being studied worldwide. The authors present the experience of a tertiary hospital of clinical, functional and radiological evaluation 3 months after hospitalization due to COVID-19.
Objectives: To evaluate clinical, functional and radiological evolution 3 months after hospitalization due to COVID-19; to assess association between alterations and hospitalization factors.
Methods: Observational unicentric prospective study that included patients hospitalized in the Pulmonology Department due to COVID-19 between March and July 2020 who underwent a thoracic CT scan. Three months evaluation with CT scan, spirometry, plethysmography, DLCO and symptoms questionnaire. Collected variables of the hospitalization, as corticotherapy, invasive mechanical ven-

tilation (IMV) and noninvasive ventilation (NIV). Statistical analysis done with software SPSS v26.
Results: Included 52 patients, 69.3% (N = 36), median age 65 (IIQ = [51.75;79.6]) years. Initial CT was done at median 14 days of symptoms (IIQ = [9;20]), with 48.1% (25) of patients having a moderate lung involvement (1/3 to 2/3 of pulmonary area), 26.9% (14) mild (< 1/3) and 25% (13) severe (>2/3). 48.1% (25) had a peripheral distribution, in 3.8% (2) peribronchovascular and in 48.1% (25) both; 36.5% (19) had ground-glass opacities, 3.8% (2) consolidative and 59.6% (31) both densities; 42.3% had interlobular septae thickening (9.6% with crazy paving pattern); traction bronchiectasis were seen in 30.8% (16), parenchymal distortion in 21.2% (11), subpleural lines in 44.2% (23) and pleural effusion in 15.4% (8). On clinical evaluation of 3 months follow-up, 71.2% (37) reported respiratory or systemic symptoms: 40.4% (21) weight loss; 36.5% (19) muscle weakness; 26.9% (14) new onset or worsening of dyspnoea; 23.1% (12) asthenia; 9.6% (5) dry cough; 7.7% (4) adynamia and 7.7% (4) anorexia. On functional evaluation (n = 37), mean FEV1 was 95.6 ± 3.6%; FVC 92.8 ± 3.1%; TLC 87.1 ± 2.1% and KCO 97.5 ± 3.1%; median of ratio FEV1/VCMax 81.09% (IIQ = [76.24;83.92]) and DLCO-SB 78% (IIQ = [67.5;87]). There was no statistical difference between functional variables in patients submitted to, or not, IMV or NIV. In radiological evaluation, 25% (13) had complete remission of alterations; 46.2% (24) had mild involvement, 25% (13) moderate and 3.8% (2) severe; majority with ground glass opacities (84.6%; 33). The remaining findings were: 46.2% (24) traction bronchiectasis; 42.3% (22) subpleural lines; 42.3% (22) interlobular septal thickening; 26.9% (14) parenchymal distortion; 25% (13) adenomegaly and 3.8% (2) pleural effusion. There was no statistical difference in CT alterations between those treated or not with corticotherapy (p = 0.747). In the logistic regression model with alterations in CT at 3 months post covid-19 as dependent variable, there was no association with IMV (OR 2.50, 95%CI: 0.43-14.68), corticotherapy (OR 1.28, 95%CI: 0.28-5.85) or NIV (OR 0.58, 95%CI: 0.11-3.01).
Conclusions: Despite the tendency to improval, significant clinical and radiological alterations persist 3 months post-COVID19. No associations with mechanical ventilation or corticotherapy were found.

***Keywords**: Follow-up COVID-19. COVID-19 sequelae. Post-COVID syndrome.*

CO 023. NON-INVASIVE TREATMENT OF ACUTE RESPIRATORY FAILURE IN PATIENTS WITH COVID-19: THE EXPERIENCE OF HOSPITAL BEATRIZ ÂNGELO

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Introduction and objectives: During the COVID-19 pandemic, continuous positive airway pressure (CPAP) and non-invasive ventilation (NIV) have been widely used in patients with acute respiratory failure (ARF). Its impact on reducing the need for intubation/invasive mechanical ventilation (IMV) and on mortality has been controversial. The aim of this study is to evaluate the effectiveness of CPAP/NIV in AKI in SARS-CoV-2 pneumonia and to identify predictive factors off its failure.
Methods: Patients admitted to Hospital Beatriz Ângelo between December 2020 and March 2021 with ARF in the context of COVID-19 treated with CPAP/NIV, were included. Demographic characteristics and comorbidities, time of disease evolution at CPAP/NIV onset date, oxygen partial pressure ratio (PaO2)/inspired oxygen fraction (FiO2) at admission and at CPAP/NIV start date were retrospectively evaluated and respective outcomes (need for intubation and mortality). A logistic regression was performed to identify factors associated with CPAP/NIV failure, excluding patients with a decision not to intubate.
Results: Of the 203 patients included, most were male (68.5%), with a mean age of 64.4 ± 12.3 years. The most frequent comorbidities were arterial hypertension (66.5%), dyslipidemia (48.3%) type 2 diabetes mellitus (40.9%), obesity (35.5%), obstructive sleep apnea syndrome (15, 3%) and heart failure (15.3%). At admission, they had an average of 6.7 ± 3.5 days of symptoms and a mean PaO2/FiO2 ratio of 212.7 ± 81 mmHg. At the start date of CPAP/NIV, they had an average of 9.2 ± 3.9 days of symptoms and a mean of PaO2/FiO2 of 111.9 ± 43.3 mmHg, with the majority (81.3%, n = 165), having a PaO2/FiO2 < 150 mmHg. In patients with a decision not to intubate (n = 58), the mortality rate was 72.4% (n = 42). In the remaining ones (n = 145), the majority (75.2%; n = 109) recovered only with CPAP/NIV and 24.8% (n = 36) needed IMV. The mortality rate was 19.4% (n = 7). Median PaO2/FiO2 values in patients with CPAP/NIV failure (92.5 mmHg; IIQ [74.5;117.5]) were statistically lower (p = 0.008) than values in patients without failure (115 mmHg; IIQ [90;144]). The maximum CPAP pressures used were statistically higher in those who progressed to IMV (p = 0.001). No statistically significant differences were found in age, gender, and number of days of symptoms at CPAP/NIV start date (p = 0.353, p = 0.071 and p = 0.118, respectively). Evolution to IMV occurred mainly in the first 48h after starting CPAP/NIV (69.4%) and for each day of CPAP/NIV the risk of failure decreased by 77.5% (p < 0.001). Ex-smokers had a 15.1 times higher risk of failure (CI [1.9;168.9]; p = 0.015) compared to non-smokers. Pulmonary thromboembolism increased 10 times the risk of IMV (p = 0.036; CI [1.3;109.1]).
Conclusions: In this study, the use of CPAP/NIV was an effective strategy in the treatment of ARF in COVID-19 patients and the PaO2/FiO2 ratio was a predictive factor for failure. The identification of patients at risk of failure continues to be the biggest challenge. The creation of algorithms for the start/interruption of CPAP/NIV and the training of teams are decisive for the future.

***Keywords**: Non-invasive ventilation. COVID-19. Acute respiratory failure.*

CO 024. POST-DISCHARGE RADIOLOGICAL EVALUATION IN SARS-COV-2 PNEUMONIA

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Introduction: Coronavirus disease 2019 (COVID-19) was first diagnosed in December 2019. Short-term pulmonary sequelae of COVID-19 as well as the optimal timing to re-evaluate after acute disease are not fully understood.
Objectives: To identify factors that impact post-discharge radiological resolution in patients with severe SARS-CoV-2 pneumonia.
Methods: Prospective observational study of hospitalized patients with severe or critical COVID-19, according to WHO criteria, between January and May 2021. Demographic, clinical, imaging and hospitalization data were analyzed. Thoracic computed tomography (tCT) scan during acute disease were classified according to parenchymal involvement in mild (< 10%); moderate (10-24%), wide (25-49%), severe (50-74%) and very severe (≥ 75%). Patients were re-evaluated 8 to 12 weeks after hospitalization. Re-evaluation tCT was considered resolved if no changes were found or if only inflammatory lesions in advanced resolution phase involving < 5% of the lung parenchyma were present.
Results: A total of 88 patients were included, 60.2% (n = 53) were male, 67.0% were obese (n = 59) and the mean age was 65.0 ± 12.2 years. No active smokers were present in the study group and 37.5% (n = 33) were former smokers. 32 patients (36.4%) had one or more previous respiratory disease (Asthma: n = 11; COPD: n = 10; OSA: n = 6; others n = 9) and only 15 patients (17.0%) had no comorbidities. The mean hospitalization period was 14.6 days (SD: 8.8). 47

patients were treated with conventional oxygen therapy (53.4%), while the rest needed to escalate treatment to high-flow nasal cannula (n = 9), CPAP (n = 14), bi-level ventilation (n = 10) or invasive ventilation (n = 8). tCT during acute disease analysis revealed parenchymal involvement: moderate in 25.0% (n = 22), wide in 36.2% (n = 32), severe in 35.2% (n = 31) and very severe in 3.4% (n = 3). At discharge, 22 patients (25.0%) maintained hypoxemic respiratory failure in need of short-term oxygen therapy (STOT) at home. All patients performed respiratory kinesiotherapy during hospitalization and 17 patients (19.3%) were proposed for outpatient respiratory rehabilitation (RR). Reassessment tCT showed resolution of changes in 33 patients (37.5%). The patterns found in the remaining patients were classified into two groups as either inflammatory changes (n = 46; 52.3%), such as ground-glass opacity and consolidation; and/or fibrotic/reticular changes (n = 34; 38.6%), with parenchymal bands, architectural distortion and bronchiectasis. The variables found to have a statistically significant correlation with the outcome of tCT resolution at 8-12 weeks after hospitalization were: age ≤ 62 years ($p < 0.001$), treatment with only conventional oxygen therapy ($p = 0.003$), < 14 days of hospitalization ($p < 0.001$), moderate or wide parenchymal involvement in tCT during acute disease ($p = 0.002$), RR after discharge ($p = 0.013$) and no need of STOT at discharge ($p = 0.029$). On the other hand, weight, smoking habits, respiratory or other comorbidities were not associated with resolution of pulmonary changes in tCT.
Conclusions: The optimal timing to reassess a COVID-19 patient with tCT is still unknown. This study suggests that age, number of hospitalization days, initial tCT changes, oxygen therapy and ventilation needs during hospitalization, need of STOT and/or RR after discharge should be taken into account when deciding the ideal period for re-evaluation.

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

CO 025. SHORT-TERM CLINICAL AND RADIOLOGICAL SEQUELAE OF SARS-COV-2 PNEUMONIA

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Introduction: Despite increasing observational data, much is still unknown about the short- and long-term sequelae of coronavirus disease 2019 (COVID-19) and its impact on patients' quality of life.
Objectives: Clinical and radiological characterization of patients recently hospitalized with SARS-CoV-2 pneumonia.
Methods: Prospective observational study of hospitalized patients with severe or critical COVID-19, according to WHO criteria, between January and May 2021. Patients were re-evaluated 8 to 12 weeks after hospitalization. Demographic, clinical and imaging data were analyzed. Reassessment thoracic computed tomography (tCT) scan was performed and tCT features were classified into two groups: inflammatory changes (ground-glass opacity and consolidation) and fibrotic/reticular lesions (parenchymal bands, bronchiectasis and architectural distortion). Involvement of each lung lobe was quantified with a score of 0-5 points, as follow: 0: imperceptible changes, 1: < 5%, 2: 6-25%; 3: 26-50%, 4: 51-75% and 5: >75% of a lobe. Points of each lobe were added, with a maximum score of 25.
Results: A total of 88 patients were included, 60.2% (n = 53) were male and the mean age was 65.0 years (SD: 12.2). 76 patients (86.6%) were still symptomatic 8 to 12 weeks after hospitalization. Respiratory residual symptoms included dyspnea (n = 6; 6.8%), cough (n = 8; 9.1%), fatigue for small efforts (n = 11; 12.5%), fatigue for moderate efforts (n = 41; 46.6%) and reduced exercise tolerance (n = 13; 14.8%). Cognitive complaints were also present, such as problems with memory (n = 29; 32.9%) and concentration (n = 11; 12.5%). Other symptoms included insomnia (n = 15; 17.0%), headaches (n = 10; 11.4%), myalgia (n = 9; 10.2%), anosmia and ageusia (n = 7; 8.0%), vision changes (n = 7; 8.0%) and alopecia (n = 7; 8.0%). Different levels of abnormality in the tCT scans were still found in 69 patients (84.8%). 17 patients (19.3%) had only inflammatory lesions involving < 5% of the lung parenchyma. The remaining 55 patients (62.5%) had a mean radiological score of 8.8 (SD: 2.5). Inflammatory changes were found in 46 patients (52.3%), such as ground-glass opacity (n = 43) and/or consolidation (n = 4). Fibrotic/reticular patterns were present in 34 patients (38.6%), with parenchymal bands (n = 25), bronchiectasis (n = 21) and/or architectural distortion (n = 8). Both types of lesions coexisted in 25 patients (28.4%). The dominant location of lesions was the lower lobes, with similar involvement of the right lung and left lung. Of the 33 patients with negligible changes in tCT, 20 (60.7%) maintained respiratory symptoms (dyspnea n = 1; fatigue for small efforts n = 3, fatigue for moderate efforts n = 14 and reduced exercise tolerance n = 5). Associations between radiological changes and clinical features were evaluated. Although fatigue for small efforts was associated with the presence of fibrotic/reticular changes, this association was not statistically significant ($p = 0.08$). No other correlation was found.
Conclusions: In this study, no correlation between clinical and radiological changes 8 to 12 weeks after SARS-CoV-2 pneumonia was found. This reinforces the importance of a complete reassessment of these patients, including clinical and radiological evaluation, in order to truly assess short-term sequelae of SARS-CoV-2 pneumonia.

Keywords: *COVID-19. Sequelae. SARS-CoV-2 pneumonia.*

CO 026. ONAF: ANALYSIS OF ITS USE AND FAILURE PREDICTORS IN PATIENTS WITH IR TYPE 1 ASSOCIATED WITH COVID-19 OUTSIDE THE ICU

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Introduction: Respiratory failure associated with COVID-19 infection is a common manifestation in these patients. During the first outbreak of the pandemic, orotracheal intubation was performed early versus the second and third outbreaks in which the use of ventilatory support with non-invasive ventilation (NIV) and high-flow oxygen therapy (ONAF) became an alternative, even more outside intensive care units.
Objectives: To analyze the cohort of patients supported in the context of a general ward with ONAF and understand the benefits and factors that predict success/failure of ONAF in this population.
Methods: Cohort study, single-centre, retrospective, with patients observed from 10/01/2020 to 03/31/2021 with COVID19 infection, treated with ONAF as 1st line outside the ICU. Analysis of demographic, comorbidities and analytical data as predictors of ventilation success/failure. Progression to invasive mechanical ventilation (IMV) at any time during treatment was considered as failure.
Results: During the period, we analyzed 40 patients who underwent therapy with ONAF in the general ward, either because of the limitation of places in intensive care units, or because of the availability of therapy in the ward. Of these, 29% (n = 12) evolved with the need for IMV, with an average age of 76 years and 58% (n = 7) male and the vast majority, 83% (n = 10) had a history of Hypertension Arterial (HTA). The PaO2/FiO2 on admission was on average 101 and ONAF was introduced on the 4th day on average. In this group, only one patient had therapeutic/DNR limitation. Rox score and SOFA score were calculated after the start of ONAF, with a mean of 3.73 and 2.6, respectively. Analytically, they presented an average of 1.7 ng/ml of procalcitonin, 185.66 mg/ml of PCR, 9.37×10^3 uL of leukocytes, 1,314 ng/ml of D-dimers, 429 U/L of DHL and 1,456 ng/ml of ferritin. The mortality rate was 66% (n = 8). Regarding patients in whom ONAF was considered successful, there was no significant

difference regarding the average age (77 years) and there was no appreciable difference between genders (53% men, n = 15 and 46% women, n = 13). 32% (n = 2) met overweight/obesity criteria (BMI > 25 Kg/m^2) and 60% (n = 17) had a history of HTA. PaO2/FiO2 on admission was on average 85 and ONAF was also introduced on the 4th day on average. Mean ROX score was 3.32 and SOFA score was 3. Analytically, they had an average of 0.104 ng/ml of procalcitonin, 103 mg/ml of CRP, 9.64 × 10^3 uL of leukocytes, 1.207 ng/ml of D-dimers, 439 U/L of DHL and 806 ng/ml of ferritin. Of these, only 42.8% (n = 12) had no intervention limits. The mortality rate was 42.8% (n = 12).
Conclusions: ONAF is increasingly a key therapy in the treatment of patients with COVID-19 infection and its early use can prevent the evolution in need of IMV. Despite the small number of patients observed and the need for more studies with larger samples, it was possible to conclude that there was no significant difference between age, sex and comorbidities between the two groups analyzed and that the mortality rate is considerably higher in patients who required VMI.

***Keywords**: High flow oxygen therapy. COVID-19. Respiratory failure.*

CO 027. PREDICTIVE FACTORS IN THE FUNCTIONAL EVOLUTION OF PATIENTS WITH SEVERE COVID-19

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Introduction: Several questionnaires and tools have been developed to assess the symptoms, degree of dyspnea and physical exercise capacity of patients after SARS-COV-2 infection. The C19-YRS questionnaire was developed to assess the need for long-term rehabilitation in patients with COVID-19. The "1-minute sit-to-stand test" (1-MSTST) is an objective test that allows you to quickly and effectively assess the physical capacity of patients with chronic respiratory disease.
Objectives: Prospective observational study in patients with a previous hospitalization in CHO with severe or critical COVID-19 to determine the poor prognostic variables described in the literature as related to the "post-COVID syndrome".
Methods: Evaluation in an outpatient clinic in the period January-May 2021, including all patients who completed the questionnaire or performed the 1-MSTST. Analysis of demographic data and performance of parametric tests to compare the different variables and the results of the test and questionnaires used.
Results: A total of 72 patients were included, with a mean age of 65 ± 11 years, of which 61.1% (N = 44) were male. 83.3% (N = 60) had ≥ 1 comorbidity, the most frequent being arterial hypertension (59.7%), dyslipidemia (48.6%), chronic respiratory diseases (34.7%) a diabetes mellitus (33.3%) and heart failure (8.3%). In the objective assessment of patients (1-MSTS): The number of sit-to-stands performed in 1min is negatively correlated with obesity and difficulty concentrating ($p < 0.05$). Lower SpO2 values prior to testing were significantly correlated with COPD, HF, complaints of fatigue on mild exertion and cough ($p < 0.05$). Lower SpO2 values after the test are correlated not only with COPD, HF and fatigue on light exertion but also with ICU admission ($p < 0.05$). Higher values on the BORG scale after performing the test correlate with fatigue for small/medium efforts with very high significance ($p < 0.001$), with dyspnea and headaches ($p < 0.05$). In the subjective assessment of patients (questionnaire C19-YRS): After SARS-COV-2 infection, 59% of patients (N = 38) reported a perception of poorer quality of life. Lower values in the global health assessment, prior to SARS-CoV-2 infection, correlate with the existence of comorbidities (mean = 7.85 points, max value = 10). After SARS-CoV-2 infection, lower values correlated with ICU admission and memory impairment (mean = 6.27 points). There is no correlation between the affected lung area on the initial CT-Chest or the length of stay with the subjective and objective assessment of patients (1-MSTST; C19YRS).
Conclusions: Most patients report a deterioration in their quality of life, with a difference of 1.57 total points in the C19-YRS, particularly in patients who required an ICU and in patients with neurological symptoms after COVID-19. There seems to be no correlation between the area of the affected lung or the prolonged length of hospital stay with the assessment of the patient in consultation. Patients with complaints of tiredness due to small efforts have worse results in both assessments, confirming the physical deconditioning of those patients.

***Keywords**: COVID-19. Questionnaire. Evolution.*

CO 028. HIGH-FLOW OXYGEN THERAPY VS CONTINUOUS POSITIVE AIRWAY PRESSURE IN PATIENTS WITH ACUTE HYPOXEMIC RESPIRATORY FAILURE AND SARS-COV-2 PNEUMONIA: A SINGLE CENTER RETROSPECTIVE COHORT STUDY

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Introduction: The magnitude of the SARS-CoV-2 pandemic placed an unprecedented pressure on the intensive care units. Different modalities of Non-Invasive Respiratory Support (NIRS) have been recommended for the initial management of COVID-19 induced acute respiratory failure as means of avoiding endotracheal intubation.
Methods: This is a retrospective study involving adult patients, during the second wave of the respiratory pandemic of SARS-CoV-2 in Portugal (Sept 2020- Feb 2021), who were considered fit for invasive ventilation. We compared the failure rate of High Flow Oxygen therapy (HFOT) versus continuous positive airway pressure (CPAP) in the management of acute hypoxemic respiratory failure of COVID-19 pneumonia patients in a non ICU setting (Infectious Diseases Ward). Failure was defined as a change to another respiratory support modality or endotracheal intubation.
Results: Of the 129 patients admitted with COVID-19 pneumonia, 45 met the inclusion criteria, of which 32 patients initiated HFOT and 13 initiated CPAP. Among baseline characteristics, age and time between symptom onset and treatment was not significantly different between the HFOT and CPAP groups. HFOT had a higher failure rate compared with CPAP (87.5% for HFOT [n = 28 out of 32] *vs.* 53.8% for CPAP [n = 7 out of 13], P 0.022). Among the 28 patients who failed HFOT, 71.4% were intubated and required mechanical ventilation. On the other hand, all seven patients who failed CPAP were intubated and mechanically ventilated. Of the patients who progressed to ETI, the median time for failure was significantly lower in the HFOT group. No significant difference was observed among the two groups in terms of mortality (31.3% for HFOT [n = 10 out of 22] *vs.* 15.4% [n = 2 out of 13], P 0.46).
Conclusions: Published studies are extremely heterogeneous addressing the application of NIRT in COVID-19 related acute respiratory failure. Success rate in avoiding ETI has been described, on average, 60% for HFOT and 55% for CPAP. This retrospective study with a small sample size population shows a higher rate of failure, namely in the HFOT group, however it should be recognized that mean PaO2/FiO2 in those studies were on average 118 in CPAP studies and 105 in HFOT studies. In this study, the mean initial PaO2/FiO2 ratio in the HFOT group was lower (M 90.49; SD 19.10), a value that is statistically different from the previous studies ($p < 0.01$) suggesting more advanced disease when NIRS was started. Further prospective randomized trials are needed to evaluate the effectiveness of NIRS treatment.

Keywords: *Acute hypoxemic respiratory failure. SARS-CoV-2. COVID-19. Non-invasive respiratory support. High-flow oxygen therapy. Continuous positive airway pressure.*

CO 029. SNAIL ALLERGY: ASTHMA AND/OR ANAPHYLAXIS?

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Introduction: Snail is a frequently consumed food in Southern Europe, and snail allergy is a condition that is rarely reported in the literature. Snail allergy frequently occurs in asthmatic patients and may manifest predominantly or exclusively with respiratory symptoms in the context of severe anaphylactic reaction.
Objectives: To describe cases of IgE-mediated snail anaphylaxis, which presented with predominant respiratory symptoms of exacerbation of asthma.
Methods: We report a series of 5 cases of patients with severe IgE-mediated snail allergy/anaphylaxis. Diagnosis was based on clinical presentation, skin prick tests and specific IgE determinations.
Results: The mean age of patients was 24 years (min 13; max 42). All patients had a clinical history of asthma. The initial clinical presentation in the 5 patients was respiratory symptoms: dyspnea, dry cough and wheezing, treated as asthma exacerbation, with inhaled bronchodilators and systemic corticosteroid therapy. In two cases, glottis edema was identified, and these were treated with intramuscular epinephrine. The diagnosis of snail allergy was made later in an Immunoalergology consultation. The serum specific IgE for the snail had a mean value of 3.17 KU/L (min 0.50, max 12.2).
Conclusions: Snail allergy occurs more frequently in patients with a history of asthma and presents with severe respiratory symptoms in the context of anaphylactic reaction. Therefore, it needs a specific therapeutic approach that includes the administration of adrenaline. It is important to be alert to the differential diagnosis between exacerbation of asthma and anaphylaxis related to food allergy, in order to adequately treat and prevent mortality.

Keywords: *Snail allergy. Asma. Anaphylaxis.*

CO 030. HEMATOLOGIC MALIGNANT PLEURAL EFFUSION AND LENT SCORE

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Introduction: Despite Hematologic Malignant Pleural Effusions(HMPE) have a better overall prognosis according to LENT prognostic score(LENTs), this could be altered by the type of haemathological cancer(HC) and this isn't usually regarded.
Objectives: We aim to understand the effect of the type of HC on HMPE prognosis and to better characterize this patients.
Methods: A two-year retrospective study was performed on hospitalized patients with HMPE and demographic, clinical and analytical data and comorbidities were reviewed. The statistical analysis was performed by appropriate methods using SPSS version 22.0.
Results: Of 34 selected patients, 52.9% were men, with median age 73.5 years. The median (± IQR) ECOG, Charlson and LENT scores were 1 ± 0.67, 3 ± 1.29 and 2 ± 0.97, respectively. 22 have died (64.7%), of which 54.5% in the first 30 days; 54.5% were men. Survival time ranged from 1 to 726 days, with an average of 39 days. The overall 1-year survival was 14.7%. Diffuse large B-cell lymphoma was the most common, with 50% death proportion (6 of 12). Acute myeloid leukemia and marginal zone lymphoma had the highest letality (3 of 3 and 2 of 2 respectively). T- lymphoblastic, mantle cell and follicular lymphomas and chronic lymphoid leukemia had 75% (3 of 4), 75% (3 of 4), 50% (3 of 6) and 33% (1 of 3) letality, respectively. Most pleural effusions were unilateral (94.1%) and half had a sero-hemorrhagic appearance. 2 were chylothoraces. The median pleural fluid LDH, total protein, pH and seric NLR were 494, 3.5, 7.59 and 6.23, respectively. HC type (p = 0.029, 95%CI: 0.61-0.97) significantly relates to the risk of death according to the Cox regression model.
Conclusions: Despite the small sample, HMPE has a high mortality. Besides LENTs variables, type of HC also had importance when determining prognosis for MPE. Further studies are needed.

Keywords: *Malignant pleural effusion. Prognosis.*

CO 031. EFFECT OF A BACTERIAL/VIRAL FILTER ON VENTILATION IN CARDIOPULMONARY EXERCISE TESTING

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Introduction: Due to the outbreak of the COVID-19 pandemic, many pulmonary function laboratories suspended cardiopulmonary exercise testing (CPET). There are some concerns regarding the higher risk of aerosol production and virus transmission during CPET. Some studies are emerging to work around this situation by assessing the potential of surgical or N95 masks and bacterial filters to mitigate this hazard. However, questions related to increased ventilator resistance and water vapour saturation oppose to its use, since it might compromise CPET's results.
Objectives: To evaluate the impact of a bacterial/viral filter on ventilation during CPET.
Methods: Ten healthy volunteers performed two incremental cycling CPETs, based on Wasserman's protocol, starting with 3 minutes at rest, then 3 minutes cycling without load, followed by cycling with incremental load up to volitional exhaustion, defined as a drop in cadence of 10 rpm for 5 consecutive seconds despite verbal encouragement. A PFT filter (MicroGard II Vyaire Medical GmbH) was used. Each subject performed the CPETs approximately 2 hours apart, with and without the filter. The subjects were familiar with the test. The CPET's results for the same subject were compared using the same incremental load. Dyspnea and leg fatigue was evaluated using Borg's scale every 3 minutes.
Results: The subjects were mostly male gender (60%), with a mean age was 32.9 years-old (± 6.1) and a mean body mass index of 23.6 Kg/m^2 (± 3.6). We found a significant increase in oxygen consumption (VO2) in CPETs performed with the filter, both at anaerobic threshold (46.8% *vs.* 52.5%, p-value 0.032) and at the peak exercise (82.0% *vs.* 90.5%, p-value 0.006). No difference was found in minute ventilation (VE) at the peak exercise (68.8 L/min *vs.* 72.3 L/min, p-value 0.288) neither in breathing rate (34.1cpm *vs.* 34.1cpm, p-value 1). After maximum load reached, we found a significant increase in VE in CPETs performed with the filter (31.1 L/min *vs.* 36.1 L/min, $p < 0.001$), during the cooling down phase. The use of the filter did not have an impact on effort, as we found no significant difference in dyspnea and leg fatigue. Also no significant difference was found on peripheral oxygen saturation at the peak exercise. VE's and BR's evolution during CPETs are presented in graphic 1 and 2 respectively.
Conclusions: The use of a filter does not significantly impact ventilation in CPETs performed by heathy individuals, and a difference in VE was only observed in the cooling down phase that may not have clinical importance. A perspective for future studies should include larger population samples and the assessment of patients with respiratory diseases and muscle weakness.

Keywords: *Cardiopulmonary exercise testing. Filters. Ventilation. COVID-19.*

CO 032. CARDIOPULMONARY EXERCISE TESTING SURGICAL RISK EVALUATION FOR LUNG RESECTION

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Introduction: Lung cancer is the most lethal neoplastic disease (~1.8M deaths in 2020), and lung resection surgery, when indicated, is the therapeutic intervention associated with better survival. The frequent association of lung cancer and COPD, with smoking as the main risk factor in common, often implies a significant decrease in ventilatory reserve and an increased risk of complications and perioperative mortality. Cardiopulmonary Exercise Testing (CPET) is the gold standard method for operative risk stratification. Peak oxygen uptake (VO2peak) has been the most used marker, however in 2016 the American Heart Association (AHA) proposed the inclusion of other parameters to obtain a more accurate assessment, such as the anaerobic threshold, the minute ventilation/carbon dioxide production slope or the blood pressure response during the test, among others, with the same importance given to all of them. The authors present the characterization of a cohort of patients who underwent CPET for operative risk assessment before performing pulmonary resection surgery and the comparison between uni and multifactorial risk stratification.
Methods: Patients who underwent CPET in our institution Respiratory Function Laboratory, for operative risk assessment, between January 2015 and April 2021, were included in the analysis. The criteria for performing this exam in these patients were FEV1 and/or DLCO measurements lower than 60% of the predicted value. Regarding VO2peak values, 20 mL/Kg/min was considered as acceptable risk for pneumectomy, and no pulmonary resection of any kind was recommended with values below 10 mL/Kg/min. Between these two levels, resections inferior to pneumectomy were considered safe. Since the AHA gives the same weight to all parameters used in the stratification, a value from 1 to 4 was assigned to each one, depending on whether the value was considered as low risk, intermediate low, intermediate high or high and the average was calculated in order to obtain a comparable objective value.
Results: One hundred patients (25 women) were included in the study, with a mean age of 67 years, 89 had smoking history. We identified 4 patients with values below 10 mL/Kg/min, 41 with values between 10 and 15 mL/Kg/min, 49 with values between 15 and 20 mL/Kg/min and 6 with values above 20 mL/Kg/min. The proposed surgery was not recommended in 17 of the patients evaluated. Using the assessment method proposed by the AHA, we verified that the 4 patients considered at high risk by VO2peak become intermediate risk patients, among the 90 at intermediate risk, 24 (26.7%) would have low risk and half of the 6 considered to be at low risk become intermediate risk patients.
Conclusions: We emphasize the importance of CPET in the preoperative evaluation of pulmonary resection surgery in patients with functional impairment. In this group of patients, 83% were considered fit for the proposed surgery with curative intent. Multifactorial evaluation seems to have a special impact on better characterization of intermediate and high risk patients, opening the possibility of proposing more aggressive interventions in some of these patients.

Keywords: *Cardiopulmonary exercise testing. Lung cancer. Lung resection.*

CO 033. USEFULNESS OF 24-HOUR HOME MONITORING OF OXYGEN SATURATION IN PATIENTS WITH INTERSTITIAL LUNG DISEASE

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Introduction: Exercise-induced hypoxia is a characteristic feature of many interstitial lung diseases (ILD). During the COVID-19 pandemic, assessments of exercise capacity became unavailable in most centers. Our aim was to evaluate the feasibility and usefulness of home 24-hour pulse oximetry in patients with ILD.
Methods: We recruited patients with ILD that presented >10% fibrosis extension on chest computerized tomography and DLCO% < 80. Oxygen saturation (SpO2) was monitored for 24 hours using an ambulatory pulse oximeter (NONIN 7500). While being monitored, patients recorded a detailed diary with daily activities and used a smartphone pedometer app to count steps and walking distance (GoogleFit). Patients were required to walk at least 500 meters and have a heart rate > 100 bpm during exercise to be included.
Results: A total of 13 patients were enrolled, but 2 were excluded for physical inactivity during monitoring. The majority of patients were male (90.9%, n = 10) with a median age of 72 years (range 59-75), whom were followed for idiopathic pulmonary fibrosis (n = 4), chronic hypersensitivity pneumonitis (n = 3), unclassifiable ILD (n = 3) and nonspecific interstitial pneumonia (n = 1). Regarding treatment, 5 patients were being treated with antifibrotic drugs, 3 with immunosuppressants and 1 with a combination of both classes. Contemporary pulmonary function tests showed median DLCO 37.7% and median FVC 71.5% of predicted value. All patients reported exertional dyspnea and none was under supplemental oxygen therapy. Through 24-hour pulse oximetry analysis, 9 patients (91.8%) presented hypoxia during exercise. In these patients, the median number of desaturation events (defined as drop in SpO2 by at least 4% for a minimum duration of 10 seconds) was 140 (range 77-267), each with a median duration of 41 seconds and an adjusted index of 6 events per hour. From the detected desaturation events, a median of 34.7% were lower than 88% SpO2. Average SpO2 was 92.9 ± 1.2% and median minimal SpO2 was 75% (range 46-82%). Mean walked distance was 4.1 ± 2.1 kilometers. Average pulse was 74 ± 7 bpm and the median number of pulse events (defined as change in rate by at least 6 bpm for a minimum duration of 8 seconds) was 140 (range 81-193). Additionally, hypoxia during sleep was detected in one patient.
Conclusions: Home 24-hour pulse oximetry is a promising tool in ILD management, as it can detect exercise-induced hypoxia during the daily life of patients, usually not predicted from dyspnea grade and SpO2 at rest. Further research is needed to validate 24-hour pulse oximetry diagnostic performance and evaluate its cost-effectiveness.

Keywords: *Pulse oximetry. Interstitial lung diseases. Exercise-induced hypoxia. Home monitoring.*

CO 034. BODY MASS INDEX REVISITED: WHAT IMPACT IN LUNG FUNCTION OF ASTHMATIC PATIENTS?

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Introduction: The association between asthma and obesity is well recognised and a public health issue. Obesity is linked with increased pro-inflammatory cytokine production and negatively impacts ventilatory mechanics, particularly lung volumes. Obese asthmatics present poorer disease control and quality of life but the impact of BMI in lung function of asthmatic patients is less well-established.
Objectives: To characterize lung function tests (LFT) of asthmatic patients and correlate results with biological and biometrical parameters.
Methods: LFTs of patients with a clinical diagnosis of asthma were retrospectively collected and analysed for demographical and biometrical data and the following parameters: FVC, FEV1, FEV1/FVC, FEF25-75%,TLC, RV and Rtot and corresponding percentages of predicted (%). Baseline characteristics and lung function were examined in different genders and in 4 age groups and BMI classes. The

differences were analysed using ANOVA test, Student's t-test and Mann-Whitney U test, as appropriate. Differences in lung function according to gender, age and BMI were further explored using linear and multivariate regression analyses.
Results: Five hundred and nine LFTs of different patients were collected. Mean age was 39.87 ± 21.34 years. Females (n = 330, 64.8%) were significantly older (mean difference 6.88 years, p < 0.01) and had higher BMI (mean difference 1.97 kg/m^2, p < 0.01), FVC% (mean difference 4.37%, p < 0.01), FEV1% (mean difference 4.51%, p < 0.05), TLC% (mean difference 6.30%, p < 0.01) and RTOT% (mean difference 13.8%, p < 0.05). Bronchodilator testing demonstrated greater relative increase in FVC (ΔFVC%) (mean difference 4.51%, p < 0.05), but not in FEV1 (ΔFEV1%) (mean difference 0.84%, p = 0.30) in this group. Obese patients (n = 132) presented lower FEV1% (mean difference 7.77%, p < 0.01) and FEF25-75% (mean difference 15.7%, p < 0.01), increased RTOT% (median difference 24.9%, p < 0.01) and a greater ΔFEV1% (mean difference 1.97%, p < 0.05) and ΔFVC% (mean difference 2.2%, p < 0.01). On the other hand, underweight individuals (n = 40) showed lower FVC% (mean difference 5.79%, p < 0.01), higher FEF25-75%% (mean difference 12.96%, p < 0.01) and higher RV% (mean difference 24.8%, p < 0.01) than the remainder. Linear regression analyses revealed very weak correlations between FEV1%, ΔFVC% and BMI (R = 0.19, b = 0.64, p < 0.01 and R = 0.19, b = 0.18, p < 0.01) and weak correlation between these parameters and age (R = 0.31, b = 0.30, p < 0.01 and R = 0.30, b = 0.08, p < 0.01). FEF25-75%% was weakly correlated with BMI and moderately correlated with age (R = 0.26, b = 1.47, p < 0.01 and R = 0.43, b = 0.70, p < 0.01, respectively). RTot% was very weakly correlated with BMI and weakly correlated with age (R = 0.16, b = 1.77, p < 0.01 and R = 0.30, b = 0.64, p < 0.01).
Conclusions: Our data suggests obesity has significant negative impact in lung function of asthmatic patients. Mobilizable volumes and airways resistance worsened with increasing age and weight. Bronchodilator response, on the other hand, appears to increase with these factors but the findings are not uniform and their clinical significance remains controversial. Underweight asthmatics appear to show lower FVC% values and higher RV% than the remainder but small sample size limits interpretation of these data. Further studies to confirm these findings are required.

***Keywords**: Lung function tests. Asthma. Body mass index. Obesity.*

CO 035. PREDICTIVE FACTORS OF SEVERITY AND CARDIOVASCULAR RISK IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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Introduction: Obstructive sleep apnea (OSA) is considered an independent risk factor for cardiovascular diseases (CVD), and arterial hypertension (AH) has the most established relationship. The severity of OSA, measured by the apnea-hypopnea index (AHI), seems to have little correlation with symptoms and cardiovascular risk. On the other hand, nocturnal desaturation, namely intermittent hypoxemia, has been recognized as a potentially important factor to the pathogenesis of CVD related to OSA.
Objectives: Characterize patients with OSA according to clinical characteristics and the sleep study (SS) level III and identify the factors that better correlate with cardiovascular risk.
Methods: Patients with OSA diagnosed in 2020 were analysed retrospectively. Clinical and anthropometric data and sleep study variables were analysed. Significant nocturnal desaturation (SND) was considered when sleep time with O2 saturations < 90% (T90) was ≥ 20% of total sleep time. CVD was defined as the presence of at least one of the following pathologies: hypertension, coronary artery disease (CAD), stroke and atrial fibrillation (AF). Patients with pulmonary diseases were excluded.
Results: We included 219 patients with OSA, with a predominance of males (64%), with a mean age of 59 ± 12 years and a mean body mass index (BMI) of 31.1 ± 4.4 kg/m^2. Regarding symptoms, 211 (96.3%) had snoring, 138 (63%) excessive daytime sleepiness (EDS) and 28 (12.8%) insomnia. About cardiovascular disease, 112 (51%) had hypertension, 11 (5%) CAD, 9 (4.1%) stroke and 10 (4.6%) AF. In sleep study there was a mean AHI of 31.2 ± 18.6, a mean oxygen desaturation index (ODI) of 30.4 ± 19.4, a mean oxygen saturation of 91.6 ± 6.9, a mean minimum saturation of 77.7 ± 10.4 and SND was identified in 41 patients (18.7%). Factors associated with a significantly increased cardiovascular risk in patients with OSA were ODI (p = 0.041), minimum O2 saturation (p = 0.045), presence of DNS (p = 0.032) and a high BMI (p = 0.015), contrarily to what was observed with the AHI (p = 0.061) and EDS (p = 0.418). Otherwise, nocturnal hypoxemia, measured through ODI and T90, was significantly associated with male gender, obesity and AHI.
Conclusions: Obesity has been shown to be a good predictor of the severity of OSA, nocturnal desaturation and cardiovascular risk, so it should be taken into account when prioritizing sleep studies. It is worth highlighting the importance of nocturnal hypoxemia in patients with OSA, namely due to its strong association with cardiovascular risk. Therefore, parameters such as ODI, T90 and minimum O2 saturation, more than the AHI, should be taken into account when evaluating the patient and choosing the treatment. The excessive sleepiness phenotype, contrary to what has been described, was not associated with an increase in cardiovascular risk or the severity of OSA.

***Keywords**: Obstructive sleep apnea. Cardiovascular risk. Nocturnal desaturation.*

CO 036. SLEEP-DISORDERED BREATHING IN WOLFRAM'S SYNDROME - A NEAR-FATAL EVENT

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Case report: Wolfram's syndrome, also called DIDMOAD (diabetes insipidus, diabetes mellitus, optic atrophy and deafness), is a rare autosomal-recessive genetic disorder associated with childhood-onset diabetes mellitus, optic nerve atrophy, hearing and vision loss, motor impairment and neurodegeneration. A high prevalence of sleep-disordered breathing (SDB) in patients with Wolfram syndrome has been reported. However, the association between these diseases and the impact of SDB on these patients is poorly explored. We report a case of a patient diagnosed with Wolfram syndrome and obstructive sleep apnea (OSA). A 33-year-old man with a previous diagnosis of diabetes mellitus and bilateral optic nerve atrophy was found unconscious at home. Upon arrival of the advanced prehospital care team, the patient was unarousable and unresponsive, had signs of recent vomiting, peripheral oxygen saturation (SpO2) < 50%, and a Glasgow Coma Scale (GCS) score of 3, therefore orotracheal intubation and invasive mechanical ventilation were required. At the hospital, the emergency medical team began the immediate stabilization of the patient and a diagnostic approach. The chest image showed opacities in the dependent lung segments on the right side, so an aspiration pneumonia was diagnosed and treated. The remaining clinical, laboratory, cardiac and neuroimaging investigation did not identify any condition or disorder (metabolic abnormalities, intoxications/overdose, neurological injuries or deficits) for the patient's neurological status. Electroencephalography (EEG) did not detect seizures or other EEG patterns suggestive of toxic metabolic abnormalities. After 24 hours, the patient had full recovery of consciousness and he was extubated after 3 days. During hospitalization, prolonged periods of

apnea during sleep were detected by the medical team. In addition, patient reported snoring, frequent morning headaches, multiple night awakenings, gasping, nocturia, and sleepiness (Epworth Sleepiness Scale (ESS) score of 17). A sleep study was performed using a type 3 monitoring device at the initial diagnosis work-up. The total apnea-hypopnea index (AHI) was 15.3/h (all apneas and hypopneas detected were obstructive), oxygen desaturation index (ODI) 10.5/h, mean SpO2 of 93% and sleep time with SpO2 below 90% (T90) was 14%. Long apneas and hypopneas were detected, the longest ones were 245 seconds and 442 seconds, respectively. Positive airway pressure (PAP) therapy was initiated with an auto-titrating positive airway pressure (APAP). An in-laboratory PSG was performed for APAP titration to reduce/eliminate obstructive events and nocturnal hypoxemia during sleep. The efficacy of PAP therapy was confirmed and the patient was discharged from the hospital. One month later, the patient was re-evaluated in a medical consultation for sleep-disordered breathing, he had adequate compliance, reported restful sleep and improved daytime sleepiness and morning headaches. The diagnosis of Wolfram syndrome was genetically confirmed (mutations in WFS1).
Discussion: In this case, the patient had undiagnosed and untreated OSA, with prolonged periods of apnea and reduced SpO2, which may have predisposed him to the development of a near-fatal event during sleep. Addressing SDB in patients with Wolfram syndrome could improve their quality of life and potentially their longevity.

Keywords: *Wolfram syndrome. Obstructive sleep apnea. Neurodegeneration. Nocturnal hypoxia.*

CO 037. ASSESSMENT OF THE SEVERITY OF OBSTRUCTIVE SLEEP APNEA BEYOND THE AHI: THE BAVENO CLASSIFICATION

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Introduction: The classification of the severity of obstructive sleep apnea (OSA) based on the apnea/hypopnea index (AHI) does not reflect the heterogeneity and prognosis of the disease. Recently, the Baveno classification proposes a new assessment system that includes symptoms and comorbidities, dividing patients into four phenotypes.
Objectives: Evaluate the distribution of patients with OSA according to the Baveno classification and its translation into adherence and daytime sleepiness at 6 months of treatment.
Methods: Prospective study including patients diagnosed with OSA between January and July 2021. Patients were divided into 4 groups (AD) according to the Baveno classification, taking into account the symptoms (daytime sleepiness, insomnia and hypersomnia) and the presence of comorbidities (uncontrolled HTA, HF, stroke and DM). Compliance with PAP treatment and Epworth Sleepiness Scale (ESS) values were obtained 6 months after initiation of therapy.
Results: A total of 91 patients (84% male, 58 ± 13 years, BMI 30 ± 4 kg/m^2) were included in the study. The ESS mean was 10 ± 6 and 51% of the patients had a score < 11. The median AHI was 28.4 events/hour (14.2; 36.0) and the oxygen desaturation index (ODI) was 20.0 events/hour (11.4; 34.0). The average peripheral oxygen saturation (SpO2) was 93% (92;94), the minimum SpO2 82% (76.86) and the time with SpO2 < 90% (T90) was 3% (0.5;13) and 9.6 minutes (2.5;48.4). Patients were distributed into the four Baveno classification groups according to defined parameters: group A: 30%; group B: 35%; group C: 17%, group D: 19%. The mean age was higher in group C (70 ± 13 years) and lower in group A (52 ± 12 years). There were no differences regarding gender and BMI between the groups. With regard to respiratory events, there were no differences in AHI and ODI between groups. On the other hand, T90 had higher values in patients with comorbidities (C,D). With regard to treatment, the prescription of PAP was higher in patients with comorbidities (C,D), and adherence to this treatment at 6 months was also higher in this group. In the subgroup of compliant patients, there was a statistically significant decrease in daytime sleepiness at 6 months in all groups, with more significant differences observed in groups B and D.
Conclusions: The integration of symptoms and comorbidities from the Baveno classification distributes patients with OSA evenly across the different phenotypes, regardless of the AHI value. The treatment decision was linked to the phenotype and patients with comorbidities (C,D) were the ones who most obtained a PAP prescription, and it was also in this group that there was the greatest adherence to treatment at 6 months. Daytime sleepiness improved in all groups, although with greater emphasis in the most symptomatic (B,D). Thus, this results show that the Baveno classification allows a better stratification of the population with OSA and can provide better guidance for the therapeutic decision.

Keywords: *Obstructive sleep apnoea. Baveno classification.*

CO 039. ASTHMA AND COVID: DANGEROUS CONNECTION? YES OR NOT?

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Introduction: COVID-19 has spread worldwide causing more than 4 million deaths so far. Despite the studies already published, it is still unclear whether chronic respiratory diseases such as asthma, constitute true risk factors for COVID-19 or are associated with a more severe evolution. These studies are still scarce in Portugal, so investigation of the impact of asthma on susceptibility for the development of a more severe SARS-CoV-2 infection is fundamental. The aim of this study is to describe the epidemiological and clinical characteristics of asthma patients hospitalized for COVID-19 in a hospital in Portugal.
Methods: This is a descriptive and retrospective study, which included 1110 patients hospitalised for COVID-19 in a hospital in northern Portugal, between January 1, 2020 and December 31, 2020. Cases were confirmed in real time by real-time polymerase chain reaction (RT-PCR) of nasal and pharyngeal swabs. Within this universe of individuals, those with an associated diagnosis of asthma were selected and epidemiological, demographic and clinical characteristics (respiratory support, inhalation therapy, severity index and mortality) were analysed.
Results: Patients with asthma accounted for only 3.96% (n = 44) of the total inpatients, and 40.91% (n = 18) were male. The median age was 56.5 years (± 16.41). Comorbidities observed were arterial hypertension 38.64% (n = 17), diabetes mellitus 27.27% (n = 12), obesity 22.73% (n = 10), heart failure 13.64% (n = 6), cardiac arrhythmias 9.10% (n = 4) and chronic obstructive pulmonary disease 6.82% (n = 3). The individuals were classified according to the severity index: 1 in 2.27% (n = 1), 2 in 29.55% (n = 13), 3 in 47.77% (n = 21) and 4 in 20.45% (n = 9). 31.82% (n = 14) of the patients were admitted to the Intensive Care Unit and only 1 death (2.72%) occurred. 25% (n = 11) of the individuals developed a healthcare-associated infection, 9.1% (n = 4) presented urinary infection and 15.91% (n = 7) pneumonia. The respiratory support used was: no respiratory support 15.91% (n = 7), oxygen therapy 52.27% (n = 23), invasive mechanical ventilation (IMV) 13.64% (n = 6) and Helmet-CPAP 18.18% (n = 8). When analysed the inhaler therapy, we highlight that in 22.73% (n = 10) no inhaler was regularly used, 25% (n = 11) used budesonide + formoterol and 20.45% (n = 9) fluticasone + salmeterol.
Conclusions: It is estimated that in Portugal asthma affects 6.8% of the population. The representativeness of asthmatics in the study population is lower than expected, suggesting that asthma is not a risk factor for the development of more severe forms of COVID-19. This finding is reinforced by the low mortality rate in the study population. Control and stabilisation of comorbidities and low-flow oxygen therapy were the most frequent interventions for most in-

dividuals. It is also important to mention that a significant part of the sample did not perform any preventive inhalation therapy and only 15% of the individuals were followed in a Pulmonology consultation. We conclude that, in the population studied, asthma was not associated with a greater risk of severe forms of the disease, nor was it associated with a worse prognosis.

Keywords: *Asthma. COVID-19. Respiratory support. Inhalation therapy.*

CO 040. EPI-ASTHMA - PREVALENCE AND CHARACTERISATION OF PATIENTS WITH ASTHMA ACCORDING TO DISEASE SEVERITY: FIRST DATA FROM AN OBSERVATIONAL, NATIONAL STUDY

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Introduction: Data on the epidemiology of asthma in Portugal were mainly grounded in studies using questionnaires and covering limited age groups. Studies assessing the prevalence of asthma diagnosis and of its sub-groups with more accurate methods are therefore needed.
Objectives: Epi-asthma aims to determine the prevalence of asthma, difficult-to-treat and severe asthma in Portugal. This work aimed to assess the feasibility of the study through the analysis of the first data obtained from Unidade Local de Saúde de Matosinhos (ULSM).
Methods: A population-based nationwide study with a multicentre stepwise approach will be conducted in 38 primary care centres. The stepwise approach in 4 stages, sequentially comprising: Stage 0 - A random sample will be obtained from all registered subjects in community health centre and participants will be invited via a phone call; Stage 1 - Telephone interview survey to assess respiratory symptoms; Stage 2 - Clinical assessment with physical examination and diagnostic tests for diagnostic confirmation; Stage 3 - Characterization of patients with asthma (sub-group) and of patients with difficult-to-treat asthma & severe asthma after 3 months. At stage 3, data will be collected through a follow-up phone call, review of the patient file in Portuguese National Health Service patients' database and CARATm app database (for patients who are willing to use it). At stage 1, 7500 adult subjects registered in the Portuguese National Health Service patients' database will be enrolled. From those, participants that have respiratory symptoms pass to stage 2.
Results: The study started in May 2021 at the ULSM. A total of 1,305 subjects were invited at stage 0, 892 accepted to participate and 573 were interviewed at stage 1 (57% female, average 52 ± SD 16 [min-max 18-89] years). At stage 2, were assessed 148 (57% female; 57 ± 15 [18-89] years). From these, 46 were diagnosis with asthma (57% female; 51 ± 17 [18-82] years), 10 of those without previous diagnosis. Half (52%) had their asthma controlled according to Control of Allergic Rhinitis and Asthma Test (score >24), 26% had at least one exacerbation in the last year and 22% had at least one unscheduled medical visit. A total of 44 (96%) accepted to participate at stage 3, planned to start in august.
Conclusions: The first data show the feasibility of the stepwise approach of EPI-ASTHMA, the first national study that will assess the prevalence of asthma, difficult-to-treat and severe asthma in Portugal. The nature and quality of the collected data will also enable a comprehensive characterization of patients with asthma and better support the clinical management of the disease.

Keywords: *Asthma. Portugal. Prevalence.*

CO 041. PERSISTENT ASTHMA IN 30 PORTUGUESE PRIMARY HEALTHCARE UNITS: DATA FROM THE INSPIRERS PROJECT

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Introduction: Data regarding asthma control in primary healthcare (PHC) is limited. This study aimed to characterize patients with persistent asthma followed in PHC.
Methods: This was a multicentre, observational and descriptive study with a convenience sample. Participants were recruited in 30 PHC units between 12/2019 and 10/2020 (3 months suspension due to COVID-19). The inclusion criteria were patients with persistent asthma under preventive inhaled medication, with at least 13 years old and with access to a smart device. Patients that refused to participate or had another respiratory disease were excluded. Demographic and anthropometric data, smoking habits, age at diagnosis, asthma control according to Global Initiative for Asthma (GINA), pulmonary function (through forced expiratory volume in the first second – FEV1), medication, inhaler adherence (visual analogue scale 0-100) and quality of life (EQ-5D) were collected.
Results: The study included 139 participants, 86% adults and 73% females, with mean age of 34 ± 14 years old and a body mass index of 25 ± 5 kg/m^2. About 11% were active smokers and 36% were second-hand smokers. Median age of asthma diagnosis was 14 (interquartile range, IQR 5-28) years old. According to GINA, asthma was partially controlled in 38% of participants and not controlled in 24%. FEV1 was recorded in only 37% of participants. 66% had, at least, one exacerbation in the last 12 months, 40% needed at least one unscheduled medical visit and 3% required hospital admissions in the same period. Participants had a mean of 1.4 ± 0.5 inhalers prescribed (94% ICS+LABA), with a median adherence of 80 (IQR 55-96). According to the EQ-5D questionnaire, some participants exhibited problems in usual activities (16%), pain/discomfort (26%) and anxiety/depression (43%). Problems related to mobility (8%) and self-care (2%) were uncommon.
Conclusions: Most patients were adults, females, with an asthma diagnosis at young age, had their asthma partially or poorly controlled and had no perception of relevant impact in their quality of life. Results showed the need to develop strategies to improve asthma monitoring and therapeutic adherence, highlighting the insufficient monitoring of lung function.

Keywords: *Primare care. Asthma control. Medication adherence. Quality of life.*

CO 042. COPD PROFILES AND TREATABLE TRAITS USING MINIMAL RESOURCES: IDENTIFICATION, DECISION TREE AND LONGITUDINAL STABILITY

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Introduction: Chronic obstructive pulmonary disease (COPD) is highly heterogeneous and complex. Hence, personalising assessments and treatments to this population across different settings and available resources imposes challenges and debate. Research efforts have been made to identify clinical phenotypes or profiles

for prognostic and therapeutic purposes. Nevertheless, such profiles often do not describe treatable traits, focus on complex physiological/pulmonary measures which are frequently not available across settings, lack validation and/or their stability over time is unknown. **Objectives:** To identify profiles and their treatable traits based on simple and meaningful measures; to develop and validate a profile decision tree; and to explore profiles' stability over time in people with COPD. **Methods:** An observational, prospective study was conducted with people with COPD. Clinical characteristics, lung function, symptoms, impact of the disease (COPD assessment test–CAT), health-related quality of life, physical activity, lower-limb muscle strength and functional status were collected cross-sectionally and a subsample was followed-up monthly over six months. A principal component analysis and a clustering procedure with k-medoids were applied to identify profiles. Pulmonary and extrapulmonary (i.e., physical, symptoms and health status, and behavioural/life-style risk factors) treatable traits were identified in each profile based on the established cut-offs for each measure available in the literature. The decision tree was developed with 70% and validated with 30% of the sample, cross-sectionally. Agreement between the profile predicted by the decision tree and the profile defined by the clustering procedure was determined using Cohen's Kappa. Stability was explored over time with a stability score defined as the percentage ratio between the number of timepoints that a participant was classified in the same profile (most frequent profile for that participant) and the total number of timepoints (i.e., 6). **Results:** 352 people with COPD (67.4 ± 9.9 years; 78.1% male; FEV1 = 56.2 ± 20.6% predicted) participated and 90 (67.6 ± 8.9 years; 85.6% male; FEV1 = 52.1 ± 19.9% predicted) were followed-up. Four profiles were identified with distinct treatable traits. The decision tree was composed by the CAT, age and FEV1% predicted and had an agreement of 71.7% (Cohen's Kappa = 0.62, p < 0.001) with the actual profiles. 48.9% of participants remained in the same profile whilst 51.1% moved between two (47.8%) and three (3.3%) profiles over time. The overall stability of profiles was 86.8 ± 15%. **Conclusions:** Profiles and treatable traits can be identified in people with COPD with simple and meaningful measures possibly available even in minimal-resource settings. Regular assessments are recommended as people with COPD may change profile over time and hence their needs of personalised treatment.

Keywords: *Clinical phenotypes. Profiles. Clusters. Treatable traits. Decision tree. COPD.*

CO 043. EFFECTIVENESS OF UNSUPERVISED PHYSICAL ACTIVITY INTERVENTIONS IN PEOPLE WITH COPD: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Physical inactivity has been associated with poor health outcomes in people with chronic obstructive pulmonary dis-

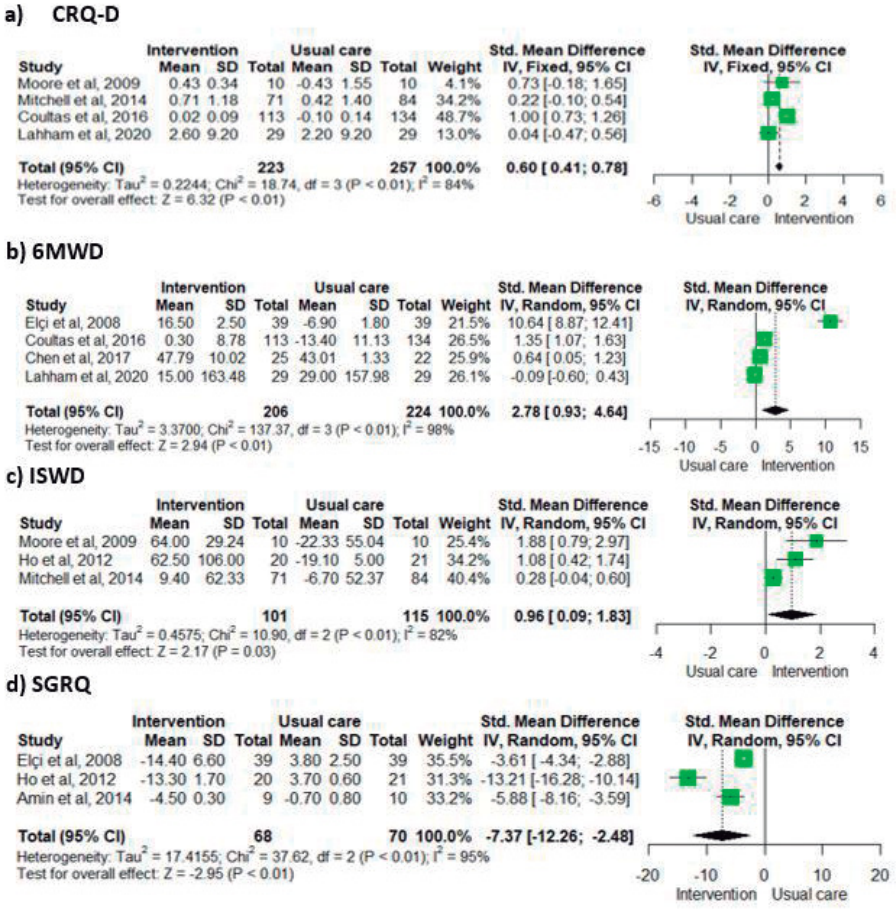

Fig. 1 - Forest plots illustrating the effect of unsupervised PA intervention in: a) Chronic Respiratory Questionnaire – dyspnea domain (CRQ-D), b) 6-minute walk distance (6MWD), c) incremental shuttle walk distance (ISWD), and d) St. George's respiratory questionnaire (SGRQ) total score, in comparison to usual care. Weights are from random-effects.

Figure CO 043A

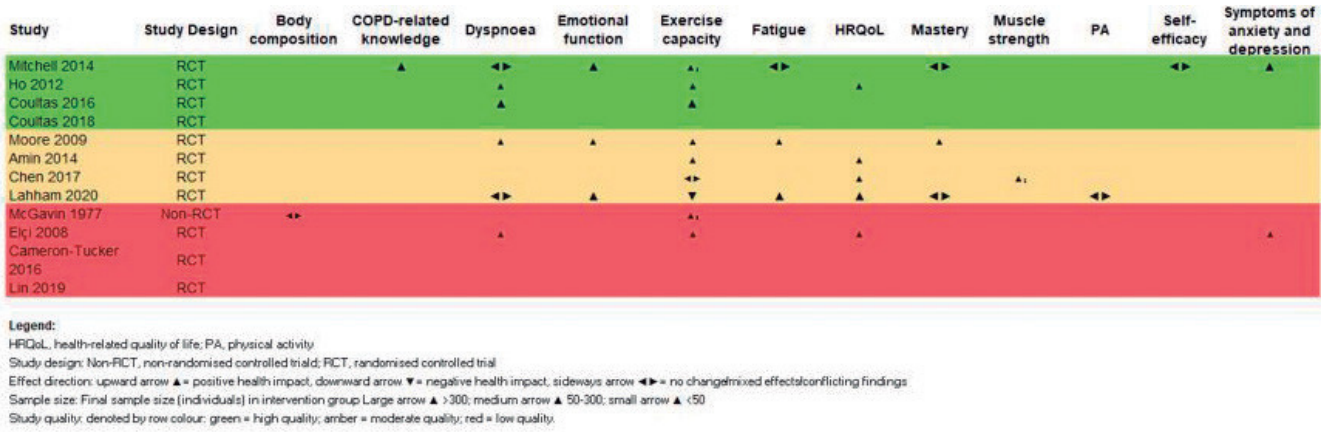

Fig. 2 – Effect direction plot of unsupervised physical activity interventions in people with chronic obstructive pulmonary disease.

Figure CO 043B

ease (COPD), being a risk factor for hospitalisations due to acute exacerbations and early mortality. Therefore, improving physical activity (PA) levels in this population is imperative. Despite the unequivocal benefits of PA in people with COPD, most studies focused on supervised interventions. Evidence about the effectiveness of unsupervised PA interventions in this population is still scarce. Thus, this study aimed to identify and synthesise the effects of unsupervised PA interventions in people with COPD.
Methods: A systematic search was conducted on the Cochrane Library, PubMed, Scopus, Web of science and EBSCOhost databases. Randomised controlled trials and quasi-experimental studies comparing unsupervised PA with usual care, were included. Two independent reviewers screened studies, extracted data and assessed the quality of evidence using the Quality Assessment Tool for Quantitative Studies. Inter-rater agreement analysis was assessed using Cohen's kappa to explore the consistency of the quality assessment. Meta-analysis was conducted using RStudio to assess the effects of unsupervised PA in dyspnoea (Chronic Respiratory Disease questionnaire – dyspnoea [CRQ-D]), exercise capacity (6-minute walk distance [6MWD] and incremental shuttle walk distance [ISWD]) and health-related quality of life (St. George's Respiratory Questionnaire [SGRQ]). The effect direction plot was also performed to synthesise results.
Results: Twelve studies assessing 14 outcomes with 44 measurement tools in 919 participants with COPD (68 years; 59.8% male, FEV1 63.3% predicted) were included. Four studies were rated as strong, four as moderate and four as weak quality. Inter-rater agreement was substantial (Cohen's Kappa = 0.73; 95%CI = 0.40-1.07; percentage of agreement = 83.3%). Most interventions were conducted at home with daily-4x/week sessions for 8-12 weeks. Walking was the most used intervention. Meta-analysis showed significant results for the experimental group in dyspnoea (CRQ-D [ES = 0.60, 95%CI 0.41-0.78]), exercise capacity (6MWD [ES = 2.78, 95%CI 0.93-4.64] and ISWD [ES = 0.96, 95%CI 0.09-1.83]) and health-related quality of life (SGRQ [ES = -7.37, 95%CI -12.26-2.48]) (fig. 1). Using the effect direction plot, our findings also showed that unsupervised PA interventions seem to be effective improving COPD-related knowledge, emotional function, fatigue, muscle strength and symptoms of anxiety and depression (fig. 2). None to minor adverse events and a high adherence rate to such interventions were found.
Conclusions: Walking was the most common unsupervised PA intervention in people with COPD. Unsupervised PA interventions seem to be effective reducing dyspnoea and improving exercise capacity, health-related quality of life, COPD-related knowledge, emotional function, fatigue, muscle strength and symptoms of anxiety and depression in this population. Nevertheless, its application is still limited and high heterogeneity among interventions was observed. Further studies, with robust methodologies, are needed to confirm our results and establish recommendations.

Keywords: *COPD. Physical activity. Unsupervised. Systematic review. Meta-analysis.*

CO 044. EFFECTS OF A PROGRAM OF TELEMONITORING AT COPD

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Introduction: Chronic diseases are one of the biggest challenges for healthcare systems in Europe. Telemonitoring has revolutionized health systems. It allowed patients to self-manage the disease and improve the responsiveness of health systems. COPD is a chronic respiratory disease, but it is increasingly assumed to be a multisystem disease in which comorbidities play an important role, translating into a growing morbidity and mortality only surpassed by cardiovascular diseases.
Objectives: To reduce exacerbations and use health services for patients with COPD in order to improve their quality of life and reduce socioeconomic costs, through a viable, simple to use and accessible method.
Methods: The Hospital Prof. Doctor Fernando Fonseca, participates in a telemonitoring project, which involves 8 patients with COPD (at least 2 exacerbations in the last year) since July 2020. A local team was created that includes 2 doctors from the Pulmonology Service who work together with the Company of Telemonitoring, Hopecare. The monitoring devices, available to patients with wireless technology, and the monitoring platform allow the automatic transmission, with minimal intervention from patients or caregivers, of the data (tensiometer, heart rate oximeter, axillary thermometer) necessary for patient follow-up.
Results: The Project started in July 2020 with the inclusion of the first patients. Selected 8 patients with COPD (7 men and 1 woman) with a mean age of 75 years (51-80), all D-GOLD class with mean post-BD FEV1: 32.8% (30-50%); all patients with home respiratory care. Between 12 July 2020 and 31 May 2021, 1813 measurements were received. 467 alerts triggered. Comparing the occurrences in a period similar to the previous year, there was a reduction of 50% of consultations (30 to 15) and 83% (23 to 4) of admissions. There was 1 death among one of the program's users.

Conclusions: Based on preliminary data, telemonitoring can be a good adjunct that helps doctors reach their patients, especially in a time of pandemic when access to healthcare is less. Most patients reported a positive experience, but further investigation is needed in this area to validate our experience. However, the results, which reflect one year, are promising and confirm that telemonitoring allows for better monitoring of patients and a reduction in hospital admissions and, consequently, in costs.

Keywords: *Telemedicine. Telemonitoring. COPD. Exacerbations.*

CO 045. A PHANTOM SENTENCE - TUBERCULOSIS IN PRISONS

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Introduction: Prisoners constitute a high risk group for tuberculosis (TB). Most are part of fragile social contexts, with low socioeconomic and educational levels and with limited access to health care. They are also more closely associated with risk behaviors such as alcoholism, smoking and illicit drug abuse, with a higher incidence of HIV infection. They are therefore more prone to TB infection and transmission. This transmission is enhanced by overcrowding, transfer of prisoners, delays in diagnosis and inadequate treatment. TB cases reported in European prisons are about 17 times higher than in the general population.
Objectives: Characterize the prisoners diagnosed with TB in prisons in the city of Lisbon.
Methods: Retrospective analysis of inmates of prisons in the city of Lisbon diagnosed with TB between 2012 and 2019.
Results: 240 prisoners with TB were identified, between 2012-2019, 95% (n = 228) male (n = 305), with a mean age of 39.3 years (minimum 18; maximum 70), at the time of diagnosis. Of these, 23.3% (n = 56) were of foreign origin, the majority (58.9%; n = 33) in the country for ≥ 2 years. The main comorbidities identified were HIV infection (28.8% of inmates; n = 69), chronic liver disease (6.7%; n = 16), diabetes (3.3%; n = 8) and COPD (2.1%; n = 5); 18.3% (n = 44) had a previous history of TB. Among the social risk factors, alcohol dependence (13.3%; n = 32), injecting drugs (40.8%; n = 98) and non-injecting drugs (23.8%; n = 57) and homelessness (4.6%) stand out; n = 11). Screening for TB was mostly motivated by suggestive symptoms (77.5% of cases; n = 186), in 4.6% (n = 11) of cases from contact tracing and in 17.9% (n = 43) from radiographic screening (RS), periodically performed in prisons. Most cases of TB had pulmonary involvement (82.5%; n = 198), with chest radiography with cavitations in 41.7% (n = 100) of inmates and direct mycobacterial examination in sputum was positive in 51.3% (n = 123). Mycobacterial culture was positive in 51.7% (n = 124) of the total number of diagnosed cases, in the vast majority of cases from respiratory samples; and it was possible to obtain antibiotic susceptibility in 88.7% (n = 110). Of these, the majority (78.2%; n = 86) corresponded to cases of M. tuberculosis complex sensitive to first-line anti-TB drugs, highlighting 5 cases of multidrug-resistant TB (4.5%), 2 of XDR TB (1.8%). The average duration of treatment was 11.6 months, with only 5 cases of interruption/abandonment (2.1%). It is noteworthy that 25.4% (n = 61) of prisoners were transferred during treatment, losing follow-up.
Conclusions: The difficulty of an adequate screening and diagnosis and also the absence of an adequate follow-up of inmates is a reality in EPs. The high rate of pulmonary TB demonstrates the need for effective infection control measures at these sites. Periodic RS appears to be an effective measure to increase TB diagnosis in this at-risk population.

Keywords: *Prisons. Pulmonary tuberculosis. Radiographic screening.*

CO 046. OCULAR TUBERCULOSIS - RETROSPECTIVE ANALYSIS OF 7 YEARS OF A PNEUMOLOGY DIAGNOSIS CENTRE

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Introduction: Ocular tuberculosis has an uncertain incidence and can involve any part of the eye. The definitive diagnosis is established by isolating Mycobacterium tuberculosis from ocular tissues. Given the difficulty of this isolation, diagnosis is often presumed in the presence of suggestive ocular findings combined with positive test to detect interferon gamma released by T cells when exposed to Mycobacterium tuberculosis (IGRA) and positive tuberculin test. Antibacillary treatment usually involves 4 drugs (isoniazid, rifampicin, ethambutol and pyrazinamide) over a period of 6-9 months. The clinical response to antibacillary treatment still supports the presumed diagnosis.
Objectives: The aim of this study is to characterize patients diagnosed with ocular tuberculosis between 2014 and 2020 in a Pneumology Diagnosis Centre (CDP).
Methods: Retrospective study of a sample of patients followed in a CDP who completed treatment for presumed ocular tuberculosis (OT). Demographic, clinical, analytical and therapeutic data and comorbidities were reviewed. Statistical analysis was performed by appropriate methods using SPSS version 22.0.
Results: Between 2014 and 2020 a total of 376 adults with active tuberculosis were followed at CDP. Of these patients, 50 (13.3%) were diagnosed with ocular tuberculosis. Most were male (56%; n = 28), with Portuguese nationality (92%; n = 46) and had a mean age at diagnosis of 63.5 years. Two patients (4%) were health professionals. As for comorbidities, 44% (n = 22) had hypertension, 38% (n = 19) dyslipidemia, 22% (n = 11) diabetes mellitus, 6% (n = 3) chronic alcoholism and previous cancer and 4% (n = 2) psychiatric pathology. All patients had a positive IGRA test which in combination with suggestive ocular findings, attested to the presumed diagnosis of OT. In one patient, a cultural examination of mycobacteria in a vitreous humor sample was performed, which was negative. As for location, 48% (n = 24) had posterior uveitis, 24% (n = 12) anterior and 28% (n = 14) panuveitis. More than half had unilateral involvement (52%; n = 26). They were proposed for antibacillary treatment for 2 months with 4 drugs (intensive phase) followed by a maintenance phase of 7 months with isoniazid and rifampicin. Subjective improvement of complaints was seen in 52% and 66% of patients treated with antibacillary treatment in the intensive and maintenance phases, respectively. Most patients completed the treatment without relevant intolerance/toxicity (80%; n = 40), with 3 cases of dropout being observed. In more than a half, ocular examination improvements were seen after therapy (52%; n = 26). In addition to antibacillary therapy, 24% (n = 12) were under systemic corticosteroid therapy.
Conclusions: The study aimed to highlight the diagnostic difficulty of ocular tuberculosis and the diversity of data used to support it. The characteristics of this unusual and difficult-to-detect entity are highlighted.

Keywords: *Ocular tuberculosis. Antibacillary treatment.*

CO 047. TUBERCULOSIS AS AN OCCUPATIONAL DISEASE

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Introduction: Health professionals are in the front line in the fight against tuberculosis. Given the aerosol transmission nature of tuberculosis, hospitals are areas of high transmission. Health professionals are at increased risk due to exposure to a greater number of patients with active TB and for longer periods. Evidence shows that TB can be considered an occupational disease – the numbers of

latent TB and active TB are 3 times higher than the numbers in the general population. About 81% of active TB cases in healthcare professionals can be attributed to workplace contagion. In addition to these numbers, there is contact with patients with multidrug-resistant tuberculosis (MDR-TB), where health professionals have a 6x increased risk of being hospitalized with the isolation of a multidrug-resistant bacillus when compared to the general population.
Case report: We present the case of a 69-year-old male patient who worked as a medical assistant for 36 years at Hospital José Maria Antunes (former referral centre for Multidrug-resistant TB). This is a patient with a history of Pulmonary Tuberculosis in 1975, who underwent treatment and was considered cured. As comorbidities, he presented arterial hypertension, dyslipidemia and depressive syndrome. In December 2018, dyspnea, generalized tiredness, asthenia and anorexia began. She went to the Pulmonology consultation, having the objective of imaging the presence of left pleural effusion and apical parenchymal consolidations. Thoracentesis was performed with pleural biopsies and sputum samples were collected for direct and cultural mycobacteriological examination (with TAAN for *M. tuberculosis*). The BAL culture was positive for *M. tuberculosis* and the histology of the pleural biopsies was compatible with a chronic granulomatous process with multinucleated giant cells and necrosis. Pleuropulmonary tuberculosis was admitted and the patient was started on HRZE. In April 2019, he presented a recurrence of pleural effusion. A new thoracentesis and fiberoptic bronchoscopy was performed, and all samples collected were negative in direct and cultural mycobacteriological examination. Also in April, the result of molecular resistance tests (genotype) of the January 2019 culture was received, which revealed mutations in the rpoB and inhA genes (mutations that confer resistance to isoniazid and rifampicin). He performed a new bronchoscopy – direct examination and negative TAAN for M.Tuberculosis. The culture was positive for *Mycobacterium* Complex with resistance to H, R, Z, E. Admitted MDR-TB, 2nd-line TSA application that showed resistance to fluoroquinolones and aminoglycosides. Complete genomic sequencing was requested at Instituto Ricardo Jorge, which confirmed the final diagnosis of pre-XDR TB, with sensitivity to bedaquiline, PAS, clofazimine and linezolid. Given the resistance profile, the patient started the PAS + LZD + CFZ + BDQ regimen and is currently being followed up at CDP Ribeiro Sanches.
Discussion: Health professionals have a higher risk of developing the disease (mainly multidrug-resistant forms) when compared to the general population. In order to be able to control TB and follow the goals proposed by the WHO, it is necessary not to forget about health professionals and to keep surveillance programs and hospital infection control measures active

Keywords: *Tuberculosis. Occupational disease.*

CO 048. HAFNIA ALVEI PNEUMONIA: A RARE CAUSE OF INFECTION IN A PATIENT WITH COVID-19

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Introduction: Most people with COVID-19 develop only mild or uncomplicated disease. Approximately 14% develop severe forms of the disease, which require hospitalisation and oxygen therapy and 5% may require invasive mechanical ventilation. Hafnia alvei is a gram-negative enteric and oropharyngeal bacillus that is generally nonpathogenic. It is rarely isolated in humans.
Case report: A 48-year-old male construction worker was admitted to a secondary care hospital with severe type 1 respiratory failure and was rapidly put on invasive mechanical ventilation (IMV). After laboratory confirmation by polymerase chain reaction (PCR), the diagnosis of SARS-CoV-2 infection was confirmed, and a bacterial co-infection was also suspected, but no microorganism was isolated in microbiological tests (haemocultures and urocultures). Empirical antibiotic therapy was started with amoxicillin/clavulanic acid and azithromycin. On the 5th day the clinical situation worsened, so new microbiological studies were carried out (haemocultures, urocultures and microbiological examination of respiratory secretions: tracheal aspirate), and antibiotherapy was changed to piperacycline/tazobactan. Direct examination of the tracheal aspirate was negative. On the 10th day the clinical situation worsened again. The cultural examination of the tracheal aspirate isolates the microorganism Hafnai Alvei, resistant to amoxicillin/ac clavulanic. Antibiotic therapy is again escalated to meropenem and linezolid. The patient continues to deteriorate clinically and ECMO (Extra Corporeal Membrane Oxygenation) is then initiated. The clinical situation begins to evolve favourably until the patient is discharged from hospital on the 61st day. The patient was followed up in a Pneumology consultation and in Physical Medicine and Rehabilitation.
Discussion: Patients with SARS-CoV-2 infection may have immunity compromise that makes them more susceptible to nosocomial infections by opportunist agents. The bacterium Hafnia alvei, although rare, can cause nosocomial respiratory infections. It is important, whenever possible, to administer targeted antibiotic therapy in order to increase the clinical effectiveness of treatment and reduce the development of antibiotic resistance.

Keywords: *COVID-19. Pneumonia. Hafnia alvei.*

CO 049. INPATIENT PNEUMONIA SEVERITY SCORES

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Introduction: Community-acquired pneumonias are an important cause of morbidity and mortality globally. Several prognostic scores are established for the classification of pneumonias. CURB-65 and Pneumonia Severity Index (PSI) are two of the most used scores. PSI is a predictive tool that includes 20 variables, and is used to identify patients with low risk pneumonia. Instead, CURB-65 evaluates confusion, serum urea, respiratory rate, blood pressure and age, and it was developed to identify patients with severe pneumonia and high mortality risk.
Objectives: Characterize hospitalized patients diagnosed with pneumonia according to severity scores and respective indications for hospital admission.
Methods: Retrospective descriptive study of patients admitted to the Pulmonology Department with a diagnosis of pneumonia on admission, during a period of 1 year (January to December 2020), evaluating the severity scores CURB-65 and PSI.
Results: Of the total of 241 patients hospitalized with a diagnosis of pneumonia, 140 were male (58.1%). The mean age was 70.1 years (± 16.6). In 112 patients (46.5%) the CURB-65 was 0 or 1, with a theoretical mortality of 1.5%. In 55 patients (22.8%) the score was 2 - 9.2% theoretical mortality, and in 74 patients (30.7%) CURB-65 was 3 or higher, corresponding to a theoretical mortality of 22%. The PSI score was in the range 0-70 points in 23.7% and 71-90 points in 15.4%, corresponding to a low risk of mortality. In 29.5% PSI scored 91-130 points - moderate mortality risk -, and it was higher than 130 points in 31.5% of patients - high risk of mortality. 26 patients died during hospitalization (10.8%), of which 73.1% had a CURB-65 greater than or equal to 3 points and 76.9% had a PSI greater than 130 points.
Conclusions: From the analyzed sample, according to the CURB-65, only 30.7% of the patients had an indication for hospitalization (score ≥ 3). However, according to PSI, there was an indication for hospitalization (score ≥ 91 points) in 96.2% of patients. Thus, PSI presents a higher discriminatory value due to the greater number of variables included, namely comorbidities, objective examination and diagnostic exams performed. However, its calculation is complex and difficult to use in the daily hospital routine, and it can underestimate the severity in young patients without comorbidities. On the other hand, despite its ease of use, CURB-65 does not include important variables that influence the patient's progression and prognosis.

Keywords: *Pneumonia. Hospitalization. Mortality. Scores.*

CO 050. PHASE 3 TRIAL TO EVALUATE SAFETY, TOLERABILITY AND IMMUNOGENICITY OF V114 FOLLOWED BY 23 VALENT PNEUMOCOCCAL POLYSACCHARIDE VACCINE 12 MONTHS LATER IN HEALTHY ADULTS (PNEU-PATH)

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Introduction: Older adults are at increased risk of pneumococcal disease (PD). Some countries recommend sequential administration of pneumococcal conjugate vaccine (PCV) and 23-valent pneumococcal polysaccharide vaccine (PPSV23). V114, an investigational 15-valent PCV, contains all serotypes in 13-valent PCV (PCV13) plus serotypes 22F and 33F. This phase 3 trial evaluated the safety, tolerability and immunogenicity of V114 or PCV13 followed 12 months later by PPSV23 in healthy adults aged ≥ 50 years.
Methods: 652 eligible adults were randomised 1:1 to receive V114 or PCV13 followed by PPSV23 12 months later. Solicited and non-solicited adverse events (AEs) were collected after each vaccination. Serotype-specific opsonophagocytic activity (OPA) and immunoglobulin G (IgG) antibodies were measured at Day 1, Day 30, Month 12 and Month 13.
Results: The most common solicited AEs following PCV vaccination were injection-site pain, fatigue and myalgia; higher proportions of participants with solicited AEs were observed in the V114 group; however, the differences between the groups were not clinically significant, as most AEs were mild and of short duration. The most common solicited AEs following PPSV23 vaccination were injection-site pain, injection-site swelling, fatigue and myalgia; the proportions of participants with these events were comparable across the intervention groups. The proportion of participants with serious AEs (SAEs) was low in both groups following PCV and PPSV23 vaccination. No SAE was reported to be vaccine related and no deaths occurred during the study. Serotype-specific OPA geometric mean titres (GMTs) and IgG geometric mean concentrations (GMCs) were comparable between the groups for all 15 serotypes at 30 days post-vaccination with PPSV23 (Table 1). OPA GMTs and IgG GMCs were comparable between the groups for the 13 shared serotypes and higher in V114 than PCV13 for serotypes 22F and 33F at 30 days and 12 months post-vaccination with PCV. V114 elicited an immune response that persisted for at least 12 months.
Conclusions: Sequential administration of V114 and PPSV23 is well tolerated, immunogenic and generally comparable to PCV13 followed by PPSV23 in healthy adults ≥ 50 years of age. This study is in support of licensure and use of V114 for the prevention of PD in adults.

Keywords: *Pneumococcal disease.*

CO 051. PHASE 3 TRIAL TO EVALUATE SAFETY, TOLERABILITY, AND IMMUNOGENICITY OF V114 FOLLOWED BY 23 VALENT PNEUMOCOCCAL POLYSACCHARIDE VACCINE 6 MONTHS LATER IN AT-RISK ADULTS (PNEU-DAY)

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Introduction: Risk factors for pneumococcal disease (PD) in immunocompetent individuals include comorbidities (e.g., chronic lung, liver or heart disease and diabetes mellitus), behavioural habits (e.g. smoking) or living in a community/environment with increased risk of PD transmission. Pneumococcal vaccination of adults is recommended with the 23-valent pneumococcal polysaccharide vaccine (PPSV23) alone or sequentially with a pneumococcal conjugate vaccine (PCV). V114, an investigational 15-valent PCV, contains all 13 serotypes in PCV13 plus two epidemiologically important serotypes, 22F and 33F. This descriptive phase 3 study evaluated safety, tolerability and immunogenicity of V114 and PCV13 administered on Day 1, and PPSV23 6 months later, in immunocompetent adults aged 18-49 years with or without risk factors for PD.
Methods: Eligible adults (n = 1515), including a cohort of Native Americans (n = 593), were randomised 3:1 to V114 (n = 1135) or PCV13 (n = 380), followed 6 months later by PPSV23. Randomisation was stratified by type/number of risk factors and site of enrolment. Solicited adverse events (AEs) were collected after each vaccination. Serotype-specific opsonophagocytic activity (OPA) was measured 30 days after each vaccination.
Results: Most participants (54.7%) had one risk factor; 25.2% had no risk factors; 20.1% had ≥ 2 risk factors. The most frequent individual risk factors were smoking (14.6%), chronic lung disease (14.3%) and diabetes mellitus (13.8%). The most common solicited AEs following V114 or PCV13 as well as PPSV23 were injection-site pain and fatigue, and the proportion of participants with AEs were comparable in both groups. V114 and PCV13 were immunogenic based on OPA geometric mean titres (GMTs) 30 days post-vaccination for all serotypes contained in each respective vaccine (table). OPA GMTs to the two unique serotypes in V114 were robust in the V114 group. PPSV23 was immunogenic for all 15 serotypes contained in V114 in both vaccination groups, including 22F and 33F.

Table: Serotype-specific OPA GMTs at 30 days post-vaccination with V114 or PCV13 (per-protocol population)

	V114 (n=1133)			PCV13 (n=379)		
	n	GMT	95% CI	n	GMT	95% CI
13 shared serotypes						
1	1019	268.6	(243.7–296.0)	341	267.2	(220.4–323.9)
3	1004	199.3	(184.6–215.2)	340	150.6	(130.6–173.8)
4	1016	1416.0	(1308.9–1531.8)	342	2576.1	(2278.0–2913.2)
5	1018	564.8	(512.7–622.2)	343	731.1	(613.6–871.0)
6A	1006	12,928.8	(11,923.4–14,019.0)	335	11,282.4	(9718.8–13,097.5)
6B	1014	10,336.9	(9649.4–11,073.4)	342	6995.7	(6024.7–8123.2)
7F	1019	5756.4	(5410.4–6124.6)	342	7588.9	(6775.3–8500.2)
9V	1015	3355.1	(3135.4–3590.1)	343	3983.7	(3557.8–4460.7)
14	1016	5228.9	(4847.6–5640.2)	343	5889.8	(5218.2–6647.8)
18C	1014	5709.0	(5331.1–6113.6)	343	3063.2	(2699.8–3475.5)
19A	1015	5369.9	(5017.7–5746.8)	343	5888.0	(5228.2–6631.0)
19F	1018	3266.3	(3064.4–3481.4)	343	3272.7	(2948.2–3632.9)
23F	1016	4853.5	(4469.8–5270.2)	340	3887.3	(3335.8–4530.0)
2 serotypes unique to V114						
22F	1005	3926.5	(3645.9–4228.7)	320	291.6	(221.8–383.6)
33F	1014	11,627.8	(10,824.6–12,490.7)	338	2180.6	(1828.7–2600.2)

CI, confidence interval; GMT, geometric mean titre (1/dilution); OPA, opsonophagocytic activity; PCV13, 13-valent pneumococcal conjugate vaccine; V114, 15-valent pneumococcal conjugate vaccine.

Conclusions: V114 administered alone or sequentially with PPSV23 is well tolerated and immunogenic for all 15 serotypes, including those not contained in PCV13, in immunocompetent adults aged 18-49 years with or without risk factors for PD. This study is in support of licensure and use of V114 for the prevention of PD in adults.

Keywords: *Pneumococcal disease.*

CO 052. SARS-COV-2 PNEUMONIA IN PATIENTS ADMITTED INTENSIVE CARE, THE REPORT OF A UNIT

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Introduction: Since March 2020, Portugal has suffered from the effects of the Coronavirus disease 2019 (COVID-19) pandemic. SARS-

CoV-2 infection has a major impact on the organization of hospital services, requiring responses that can drain resources and lead to the collapse of the national health service. Since then, mortality from COVID-19 has continued to grow, making it essential to study populations as to the factors that may contribute to this outcome.
Objectives: To describe the clinical characteristics and impact on the need for invasive ventilation, length of stay and in-hospital mortality in patients admitted with SARS-CoV-2 pneumonia in a polyvalent intensive care unit (PICU).
Methods: An observational and retrospective study was carried out, including patients aged ≥ 18 years with a diagnosis of pneumonia due to COVID-19, admitted to the PICU from March 2020 to February 2021. Patients with laboratory confirmation of COVID-19 who were hospitalized for another reason were excluded. Sociodemographic characteristics, comorbidities and outcomes [need for invasive mechanical ventilation and in-hospital mortality] were analyzed. A comparative analysis was performed between two groups (survivors *vs.* non-survivors).
Results: 206 admissions were identified, of which 183 were for SARS-CoV-2 pneumonia. The mean age was 65.3 ± 11.5 years, of which 76.5% were male. The main comorbidities presented by the patients were arterial hypertension (n = 110), dyslipidemia (n = 94), diabetes mellitus (n = 63) and obesity (n = 74). The mean length of stay at the PICU was 21.6 ± 22.6 days. The mean clinical time for SARS-CoV-2 (Tc) at admission to the PICU was 11.09 ± 4.8 days. Invasive mechanical ventilation (IMV) was required in 66.7% (n = 122) of the cases, whose Tc was 7.6 ± 6.6 days. It was necessary to perform a tracheostomy in 27 cases. There were thromboembolic complications in 27 cases. A total of 66 deaths were recorded, with a mean age of 68.35 ± 10.6 years and with a predominance of males (n = 47.71.2%). In 77.2% (n = 51) of the cases underwent IMV. The Tc at admission was 11.8 ± 4.8 days and the mean length of stay was 16.87 ± 19.2 days. Up to 28 days after discharge from the PICU, another 6 patients died. In the comparative analysis between the groups (survivors *vs.* non-survivors) it was found that the group of survivors had a lower mean age, were admitted to PICUs earlier and less need for IMV.
Conclusions: This study provides clinical characteristics, evolution and outcomes of patients admitted to a PICU.

Keywords: *COVID-19 pneumonia. Intensive medicine.*

CO 053. IMMUNE-RELATED ADVERSE EVENTS AS PREDICTORS OF OUTCOMES IN PATIENTS WITH NON-SMALL CELL LUNG CANCER TREATED WITH IMMUNE CHECKPOINT INHIBITORS

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Introduction: Patients with non-small cell lung cancer (NSCLC) treated with immunological checkpoint inhibitors (ICIs) often develop immune-related adverse events (IRAEs) by increased stimulation of the immune system and re-establishment of antitumor responsiveness.
Objectives: To evaluate predictors of progression-free survival (PFS) and overall survival (OS) in patients with NSCLC treated with ICIs. Compare PFS and OS between the group of patients who developed IRAEs and the group of patients who did not develop IRAEs.
Methods: Retrospective analysis of patients with NSCLC treated with ICIs (Nivolumab, Pembrolizumab, and Atezolizumab) between 2016 and 2020, in the Department of Pulmonology at the Hospital and University Center São João, Portugal. Based on IRAEs, patients were divided into two groups (IRAEs group and Non-IRAEs group). Demographic and clinical characteristics and blood laboratory results were analyzed and compared between groups. Progression-free survival (PFS) and overall survival (OS) curves were calculated using the Kaplan-Meier method, and the long-rank test was used to assess survival differences between groups. Univariate and multivariate Cox proportional hazards regression models were used to identify factors associated with PFS and OS. The value considered statistically significant was $p \leq 0.05$.
Results: There were 184 patients, 77.7% male, mean age 66.9 ± 9.5 years, 82.1% with ECOG PS score 0-1. In total, 67.4% of patients had adenocarcinoma, 78.7% had PD-L1 expression ≥ 1%, and 98.4% had stage IV disease at the start of ICI. Seventy (38.0%) patients were treated with Pembrolizumab, 77 (41.8%) with Nivolumab and 37 (20.1%) with Atezolizumab. During follow-up (median time of 36.5 (13.3-81.3) weeks), 49 (26.6%) patients developed IRAEs and 149 (81.0%) died. Patients who developed IRAEs had significantly longer medians of PFS (41.0 *vs.* 9.0 weeks, $p < 0.001$) and OS (89.0 *vs.* 28.0 weeks; $p < 0.001$) compared to patients without IRAEs. In the univariate analysis, an ECOG PS score of 0-1 ($p = 0.002$) and the development of IRAEs ($p < 0.001$) were significantly associated with better PFS and baseline NLR ≥ 5 ($p = 0.030$) with worse PFS. The development of IRAEs (HR: 0.42; 95%CI: 0.27-0.65, $p < 0.001$) and ECOG PS of 0-1 (HR: 0.57; 95%CI: 0.36-0.90, $p = 0.017$) remained significantly associated with better PFS in the multivariate analysis. Regarding OS, univariate analysis showed that ECOG PS score 0–1 ($p = 0.004$), baseline LDH value ($p = 0.002$), NLR ≥ 5 ($p = 0.001$), and the development of IRAEs ($p < 0.001$) were statistically significantly associated with OS. In multivariate analysis, the development of IRAEs remained significantly associated with better OS (HR: 0.37; 95%CI: 0.21-0.67, $p = 0.001$).
Conclusions: In our analysis, the development of IRAEs was associated with significantly longer PFS and OS compared to the group of patients who did not develop IRAEs.

Keywords: *Non-small cell lung cancer. Immunological checkpoint inhibitors. Immune-related adverse events. Outcomes.*

CO 054. ATEZOLIZUMAB VERSUS NIVOLUMAB IN PATIENTS WITH ADVANCED NON-SMALL-CELL LUNG CANCER

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Introduction: Atezolizumab and nivolumab are both approved as second-line treatment in patients with advanced non-small-cell lung cancer (NSCLC), irrespective of PD-L1 expression, who progressed during or after first-line therapy. There is a lack of data comparing these two agents in terms of efficacy or safety.
Objectives: This work aims to assess the differences between atezolizumab and nivolumab, in terms of efficacy and safety profiles, in pre-treated NSCLC patients followed in our centre.
Methods: Retrospective study of patients followed in CHUC, with stage IV NSCLC, without PDL-1 expression and driver mutations, who started atezolizumab or nivolumab, after first-line chemotherapy, between 2018 and 2020. We analysed objective response rate (ORR), disease control rate (DCR), progression-free survival (PFS), overall survival (OS), mortality, toxicity and discontinuation rate. Statistical analysis with SPSS.
Results: Totally, 57 patients were included, predominantly male (73.7%), with a median age of 67 years old. The majority presented with a performance status of 0-1 (89.5%) and had smoking habits (77.2%). Most NSCLC were adenocarcinoma (68.4%) and squamous cell carcinomas (26.3%). Nivolumab was initiated in 29 patients and atezolizumab in 28. The ORR was 0.178 with atezolizumab (N = 5) and 0.035 with nivolumab (N = 1), but DCR was 0.428 with atezolizumab (N = 12) and 0.448 with nivolumab (N = 13). PFS with atezolizumab was 8.79 months and with nivolumab was 9.17 months. These differences were not statistically significant ($p > 0.05$). Mortality and OS in patients treated with atezolizumab was 36% and 12.5 months respectively, and 66% and 11.4 months with nivolumab, ($p < 0.05$). Grade

2-3 toxicity occurred in 7% of the patients undergoing atezolizumab and in 3.4% with nivolumab. Patients undergoing atezolizumab discontinued therapy in 17.9% of the cases, while only 6.9% of the patients medicated with nivolumab withdraw the treatment. These results had no statistically significative difference ($p > 0.05$).
Conclusions: In our centre atezolizumab had higher ORR but nivolumab presented higher DCR and PFS. Toxicity and discontinuation rate were higher in patients treated with atezolizumab. These differences were not statistically significant. Patients treated with atezolizumab showed lower mortality and higher OS. More studies are need in order to establish these differences.

Keywords: *Atezolizumab. Nivolumab. NSCLC.*

CO 055. METASTATIC NON-SMALL CELL LUNG CANCER TREATED WITH PEMBROLIZUMAB AND CHEMOTHERAPY: THE EXPERIENCE OF THE MULTIDISCIPLINARY THORACIC TUMOUR UNIT OF CENTRO HOSPITALAR VILA NOVA DE GAIA/ESPINHO

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Introduction: Metastatic non-squamous non-small-cell lung cancer (NSCLC), without target mutations, was historically treated in first-line with chemotherapy, and later with pembrolizumab, in patients with PD-L1 expression ≥ 50%, based on the KEYNOTE-024 trial results. More recently, the KEYNOTE-189 trial showed benefit in overall survival (OS) and progression-free survival (PFS) with the combination of immunotherapy (IT) with chemotherapy (CT), in first-line. In Portugal, the approval of this therapeutic scheme is restricted to the population with PD-L1 < 50%. The authors intend to characterize the patients selected for this therapy in the Multidisciplinary Thoracic Tumour Unit (UMTT) and evaluate its efficacy and safety with real-life data.
Methods: Retrospective, unicentric study. Included patients diagnosed with metastatic non-squamous NSCLC, with no previous lines of treatment, proposed for a combined regimen of pembrolizumab with carboplatin and pemetrexed, every 3 weeks for 4 cycles, followed by maintenance with pemetrexed and pembrolizumab. Data included from August 2020 to July 2021. OS and PFS were analyzed by the Kaplan-Meyer method. Statistical analysis was performed in SPSS.
Results: Twelve patients were included, the majority were men (92%, n = 11), with a median age of 63 years (range, 43-74). All patients had an ECOG-performance status (ECOG-PS) between 0-1 (ECOG-PS 1: 58%, n = 7, ECOG-PS 0: 42%, n = 5). At diagnosis, 50% (n = 6) of the patients were smokers and 42% (n = 5) ex-smokers. Half of the patients had PD-L1 expression < 1% and the remaining 50% between 1 and 49%. The most common site of metastasis was the contralateral lung (42%, n = 5), followed by the brain (25%, n = 3). All patients with ab initio cerebral metastasis underwent holo-cranial radiotherapy. Of the 12 patients who started treatment, five discontinued due to disease progression, one of which was in treatment maintenance, and in two, there was still no response assessment. In the remaining 10 patients, after a median follow-up of 6.5 months (95%CI: 2.3-9.2), the median PFS was 4.4 months (95%CI: 3.7 -7.8) and OS at 6 months was 83.3%. Regarding tolerance, 33% (n = 4) delayed a cycle due to adverse events, but only one patient needed hospitalization. The most frequent adverse events were grade 2 nausea (42%, n = 5), and neutropenia (25%, n = 3) grade 1, in one patient and in the remaining grade 2 (CTCAE v.5).
Conclusions: This study's efficacy data, considering the limitations inherent to the small number of patients and the short follow-up time, are inferior to the results in the KEYNOTE-189 trial, in accordance with a real-life study. We highlight the inclusion of three patients with ab initio brain metastasis with impact on the results in a small sample, as well as the restriction imposed on the exclusion of patients with PD-L1 ≥ 50%, contrary to the trial. Adverse events, were mostly manageable in an outpatient setting. Bigger studies in the Portuguese population are needed to assess the benefit and efficacy of this treatment.

Keywords: *Non-small-cell lung cancer. Chemotherapy. Pembrolizumab.*

CO 056. PATIENTS' CHARACTERISTICS AND TREATMENT PATHWAYS IN STAGE III NON-SMALL CELL LUNG CANCER, IN REAL LIFE SETTING IN PORTUGAL - PICTURE

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Introduction: Non-Small Cell Lung Cancer (NSCLC) is responsible for approximately 80-90% of all lung cancers, and is often diagnosed at an advanced stage with poor prognosis. About one third of NSCLC patients are diagnosed with stage III disease – a very complex and highly heterogeneous condition yet poorly characterized. The PICTuRE study aims to describe demographic and clinical characteristics, treatment strategies and healthcare resource utilization among stage III NSCLC patients in Portugal.
Methods: PICTuRE is a multicentric, retrospective real-world study, based on secondary data collection from medical records that, by Q2 2021, is expected to have enrolled 350 adults patients diagnosed with locally advanced stage III NSCLC between 1 January and 31 December of 2018 followed at public and private reference centers in Portugal.
Results: This interim analysis is based on data from 193 patients: 75.7% male, mean age at diagnosis of 67.2 ± 10.9 years. Most patients were smokers or former smokers (38.0% and 47.1%, respectively) with ECOG performances status 0 or 1 (42.3% and 46.2%, respectively). The majority of patients had comorbidities (79.9%, including 54.5% patients with more than one) DPOC was a comorbodity in 19.7% of patients. Tumours were mostly subtyped into adenocarcinoma (54.5%) and squamous cell carcinoma (38.1%). The main sample source was small biopsy (83.2%), mainly collected through core biopsy (36.8%), fine needle aspiration (23.8%) and transthoracic needle biopsy (16.8%). Staging was mainly performed according with TNM AJCC edition 8 (83.6%): 30.1% patients were IIIA, 38.7% IIIB and 12.9% IIIC. The great majoriy of patients (91.0%) received active treatment: definitive chemoradiation (43.4%), surgery (18.7%) or other, as chemotherapy or radiotherapy (28.9%).
Conclusions: This interim analysis provides important insights into the characteristics of NSCLC patients in Portugal. Further details on treatment approaches will be presented, as well as outcomes, namely mPFS and mOS. These findings highlight the diversity of disease presentation patterns and reinforce the need for specific treatment strategies to improve patient's outcomes.

Keywords: *Non-small cell lung cancer (NSCLC). Locally advanced stage iii nsclc. Portugal.*

CO 057. ACCESSING PROGNOSTIC SCORES FOR MALIGNANT PLEURAL MESOTHELIOMA: WHICH SCORE TO CHOOSE?

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Introduction: Malignant Pleural Mesothelioma (MPM) is a rare but aggressive cancer with no cure. Several tools have been developed

in an attempt to improve assessment of prognosis and help clinicians manage MPM.
Objectives: To evaluate the usefulness of the Brims' decision tree analysis, the EORTC prognostic score, the CALGB prognostic groups, the modified Glasgow Prognostic Score (mGPS), and the LENT prognostic score in our MPM patients.
Methods: Local retrospective database analysis of patients with MPM diagnosed between 2000 and 2020. The different scores were applied and MPM group risks' evolution was analyzed.
Results: A total of 67 patients were evaluated (55 males, 82.1%). Mean age at diagnosis was 67.5-year-old (± 11.5). Smoking habits were present in 35 individuals (52.3%). Asbestos exposure was described in 26 patients (38.8%). Epithelioid MPM was the commonest histological type (51 patients, 76.1%). Median overall survival (OS) was 11 months (IQR 23) and median progression free-survival (PFS) was 7 months (IQR 12.5). OS and PFS did not statistically differ amongst histological types (respectively, p = 0.583 and p = 0.77). Brims' MPM group risks were as follow: group 2, 10 patients (15.9%); group 3, 22 (34.9%); and group 4, 31 (49.2). Prognostic groups in the EORTC score were: good prognosis, 30 patients (62.5%), and poor prognosis,18 (37.5%). CALGB prognostic groups were as follow: group 1, 1 patient (2.2%); group 2, 3 (6.5%); group 3, 16 (34.8%); group 4, 4 (8.7%); group 5, 17 (37%); and group 6, (10.9%). In regards to mGPS, prognostic groups were as follows: good prognosis, 8 patients (22.2%); intermediate, 17 (47.2%); and poor, 11 (30.6%). LENT score incorporated 3 group risks, being: low risk, 7 patients (41.2%); intermediate, 9 (52.2%); high, 1 (5.9%). There were insufficient data to characterize 4 patients in the Brims model, 19 in the EORTC score, 31 in the mGPS, and 17 in the LENT score. Survival distributions were statistically significantly different for the Brims' and the mGPS' groups (respectively, χ^2 = 7.188, p = 0.027, and χ^2 = 6.46, p = 0.04). For EORTC, CALGB and LENT score, there were not statistically significant differences in survival distributions (respectively, χ^2 = 0.57, p = 0.811; χ^2 = 7.978, p = 0.157; and χ^2 = 1.23, p = 0.267). Brims' model and mGPS statistically significantly predicted OS (respectively F(1.57) = 11.1, p < 0.01, and F(1.32) = 6.846, p < 0.13). EORTC, CALGB and LENT failed to statistically significantly predict OS (respectively, F(1.44) = 0.003, p = 0.955; F(1.43) = 0.722, p = 0.4; and F(1.14) = 1.193, p = 0.293).
Conclusions: In our cohort, the Brims' model and mGPS showed significant differences in the survival of the respective groups, suggesting their clinical applicability. The small sample and missing data for some parameters are limitations of our analysis. However, as far as we know, this was the first study to address MPM prognostic scores in our country.

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

CO 058. PEMBROLIZUMAB IN ADVANCED STAGE NSCLC – NEW PROGNOSTIC MARKERS

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Introduction: Immunotherapy is an established therapy in non-small cell lung carcinoma (NSCLC). PD-L1 has been used as a predictor of response to treatment with pembrolizumab. There is variability of response to therapy regardless of the presence of high expression of PD-L1. In this sense, new prognostic markers have been proposed, particularly peripheral blood biomarkers, given their low price and easy availability. Among others, an elevated neutrophil-lymphocyte ratio (NLR ≥ 5) and high levels of lactate dehydrogenase (LDH > 247mg/dL) are described in the literature as being related to shorter overall survival (OS) and progression-free survival (PFS).
Objectives: To evaluate the potential role of NLR and LDH in PFS and OS in the first line treatment of NSCLC with pembrolizumab.
Methods: Retrospective analysis of clinical data from patients with advanced-stage NSCLC, with expression of PD-L1 ≥ 50%, treated with pembrolizumab in 1st line, followed up in an oncologic pulmonary department in CHUC for 49 months. The values of NLR< 5 or ≥ 5 and LDH ≤ 274 (LDH_normal) or > 274 (LDH_high) were evaluated before starting pembrolizumab (T0), after the 3rd (C3) and 6th cycles (C6). PFS and OS were compared according to these values and also according to a new score that associated the two markers (NLR < 5+LDH_normal *vs.* NLR < 5+LDH_high *vs.* NLR ≥ 5+LDH_normal *vs.* NLR ≥ 5+LDH_high).
Results: 66 patients were included, 77.3% male, with a mean age of 65.8 ± 11.2 years. Most NSCLC were adenocarcinomas (65.2%) and squamous cell carcinomas (27.3%). Most individuals (90%) had metastatic disease. Approximately 8% were never smokers. The median value of PD-L1 expression was 70%, and patients completed an average of 11.5 ± 11.3 cycles of pembrolizumab. Adverse effects occurred in 59% of patients, but it was only necessary to suspend therapy in 18%. In the assessment of mortality, the C3_NLR showed AUC (area under the curve) 0.729, p < 0.05; in the assessment of progression and/or mortality, the T0_NLR was similar to the C3_NLR (AUC 0.732 and 0.731, p < 0.05 respectively). Regarding the assessment of survival curves, patients with NLR < 5 at C3 had higher median PFS and OS (23.6 *vs.* 4.4 months, p < 0.05 and 33.1 *vs.* 11.1 months, p < 0.05 respectively). Patients with LDH_normal at T0 had higher PFS (11.9 *vs.* 2.8 months, p > 0.05); patients with normal_ LDH in C3 had longer PFS and OS (23.6 *vs.* 2.1 months, p < 0.05; 32.9 *vs.* 6.3 months, p < 0.05). Given the OS and PFS assessment with the new score, patients with NLR < 5+LDH_normal had a longer PFS than the other groups (23.6 months in the NLR < 5+LDH_normal *vs.* 3.23; 8.23; 2.1 months in the NLR< 5 +LDH_high; NLR ≥ 5+LDH_normal; NLR ≥ 5+LDH_high, p < 0.05). There were no statistical differences in C6.
Conclusions: The assessment of NLR and LDH as independent scores or in association before starting pembrolizumab and after the 3rd cycle can be auxiliary markers in predicting treatment response.

Keywords: *PD-l1. NSCLC. Pembrolizumab. NLR. LDH.*

CO 059. PULMONOLOGY, ONCOLOGY AND GENETICS – MERELY CROSSTALK OR A PUZZLING CASE REPORT?

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Introduction: Genetics increasingly impacts the diagnosis, treatment, and prognosis of countless conditions, especially in pulmonary neoplasms. This case report highlights the role of germline genetic studies in the optimal treatment and management in the pulmonology and oncology fields. In addition, it illustrates the importance of careful anamnesis and cooperation among medical specialties to ensure improved outcomes.
Case report: We report a case of a 68-year-old Caucasian woman, smoker, referred in 2015 to the Pulmonology outpatient clinics for asymptomatic imaging alterations – apical pleural thickening and basal cysts, with preserved lung function. She had a history of bilateral pneumothoraces at age 32 (requiring bilateral surgical pleurodesis) and previous contacts with pulmonary tuberculosis. The study for the Alpha-1-Antitrypsin deficiency was negative. During the follow-up, the patient presented a lung nodule, which was subsequentially diagnosed and resected as a stage IA lung adenocarcinoma with a TP53 R273C mutation. She started follow-up at the Oncology department. Three years later, a novel suspicious lung nodule was also resected, and the pathological analysis revealed a

new adenocarcinoma, now with EGFR G719A, a driver mutation in the Exon 18, which excluded a disease progression scenario and allowed the appropriate staging of this different tumour to a stage IB. The patient also referred a family history of multiple pneumothorax episodes - four of her children and three of her siblings. One son affected with previous multiple pneumothorax episodes was also suspected to have facial fibrofoliculomas. She did not refer any history of renal cancer in the family. In light of the pulmonary imaging characteristics and previous clinical and family history, the suspicion of a Birt-Hogg-Dubé Syndrome (BHDS) case index was raised, and the patient was referred to genetic counselling. FLCN is the causing gene of BHDS and encodes a GTPase crucial to the mTOR pathway so germline analysis of this gene was offered in the genetic counseling unit. The genetic study revealed a germline variant (c.396G>C), in the Foliculin (FLCN) gene. The prediction programs suggest this variant could affect Exon 5 splicing. However, according to current knowledge, there is not enough evidence to classify it as pathogenic; therefore it is classified as a variant of unknown significance.
Discussion: In this case, genetic studies were critical on multiple fronts. They deeply impacted the patient's management of lung cancer, allowing to differentiate two distinct tumours. On the other hand, the ready suspicion of a clinical BHDS opened up the possibility for familiar study and genetic counselling. Previous research states BHDS as a heterogeneous syndrome, even among elements of the same family. A clinical suspicion of BHDS persists, and even though germline genetic diagnosis may be a complex process, it can be useful to determine the family members with increased risk of cancer that benefit of a specific and careful surveillance.

***Keywords**: Genetic syndromes. NSCLC. Interstitial lung diseases.*

CO 060. PRIMARY CHORIOCARCINOMA OF THE LUNG, A (VERY) RARE DISEASE

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Fundação Champalimaud.

Introduction: Choriocarcinoma is a germ cell tumor consisting of syncytiotrophoblast cells, typically secreting beta-human chorionic gonadotropin (β-hCG). Most cases occur in women because of pregnancy. Primary pulmonary choriocarcinoma (PPC) is a rare disease with only a few reported cases. Prognosis is usually dismal despite the treatment chosen.
Case report: We present the case of a 40-years-old female, smoker (20 packs-year), obstetric history G1P1, under continuous oral contraceptive, with primary pulmonary choriocarcinoma, who in November 2020 tested positive for pregnancy in a pharmacy test after a period of persistent nausea. One week later, she had vaginal bleeding with pelvic pain and was admitted for diagnosis. She had a high β-hCG (175 U/mL; normal titer < 7.0 U/mL), and pelvic ultrasonography (US) was suspicious for a right ectopic pregnancy. She was treated with methotrexate (MTX), with symptoms improvement but no reduction of β-hCG levels. She was submitted to laparoscopy and dilation and curettage (D&C), which showed no ectopic pregnancy, pelvic tumor, or pregnancy in the uterus. Her endometrium was in the proliferative phase, and biopsies from both salpinges had no evidence of malignancy or scarring. A PET/CT revealed a hypermetabolic peripheral nodule in the upper lobe of the right lung, with no suspicious hilar or mediastinal lymph nodes and a hepatic mass. Liver biopsy was negative, and a transthoracic needle biopsy of the lung lesion was consistent with choriocarcinoma. The patient was considered to have a low-risk gestational trophoblastic disease, starting first-line chemotherapy with MTX according to the 8-day MTX regimen. After the second treatment administration, the β-hCG titer continued high (maximum 1,633 U/mL), with an enlargement of the pulmonary lesion. In June 2021, the patient was submitted to a thoracoscopic right upper lobectomy with systematic lymphadenectomy. The postoperative course was uneventful with gradual β-hCG titers normalization. Histologic findings were consistent with choriocarcinoma stage IB, pT2a pN0 R0 (AJCC, 8th ed). A decision was made to study the husband's genetic contribution to the tumor for a differential diagnosis with a primary lung neoplasm. The tumor's genetic identity showed a DNA profile coincident with the patient's, with no contribution from the husband.
Discussion: PPC is a rare condition with a challenging diagnosis and management. Elevated β-hCG titers normalize after surgery or chemotherapy, a solitary or predominant lung lesion excluding a primary gonadal site, no previous gynecologic malignancy in women, and histologic confirmation of the disease fulfill the criteria for the diagnosis of PPC. There are no treatment recommendations, and in the few cases reported, a combined treatment with surgery and adjuvant chemotherapy represents the best treatment strategy for the completely removed localized disease.

***Keywords**: Primary lung choriocarcinoma.*

CO 061. SUPERSCAN ON BONE SCINTIGRAPHY: DIAGNOSTIC APPROACH OF A RARE ENTITY IN A PATIENT WITH SMALL CELL LUNG CANCER

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Introduction: Superscan is defined as "a bone scan which demonstrates markedly increased skeletal radioisotope uptake relative to soft tissues in association with absent or faint renal activity". This pattern on bone scintigraphy may appear due to certain types of metastatic cancers, metabolic bone disease or hematological disease, and its diagnostic workup is essential for a correct treatment. In cases of diffuse metastatic disease, it is most commonly seen in prostate and breast cancer, being a rare phenomenon in lung cancer patients.
Case report: 56-year-old male, smoker (50 pack-year), with no other relevant pathological conditions. The patient went to the assistant physician with a 2-month history of dyspnea and irritative cough. Chest CT that documented a left hilar lung mass contiguous with subcarinal and aortopulmonary adenopathic conglomerate (axial axes of approximately 50 × 38 mm). The pulmonary mass presented invasion of adjacent structures, namely the left main bronchus, left pulmonary artery, aortic arch and esophagus. Diagnosis of small cell lung cancer (SCLC) was established through bronchial biopsies. Whole body bone scintigraphy was performed after administration of HMDP-Tc-99m which revealed heterogeneous radioisotope uptake in the skeleton (mainly axial) associated with an absence of renal activity, constituting a scintigraphic pattern of metastatic bone superscan. Extensive analytical study was carried out which excluded phospho-calcium metabolism disorder. No elevation of tumor markers, namely PSA and alpha-fetoprotein, was noted. A CT scan of the spine was performed, which showed marked attenuation of the vertebral bodies and respective posterior arches and rounded areas of lithic aspect in the thoracic, lumbar and sacred segments. Bone biopsy and myelogram were performed, whose histological analysis showed markedly fibrous marrow and neoplastic cell aggregates with a high nucleus-cytoplasmic ratio, findings compatible with SCLC bone metastasis. Systemic treatment with chemotherapy was decided in an oncology group meeting, having completed 3 cycles of carboplatin/etoposide to date. Chest CT reassessment showed partial response with an exuberant reduction of the lung mass.
Discussion: The overall incidence of metastatic bone superscan pattern in different solid organ neoplasms is 1.3%, being an even rarer phenomenon in the context of lung cancer. Histological confirmation and screening for endocrine and hematological disorders

is essential to provide the correct treatment to the patient. If the neoplastic etiology is confirmed, the presence of this pattern indicates advanced metastatic disease with extensive bone metastasis followed by osteoblastic reaction, associated with a worse prognosis.

Keywords: *Superscan. Bone scintigraphy. Small cell lung cancer.*

CO 062. EPSILON SCORE AS A PREDICTIVE SCORE OF SURVIVAL IN PATIENTS WITH NON-SMALL CELL LUNG CANCER TREATED WITH NIVOLUMAB

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Introduction: In NSCLC, inflammatory biomarkers have shown to correlate with a poor prognosis and a low therapeutic response to conventional treatment. The EPSILoN score integrates clinical and biochemical biomarkers, including Eastern Cooperative Oncology Group (ECOG PS) performance status, smoking, liver metastases, lactate dehydrogenase (LDH) and neutrophil to lymphocyte ratio (NLR). This score has been reported as a predictor of prognosis when applied to patients treated with second or further-line immunotherapy and may be a useful tool in the future to guide treatment decisions.
Objectives: To assess overall survival in patients with metastatic NSCLC treated with second or further-line nivolumab based on EPSILoN score.
Methods: Retrospective cohort study conducted at a central and university hospital including 66 patients with stage IV non-small lung cancer who received second or further line with nivolumab between September 2015 and July 2019. ECOG PS > 2, liver metastases, smoking < 40 pack/years, LDH ≥ 400 mg/dL and NLR ≥ 4 account for 1 point. The identified prognostic groups are best, intermediate and poor prognosis for 0, 1-2 and 3-5 points, respectively. The overall survival (OS) curve was calculated using the Kaplan-Meier method and the log-rank test was used to assess differences between groups. Univariate and multivariate analysis was performed using Cox regression to verify the association of patient and disease characteristics and OS.
Results: From the 66 patients analysed, 74.2% were male (n = 49), presenting a median age of 67.5 years (62.5-75.3), 77.3% (n = 51) were active or former smokers from which about 51% reported < 40 pack/years (n = 26). ECOG PS 0-1 was found in 83.3% (n = 55) of the patients. LDH ≥ 400 and NLR ≥ 4 was obtained in 9.7% (n = 6) and 45.2% (n = 28), respectively. Adenocarcinoma was the more frequent histology (71.2%, n = 47) and 50% of the patients had multiple extrathoracic metastases (n = 33). Overall median survival was 32.0 (14.00-99.00) weeks and survival curves were statistically different between each group (p = 0.006) of 3 prognostic survival groups identified by EPSILoN score (1, 51 and 14 patients were allocated to best, intermediate and poor prognosis, respectively). The univariate analysis identified ECOG PS > 2 (p = 0.023) and liver metastases (p = 0.037) as factors associated to worse OS. On the contrary, smoking < 40 pack/years (p = 0.085), LDH ≥ 400 mg/dL (p = 0.095) and NLR ≥ 4 (p = 0.120) were not recognized as factors linked to worse OS. After adjusting for age, sex and histology, smoking < 40 pack/years (HR 0.54, 95%CI 0.29-1.00, p = 0.05), ECOG PS > 2 (HR 2.41, 95%CI 1.08-5.37, p = 0.032) and liver metastases (HR 2.13, 95%CI 0.88-2.96, p = 0.04) were found as independent predictors for OS, on multivariate analysis.
Conclusions: The EPSILoN score is simple and easy to use. In our analysis, the EPSILoN score identified 3 prognostic survival groups, with statistically significant differences in overall survival between them. In the multivariate analysis, the variables smoking ≤ 40 pack/years, ECOG PS > 2 and liver metastases, included in the EPSILoN score, were found as independent predictors of survival.

Keywords: *Epsilon. Non-small cell lung cancer. Immunotherapy. Prognostic group.*

CO 063. REFRACTORY CHYLOTHORAX- THERAPEUTIC STRATEGY

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Introduction: Postoperative chylothorax can be a serious complication since it can promote nutritional deficiencies, prolong the duration of mechanical ventilation, induce lymphopenia and immunosuppression, increasing the patient vulnerability to infections and mortality rate.
Case report: We report a case of a 37 weeks gestation male neonate, with prenatal diagnosis of esophageal atresia that underwent a right thoracotomy with correction of the esophageal atresia and the tracheoesophageal fistula on the second day of life (DOL). This intervention was complicated with right chylothorax (confirmed by biochemical analysis of pleural effusion) and conservative treatment was started (total parenteral nutrition and octreotide perfusion). He was sent to our centre to do an aortopexy and closure of the arterial duct via median sternotomy by Cardiothoracic Surgery because he had a vascular ring and persistence of the arterial duct. The chylothorax persisted despite medical measures, so on the 22nd DOL he was underwent a right posterolateral thoracotomy (8th intercostal space). Intraoperatively, the thoracic duct was identified near the aortic hiatus and it was oversewn with nonabsorbable suture. A mechanical pleurodesis was performed and the chest drain was replaced. Although an initial reduction in pleural drainage, the patient had a relapse and a new chylothorax appeared. The lymphangiography was inconclusive and the presence of a thrombus in the superior vena cava was excluded. On the 32nd DOL underwent a right thoracotomy (5th intercostal space) and multiples lymphatic pathways were overseen. Due to the persistence drainage, a pleuroperitoneal shunt (PS) was placed, on the 51st DOL. The pressure gradient necessary to open the valve can be overcome by compressing the bulb (overlying the costal margin) which houses the one-way valve, forcing the flow from chest to abdomen. The pleural drainage significantly reduced, but the bulb which houses the one-way valve was pressed several times per hour. The infant started oral feeding after 7 days and it was well tolerated. Regular abdominal ultrasounds were performed without evidence of ascites. The pleural drain was removed 20 days after the last surgery. He remained under invasive mechanical ventilation until 56th DOL. The patient was discharged home at 3 months-old without relapse of pleural effusion or ascites. He is currently at home, under milk formula and still maintains the PS.
Discussion: The treatment of chylothorax should be stepwise. Drainage of pleural effusion is usually required, although a prolonged significant continuous drainage can cause nutritional deficits. The surgical approach includes thoracic duct ligation, pleurodesis, pleurectomy and PS. Timing for surgical intervention is variable, with strategies ranging from two to four weeks after conservative management, to early intervention depending on whether there is a large-volume chylothorax, severe metabolic and nutritional complications or a well identified site of chyle leak since thoracic ligation is the most definitive treatment if the site of rupture was previously identified by lymphangiography. PS can be useful for treatment of refractory chylothorax since it is technically easy to perform and can allow lymphatic vessels healing without loss of proteins and nutrients.

Keywords: *Refractory chylothorax. Neonate. Pleuroperitoneal shunt.*

CO 064. LYMPH NODE UPSTAGING IN PATIENTS WITH NEGATIVE MEDIASTINAL STAGING BY MEDIASTINOSCOPY

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Introduction: The staging of lung cancer is crucial as treatment options and prognosis differ significantly according to disease progression. In addition to imaging techniques, locoregional staging using more invasive techniques such as endobronchial ultrasound (EBUS) and/or endoscopic ultrasound (EUS) and videomediastinoscopy is indicated for patients at higher risk for mediastinal lymph node metastases.
Objectives: Evaluate the percentage of unpredictable N2 after surgery in patients with lung cancer with negative mediastinal lymph node staging by mediastinoscopy in a reference Hospital Center.
Methods: Retrospective unicentric observational study carried out between January 2019 and July 2021, which included patients with proven primitive malignant neoplasm of the lung, undergoing surgical lung resection with lymph node dissection and with previous mediastinal staging by mediastinoscopy negative for neoplastic cells. Patients undergoing neoadjuvant chemotherapy were excluded.
Results: A sample of 54 patients with a mean age of 66 ± 9.03 years was obtained, 39 (72%) were male. The most frequent anatomical tumor location was the upper left lobe (35%), followed by the upper right (22%) and lower right lobes (22%), lower left lobe (19%) and middle lobe (2%). With regard to pathology, the most frequent histological type was adenocarcinoma (67%), followed by squamous cell carcinoma (15%), neuroendocrine carcinoma (13%), including small cell carcinoma (6%), large cell neuroendocrine carcinoma (4%) and carcinoid tumor (2%), and pleomorphic carcinoma (6%). Of the sample, 8 patients (15%) had N2 finding after lung resection and lymph node dissection, 6 with histological diagnosis of adenocarcinoma and 2 with neuroendocrine carcinoma, with no predominance in the anatomical tumor location. In 5 patients (9%), upstaging occurred in lymph node groups that had been approached by mediastinoscopy. The time intervals between mediastinoscopy and resection surgery were also analyzed, and no significant differences were found between patients in whom lymph node upstaging occurred (mean 36.6 ± 31.3 days) and the remaining sample (mean 40, 3 ± 33.3 days).
Conclusions: With the emergence of new less invasive techniques, videomediastinoscopy is no longer the gold standard in mediastinal staging. However, according to local experience and the need for quick response in cancer cases, it maintains an important role in the management of these patients. The significant percentage of false negatives of 15% in this sample is higher than the reports found in the literature, and it is also important to note that lymph node upstaging in 5 patients occurred in lymph node groups that were biopsied during videomediastinoscopy. These findings suggest that the review of surgical procedures and techniques is relevant in order to reduce the rate of unexpected N2 and thus improve the adequacy of the final treatment offered to these patients.

Keywords: *Mediastinoscopy. Lymph node upstaging. Mediastinal staging. Lung neoplasm.*

CO 065. ENDOSCOPIC RESECTION... AS IF IT NEVER HAPPENED?

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Introduction: The gold standard for treatment of early-stage lung cancer in the airways is surgery. However, surgery often implies a large resection of normal lung and presents important morbimortality. Endoscopic treatment is an effective alternative for curative treatment, as we intend to show with these cases.
Case reports: Case Report-1. Woman, 51-years-old, non-smoking. Hemoptoic sputum and progressive dyspnea in the last year. Thoracic CT: endobronchial mass in the left main bronchus, with associated obstructive pneumonitis. Rigid bronchoscopy (RB): left main bronchus totally occluded by neoformation, after laser photocoagulation and mechanical debridement, left lobar bronchi are permeable, residual tumor in the secondary carina. Histology: carcinoid tumor. No significant FDG-PET/CT or Ga-DOTA-NOC-PET/CT uptake. Flexible bronchoscopy: residual tumor in the secondary carina. Multidisciplinary group meeting (MGM) (T2N0M0): surgery. Intraoperative flexible bronchoscopy: scar tissue in the secondary carina, cryobiopsy was performed, extemporaneous examination: no evidence of malignancy. Surgery was cancelled. After one year from diagnosis: no signs of relapse, asymptomatic. Imagiologic and endoscopic revaluation at 6 months. Case Report-2. Man, 81-years-old, non-smoking. Hemoptoic sputum for 3 months and small-volume hemoptysis 3 days before diagnosis. Thoracic CT: heterogeneous area, in the apical segment of the right lower lobe (RLL). Flexible bronchoscopy: rounded, smooth and vascularized lesion, at the apical segment of the RLL. Histology: carcinoid tumor. No significant FDG-PET/CT uptake. Somatostatin receptor scintigraphy: enhanced tracer uptake in the first right rib and mediastinum (left), thoracic CT with no lesions. MGM (T2N0M0): Conservative treatment - Lanreotide every four weeks and endoscopic evaluation. RB: lesion in the apical segment of the RLL, after laser photocoagulation, it is partially permeable. A month later, flexible bronchoscopy: residual lesion, RLL is permeable. Thoracic CT: significant improvement. Today, after three years: no signs of relapse, asymptomatic, still under Lanreotide. Case Report-3. Man, 70-years-old, former smoker. Cough for the last 4 months, dyspnea for the last month. Thoracic CT: intraluminal hyperdense image at main carina. Flexible bronchoscopy: exophytic lesion, at main carina, causing partial obstruction of both main bronchi. RB: exophytic lesion causing obstruction of ~80% of both main bronchi, after laser photocoagulation and mechanical debridement, main bronchi are permeable, residual tumor in the main carina. Histology: Squamous cell carcinoma of the lung. FDG-PET/CT uptake in the lesion. EBUS-TBNA: subcarinal adenopathy was biopsied, no other adenopathies were recognised. Histology: Squamous cell carcinoma. MGM (T4N2M0): Concurrent Chemoradiation therapy. Three months later, flexible bronchoscopy: sessile lesion removed from the right lower lobar bronchus. Histology: Squamous cell carcinoma. Thoracic CT: upper right paratracheal adenopathy (2R). FDG-PET/CT: FDG uptake in the 2R adenopathy. EBUS-TBNA: 2R adenopathy was biopsied, no other adenopathies were recognised. Histology: Squamous cell carcinoma. Bronchoscopy: no signs of endoscopic relapse. Thoracic CT: slight increase of the 2R adenopathy, no other lesions or adenopathies identified. MGM: surgical resection of adenopathy.
Discussion: Endoscopic treatment is a safe and effective alternative for curative treatment of early-stage lung cancer in the airways, being less invasive and expensive than surgery. It should be considered as an alternative, namely for patients who are unfit or unwilling to undergo surgery.

Keywords: *Endoscopic resection. Lung cancer. Bronchoscopy.*

CO 066. ISOLATED MEDIASTINAL ADENOPATHY UNDERGOING EBUS-TBNA AND EUS-B-FNA

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Introduction: Bronchial ultrasound-guided transbronchial needle aspiration (EBUS- TBNA), in addition to representing the gold standard procedure for mediastinal lymph node staging of non-small cell

lung cancer, is also relevant in the diagnosis of isolated mediastinal adenopathy.
Objectives: To identify the main etiologies of isolated mediastinal adenopathy through EBUS-TBNA and endoscopic ultrasound-guided fine needle aspiration (EUS-b-FNA), in a reference center.
Methods: Patients referred to the Portuguese oncology institute (IPO) of Coimbra between 01-01-2019 and 31-12-2019 were included in this study, for EBUS-TBNA or EUS-b-FNA, with clinical information on isolated mediastinal adenopathy, with no history of oncologic disease or pleuroparenchymal alterations. The variables studied were age, gender, smoking status, occupational inhalation exposure, associated pathology, quality of collected material, histological result, and follow-up up to 2 years.
Results: During this period, 213 exams were performed (140 EBUS-TBNA and 73 EUS-b-FNA). 25 presented inclusion criteria for the study. The mean age of patients was 57.5 years (SD ± 13.2), 13 being male. 6/25 with a history of smoking. In most cases (14/25) 2 lymph node stations were punctured, the most frequent (19/25) station 7; the size ranged between 10-25mm. Histological diagnosis was established in 13/25 exams: 12 with non-necrotizing granulomatous lymphadenitis and 1 with lymph node metastasis from small cell lung carcinoma (SCLC). In the remaining 12 exams, professional inhalation exposure was found in 4 cases (2 construction operators, 1 granite cutter with exposition to granite dust and 1 carpenter), 5 cases with respiratory pathology (2 COPD, 2 asthma and 1 bronchiectasis), 1 case of variable common immunodeficiency, 1 Sjögren syndrome and 1 suspected Rosai-Dorfman disease (RDD). Of these 12 patients, in 6 cases neoplastic, granulomatous, and lymphoproliferative disease were excluded, and the same result was confirmed by mediastinoscopy in one of the cases; in the other 6 exams, the material collected had little representation of lymph node tissue. In follow-up of up to 2 years, it was found that the 12 patients with non-necrotizing granulomatous lymphadenitis were being followed up in interstitial lung consultation with diagnosis of sarcoidosis and the patient with lymph node metastasis due to SCLC continued to be followed up in oncologic consultation. The remaining 12 patients showed stability in imaging exams, as well as in the remaining complementary study carried out; the RDD case has not been confirmed.
Conclusions: In this study, the main etiology associated with isolated mediastinal adenopathy was sarcoidosis. In cases where no histological diagnosis was established, there was a considerable association between occupational inhalation exposure and previous inflammatory lung disease. The presence of imaging stability in these patients is an indicator of benignity of these findings.

Keywords: *EBUS-TBNA. EUS-B- FNA. Isolated mediastinal adenopathy.*

CO 067. PREDICTORS OF COMPLICATIONS IN FLEXIBLE BRONCHOSCOPY

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Introduction: Flexible bronchoscopy (FB) is currently widely used, effective and safe, with mortality rates < 0.1%. Nevertheless, understanding its complications is of particular relevance, predicting possible outcomes and managing patient expectations.
Objectives: Identify predictors of complications during and up to 72h post-BF.
Methods: For 11 weeks, patients who underwent BF at CHUPorto were prospectively analysed regarding clinical and analytical characteristics, events and vital signs during and 0/30/60min post-BF. A telephone call was also carried out at 72 hours with an active search for post-procedure symptoms. Patients without the recommended hypocoagulation/clopidogrel withdrawal time or with respiratory failure were excluded.
Results: Among the 131 patients analysed, none had serious adverse effects according to the classification proposed by the BTS guidelines.2 Transient desaturation (SatO2< 90% or change>4%) occurred in 33 patients (25.2%), which lasted immediately post-FB in 13 (9.9%), all of these with resolution 1h post-FB. Past history of pulmonary tuberculosis (OR = 7.1; p = 0.002) and heart failure (OR = 3.2; p = 0.045) were risk factors for transient desaturation at the end of BF. Transient desaturation at the end of the examination occurred in 10 of 92 patients undergoing BAI and was associated with higher instilled volume (p = 0.006), being more common in those with 200 mL instillation (5/14; 35.7%) compared to 150 mL (3/21; 14.3%) or 100 mL (2/26; 7.7%). The volume not recovered in the LBA tended to be higher in those with desaturation at the end of the examination, although without statistical significance (84 *vs.* 64 mL, p = 0.058). Considering those with cough during FB, 54.8% had some symptom at 72h (p = 0.004), highlighting among these hemoptoic sputum (p = 0.024). The most common complications within 72h post-BF were haemoptoic sputum (n = 21, 16.0%), followed by fever (n = 9, 6.9%), cough (n = 6, 4.6%), epistaxis (n = 5, 3.8%), wheezing (n = 2, 1.5%) and dyspnoea (n = 1, 0.8%). All symptoms resolved within 72 hours with the exception of one case of haemoptoic sputum in a patient undergoing bronchial biopsy for suspected neoplasm. Fever was observed in 10.8% of BAL, with a tendency to occur in those with higher non-recovered volume (82.7 *vs.* 64.5mL, p = 0.099), without statistically significant differences. In the same way, considering only BAL with a 50/100 mL instillation, a relationship between fever and higher non-recovered volume was found (72.8 *vs.* 50.1 mL, p = 0.035). Post-BF cough correlated with a lower mean dose of fentanyl administered (50.0 *vs.* 63.2, p = 0.019). Those with post-FB cough also had a lower initial SatO2 (89.5 *vs.* 97.1%, p < 0.001), and during FB had desaturation < 90% more frequently (p = 0.036). The occurrence of haemoptoic sputum at 72h correlated with the existence of friable mucosa during FB (p = 0.023). Relative to the 33 patients previously on enoxaparin, those who came to have haemoptoic sputum by 72h had on average shorter hypocoagulation withdrawal time, although without statistical significance (16.0 *vs.* 33.8h, p = 0.098).
Conclusions: Transient desaturation was the most relevant minor complication in the peri-BF period. In the first days after BF, hemoptoxic sputum, fever and cough were the most frequent events. Cough conditioned complications during and after the examination, so the use of drugs that inhibit it during FB may be beneficial.

Keywords: *Flexible bronchoscopy. Complications. Risk factors. Bronchoalveolar lavage.*

CO 068. DIAGNOSTIC YIELD OF BRONCHOSCOPY PROCEDURES

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Introduction: Flexible bronchoscopy (FB) is commonly used to evaluate suspicious lung lesions. The diagnostic yield varies between centres depending on the techniques and patients evaluated, as well as the associated laboratories.
Objectives: Assess diagnostic yield of techniques in bronchoscopy.
Methods: For 11 weeks, patients who underwent FB at CHUPorto were prospectively analysed regarding clinical and analytical characteristics, events and vital signs during and 0/30/60min post-FB. A telephone call was also made at 72 hours with an active search for post-procedure symptoms.
Results: Of the 140 patients examined, 22 had a previous diagnosis of lung neoplasia and underwent FB pre-thoracic surgery and were

therefore not analysed. The remaining 118 patients comprised 117 bronchial aspirates, 83 bronchoalveolar lavage (BAL), 26 bronchial biopsies and 5 bronchial brushes. Among patients with suspected pneumonia without microbiological confirmation, BAL obtained isolation in 100% of the immunosuppressed and 85.7% of the immunocompetent patients. This contrasts with data from bronchial aspirates, where there was only isolation in 15.8% of cases of suspected pneumonia. The diagnostic yield of BAL, when performed for microbiological purposes only, tended to be higher in those with higher volume retrieved (35.2 *vs.* 24.5 mL, p = 0.084) or higher retrieved/instilled volume ratio (42.3 *vs.* 32.2%, p = 0.105), although without statistical significance. This increased microbiological diagnostic yield dissipates at volumes greater than 100mL (88.3 *vs.* 87.1 mL, p = 0.954). Four of the ten diagnoses of TP occurred in patients where this was not the main suspicion, which reinforces the importance of mycobacteriological examination. Analysing cytology by suspicion of neoplasia, the aspirate was positive in 10% of cases, as opposed to BAL where all cytology was negative. Microbiological yield of bronchial aspirate and BAL were not influenced by the dose of topical lidocaine applied (p = 0.366). Among those submitted to endobronchial biopsy, 22 (84.6%) had a histological diagnosis. Biopsies performed in the upper lobe bronchi had 100% diagnostic pyield, as opposed to the middle lobe/lingula (50%) and lower lobe bronchi (66.7%). The number of punctures performed was similar in those with and without diagnosis (7.5 *vs.* 6.8, p = 0.659). Although coughing during the procedure is associated with higher risk of bleeding (p < 0.001) during FB and more haemoptoic sputum at 72h (p = 0.024), the 4 patients without diagnosis had no significant cough during the procedure(p = 0.030).
Conclusions: Endobronchial biopsy is a procedure with high diagnostic yield, dependent on the characteristics and location of the target lesion. BAL is highly cost-effective for microbiological isolation, which correlates with the volume retrieved in BAL up to 100mL of volume instilled.

Keywords: *Flexible bronchoscopy. Bal. Diagnostic yield. Endobronchial biopsy.*

CO 069. INFLUENCING FACTORS IN PNEUMOTHORAX REABSORPTION – CASUISTIC REPORT OF A PULMONOLOGY UNIT

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Introduction: Pneumothorax is defined by the presence of air in the pleural cavity, causing separation between the pleural and visceral pleura and lung collapse, frequently requiring insertion of a chest tube. Although risk factors associated with pneumothorax are well established, factors related with persistent air leaks (PAL) are still under established.
Objectives: Determination of patient-related factors associated with PAL and lengthier need for chest tube drainage.
Methods: The following is a retrospective observational study involving patients admitted to the Pulmonology ward at Centro Hospitalar Universitário do Porto (CHUPorto) between January 2020 and June 2021. PAL was defined by the presence of sustained air leak 72 hours after insertion of a chest tube. All demographic and clinical data were submitted through descriptive and inferential statistical analysis; a significance level of.05 was assumed.
Results: A total of 69 cases were identified, 76.8% of which were male, with an average age of 57.2 ± 17.4 years old. Fifty-five were reported to have risk factors associated with development of pneumothorax. Forty-three (61.4%) were subjected to placement of a chest tube (average duration of 9.5 ± 11.7 days) and the rest to conservative management. Low pressure suction was initiated in 22 (31.7%) of cases. In this sample higher age (p = 0.04), pulmonary emphysema (p = 0.035), large volume pneumothorax (p = 0.005) and initiation of low pressure suction (p = 0.028) were all identified as factors associated with lengthier duration of chest tube drainage. PAL was observed in about a third of cases (33%). The use of a jolly chest tube was associated with higher incidence of PAL when compared to pigtail catheters (p = 0.004); however, this association did not preclude an increase in number of days with a chest tube or a longer in-hospital stay.
Conclusions: The goal of this study was to provide better understanding of cases of pneumothorax with longer drainage times. The most influential factors were found to be older age, lung emphysema, large volume pneumothorax and the need for low pressure suction. The device used for drainage was associated with different incidence of PAL, but not with the duration of chest tube drainage.

Keywords: *Pneumothorax. Persistent air leak.*

CO 070. IN PLEURAL EFFUSION, DOES CHEST TUBE SIZE MATTER?

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Introduction: Management of pleural effusion often requires placement of a chest tube (CT). Large-bore tubes (≥ 16 Fr) require surgical incision and dissection, while small-bore tubes (≤ 14 Fr) can be placed percutaneously using the Seldinger technique, and thus are more comfortable for the patient. Large-bore CT placement is indicated in hemothorax or grade II/III empyema; however, in other etiologies of exudative pleural effusion, a difference in efficacy between small- and large-bore tubes has not been demonstrated.
Objectives: We aimed to compare the outcomes of small- and large-bore CTs in the management of pleural effusion.
Methods: Retrospective study of CT placements in the Interventional Pulmonology Unit of Santa Marta Hospital, between July 2020 and July 2021. Patients with pneumothorax, hemothorax and grade II/III empyema were excluded. Data analysis was performed using SPSS software.
Results: Twenty-two patients were included, 63% of whom were female, with a mean age of 72 years. Twenty-four CTs were placed in total (two patients with bilateral effusion required two drainages); of these 24, 12 were small-bore tubes (8-14 Fr) and 12 were large-bore tubes (18-24 Fr). On thoracic ultrasound, 75% of effusions were free flowing, 12.5% had septations and 12.5% were loculated. According to the Light criteria, 87.5% were exudates and 12.5% were transudates. Malignancy was the main cause of exudative effusion (71.4%), followed by infection of pleural fluid or adjacent lung parenchyma (28.6%); in 9.5% of cases the exudate was idiopathic. Average duration of chest drainage was shorter in the small-bore group, but without statistical significance (4.83 *vs.* 7 days, p = 0.214). Lung expansion was achieved in only 50% of cases in the small-bore group *vs.* 91.7% in the large-bore group, but this difference was not statistically significant (p = 0.069). Both groups needed a similar amount of time, on average, to achieve lung expansion (3.17 for small CTs *vs.* 3 days for large CTs, p = 0.926). Complications were more frequent in the small-bore group, but the difference was not significant (25% *vs.* 8.3%, p = 0.590). Talc slurry pleurodesis was performed in six effusions with large-bore CT, with a recurrence rate of 33.3%; however, only two effusions in the small-bore group underwent pleurodesis, none of which recurred. There were no significant differences regarding in-hospital mortality in both groups (33.3% *vs.* 8.3%, p = 0.317).
Conclusions: Although we found no statistically significant differences between small- and large-bore CT regarding the aforementioned parameters, there is a trend towards lower lung expansion rates in the small-bore group. This study has several limitations, namely the small sample size, and the inclusion of some transuda-

tive effusions, in which CT drainage is not formally indicated, creating bias. According to available evidence, there are no significant differences in efficacy between small- and large-bore CTs in exudative pleural effusion (except hemothorax and purulent empyema). Small-bore CT placement is easier and causes less discomfort to the patient. Therefore, their use can be considered in larger, refractory or quickly recurring transudative effusions.

Keywords: *Pleural effusion. Chest tube. Large-bore. Small-bore.*

CO 071. WHAT HAPPENS WHEN WE PLACE INDWELLING PLEURAL CATHETERS IN THE MOST DIFFICULT PATIENTS? LESSONS LEARNED FROM THE FIRST 50 CASES

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Introduction: Indwelling pleural catheters (IPCs) are increasingly being used for patients with recurrent malignant pleural effusions, uniformly relieving dyspnea and improve quality of life of patients. In some patients with recurrent non-malignant pleural effusions, IPCs proved to be effective as well. With increasing use of IPCs, physicians and patients are faced with complications related to the presence of an indwelling catheter for extended periods of time.
Objectives: To characterize the population of adult patients in whom was placed an indwelling pleural catheter.
Methods: Prospective cohort study conducted at an university hospital, including adult patients in whom was collocated an indwelling pleural catheter from august 2014 to may 2021.
Results: From 50 patients included, 64% were male (n = 32), presenting a median age at time of the pleural catheter of 68.5 ± 11.0 years, 50% were active or former smokers (n = 25) and 54% had an ECOG PS ≥ 2 (n = 27). In all three cases presenting with bilateral pleural effusion, the IPC was placed on the left side. Malignant pleural effusions corresponded to 94% of the cases (n = 47), being the most frequent aetiologies: lung adenocarcinoma (42.6%, n = 20), breast cancer (12.8%, n = 6) and pancreatic adenocarcinoma (8.5%, n = 4). Regarding the benign diagnosis, there were two cases of hepatic hydrothorax and one case of congestive heart failure. The indications for IPC placement were trapped lung in 44% (n = 22) and talc slurry pleurodesis failure in 32% (n = 16) of the patients. IPC was first choice treatment of recurrent pleural effusion in 22% (n = 11) of the cases). Hospitalized patients corresponded to 68% of the cases (n = 34) and the majority (96%, n = 48) had a previous thoracocentesis, the first one, in median, 70 days previously. Immediate complications were observed in two cases (subcutaneous emphysema and hemothorax). Pleural infection occurred in 24% of the cases (n = 12) and MSSA was the most frequent isolated microbiological agent (33.3%, n = 4), determining early pleural catheter removal in 75% (n = 3) of the cases. Pleural catheters were removed either due to pleural infection (n = 6) and spontaneous pleurodesis (n = 5). Three were removed accidentally. About 70% (n = 34) of the patients were not followed by Palliative Care, and 86% of them died during follow-up, with a median survival after IPC placement of 56 days (2-431 days).
Conclusions: Malignant pleural effusions account for the major aetiology in adult patients in whom was collocated an IPC and the principal indication was trapped lung. Pleural infection occurred in about 1/4 of the patients determining precocious pleural catheter removal in about half of these. Only 1/3 of the patients were followed by Palliative Care at first and about 90% died within two months after the IPC was placed, revealing that these devices have been used mainly in patients with advanced disease.

Keywords: *IPC. Malignant pleural effusion. Trapped lung. Pleural infection.*