Pulmonol. 2022;**28(Esp Cong 3)**:1-33

PULMONOLOGY

www.journalpulmonology.org

ORAL COMMUNICATIONS

38º Congresso de Pneumologia

Algarve, 10-12 de Novembro de 2022

CO 001. CHALLENGES IN DIAGNOSTIC APPROACH OF PLEURAL TUBERCULOSIS

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Introduction: The diagnosis of pleural tuberculosis (pTB) remains a challenge, due to limited sensitivity of conventional microbiology methods. A confirmed diagnosis of pTB is achieved when *Mycobacterium tuberculosis* complex bacteria are identified in cultural examination of pleural fluid (PF) or pleural biopsy (PB), or in the presence of a positive acid-fast bacilli (AFB) smear and a positive nucleic amplification test. However, the decision to start treatment is sometimes based on a probable diagnosis, in patients with typical clinical and imaging findings who present with a lymphocytic predominant exudate, a high adenosine deaminase (ADA) level and/or histological examination suggestive of pTB, such as presence of granulomas and/or caseous necrosis. pTB is frequently associated with pulmonary tuberculosis (TB), which can also reinforce this diagnosis.
Objectives: To evaluate the usefulness of the different diagnostic methods available in the diagnosis of pTB.
Methods: Retrospective observational study of patients diagnosed with pTB who were submitted to thoracentesis between 01/2010 and 07/2022. Demographic, clinical and laboratory data were collected, including PF's differential cell count, LDH, protein, glucose and ADA levels, AFC smear and cultural examination. When PB were performed, AFC smear, cultural and histological examination results were also analyzed. Evaluation of pulmonary involvement was performed in all patients.
Results: A total of 34 patients were included, 27 (79%) were male and the mean age was 41.9 years (standard deviation - SD: 18.3). A confirmed diagnosis of pTB was possible in 35.3% (12/34) and a probable diagnosis was achieved in the remaining 64.7% (22/34), of which 27% (6/22) had a confirmed pulmonary TB diagnosis. In 2 cases, it was not possible to collect PF due to complications in the procedure and in 7 patients more than one diagnostic thoracentesis was performed. All PF were exudates (32/34), and 84.4% (27/32) had a lymphocytic predominance. Mean glucose levels were 85.4 mg/dL (SD: 37.4 mg/dL) and mean LDH levels were 648.0 U/L (SD: 1,046.9 U/L). High ADA levels were present in 90.6% (29/32), with a mean value of 69.2 UI/L (SD: 38.8 Ul/L). AFC smear in PF was negative in all patients and PF's cultures were positive in 21.9% (7/32). Regarding PB, histological examination was suggestive of pTB in 92.3% (24/26) of the cases where it was performed. AFC smear in PB was positive in 7.7% (2/26) and cultural examination of PB confirmed the diagnosis of pTB in 41.7% (5/12) of patients.
Conclusions: Although multiple diagnostic tools are available in the diagnosis of pTB, a definite pTB diagnosis was not possible in the majority of cases. The most frequently changes found in exams, such as PF characteristics, ADA level and histological examination, only led to a probable diagnosis. Efforts should be made to perform the highest and most variated number of diagnostic exams, including cultural examination of PB, in order to maximize the likelihood of obtaining a definite diagnosis.

Keywords: *Tuberculosis. Pleural tuberculosis. Tuberculosis' diagnostic methods.*

CO 002. SCREENING FOR TUBERCULOSIS IN THE MIGRANT POPULATION, STRATEGY OR STIGMA? EXPERIENCE OF SCREENING WAR REFUGEES FROM UKRAINE

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Introduction: The World Health Organization considers Ukraine as a country with a high incidence of tuberculosis (TB) and multidrug-resistant TB (1/3 of new diagnoses). The emergence of a new wave of refugees becomes a challenge for host countries. The Centro Diagnóstico Pneumológico de Gaia (CDPGaia) carried out the TB screening of these migrants. The aim of this study was to assess adherence, ability to follow up this group and identify the main obstacles to implementing screening in the migrant population.
Methods: Cross-sectional study by completing a questionnaire (with the clinical history and results of the tests requested) during the consultations of migrants undergoing screening for TB implemented by CDPGaia in April and May 2022.
Results: 114 migrants were screened (identified by Public Health and supported by local organizations for their reception), with a mean age of 30.35 years, the youngest was 2 and the oldest was 81

years old. The majority (65.8%) were female and had Ukrainian nationality (86.9%). When asked about the relevance of screening, only 38.5% reported understanding the reasons, 12.2% reported not understanding/feeling discriminated against by the situation and 49.1% did not answer the question. During the screening, ninety migrants were discharged at the first visit (no clinic, no exposure or radiological changes). Of the remaining twenty-four, sixteen were absent from the subsequent consultation. Among the patients who were absent, there was a patient with a previous history of TB with incomplete treatment. The others were asked for exams for progression of the study (presence of complaints, history of exposure or doubts in the reading of the chest X-ray). Microbiological examinations and IGRA tests were performed at CDPGaia on the day of the consultation, so we have access to the results. We did not have access to the exams requested from the outside of the patients who were absent. Five patients with latent infection by *Mycobacterium tuberculosis* (TBLI) were identified, and it was possible to start preventive treatment for three, one remained in treatment and finished the prescribed regimen. It was not possible to establish contact with the remaining absentees – change of address, departure from the country.
Conclusions: The main obstacles encountered during the screening were the national and international mobility of migrants, which is associated with the consequent poor adherence to subsequent screening consultations. In addition to mobility, the difficulty in perceiving the relevance of screening, as well as the diagnosis and treatment of TBLI contributed for loss of follow-up. Screening for TB in the migrant population remains a controversial topic despite some studies pointing it as a cost-effective strategy to screen migrants from high-incidence countries. However, it is necessary to implement more comprehensive strategies, namely at the national level, to allow greater adherence and follow-up of people who are on the move.

Keywords: *Tuberculosis. Screening. Ukraine. War. Refugees. Migrants.*

CO 003. LATENT TUBERCULOSIS INFECTION TREATMENT IN IMMUNOSUPPRESSION CANDIDATES – EXPERIENCE FROM A SINGLE PULMONOLOGY DIAGNOSTIC CENTER

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Introduction: Latent tuberculosis infection (TBIL) is a pivotal intervention point in the prevention of tuberculosis, which is especially worrying in patients due to undergo systemic immunosuppression. Amongst the side effects, hepatotoxicity e gastrointestinal (GI) symptoms standout, as they may affect treatment compliance and efficacy.
Objectives: To determine the prevalence of side effects associated with LTBI treatment with isoniazid in patients who are candidates to systemic immunosuppression, as well as potential risk factors.
Methods: The following is an observational, retrospective observational study involving patients attending a Pulmonology Diagnostic Center for LTBI treatment, due to being immunosuppressed or being candidates to systemic immunosuppression, who initiated isoniazid treatment between January 2020 and June 2021. All demographic and clinical data were submitted through descriptive and inferential statistical analysis; a significance level of 0.05 was assumed.
Results: A total of 129 patients were evaluated (47.5% male; median age of 53.5 ± 17.5 years). The most common comorbidities were overweight (41.1%) and dyslipidemia (26.4%). The most common inflammatory diseases, which motivated referral, were psoriasis (24.8%), spondyloarthropathies (22.5%), rheumatoid arthritis (20.9%) and inflammatory bowel disease (14%). Immunosuppression agents later initiated included methotrexate (34.9%), tumor necrosis factor alfa inhibitors (24.8%) and oral corticosteroids (20.9%). Every patient was prescribed 9 months of treatment with isoniazid; 72.1% also initiated treatment with pyridoxin. During treatment, 23 (17.8%) patients reported GI symptoms; these were significantly more prevalent in older individuals (60.4 *vs.* 52.8 years; p = 0.023). A total of 12 (9.3%) patients experienced symptoms of peripheral neuropathy, with no need to interrupt treatment. Thirty cases (18.5%) of hepatotoxicity were observed, with interruption of treatment. Univariate analysis revealed a statistically significant relationship between hepatotoxicity and dyslipidemia (p = 0.012), rheumatoid arthritis (p = 0.028) and methotrexate treatment (p = 0.049).
Conclusions: The goal of this work was to provide an overview of LTBI patients who were also under immunosuppression. Although it is a preventive treatment, there are risks associated with it, with a considerable prevalence of hepatotoxicity in our sample; monitoring is essential, especially in patients undergoing immunosuppression with hepatotoxic drugs and who have comorbidities. On the other hand, GI symptoms were found to be more common in older individuals. Further multicentric studies are required to better understand and treat these individuals.

Keywords: *Latent tuberculosis infection.*

CO 004. TUBERCULOSIS IN IMMIGRANTS IN LISBOA E VALE DO TEJO

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Introduction: The number of notified cases of tuberculosis (TB) in Portugal has been lowering thanks to the native population with the number of cases in the immigrant population remaining relatively steady. Immigration impacts local epidemiology of TB.
Objectives: To characterize a população of immigrants with TB. To compare with the native population during the period of time.
Methods: Retrospective study based on TB Surveillance System forms including TB new cases and re-treatments records from 01/01/2017 to 31/12/2019. Data statistical analysis was performed using t Student test and chi square test. A p-value < 0.05 was considered statistically significant.
Results: The majority of immigrants came from the African continent, mainly Angola and Guiné Bissau. Compared to the native population, immigrants were younger, presented a significant percentage of HIV/TB co-infection and 5,3% (n = 23) lived in community housing. The native population presented a higher percentage of comorbidities, mostly COPD and cancer. In both groups, the lung was the predominant site of TB. However, immigrants presented a significant percentage of disseminated TB. There was not a statistically significant difference between drug resistance profiles among the two populations. Most cases corresponded to first line drug-susceptible TB. The majority of patients completed treatment. Transference to another facility or emigration during treatment was more common to occur among immigrants. Mortality was higher in the native population (non iatrogenic cause).
Conclusions: On the one hand, the native population was an older group of patients presenting more comorbidities and subsequently higher mortality during the course of treatment. On the other hand, the immigrant population was a younger group of patients presenting higher HIV/TB co-infection prevalence, increased infection risk at least partially due to housing conditions and extra-pulmonary TB more commonly, namely disseminated TB.

Keywords: *Tuberculosis. Immigration. Native population.*

CO 005. TUBERCULOSIS AND CHRONIC LIVER DISEASE IN LISBOA E VALE DO TEJO

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Introduction: Chronic liver disease (CLD) patients present higher incidence of tuberculosis (TB), namely extra-pulmonary and dis-

seminated TB. The frequency of adverse drug reactions (ADR) to TB drugs is higher in these patients.
Objectives: To characterize a population of individuals with CLD and TB. To determine the prevalence of ADR to TB drugs in these population.
Methods: Retrospective study based on TB Surveillance System forms including TB new cases and re-treatments records from 01/01/2017 to 31/12/2019 mentioning "Liver disease" in the field "Diseases before TB". Data analysis was performed using Microsoft Excel.
Results: From the 1,059 records, 52 patients presented CLD (5%). The majority of these patients were male (83%, n = 43) and the average age was 51 years old (minimum 20, maximum 81). Concerning the etiology of CLD, the most frequent one was viral (73%, n = 38) followed by alcoholic (21%, n = 11). HIV infection was the most common comorbidity (35%, n = 18) followed by COPD (10%, n = 5) and diabetes (10%, n = 5). Among these patients, 33% of patients were alcohol dependent (n = 17) and 21% were intravenous drug users (n = 11). Regarding their social environment, 15% lived in community housing (n = 8), 8% were homeless (n = 4) and 6% were inmates (n = 3). The primary diagnosis in the majority of cases was pulmonary TB (80%, n = 40), cavitating in 58% (n = 23) and bacilliferous in 55% (n = 22). There were six cases of disseminated TB (12%), three of pleural TB (6%) and three of extrathoracic TB lymphadenitis (6%). Most patients initiated treatment with Isoniazid, Rifampicin, Pirazinamide and Ethambutol (87%, n = 45). For five patients with HIV infection (10%), rifabutin was chosen instead of rifampicin. One patient took levofloxacin due to resistance to isoniazid. For one patient, it was decided to start treatment without pirazinamide. There were 19 cases of ADR to TB drugs (37%). The most common was hepatotoxicity (17%, n = 9) which was symptomatic in 56% (n = 5). TB drugs were temporarily suspended and only in two patients they were not completely reintroduced (pirazinamide was excluded). The second most common ADR was paresthesia (8%, n = 4) which was managed by increasing pyridoxine dosage. Three patients (6%) complained about generalized pruritus and two (4%) about epigastralgia. All improved with symptomatic treatment. There was one case of visual disturbance that led to suspension of etambutol. Most patients completed treatment (87%, n = 45). Five patients abandoned treatment (10%) and two died (non iatrogenic cause).
Conclusions: In our sample of CLD patients, we highlight the significant percentage of HIV/TB co-infection, demanding close clinical and analytical surveillance. Exposure to an unfavourable social environment in some cases may contribute to treatment abandonment. The prevalence of ADR to TB drugs was significant with the most frequent one being hepatotoxicity as one could predict. Nevertheless a high percentage of patients completed treatment.

Keywords: *Tuberculosis. Chronic liver disease.*

CO 006. TUBERCULOSIS IN THE IMMUNOSUPPRESSED PATIENT: THE IMPORTANCE OF MAINTAINING SURVEILLANCE

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Introduction: Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. Treatment with biotechnological agents, particularly tumor necrosis factor alpha (TNF-α) inhibitors, is associated with an increased risk of developing active TB due to immune compromise, and TB screening is indicated in candidates for these treatments. This should be performed prior to the start of biotechnology, with indication for treatment of latent TB if clinical criteria are identified or in complementary diagnostic tests, after exclusion of active TB. If patients remain on this therapy, they should maintain TB surveillance with annual screening or earlier, whenever exposure to a case of TB occurs.
Case report: Male, 35 years old, born in India, in Portugal since February 2020, owner of a restaurant. With a history of axial spondylarthritis medicated with adalimumab since May 2020. Prior to starting adalimumab, he underwent tuberculosis screening at the Pulmonary Diagnostic Center (CDP), which was negative, with a tuberculin sensitivity test 0 mm, negative IGRA and radiography of chest without changes suggestive of active tuberculosis. However, in May 2021 he had contact with a colleague with bacillary pulmonary tuberculosis. In August 2021, he developed a non-productive cough, afternoon fever, night sweats, asthenia and unintentional and unquantified weight loss. He went to the Emergency Department twice, having been discharged with only symptomatic therapy. Subsequently, the patient was seen in a Rheumatology consultation, where he suspended adalimumab and was referred for evaluation at the CDP, considering clinical signs suggestive of active tuberculosis. Two sputum samples were collected for mycobacteriological examination, whose nucleic acid amplification test for *Mycobacterium tuberculosis* complex, direct microscopy and cultural examination (solid and liquid medium) were negative. Computed tomography of the chest revealed "pathological adenopathies at the level of the mediastinum, mainly subcarinal and in Baretti's loca... millimeter nodularity in both upper lobes... inflammatory aspects of the small airways in the right lower lobe (LID)". For better clarification, taking into account the high clinical suspicion, a bronchoscopy was performed, which showed "inflammatory changes in the mucosa in the right upper lobe and a lesion with a granulomatous appearance in the mucosa at the entrance of the LID", with biopsies and collection of bronchial secretions and bronchoalveolar lavage, whose direct mycobacteriological examination and nucleic acid amplification test were negative, but with cultural isolation of *Mycobacterium tuberculosis* complex. Bronchial biopsies showed "aspects consistent with granulomatous disease - an epithelioid granuloma without necrosis was observed, with a negative search for alcohol-acid resistant bacilli." The HIV test was also negative. The patient started anti-bacillary therapy with Isoniazid, Rifampicin, Pyrazinamide and Ethambutol, immediately after the bronchoscopy. After four months of treatment, he restarted therapy with the biotechnological drug-secukinumab (anti-IL17), without intercurrences. Currently, he is being followed up at the CDP, being in the 9th month of treatment.
Discussion: With this clinical case, we intend to highlight the importance of early screening in immunosuppressed patients, namely under biotechnological therapy, after exposure to a known case of tuberculosis, to institute preventive treatment in a timely manner, thus avoiding progression to active tuberculosis.

Keywords: *Screening. Latent tuberculosis. Pulmonary tuberculosis.*

CO 007. OSTEOARTICULAR TUBERCULOSIS IN THE LISBON REGION

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Introduction: Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is the second leading cause of death from infectious disease worldwide. Osteoarticular TB (OTB) constitutes 10-35% of cases of extrapulmonary TB and is one of the oldest pathologies in the world, having been identified in Egyptian mummies from 9,000 years ago. Vertebral TB, or Pott's disease, is the most common form of OTB, comprising about half of all cases. In developed countries, OTB is uncommon and mainly affects immigrants from countries with high TB incidence.
Objectives: To characterize the population diagnosed with OTB in the Lisbon region (municipalities of Lisbon, Loures, Odivelas and Oeiras).

Methods: Retrospective analysis of patients diagnosed with OTB from January 2012 to July 2022 in the city of Lisbon.
Results: From January 2012 to July 2022, 72 patients were diagnosed with OTB, with a mean age of 48 years (minimum 11; maximum 87) at the date of diagnosis. The majority (63.9%; n = 46) were male and 44.4% (n = 32) were of foreign origin. The main comorbidities identified were human immunodeficiency virus (HIV) infection in 15.3% of patients (n = 11), diabetes in 5.6% (n = 4), neoplasms in 4.2% (n = 3) and systemic inflammatory diseases in 4.2% (n = 3). Five patients (6.9%) had a known history of previous TB. Regarding social risk factors, alcohol dependence (4.2%; n = 3) and imprisonment (1.4%; n = 1) were identified. Of the 72 patients identified, 41 (56.9%) had tuberculosis limited to the osteoarticular system, while 31 (43.1%) had disease in several organs, the lung being involved in 17 cases. Of the total number of patients, 63.9% (n = 46) had vertebral tuberculosis. Culture positivity was obtained in 69.4% (n = 50) of cases, and antimicrobial susceptibility testing (AST) was obtained in 88.0% (n = 44) of these. The majority (68.2%; n = 30) were *Mycobacterium tuberculosis* sensitive to all first line antibacillary drugs. We identified four cases (9.1%) of mono-resistance to isoniazid; 7 cases (15.9%) of mono-resistance to ethambutol, streptomycin or pyrazinamide; one case (1.4%) of simultaneous resistance to isoniazid and streptomycin and 2 cases (4.5%) of multidrug-resistant TB were identified. Of the total number of patients, 57 (79.2%) completed the treatment, the average duration of which was 15.1 months. Four patients (5.6%) abandoned treatment, 3 (4.2%) died before the end of treatment and 6 patients (8.3%) are still under treatment. Two patients (2.8%) were transferred during treatment, losing follow-up.
Conclusions: Despite being relatively rare, OTB is still a reality in Portugal. It is a pathology that can cause sequelae and often requires a very long treatment, so it is important to invest in prevention and early diagnosis.

Keywords: *Osteoarticular tuberculosis. Pott's Disease. Antibacillary drugs.*

CO 008. CHALLENGES IN MANAGING TUBERCULOSIS IN THE ELDERLY PATIENT: CASE REPORT

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Introduction: Tuberculosis (TB) is still a major public health issue in Portugal, particularly in major cities and high risk populations like the elderly. Ageing related immunodeficiency, multiple comorbidities, polypharmacy and malnutrition lead to difficulties in the diagnosis and management of TB in these patients.
Case report: 88 year old female patient, Caucasian, living at home with the aid of her daughter. She had a medical history of hypertensive, ischaemic and valvular cardiac insufficiency, asthma, pancytopenia, multinodular goitre and dementia; no history of smoking or alcohol consumption. Admitted to the hospital with recurrent fever, night sweats, weakness, loss of appetite, weight loss and nonproductive cough for the last month. Laboratory results showed elevation of PCR 5,5 mg/dL, creatinine 1.23 mg/dL, sodium 133 mmol/L, AST 67 U/L e GGT 180 U/L. Thoracic CT revealed multiple bilateral pulmonary micronodules suggestive of military TB. The flexible bronchoscopy with bronchoalveolar lavage confirmed the diagnosis of pulmonary TB with susceptibility to all anti tuberculous drugs. TC-CE and TC-AP showed no evidence of extrapulmonary TB in the urine, TC-CE or TC-AP and the HIV test was negative. Treatment with isoniazid, rifampicin, pyrazinamide and ethambutol was initiated and she was discharged to the CDP for continuation of care. After 8 days of treatment her daughter noticed psychotic symptoms which persisted after simplification of chronic medication, as well as nausea, vomiting and prostration. Laboratory results were normal, including liver function tests. These symptoms were assumed as isoniazid-related psychosis and gastrointestinal intolerance to pyrazinamide, and the two drugs discontinued. She maintained treatment with rifampicin, ethambutol and added levofloxacin, and the thoracic CT at 3 months of treatment showed a positive response. One month later the patient presented at the Emergency Department with a cutaneous pruriginous rash and perineal candidiasis, initiated treatment with itraconazol and interrupted temporarily rifampicin due to drug interaction. Three days later the rash had worsened with involvement of the scalp. All antifungal and antituberculous drugs were withdrawn and corticosteroids and antihistamines started, with clinical improvement. The patient resumed antituberculous treatment gradually with rifampicin and ethambutol with no adverse reactions. However, two days after restarting levofloxacin, she presented again with a pruriginous rash in the perineal area. Levofloxacin was suspended due to generalized cutaneous hypersensitivity reaction. She continued treatment with rifampicin and ethambutol until completion of a total of 9 months of antituberculous drugs. There was clinical and imagiological improvement, and the treatment completed.
Discussion: We present a case of TB in an elderly patient, with an atypical lung involvement and multiple adverse effects to the antituberculous drugs that determined the interruption and adjustment of the therapeutic regimen. We highlight the importance of family support and coordination between the healthcare team and the caregivers to the successful completion of the treatment.

Keywords: *Tuberculosis. Anti-tuberculous drugs. Adverse effects.*

CO 009. *MYCOBACTERIUM TUBERCULOSIS* IDENTIFICATION INBRONCHIAL ASPIRATE

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Introduction: According to the WHO, about ¼ of the world's population is infected with *M. tuberculosis* (MTB), and early diagnosis and treatment is important to minimize transmission in the community. The gold standard method for diagnosis consists of the cultural exam of biological products, but there are other (faster) methods, such as nucleic acid amplification (NAA) and detection of acid-fast bacilli (AFB).
Objectives: To determine the sensitivity (SE) and specificity (SP) of AFB and NAA of bronchial washing in a population in which samples were routinely processed for those techniques, regardless of the indication for bronchoscopy and to inquire about its value in diagnosis and therapy.
Methods: Retrospective study of bronchoscopies between 01/04/2007 and 31/12/2021, by consulting the department database. Inclusion criteria: positivity in at least one of the diagnostic methods.
Results: Results from 3,019 bronchoscopies were consulted (MTB identification in 2.0%). Inclusion of 85 patients: 54 (63.5%) were male; Mean age of 57.33 ± 20.61 years. Patients with cavitated lesions (n = 31; 36,5%): 64.5%, 83.9% and 77.4% had, respectively, positive AFB,NAA and cultural exams. Patients with negative culture: positive AFB in 33.3% (n = 8); positive NAA in 79.2% (n = 19). Patients with positive culture: 44.3% (n = 27) were positive for both AFB and NAA (p = 0.017). SE of 47.5% and 83.6% and SP of 66.7% and 20.8% for AFB and NAA, respectively. When combined, SEof 44.3% and SP of 83.3%.
Conclusions: Our sample was mostly male, with an average age higher than that described in the literature. MTB identification in 2.0%. The combination of AFB and NAA presented greater diagnostic value, with a statistically significant correlation between the positivity of both and the identification of MTB in cultural exam. In 27

patients, it was possible to anticipate anti-bacillary therapy by 42 days, thanks to AFB and NAA tests being performed in all samples.

Keywords: *Pulmonary tuberculosis. Bronchoscopy. Bronchial washing.*

CO 010. MULTIDRUG-RESISTANT PULMONARY TUBERCULOSIS - A 10-YEAR ANALYSIS

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Introduction: Multidrug-resistant tuberculosis is defined as an infection caused by *Mycobacterium tuberculosis* without sensitivity to at least isoniazid and rifampicin.
In the period 2016-2020 in Lisbon Amadora was the municipality with the highest rate of tuberculosis case notification, 39.2 cases/100,000 inhabitants. In 2020 in Portugal there was a prevalence of 1.5% of multidrug-resistant pulmonary tuberculosis.
This study aims to perform a descriptive analysis of cases of multidrug-resistant pulmonary tuberculosis (MDR-PT) in a tertiary care hospital in the last 10 years.
Methods: Retrospective study of patients diagnosed with MDR-PT in a tertiary care hospital between 2012 and 2021. Demographic characterization, symptoms including time of evolution, date of diagnosis, type of diagnostic specimen, bronchofibroscopy, laboratory identification method of infection and resistance, resistance profile, and in-hospital mortality were performed.
Results: Twenty patients with MDR-PT were included. The majority were male (65%, n = 13), and the median age at diagnosis was 41 years. 45% (n = 9) of patients had a concomitant diagnosis of Human Immunodeficiency Virus (HIV) infection. The most frequent symptoms were fever, cough and weight loss (78%, n = 14 respectively) with a median duration of 60 days. Only 1 patient had a history of previously treated tuberculosis. The highest number of MDR-PT diagnoses was in 2012 (25%, n = 5) with a median of about 2 cases per year. The main specimen type for diagnosis was sputum (55%, n = 11), followed by bronchial secretions (25%, n = 5), bronchoalveolar lavage (10%, n = 2) and pleural fluid and biopsy (1 each). Bronchofibroscopy was performed in 45% (n = 9) of cases. The diagnosis was mostly made by direct examination (75%, n = 15). The diagnosis of MDR-PT was made a median of 26 days after diagnosis. Resistance was detected in 40% of cases (n = 8) by polymerase chain reaction (PCR) at a median 1 day after diagnosis, 35% (n = 7) by antimicrobial susceptibility testing (AST) after 46 days, and 25% (n = 5) by strain PCR after 43 days. Resistance to more than 4 antimicrobials was found in 40% of cases, especially resistance to streptomycin (n = 17), followed by pyrazinamide (n = 12), ethionamide (n = 10) and ethambutol (n = 5). There was 1 case of extensively resistant PT (ofloxacin, ciprofloxacin, amikacin and capreomycin). In-hospital mortality was 30% (n = 6).
Conclusions: Demographic characteristics are similar to what has been described in the literature, but more HIV co-infection. The delay of 26 days to the diagnosis of multidrug resistance may be due to the higher number of cases identified by AST and PCR of the strain. It should be taken into account that until 2014 the molecular identification of resistance depended on positivity by the Ziehl-Neelsen technique. While since the use of another method without this requirement it was possible to identify resistance within 1 day. The high in-hospital mortality of 30% may be due to counting the number of deaths over 10 years, without differentiating the diagnosis of concomitant HIV infection or other comorbidities and because it is an infection by a multidrug-resistant microorganism.

Keywords: *Pulmonary tuberculosis. Multidrug-resistant. Diagnosis. Tertiary hospital.*

CO 011. CHARACTERIZATION OF SLEEP QUALITY IN THE ELDERLY

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Introduction: Aging is related to changes in the structure and sleep quality, conditioning the appearance of sleep disorders. Sleep assessment in the elderly is essential for the diagnosis and treatment of these disorders and their consequences. The Geriatric Sleep Questionnaire (GSQ-6) is a new diagnostic tool validated for the Portuguese population that allows assessing the subjective sleep quality in the elderly through six questions.
Objectives: To characterize the sleep quality of the elderly and assess the impact of Sleep Apnea (SA) and other variables through the application of the GSQ-6 questionnaire.
Methods: Assessment of sleep quality in the elderly followed in a sleep or respiratory failure appointments at Centro de Responsabilidade Integrado Sono e VNI from March to May 2022 at Centro Hospitalar Universitário de São João, through the GSQ-6.
Results: Ninety-five patients were included, most of them male (64.2%) and with a mean age of 73.1 years (65-90 years). Thirty-six patients (37.9%) were medicated with at least one of the drugs (anxiolytics, antidepressants and sleep inducers). Most patients lived in urban areas (71.6%) and had low education (80%). The questionnaire mean score was 13.9, and one-third of patients had a score ≥ 16 (cutoff for sleep disorders detection). Most of the patients had a sleep study (76.8%), most of them level 3 (93.2%), and the remaining level 1. The exam revealed mild SAS in 19 patients, moderate in 20 and severe in 27. Time spent below SpO2 90% (T90) was on average 22.9%, with 26 patients (27.4%) having a T90 equal to or greater than 20%. There was no statistically significant association between sleep quality and the presence and/or severity of SAS, presence and severity of nocturnal hypoxemia, education or residential environment. The relationship between age and the questionnaire score was also not shown to be statistically significant.
Conclusions: In this sample, one third of the patients had a QSQ-6 questionnaire score compatible with the existence of sleep disorders, however there was no association between this score and the presence/severity of SAS and nocturnal hypoxemia. There was also no association between age, education level or residence environment and this score. The GSQ-6 is a validated tool for Portuguese population, brief and easy to implement, and could be valuable for future investigations about the relationship between sleep quality and the mental health and well-being in older people.

Keywords: *Sleep. Geriatric Sleep Questionnaire. Sleep apnea.*

CO 012. RESPONSIVENESS TO PULMONARY REHABILITATION IS RELATED WITH CHANGES IN ORAL MICROBIOTA OF PEOPLE WITH COPD

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Introduction: Pulmonary Rehabilitation (PR) is one of the most cost-effective therapies for chronic obstructive pulmonary disease (COPD), with proven benefits in domains such as exercise capacity and quality of life. Despite its clear benefits, patients are not equally responsive to PR. Reasons behind that as well as the role of the airway microbiota in PR effectiveness are currently unknown.
Objectives: Here, we explored for the first time, the effects of PR on oral microbiota and inflammatory markers and the link with re-

sponsiveness to PR. Study design: 76 participants were enrolled in this prospective cohort study, half of whom integrated a 12-week PR program. During the 6-month follow-up, a total of 417 saliva samples, and data on dyspnoea during exercise (mBorg), exercise capacity (6MWT) and impact of the disease (CAT) were collected. PR responsiveness was defined as overcoming the published minimal clinically important difference for mBorg (-1 point), 6MWT (25m) and CAT (-2 points).
Results: PR modulated patients' microbiota composition and dynamics. Specifically, an enrichment of Proteobacteria (*Haemophilus*) and a depletion in Bacteroidetes (*Prevotella*), previously associated with increased severity (Melo-Dias et al, Respir Res 2022), were observed upon PR. We also observed changes in the levels of IL-1β, TNF-α and IL-10. When separating patients in responders (R) and non-responders (NR), distinct patterns of bacteria/bacteria and bacteria/inflammatory marker longitudinal correlation were observed among the groups. In R, the increase in *Prevotella* negatively correlated with *Lautropia* (enriched in most severe cases of COPD (Melo-Dias *et al.,* Respir Res 2022)). The opposite trend was observed in NR, with Lautropia showing a positive correlation with several pro-inflammatory markers. Conversely, in all groups of R, *Rothia* and *Gemellaceae* presented negative correlations with several pro-inflammatory markers.
Conclusions: Overall, despite responsiveness to PR being multidimensional and heterogeneous, giving rise to a moderate overlap across domains in individual response, PR-induced changes in microbiota revealed surprisingly consistent patterns among R and NR. Future studies should address the implications and stability of these findings.

Keywords: *Pulmonary rehabilitation. COPD. Oral microbiota. Responsiveness to pulmonary rehabilitation.*

CO 013. BRONCHODILATOR RESPONSIVENESS TESTING: THE IMPACT OF THE NEW CRITERIA PROPOSED BY THE ATS/ERS

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Introduction: The bronchodilation test has been used for several years to assess changes in lung function in response to the administration of a bronchodilator. According to the most recent technical standard for the interpretation of pulmonary function tests, dating from 2021, from the American Thoracic Society/European Respiratory Society (ATS/ERS), the bronchodilation test is classified as positive when there is an increase equal to or greater than 10% of individual's predicted value of FEV1 or FVC. These new criteria contrast with the long-standing one, dating from 2005, in which the absolute increase of 200ml and 12% in FEV1 or FVC would define a positive test.
Objectives: The objective of this study was to understand the impact of using the new criteria recommended by the ATS/ERS in the interpretation of the bronchodilation test.
Methods: All spirometry with bronchodilation test performed in the functional exploration laboratory of a tertiary hospital from 11 to 22 July 2022 were analyzed and categorized as positive or negative taking into account the 2021 and 2005 criteria from the ATS/ERS. The following data were also collected: age, sex, race, height, diagnosis, information if the test was performed under bronchodilator therapy, purpose of the exam (diagnosis or follow-up) and whether or not changes were detected. Categorical variables were expressed as frequency and percentage and continuous variables as mean ± standard deviation. The results obtained in the bronchodilation test using the different classification criteria were compared using the McNemar test. The threshold for statistical significance was set at $p < 0.05$. All statistical procedures were performed using the IBM Statistical Package for the Social Sciences (SPSS) software, version 28.0.0.
Results: 209 bronchodilation tests were analyzed. In the study sample, 107 patients (51%) were female. The mean age of the patients was 53 ± 22 years, the mean height was 162 ± 10 cm and 100% of the patients were Caucasian. The respiratory functional study was performed without the effect of any baseline Bronchodilator therapy in 107 cases (51%), it was performed for diagnostic purposes in 61 cases (29%) and showed alterations in 138 cases (66%). The most frequent diagnoses were asthma with 75 cases (36%) and COPD with 42 cases (20%). According to the 2005 and 2021 ATS/ERS criteria, 48 (23%) and 37 (18%) tests of bronchodilation were classified as positive, respectively. Of the tests classified as positive using the oldest criteria, 25% have their result changed to negative and of those classified as negative, only 1 test changes to positive. The classification of bronchodilation tests, using the different criteria, are in agreement in 196 cases (94%) and discordant in 13 cases (6%). The McNemar test showed that there are differences in the proportions of positive and negative bronchodilation tests using the different criteria ($p = 0.03$).
Conclusions: The use of the new criteria proposed by the ATS/ERS will lead to a change in the interpretation of bronchodilation tests and, consequently, will have an impact on clinical practice.

Keywords: *Bronchodilator responsiveness testing.*

CO 014. OBSTRUCTIVE SLEEP APNEA THERAPY EFFECTIVENESS FOR SECONDARY ERYTHROCYTOSIS

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Introduction: Although rare as an overall cause of erythrocytosis, Obstructive Sleep Apnea (OSA) is a prevalent cause of secondary erythrocytosis (SE) and a frequent reason of referral to the Sleep Clinics in our practice. Erythrocytosis significantly increases the blood viscosity and the risk of thrombotic events; this might be of particular importance in a susceptible population.
Objectives: We aimed to evaluate the effectiveness of OSA therapy on correcting hemoglobin and hematocrit levels for SE.
Methods: We performed a retrospective cohort study, selecting 45 patients referred to our outpatient clinics for OSA SE undergoing effective OSA therapy. We obtained the hemoglobin (Hb) and hematocrit (Htc) levels at the baseline and after, at least, six months of effective therapy. The statistical analysis was performed using IBM SPSS statistics® v23 and the appropriate statistical tests.
Results: Our cohort patients were mostly men (n = 40, 88.90%) with a mean age of 61.00 ± 13.44 years. Most patients showed severe OSA (n = 26, 58.80%). The prevalence of obesity was 48.90% (n = 22) and previously diagnosed lung disease (stable and without respiratory failure) was present in 10 patients (22.90%). Hb levels at the baseline were 17.72 ± 1.23 g/dL and the Htc 52.56 ± 3.24%. Patients with more severe desaturation indexes showed higher baseline Htc levels ($p < 0.001$). All the analyzed patients showed satisfactory adherence to therapy (according to Portuguese general directorate of health directives). OSA therapy was effective in correcting Htc and Hb in 13 patients (31.00%); the remaining patients, although observing a significant decrease in the Htc values ($p = 0.012$) and Hb values ($p = 0.016$), failed the target of the normal range. The achievement of corrected Hb and Htc levels was less frequent for postural OSA ($p = 0,026$), but we failed to determine other factors potentially related to treatment effectiveness regarding Htc and Hb levels.
Discussion: We showed a significant decrease in Htc and Hb levels after effective OSA therapy, which one can infer to have lowered the hyper viscosity and the subsequential risk for thrombotic events. However, an effective OSA therapy was not a grant for achieving values within the normal range. More research is needed to understand the meaning of this finding, regarding the risk of thrombotic events, the need to add-on therapies and other potentially contributing factors.

Keywords: *Obstructive sleep apnea. Erythrocytosis. APAP.*

CO 015. CHARACTERIZATION OF THE POPULATION WITH REM OBSTRUCTIVE SLEEP APNEA SYNDROME

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REM-related Obstructive Sleep Apnea Syndrome (OSAS) is present in 10 to 36% of the population with OSAS. It is more frequent in women and has been associated to a higher risk of cardiovascular pathology and neurocognitive alterations. In this retrospective study, we aimed to characterise the population with REM-related OSAS followed in a Portuguese tertiary hospital. Patients with REM-related OSAS diagnosis (defined as total AHI ≥ 5/h, NREM AHI < 15/h and REM AHI/NREM AHI ≥ 2) performed by level I polysomnography between December 2020 and September 2021 were included. During this period, 62 patients were identified, with a mean age of 52.6 years (minimum 27; maximum 85). The majority (61.3%; n = 38) were female. The average BMI was 30.2 Kg/m^2. Seven patients (11.3%) had mild REM-related OSAS (5 ≤ REM IAH < 15/h), 27 (43.5%) had moderate REM-related OSAS (15 ≤ REM IAH < 30/h) and 28 (45.2%) had severe REM-related OSAS (REM IAH ≥ 30/h). The mean REM AHI was 30.9/h and the mean NREM AHI 7.2/h. Patients had a mean sleep efficiency of 82.7%, with the mean REM total sleep time (TST) being 18.5% and the deep sleep TST 19.4%. The average time of peripheral oxygen saturation below 90% (T90) was 1.7%. The study population had a mean Epworth Sleepiness Scale (ESS) score of 10.3. Thirty-five patients (56.5%) presented cardiovascular pathology, being the most frequent diagnosis arterial hypertension (51.6%; n = 32). Of the patients studied, 15 (24.2%) were diagnosed with depression or anxiety disorders. Thirty-five patients (56.5%) were medicated with at least one sedative or psychotropic drug and 10 (16.1%) were medicated with two or more of these drugs. Patients with an REM AHI ≥ 30/h had a significantly higher T90 than patients with an REM AHI < 30/h; there were no significant differences in sleep efficiency, REM TST, deep sleep TST or ESS score. There was a statistically significant correlation between severe REM-related OSAS and presence of cardiovascular pathology (Odds Ratio 3.39), and no correlation was observed between severe REM-related OSAS and presence of psychiatric disease. In this study, we verified that the population with REM-related OSAS is relatively young, predominantly female and presents low levels of sleepiness. There was also a high prevalence of cardiovascular pathology, as well as depressive and anxious pathology. T90, REM TST and deep sleep TST were within normal range. Patients with REM AHI ≥ 30/h had significantly higher T90 compared to the rest of the study population, and no significant differences were found regarding the other polysomnographic parameters studied or the level of sleepiness. A statistically significant correlation was observed between severe REM-related OSAS and the presence of cardiovascular pathology.

Keywords: *Obstructive sleep apnea syndrome. REM Sleep. Level I polysomnography.*

CO 016. IS SLEEP POSITION INFLUENCED BY POLYSOMNOGRAPHY?

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Introduction: A few studies suggest that by wearing a polysomnography (PSG) device, patients are likely to spend more time in the supine position. That can subsequently influence obstructive sleep apnea (OSA) severity measured by PSG, as OSA is frequently worse when supine position is adopted. According to the literature, around 60% of patients with OSA have positional OSA. However, if in fact the device affects sleep position remains poorly reported.
Objectives: To evaluate if sleep position is affected by the PSG equipment.
Methods: It was a prospective study on 33 patients from a Respiratory Sleep Pathology dedicated unit of a Portuguese district Hospital, aged over 18 years, with moderate to high suspicion of OSA, proposed to a level III PSG. Patients who consecutively met the criteria and consented, between 01/01/2022 and 31/03/2022, completed three evaluation nights – all with positional trainer Night ShiftMT (NS) and the last night also with the PSG equipment. NS was set on diagnosis mode, with intervention function inactivated and was assumed to have a slight impact on sleep position. Supine sleep time in hours and percentage of total recording time (TRT), provided by the NS, was recorded and compared between the three nights. From the PSG data, TRT and apnea-hypopnea index (AHI) (total, supine, and non-supine) were evaluated.
Results: Patients' mean age was 53.73 ± 9.84 years and the majority were females (n = 19; 57.58%). The average body mass index was 33.91 kg/m^2. The mean total AHI was 16.23 events/hour (minimum: 0.5; maximum: 60.4). Males' total AHI and supine AHI were significantly higher than females' (p = 0.021 and p = 0.017, respectively). Total recording time, provided by the NS, was equal on the first (N1), second (N2) and third (N3) nights, but was shorter in the polygraph record (p = 0.000). The mean percentage of time spent in supine position was 29.24% during PSG night, 27.35% at N2 and 22.61% at N1. Between the two first nights with NS, there were no significant differences in supine sleep time percentage. In contrast, patients on PSG night spent a higher percentage of time in the supine position (p = 0.01 and p = 0.031, compared to N1 and N2, respectively).
Conclusions: In our study, we found a higher time spent in supine sleep position during the PSG night when compared with the two previous nights. Sleep position can be influenced by several factors and the equipment used for diagnosis may interfere with the preferred position of the patient. These results may have implications on PSG interpretation. However, more studies with higher patient numbers and nights are needed to understand the clinical impact of these data.

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

CO 017. IMPLICATION OF BEAT-TO-BEAT BLOOD PRESSURE MEASUREMENT IN THE 6 MINUTES WALKING TEST. A PILOT STUDY

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Introduction: The 6 minutes walking test (6MWT) is a simple exercise test to assess the physical performance in patients with respiratory and/or cardiac diseases. The 6MWT assesses the distance walked in 6 minutes, clinical signs like dyspnoea induced by the test, and the evolution of the peripheral oxygen saturation (SpO2). However, the test does not investigate the complex cardio-pulmonary interaction that might explain the physical limitation of the individual tested. In this pilot study we investigated the feasibility of including a continuous beat-to-beat measurement of the blood pressure (BP).
Methods: Participants: n = 8, systolic (SysBP) BP, heart rate (HR) and SpO2 were continuously measured by the SomnoTouch™ NIBP device, Somnomedics, Germany. The evaluation via pulse transient time (PTT) has been validated and considered to fulfil de requirements of the European Society of Hypertension. All acquired data

was extracted, synchronized and for further statistical analysis exported into SPSS vs. 26 software. Results are displayed as median with interquartile range (IQ). Beside the absolute values we investigated the slope of the BP development – 1 minute until +2 minutes of the test by a simple regression analysis (R2 and B) of each consecutive pulse wave against SysBP and HR. Additionally, we computed a regression analysis of HR *versus* SysBP relationship.
Results: Median SysBP measured during the test was 139.44 mmHg (IQ: 32.8 mmHg). The SysBP range was 44.5 mmHg (IQ: 44 mmHg). This indicates a relevant increase of BP during the test. The maximum SysBP was with 156 mmHg (IQ 57) while the BP measured manually after the test was 126.0 mmHg (IQ 31). Mean HR was 110 bpm (IQ: 30.5). Median SpO2 was 88,5% (IQ 5%). The regression analysis detected an increase of SysBP at test begin with a B of 0.11 indicating a small increase of the BP with each consecutive heartbeat. R2 was 0,38 (IQ: 0,30) and reached individually, except in one participant, a high significance level ($p < 0.001$). When plotting HR vs. SysBP we found a R2 of 0,388 and a B of 0,49 (IQ 0.60). Thus, HR is accompanied by SysBP increase but with a high interindividual difference. There were only 3 patients with a SpO2 drop < 90%.
Conclusions: In this pilot study we can show that the beat-to-beat measurement of the systolic blood pressure may be feasible and might add important information for the interpretation of the 6MWT results. The maximum in test SysBP was higher than the traditionally received post test results and might explain dyspnoea. The SysBP slope at test begin and test end as well as the HR to SysBP analysis might help to explain interindividual not SpO2 dependent performance limitations. Further clinical investigation is warranted.

Keywords: *Pulse transit time. Blood pressure. Exercise test.*

CO 018. COPD EXACERBATION SEVERITY IN PATIENTS WITH AND WITHOUT OSA OVERLAP SYNDROME: RETROSPECTIVE ANALYSIS OF CLINICAL OUTCOMES BETWEEN 2017-2021

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Introduction: Patients with overlap syndrome Chronic Obstructive Pulmonary Disease-Obstructive Sleep Apnea Syndrome (COPD-OSAS) have poorer clinical control, increased risk of exacerbations and mortality in the stable phase of COPD. The impact of this syndrome on exacerbation severity is poorly understood. The aim of this study was to describe clinical outcomes of exacerbation severity in COPD patients with and without concomitant OSAS.
Methods: A retrospective cross-sectional study was carried out in a Portuguese hospital, from January 2017 to December 2021. Patients hospitalized for COPD exacerbation (AECOPD) were consecutively included, excluding those without proven disease by respiratory functional study. Patients diagnosed with OSAS included had nocturnal polysomnography or were on positive pressure therapy. Groups were compared, including sociodemographic data, comorbidities, COPD severity, inhaled therapy, and use of non-invasive ventilation (NIV) on an outpatient basis. During AECOPD, type 2 respiratory failure, respiratory acidemia, NIV use, length of hospital stay, mortality, and 7- or 30-day readmission were evaluated. Analysis of COPD patients with and without OSAS and outcomes was performed using absolute and relative frequencies and measures of central tendency. Differences between groups were tested with Chi-Square, Mann-Whitney U and Student's t tests.
Results: Of the 197 identified exacerbations, 60 were excluded. 137 AECOPD were included, corresponding to 85 patients. Of these, 14% (19/137) had overlap syndrome and 86% (118/137) did not. The COPD-OSAS group was composed of younger patients (62 *vs.* 67 years; $p = 0.074$); mostly male (68 *vs.* 80%; $p = 0.368$), with more comorbidities such as ischemic heart disease (16 *vs.* 11%; $p = 0.466$), heart failure (42 *vs.* 10%; $p = 0.039$) and obesity (BMI 32 *vs.* 23 kg/m^2; $p < 0.001$). Regarding the severity of COPD, the group with OSAS, 68% (13/19) had it in GOLD 2 and 21% (4/19) in GOLD 3, while the group without OSAS the severity was higher: 47% (55/118) in GOLD 3 and 36.4% (43/118) in GOLD 4 ($p < 0.001$). About triple bronchodilator therapy, in the COPD-OSAS group the percentage was 74% (14/19) and 38% (45/118) in the COPD group ($p = 0.002$). Relative to use of NIV on an outpatient basis, the group with OSAS, 58% (11/19) used BiPAP and 21% (4/19) used APAP, while in the group without OSAS, 39% (45/116) used BiPAP. During AECOPD, patients with overlap syndrome had a higher percentage of type 2 respiratory failure (89 *vs.* 77%; $p = 0.592$) with respiratory acidemia (68 *vs.* 48%; $p = 0.137$) and greater need for NIV use (89 *vs.* 67%; $p = 0.065$). Inpatient mortality was higher in COPD-OSAS group (11 *vs.* 8%; $p = 0.673$), although there were no differences in length of hospital stay (8 *vs.* 9 days; $p = 0.380$) or readmission rate at 7 or 30 days (respectively 0 *vs.* 5% and 5 *vs.* 10%).
Conclusions: The study shows that patients with COPD-OSAS are significantly more obese and may present, during AECOPD, more vulnerable to type 2 respiratory failure occurrence and mortality in lower GOLD stages than patients with COPD alone. The analysis also showed that patients with COPD-OSAS have a higher rate of triple therapy use, and may be more symptomatic. COPD-OSAS association may represent a possible clinical phenotype of severity during AECOPD.

Keywords: *Acute exacerbation of chronic obstructive pulmonary disease. Obstructive sleep apnea syndrome. Mortality. Obesity.*

CO 019. TELEMONITORING IN COPD – EXPERIENCE OF A TERTIARY HOSPITAL

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Introduction: Telemonitoring in chronic obstructive pulmonary disease (COPD) allows remote monitoring and management of patients, aiming to improve disease control and reduce the use of health resources. In 2020, a telemonitoring program was started for COPD patients with a history of frequent exacerbations (COPD-HFE) in a tertiary hospital.
Objectives: Demographic characterization and number of medical appointments, emergency department (ED) visits, and hospitalizations of COPD-HFE patients under telemonitoring after 6, 12, and 24 months of the program. To compare the number of health resources consumed in the first year of telemonitoring compared to the previous year.
Methods: Retrospective analysis of COPD-HFE patients GOLD III or IV and C or D undergoing telemonitoring between July 2020 and July 2022. Patients telemonitored for more than 6 months were included and divided into 3 groups: group A, those who completed 12 months, group B, those who completed 24 months, and group C, those who completed 6 months.
Results: The program comprehends 24 patients with COPD class D, 18 of whom were included in the study: 10 in group A, 3 in B, and 5 in C. Most patients were male (78%, A: n = 7, B: n = 3, C: n = 4) and at admission to the program had: median age of 71 years (IQ 67-77), an average of 3.6 ± 2.8 visits to the emergency room, 2.9 ± 1.8 hospitalizations, and 3.9 ± 2.3 COPD related appointments in the prior year. There were recorded 26937 measurements of vital signs and 5541 alerts, with 38% generating contact with a nurse and 1% contact with a doctor. There were 8 deaths (6 due to COPD exacerbation), 5 of which corresponded to group A and 3 to group C. It should be noted that the patients who died were on average 5 years older and were followed up for a median of 418 (IQ 366-468) days,

having required an average of: 5 appointments for COPD related symptoms, 4 visits to the ED and 2 hospitalizations. In group A, there was an average of 1.3 ± 1.3 visits to the ED, 1 ± 0.8 hospitalizations, and 2.3 ± 1.8 medical appointments related to COPD. Thus, there was a 41% reduction in appointments (p = 0.101) and a significant decrease both in the number of visits to the ED (64%, p = 0.038) and hospitalizations (66%, p = 0.008) related to COPD compared to the previous year. In group B, there were 2 ± 1.2 emergency episodes, 0.6 ± 0.3 hospitalizations, and 2.2 ± 1 appointments, annually. In group C, there were 1.2 ± 1.2 visits to the ED and hospitalizations, and 2.4 ± 0.9 appointments.
Conclusions: The study shows that telemonitoring in COPD allowed a significant reduction in the number of hospitalizations and visits to the ED after one year. The alerts that generated contact with the doctor or nurse were a minority. Patients who died required higher hospital admissions and appointments, suggesting the benefit of their earlier inclusion. In summary, telemonitoring was a beneficial and efficient tool in COPD patients.

Keywords: *COPD. Exacerbation. Telemonitoring. Health resources.*

CO 020. RELATIONSHIP BETWEEN DLCO AND TREATABLE TRAITS IN COPD

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Introduction: The introduction of diffusing capacity of the lung for carbon monoxide in clinical practice revealed itself as an important tool for the evaluation of gas transfer properties of the respiratory system. Nonetheless, its use has been limited by the technique involved and the associated costs. In COPD, low values of DLCO seem to be associated with a decreased exercise capacity, increased symptoms, worse health status and increased risk of death.
Methods: Retrospective analysis of the clinical data was performed for every patient followed in respiratory functional readaptation consultation of the Pneumology Department from a tertiary hospital in the first semester of 2021. Data collected included DLCO values (% of predicted), treat identification markers for 22 treatable traits identified in literature and information about the occurrence of exacerbations in the 12 months prior to consultation. Statistical analysis was performed with IBM SPSS Statistics 26.
Results: During the considered period, 128 patients were evaluated, with a mean age of 73 ± 9.5 years and the majority being males (82%). DLCO values (% of predicted) showed a normal distribution, and a mean value of 65.2 ± 24.2%. A statistically significant difference in DLCO values was found in relationship with gender (p = 0.007), presence of respiratory insufficiency (p = 0.001), bronchiectasis (p = 0.033), emphysema (p = 0.044), pulmonary hypertension (p = 0.014), malnutrition (p = 0.001), obesity (p = 0.005), exercise intolerance (p = 0.007), exercise oxygen desaturation (p = 0.001), physical inactivity (p = 0.027) and between GOLD classification groups (A, B, C and D) and GOLD grades of obstruction severity (1 to 4) (both with p = 0.001). The occurrence of exacerbations, smoking status, pulmonary hyperinflation, eosinophilic inflammation, alpha-1-antitrypsin deficiency, chronic bronchitis, OSA, cardiac disease, depression/anxiety, gastro-esophageal reflux, poor inhaler technique, poor therapeutic adherence and poor social support did not show any statistically significant differences.
Conclusions: Our study demonstrated that DLCO measurement could be an important tool in COPD patient characterization, as well as in their comorbidity and treatable traits evaluation. Even though current COPD prognostic models and scores do not include DLCO measurement, recent research suggests its inclusion might be beneficial, which is in accordance with our results.

Keywords: *COPD. DLCO.*

CO 021. IMPROVEMENT OF CLINICAL OUTCOMES IN SEVERE EOSINOPHILIC ASTHMA PATIENTS TREATED WITH BENRALIZUMAB IN REAL-WORLD CLINICAL PRACTICE: BETREAT STUDY

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Introduction: Benralizumab is indicated as add-on maintenance treatment in adult patients with severe eosinophilic asthma (SEA) inadequately controlled despite high-dosage inhaled corticosteroids plus long-acting β-agonists and was approved for reimbursement in Portugal in May 2019 (pre-filled syringe) and June 2020 (pre-filled pen for home use). In-depth knowledge of the profile of patients with SEA being treated with benralizumab, treatment patterns and clinical outcomes is needed.
Objectives: This analysis of the BETREAT study aimed to describe baseline demographic and clinical characteristics of SEA patients treated with benralizumab and to assess clinical outcomes associated with benralizumab use.
Methods: BETREAT is a retrospective, multicentre, observational study, utilizing secondary data from electronic medical records. SEA patients aged 18 years or above that were treated at 16 investigational sites and had their first benralizumab dose between July 2019 and October 2020 were included upon informed consent. Patient characteristics and treatment patterns were described according to available data at baseline (up to 12 months prior to first benralizumab dose). Change from index (first administration of benralizumab) in exacerbations, OCS use and asthma control (ACT and CARAT) were assessed at 12 months post-index.
Results: Data was available for 74 patients, with 66 (89%) having 12 months follow-up. In the baseline year, 60% had peak blood eosinophil counts 400 cells/μL or above (mean: 778, standard deviation [SD] 661) and exacerbations were 3 or above and 4 or above for 54% and 38%, respectively (mean: 3.1, SD 2.2). 37% had previous biologic experience, of those 48% with mepolizumab and 52% with omalizumab. Most patients (98.5%) were still receiving benralizumab at 12 months, of which 89% had 100% adherence. Benralizumab treatment reduced mean annualized exacerbation rates from 3.1 (SD 2.2) at baseline to 0.5 (SD 0.9) at 12-months post-index. Peak eosinophil mean was reduced from 508.9 at baseline to 8.6 at 12-months post-index. In patients with ACT record available at baseline and 12-months (n = 8) benralizumab led to an increase in the proportion of those with ACT score 20 or above from 17.4% to 75%, respectively. In patients with CARAT record available at baseline and 12-months (n = 12), the proportion of those with CARAT score 24 or above increased from 6.7% to 50%, respectively. The proportion of patients with OCS use decreased from 52.7% at baseline to 36.4% at 12-months follow-up.
Conclusions: In this real-world cohort of SEA, benralizumab reduced exacerbation rates, OCS use and led to clinically important improvements in PROs. This study complements available randomized trial evidence on the clinical performance of benralizumab in a high-risk, hard-to-treat, SEA patient population.

Keywords: *Severe eosinophilic asthma. Benralizumab. Real-World.*

CO 022. NATIONWIDE PORTUGUESE CONSENSUS FOR OPTIMIZING THE USE OF SYSTEMIC CORTICOSTEROIDS IN SEVERE ASTHMA: RESULTS FROM THE ROSA II PROJECT

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Objectives: In severe asthma, there are still some clinical practice dilemmas regarding drugs' availability, treatment costs, patients'

eligibility, and time for starting therapy that need to be clarified to enable disease management optimization. We aimed to build a national consensus among pulmonology and immunoallergology experts from Portugal focusing on the use of oral/systemic corticosteroids (CS) in adult patients with severe asthma - both eligible and ineligible for biological therapy.
Methods: This study was designed as a 3-phase modified Delphi method consisting of a pre-round for the development of the 58 statements and two sequential rounds of anonymous questionnaires (1st and 2nd rounds). The study was performed online between May-July 2021. To rate each statement, a five-point Likert-type scale (1-'strongly disagree'; 5-'strongly agree') was used. Consensus threshold was established as a percentage of agreement among experts (≥ 90% in the 1st round; ≥ 85% in the 2nd round). The level of consensus achieved by the participants after each round was discussed by the scientific committee during virtual meetings. Procedures followed standards for scientific research and were performed according to the Declaration of Helsinki.
Results: Overall, 45 physicians with clinical and academic expertise in the management of severe asthma and distributed at national level, participated the study (93.8% response rate). In the 1st round, positive consensus (i.e., due agreement) was reached for n = 44 out of the 58 statements (75.9%). Most statements (n = 37; 84.1%) had a concordance over 95% in this round, with n = 17 of them presenting an agreement rate equal to 100%. Fourteen remaining items were iterated in the 2nd round, where n = 12 (85.7%) reached positive consensus. By the end of the study, only n = 2 statements (3.4%) were not consensual. Experts reinforced the need of best practices in severe asthma management during patients' journey, including early specialists' referral, phenotyping, risk factors and comorbidities evaluation, and rational use of oral/systemic CS. Conversely, no consensus regarding the use of CS in non-type 2 asthma patients or on the selection of alternatives for type 2 inflammation with insufficient response to targeted therapies were obtained (e.g. uncertainty). Yet, participants believe that systemic CS should not be used as chronic treatment unless improvements in efficacy parameters are noted, and no other effective therapy is available. There are still controversies on the use of bronchial thermoplasty in this scenario.
Conclusions: Several aspects addressed during this Delphi exercise can be used to inform clinical practice in severe asthma, namely OCS use and tapering, adverse effects screening, and biologics initiation. Further research is needed on topics related to the effects of CS for non-type 2 asthma and on alternative approaches for non-responders to target therapies.

Keywords: *Severe asthma. Systemic corticosteroids. Delphi panel. Consensus.*

CO 023. EMERGENCY OF CEFTAZIDIME/AVIBACTAM RESISTANCE IN PORTUGAL

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Introduction: Ceftazidime/avibactam (CZA) is a novel beta-lactam/beta-lactamase inhibitor combination recently introduced into clinical practice, inactivating most Ambler class A (including Klebsiella pneumoniae carbapenemase, class C, and class D β-lactamases, but it is not effective against class B (metallo-β-lactamase-producing strains).
Methods: Strains resistant to CZA were identified in two hospital centres in Lisbon and sent to the Microbiology Research Laboratory on Environmental Health to further genomic studies. Between 2019 and 2021, eight KPC-producing *K. pneumoniae* strains were collected from ascitic fluid, urine, blood, and respiratory secretions. Metallo-β-lactamase-producing strains were excluded due to known reported resistance to CZA. Antimicrobial susceptibility testing by disk diffusion test and PCR screening for produced carbapenemase genes were conducted. Molecular epidemiology and antimicrobial resistance genes were further characterized by whole-genome sequencing (WGS).
Results: The antimicrobial susceptibility profile results showed that the isolates were all resistant to ceftazidime-avibactam, as well as to ceftazidime, gentamicin, amoxicillin/clavulanic acid and ertapenem (all 8/8; 100%). Furthermore, 7/8 (87.5%) were resistant to cefotaxime, 6/8 (75.0%) to cefoxitin, 6/8 (75.0%) to aztreonam, 5/8 (62.5%) to meropenem, 5/8 (62.5%) to imipenem 4/8 (50.0%) to ciprofloxacin and 3/8 (37.5%) were resistant to tygecicline, according to the EUCAST guidelines (v.12.0, 2022). Out of all 8 *K. pneumoniae* isolates, 4 showed mutations in the Ω2-loop region (Arg164 and Asp179): KPC-70 (D179Y and T263A), KPC-98 (R164H) and 2 *K. pneumoniae* isolates producing a KPC-40 (L167_E168dup; T237S), all KPC-3 variants. All isolates belonged to ST13 high-risk clone. The remaining 4 *K. pneumoniae* isolates were KPC-3 producing isolates and belong to different sequence types: ST231, ST45, ST348 and ST147.
Conclusions: Herein, we report the increased emergency of ceftazidime-avibactam resistance in Portugal. It is also worth noting that this is the first description of a KPC-98 and KPC-40 *K. pneumoniae* isolates worldwide and only the second report of KPC-70 in the world. Furthermore, all these isolates belong to the ST13 high-risk clone. The emergence of CZA resistance is a serious threat to public health, creating a new challenge in combating this already difficult-to-treat pathogens. Enhanced clinical awareness and epidemiologic surveillance are urgently needed, to promote the maintenance of CZA therapy.

Keywords: Klebsiella pneumoniae. *KPC variants. Ceftazidima/Avibactam resistance.*

CO 024. APPLICATION OF THE NOPES SCORE IN A PORTUGUESE POPULATION OF PATIENTS WITH MODERATE-TO-SEVERE ASTHMA

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Introduction: Asthma and bronchiectasis are heterogeneous conditions, and even though different pathophysiological mechanisms are involved, with distinct inflammatory cells and biomarkers typically present, there is a high clinical overlap of these two entities. NOPES score (FeNO, Pneumonia, Expectoration and asthma Severity) was proposed as a predictive tool for bronchiectasis in patients with moderate-to-severe asthma.
Methods: Retrospective data were obtained from a population of patients followed in a Portuguese tertiary hospital in order to calculate the NOPES score. Diagnosis of bronchiectasis was obtained on chest computed tomography. Statistical analysis was performed with IBM SPSS Statistics software.
Results: A total of 130 patients were included (86.2% with severe asthma) and bronchiectasis were diagnosed in 27.7%. The identification of bronchiectasis was associated with chronic expectoration ($p = 0.001$), the occurrence of at least one previous episode of pneumonia ($p = 0.001$) and asthma severity ($p = 0.024$). An association between FeNO levels and bronchiectasis was not verified ($p = 0.65$). The NOPES score was applied and its diagnostic yield for the identification of bronchiectasis in asthmatic patients was represented by an AUC-ROC of 0.82. The best cut-off point was identified as a score ≥ 2 (sensitivity of 80.6% and specificity of 69.1%).
Conclusions: Our study showed a prevalence of bronchiectasis in accordance to the literature and NOPES score performed as a good

diagnostic tool for initial guidance in the assessment of its presence in patients with moderate-to-severe asthma. In the other hand, our data showed a poor association between FeNO levels and the presence of bronchiectasis in this population.

Keywords: *Asthma. Bronchiectasis. NOPES Score.*

CO 025. BETTER TOGETHER: A COMPOSITE SCORE TO EVALUATE SEVERE ASTHMATICS ON BIOLOGIC THERAPY

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Biological therapy in asthma requires regular evaluation of efficacy with consideration of variables such as symptoms, pulmonary function, exacerbations and use of systemic corticosteroids. In Portugal, the use of the GETE score has been advocated in the evaluation of this effectiveness. Recently, a new score for this purpose - FEOS score - was released, which includes the previously mentioned variables (FEV1, exacerbations, oral corticosteroids, symptoms). This score does not yet allow categorization of patients into classes, but it quantifies the response to therapy, and the higher the result, the greater the gain that the patient presents with the treatment. From January 2020 to August 2022, 54 treatments with monoclonal antibody were started in the Severe Asthma consultation of the Centro Hospitalar e Universitário de Coimbra, including 53 patients aged between 19 and 82 years, 6 of whom had already undergone prior therapy with a biological agent. From this group, 8 patients were excluded from our analysis due to insufficient data to calculate the FEOS score at the last assessment or lack of assessment due to the recent initiation of biological therapy. Data from 46 patients was analyzed, 27 females and 19 males, with a mean age of 54 years. The FEOS score averaged 70 points, with a minimum of 30 and a maximum of 100 points. The patient's GETE score (global assessment of treatment effectiveness) was also recorded for each patient, whose mean was 3.7, with a median of 4, corresponding to good effectiveness. The sample was divided into two groups according to BMI and it was found that 23 patients were obese (BMI > 30 kg/m^2), with a mean FEOS of 70. In the group of non-obese patients, the mean FEOS was 69, therefore, there was no significant difference. Eight patients discontinued therapy, two due to adverse reactions and the remaining six due to therapeutic failure, whose Feos scores ranged from 30 to 55 points, with a mean GETE of 2. In the group of patients who continued on therapy, na average FEOS of 75 points was observed, with an average GETE of 4. For better characterization, the FEOS values were categorized into 5 categories (0-19; 20-39; 40-59; 60-79; 80-100) and there was a coincidence of results with the values obtained in GETE score. In Portugal, there are several monoclonal antibodies approved for the treatment of severe asthma that generate high costs, so it is essential to evaluate their effectiveness. The FEOS score presents itself as a more comprehensive tool and probably more informative about the response to therapy than the GETE, and it could be a useful tool to be applied in clinical practice.

Keywords: *Severe asthma. FEOS. Monoclonal antibodies.*

CO 026. TRIPLE MODULATING THERAPY (IVACAFTOR/TEZACAFTOR/ELEXACAFTOR) IN ADULTS WITH CYSTIC FIBROSIS - RESULTS OF A CENTER

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Introduction: Cystic fibrosis (CF) is an autosomal recessive disorder that affects CFTR (Cystic Fibrosis Transmembrane Regulator) gene, compromising transmembrane chloride transport by CFTR protein, by disrupting its synthesis, processing or function. CFTR modulators are new drugs designed to improve or even restore functional expression of specific mutations causing the disease. Of those currently available, the most effective in clinical trials was the latest triple combination of ivacaftor/tezacaftor/elezacaftor (Kaftrio), which contains 2 correctors and a potentiator of the CFTR protein. In Portugal, it is approved for patients 12 years of age and older with at least one F508del mutation in the CFTR gene, covering the majority of patients with CF. The ongoing real-life studies allow better analysis of efficacy and safety over time.
Objectives: Evaluate the efficacy and safety of ivacaftor/tezacaftor/elezacaftor in patients with CF, followed in the Reference Center of CHUC.
Methods: Retrospective study of adult patients with CF, undergoing triple therapy, followed in CHUC. Evaluation of FEV1, sweat test, exacerbations and adverse events, from its introduction to 6 months therapy. Statistical analysis performed with SPSS 28.0.
Results: Totally, 22 patients were evaluated, 50% female and 50% male, with a median age of 28 years old. 54.5% of the patients (n = 12) were previously medicated with ivacaftor/lumacaftor and the rest (45.5%, n = 10) were naïve from modulator therapy. The mean value of baseline FEV1 was 60.2%, increasing on average 17.4% after 1 month of treatment, 19.9% after 3 months and 20.7% after 6 months of treatment. Any patient presented functional worsening, comparing to baseline value, over the 6 months treatment. Every patient had a positive sweat test before starting ivacaftor/tezacaftor/elezacaftor, with an average chlorine concentration of 86.23 mEq/L. After 3 months of therapy this was 47.3mEq/L, with an average reduction of 44.3% of its value. All patients with exacerbations in the year prior to this therapy onset (mean of 1.18 exacerbations) had a marked reduction in their number after the initiation of this therapy (mean of 0.18 in the next 6 months). 40.9% of patients had mild and self-limited adverse effects when initiating therapy: bronchorrhoea (n = 4), transaminases elevation (n = 2), skin rash (n = 1), headache (n = 1) and tiredness (n = 1).
Conclusions: Adults followed at the Center's Cystic Fibrosis Reference Center showed a significant and sustained improvement in lung function, a reduction in sweat chloride concentration, to values closer to normality, and reduction of exacerbations after initiating ivacaftor/tezacaftor/elezacaftor. Adverse effects were little significant and self-limited. The results of this study are in line with the currently available literature, highlighting the remarkable role of this drug in the course of the disease.

Keywords: *Ivacaftor/Tezacaftor/Elexacaftor. Cystic fibrosis.*

CO 027. LONG-TERM SAFETY AND EFFICACY OF ELEXACAFTOR/TEZACAFTOR/IVACAFTOR IN PEOPLE WITH CYSTIC FIBROSIS HETEROZYGOUS FOR F508DEL-CFTR AND A GATING OR RESIDUAL FUNCTION MUTATION

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Introduction: The triple combination regimen of elexacaftor/tezacaftor/ivacaftor (ELX/TEZ/IVA) was shown to be safe and efficacious in people with CF aged ≥ 12 years with cystic fibrosis (CF) and heterozygous for F508del-CFTR and either a CFTR gating mutation (F508del-gating genotypes) or residual function mutation (F508del-residual function genotypes). A 96-week Phase 3, open-label extension study was conducted to assess long-term safety and efficacy in these participants.
Methods: Participants received ELX 200 mg once daily/TEZ 100 mg once daily/IVA 150 mg every 12 hours. The primary endpoint was

safety and tolerability; secondary endpoints included absolute changes in percent predicted FEV1 (ppFEV1), sweat chloride concentration, body mass index (BMI), body weight, and Cystic Fibrosis Questionnaire-Revised (CFQ-R) respiratory domain score.
Results: 251 participants (F508del-gating genotypes, n = 92; F508del-residual function genotypes, n = 159) were enrolled and dosed. Mean (SD) exposure to ELX/TEZ/IVA was 89.3 (20.0) weeks. Overall, 241 participants (96.0%) had an adverse event (AE), which for most were mild (32.3%) or moderate (55.0%) in severity. The exposure adjusted rates of AEs and serious AEs (589.36 and 13.38 events per 100 patient years) were lower than in the 8-week parent study (1,033.98 and 26.74 events per 100 patient years). Thirteen patients (5.2%) had AEs that led to treatment discontinuation (increased liver function tests [n = 6], psychiatric events [n = 4], other events [n = 3]) and there was one death due to an operative complication during resection of a cecal mass which was not considered related to ELX/TEZ/IVA. Following a 4-week run-in period with either IVA or TEZ/IVA, participants who received ELX/TEZ/IVA in the parent study had improvements in ppFEV1, sweat chloride concentration, and CFQ-R respiratory domain score that were maintained to Week 96 of this extension study while participants who started ELX/TEZ/IVA in the extension study had similar improvements from parent study baseline at Week 96.
Conclusions: ELX/TEZ/IVA continued to be generally safe and well-tolerated in participants age 12 years and older with F508del-gating or F508del-residual function genotypes, with no new safety findings. Improvements in lung function, respiratory symptoms, and CFTR function reported in the parent study were maintained through this extension study. These results demonstrate the favorable safety profile and durable clinical benefits of ELX/TEZ/IVA treatment in this population.
Sponsor: Vertex Pharmaceuticals Incorporated.

Keywords: *Elexacaftor. Cystic fibrosis. CFTR function.*

CO 028. PICTURE - REAL-WORLD TREATMENT PATHWAYS IN STAGE III NON-SMALL CELL LUNG CANCER IN PORTUGAL

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Introduction: Stage III NSCLC is a heterogeneous and complex setting that requires multimodal management. Recent advances in modern medicine led to the implementation of immuno-oncology (IO) into clinical practice. PICTuRE aims to assess the clinical management and the IO impact on clinical outcomes in stage III NSCLC patients (pts).
Methods: PICTuRE is a multicentric, retrospective real-world study, based on secondary data from medical records of reference centers in Portugal. Study included adults initially diagnosed with stage III NSCLC during 2018 and followed up until disease progression, death, end of study, or loss to follow up (whichever occurs first).
Results: A total of 287 pts were enrolled. For this interim analysis, treatment information and follow-up data was available for 221 pts: 76.5% male, 66 ± 10 yr mean age at diagnosis. Overall median follow-up time was 9m (8-12, 95% CI). Most tumours were adenocarcinoma (58.4%) or squamous cell carcinoma (36.2%). Staging was performed according to TNM AJCC 8th edition: 46.2% pts were IIIA, 37.6% IIIB, 12.2% IIIC, and 4.1% other. Initial treatment options for stage III diagnosis were as follows: 24.9% of pts underwent surgery, 51.1% received CRT, and 24.0% palliative therapy. IO treatment was given to 66 pts: within surgery group 12.7% any time after recurrence; within CRT group 6.2% IO consolidation and 29.2% at any time after CRT progression; within palliative group 13.2% in first line and 22.6% in second or subsequent lines. Impact of treatment is summarized in the Table.
Conclusions: PICTuRE showed that among patients treated with radical treatment (surgery and CRT) that did not receive IO, more than half progressed within the follow-up period of 9m, showcasing the high unmet medical need. Early initiation of IO is beneficial for patients and worse outcomes are seen in those who are not given IO. Further analysis are needed to strengthen statistical and clinical relevance of these results.

Keywords: *Non-small cell lung cancer (NSCLC). Locally advanced disease. Immuno-Oncology (IO). RWE.*

CO 029. SMOKING EFFECTS ON IMMUNOTHERAPY EFFECTIVENESS IN LUNG CANCER – A CENTER EXPERIENCE

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Introduction: Studies on immunotherapy (IT) in lung cancer suggest different therapeutic responses in smokers and non-smokers. We intend to evaluate the impact of smoking on the response to IT (Pembrolizumab) in patients with advanced stage lung cancer followed at the Portuguese Oncology Institute (IPO) - Lisbon.
Methods: We performed a retrospective study of patients with lung cancer, followed at the IPO - Lisbon, who have started Pembrolizumab monotherapy between 1 January 2017 and 31 July 2021. We analyzed progression-free survival (PFS) and overall survival (OS) between smoking *vs.* non-smoking groups (Kaplan-Meier, Log Rank and Cox Regression).
Results: We analyzed 148 patients, of which 58 (39.2%) were women, with a mean age of 62.9 years, and 37 non-smokers (25%). Smokers were younger (age 62.5 ± 10.2 *vs.* 64.5 ± 16.6 years in non-smokers), mostly men [77 (69.4%) *vs.* 13 (35.1%) in non-smokers; p < 0.001] and more frequently had histology of squamous cell carcinoma [24 (21.6%) *vs.* 0%; p = 0.002] or adenocarcinoma, the latter with similar prevalence between the two groups [79 (71.2%) vs. 30 (81.1%)]. PD-L1>50% was found more frequently in smokers [70 (63.1%) *vs.* 18 (48.6%)], with IT being used more frequently in subsequent lines of treatment in non-smokers [23 (62, 2%) *vs.* 49 (44.1%)], while in 55.9% of smokers it was used as first-line treatment. The smoking group had more often a history of another known malignancy [38 (34.2%) *vs.* 6 (16.2%); p = 0.038]. PFS was higher in smokers (mean 14.0 ± 3.7 *vs.* 8.5 ± 3.1 months; HR 0.55 [95%CI, 0.36-0.83; p = 0.004]. OS was also higher in smokers, although without statistical significance (30.0 ± 3.5 *vs.* 15.3 ± 3.5 months; HR 0.68 [95%CI, 0.43-1.08]; p = 0.099). The presence of G>2 toxicity was similar between groups [35 (31.5%) *vs.* 8 (21.6%)]. The possible confounding variables considered were as follow: age, sex, histology, PD-L1, line of treatment, G>2 toxicity, history of another malignancy. In the multivariate analysis, only sex was a true confounding variable, confirming the higher PFS observed in smokers vs. non-smokers (HR 0.45 [95%CI 0.29-0.71]; p = 0.004), along with the difference in OS favoring smokers which was accentuated between the two groups and was statistically significant (HR 0.55 [95%CI, 0.34-0.89]; p = 0.047).
Discussion: This study reinforces the idea previous defended in other studies that, in patients with advanced stage lung cancer, therapy with pembrolizumab in monotherapy seems to be less effective in non-smokers when compared to smokers or ex-smokers. Despite the limitations of the study, namely being a retrospective, unicentric study with a small sample, these results suggest that in non-smoking patients, IT alone may not be the best therapeutic strategy.

Keywords: *Lung cancer. Immunotherapy. Pembrolizumab. Smoking.*

CO 030. PEMBROLIZUMAB AS A 1ST LINE TREATMENT OF NON-SMALL CELL LUNG CANCER – EXPERIENCE FROM A CENTER

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Introduction: About 23 to 28% of non-small cell lung cancer (NSCLC) patients have a high expression of PD-L1 (programmed death ligand 1). If such expression exceeds the 50%, pembrolizumab in monotherapy as a first line agent showed a significant higher overall and progression free survival and fewer adverse events, when comparing to platin based chemotherapy.
Objectives: To access the efficacy and safety profile of pembrolizumab in monotherapy in the 1st line treatment of NSCLC with PD-L1 expression of at least 50%, as well as likely predictive factors.
Methods: We studied the NSCLC patients treated with pembrolizumab in monotherapy as a 1st line treatment, from a hospital center. Demographic and clinical descriptive analysis and comparative studies were performed with SPSS Statistics® 23rd version.
Results: We included 29 patients, the majority male (n = 24, 82,8%), with a median age of 63 yo (IQR 7,5). Adenocarcinoma was the most common subtype (n = 19, 65,5%). The median overall survival (OS) was 69,0 weeks (95% confidence interval CI; 30,0 to 108,0) and the median progression free survival (PFS) was 50,0 weeks (95% CI; 44,7 to 55,3). From the comparative study, there were no significant differences, respectively, in the OS and PFS, amongst the histological subtypes (χ^2 = 7,281; p = 0,122) (χ^2 = 4,653; p = 0,325) and level of PD-L1 expression (χ^2 = 2,823; p = 0,588) (χ^2 = 6,881; p = 0,142). The presence of pleural (χ^2 = 5,160; p = 0,023) and contralateral lung (χ^2 = 5,216; p = 0,022) metastasis at diagnosis was associated with a significant lower PFS. The smoking status did not significantly influence the OS (X2 = 5,100; p = 0,078) and PFS (χ^2 = 3,765; p = 0,152). The patients with adverse events had a significant higher OS (χ^2 = 9,338; p = 0,002) and PFS (χ^2 = 6,437; p = 0,011).
Conclusions: With this small real-life study, it was possible, to a certain degree, to reaffirm the results from the KEYNOTE's trials, specifically referring to the median OS and PFS and the frequency of adverse events. The OS and PFS were not influenced by the PD-L1 expression level (if at least 50%) and the histological subtype. However, the absence of pleural and contralateral lung metastasis and the presence of adverse events could be interpreted as a higher survival predictive factors.

Keywords: *Non-small cell lung cancer. Advanced stage. Immunotherapy.*

CO 031. DIM: A PROGNOSTIC SCORE FOR IMMUNOTHERAPY IN NON-SMALL-CELL LUNG CANCER

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Introduction: DiM is a prognostic score for second or further-line immunotherapy (IT) in non-small-cell lung cancer (NSCLC) and includes the following parameters: Eastern Cooperative Oncology Group performance status (ECOG PS), gender, histology, stage, first-line treatment with platinum and response to first-line treatment.
Objectives: To assess overall survival (OS) in NSCLC treated with IT in ≥ 2-line using the DiM score.
Methods: Retrospective cohort study conducted at a central and university hospital that included patients with NSCLC treated with IT in ≥ 2-line between September 2015 and July 2019. Patients were stratified into 3 groups: best (< 5 points), intermediate (5-9 points) and poor prognosis (> 9 points). Kaplan Meier and log-rank test were used to calculate OS curves and to assess survival differences. Univariate and multivariable cox-regression-analysis were performed to identify factors associated with OS.
Results: A total of 108 patients were included, median age of 67.5 years (range 44-94 years), 84 (77.8%) were male, 86 (79.6%) were smokers or former smokers and 87 (80.6%) had an ECOG PS of 0 or 1. Adenocarcinoma was the most frequent histology (n = 72, 66.7%). At diagnosis, 79 (73.2%) of patients were stage IV and 29 (26.8%) were stage IIIb or IIIc. Most patients received IT in second line (71,3%). Using the DiM score, we were able to identify 3 groups with different prognosis: best (31,5%), intermediate (49,1%) and worst prognosis (19,4%). Median OS was 11 months, with differences between groups (17 *vs.* 10 *vs.* 6 months, log rank p = 0,039). Median PFS was 6 months, also with differences between groups (10 *vs.* 5 *vs.* 3 months, log rank p = 0,021). Multivariate analysis (adjusted to age, smoking status and hepatic metastasis) showed DiM score was a predictor of mortality (intermediate group *vs.* best group HR: 1.891 [95%CI, 1.140-3.138; p = 0.014] and worst group *vs.* best group HR: 2.219 [95%CI, 1.174-4.195; p = 0.014]).
Conclusions: DiM is a clinical score and an easy-to-use tool that identified 3 groups with different prognosis and proved to be a predictor of mortality. In our cohort, patients included in the worst prognosis group had a short OS and PFS and other therapeutic options may be considered in such cases.

Keywords: *Non-Small-Cell Lung Cancer. Immunotherapy. Prognostic Score.*

CO 032. EFFICACY AND TOXICITY OF MONOTHERAPY PEMBROLIZUMAB (1ST LINE) IN PATIENTS OVER AND UNDER 70 YEARS OLD

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Introduction: Lung cancer is the leading cause of cancer-related death world-wide. Immunotherapy have dramatically altered the therapeutic scenario in NSCLC (non-small cell lung cancer), with a significant improvement in quality of life and overall survival (OS) of patients. Although generally well tolerated, it can sometimes cause important immune-related side effects.
Objectives: In this study, we aim to evaluate the efficacy and safety of first-line Pembrolizumab in patients with advanced NSCLC patients with high PD-L1 expression (≥ 50%), and to compare the results in patients aged over and under 70 years old.
Methods: Retrospective analysis of data from patients with NSCLC treated with monotherapy Pembrolizumab as first-line treatment between 2018 and 2020. Clinical data, histology, performance status (PS), therapy, OS, objective response rate (ORR), disease control rate (DCR) and adverse events were evaluated. Statistical analysis was performed using SPSS v.28.
Results: Sixty-seven patients with advanced NSCLC were enrolled, of which 82,1% were male, and had an average age of 64,4 years. Most patients were former smokers (61,2%) and 94% had a PS 0-1; all patients with PS 2 were ≥ 70 years old. Patients with adenocarcinoma predominated (68,7%), 23,9% were squamous carcinoma, 6% adenosquamous and 1.5% large cell carcinoma. The median global duration of treatment with Pembrolizumab was 12 months (IQR 20). For those aged ≥ 70 years old, duration of treatment was 8 months (p > 0,05). The global overall survival (OS) was 21,2 months (SD 14,4), but was longer for patients < 70 years old [OS was 22,1 months (SD 13)] than for patients ≥ 70 years old [OS was 18,8 months (SD 17,5)], and this difference was statistically significant (p < 0,05). In the total population, the objective response rate (ORR) was 49.3% and disease control rate (DCR) was 70,2%. It was reported 30 immune related adverse events [cutaneous (n = 9), colitis (n = 6), endocrinopathies (n = 5), hepatitis (n = 4), hematologic (n

= 3), pneumonitis (n = 2) and nephritis (n = 1)]. In the population ≥ 70 years old, 52,6% of patients reported immune-related adverse events, compared to 41,7% in the population < 70 years old.
Conclusions: Our findings reveal good response rates with favourable tolerability when using monotherapy Pembrolizumab as first-line treatment of advanced NSCLC. Patients ≥ 70 years old showed a shorter duration of treatment and overall survival, which can be explained by worst performance status and comorbidities associated in this specific population. They also reported more adverse events, which is in line with some studies suggesting that older and more vulnerable patients may be at a higher risk of immune-related adverse events and early treatment discontinuation. Clinical trials tend to include younger patients and good PS; with our study we intend to present real-world data from patients who constitute our daily reality, who tend to be older.

Keywords: *Lung cancer. Immunotherapy. Elderly.*

CO 033. CUF ONCOLOGY LUNG CANCER EARLY-DETECTION PROGRAM IN PORTUGAL: PRELIMINARY RESULTS

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Introduction: Lung cancer is the most common cause of cancer death worldwide. International guidelines recommend lung cancer screening in high-risk populations to promote early-stage diagnosis and decrease mortality but currently there is no national comprehensive screening program in Portugal. CUF Hospitals are a private health group that started an early detection program according to established guidelines.
Objectives: To evaluate the preliminary results of the CUF lung cancer early-detection program.
Methods: Data from the lung cancer early-detection program was collected through a digital health record review.
Results: Between April 2021 and July 2022, 237 individuals were enrolled in the program, with 43.5% women, mean age was 57 years (range 38-80 years), 62.4% were current smokers (mean 35-pack year history) and 32.9% were ex-smokers (< 15 years of smoking cessation). Low-dose chest CT studies were classified according with Lung-RADS assessment categories: 94.5% as Lung-RADS 1/2, 10% as Lung-RADS 3, 1.4% as Lung-RADS 4A and 0.5% as Lung-RADS 4B. Patients with Lung-RADS 3 to 5 were discussed at the multidisciplinary lung cancer meeting for appropriate diagnosis and management. 11% of smokers were enrolled in smoking cessation appointments.
Conclusions: Lung cancer early-detection program at CUF allowed the recognition of 2% of patients with lung cancer and reinforced the need for smoking cessation. There are challenges to overcome in patient eligibility, and program adherence.

Keywords: *Lung cancer. Early detection. Screening. Low-dose computed tomography.*

CO 034. SPREADING THROUGH AIR SPACES AND THINKING ABOUT LUNG METASTASES

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CHVNG/E.

Introduction: Spread through air spaces (STAS) is a novel pattern of invasion in primary lung cancers, which was introduced in the 2015 World Health Organization classification. Several studies have validated STAS to be a predictor of clinical outcome in lung adenocarcinoma. However, little is known about STAS as a mode of intraparenchymal diffusion of pulmonary metastases (PMs).
Objectives: The aim of this study was to investigate the incidence of STAS among PMs and the association between STAS and clinicopathological characteristics of PMs.
Methods: From August 1, 2017 to July 31, 2022 50 patients underwent pulmonary metastectomy at Centro Hospitalar vila Nova de Gaia/Espinho. Clinicopathological characteristics of patients were retrospectively evaluated. Continuous variables were compared by using unpaired Student´s t-test or Mann Whitney test, as appropriate. Categorical variables were compared by using Qui-squared test or Fisher´s exact test as appropriate.
Results: A total of 50 patients with PMs who underwent surgical resection were analyzed, 68% being male. The median age of the study population was 60 years (range 24-80). Most patients had primary cancer originating from epithelial tissue (n = 45) and the remaining from mesenchymal tissue (n = 5). Colorectal cancer was the most frequent primary site of PMs (n = 32), followed by kidney (n = 4) and osteosarcoma (n = 3). 60% of patients (n = 30) underwent sublobar resection (wedge resection or anatomic segmentectomy). STAS was observed in 10 patients (20%): 7 patients with PMs from CRC, 1 with PM from palatine tonsil, 1 from kidney and 1 from uterus. STAS was more frequent in elder patients (62 years, SD = 7.099 *vs.* 60 years, SD = 13.889; p = 0.034). Notably, STAS was significantly more frequent in PMs with larger dimension (2.8 cm, SD = 2.049 *vs.* 2.03, SD = 1.104; p = 0.010), patients with lymph node metastases (p = 0.004) and in patients who underwent lobectomy rather than sublunar resection (70% *vs.* 32.5%; p = 0.03). Although without statistically significant difference, locorregional recurrence and mortality was higher in patients with STAS+ (40% *vs.* 22.5% and 40% *vs.* 20%, respectively).
Conclusions: STAS is nowadays considered to be a lung-specific tumour invasion pattern and is commonly observed in PMs of different origins.

Keywords: *Spread through air spaces. Lung cancer. Pulmonary metastases. Prognosis. Recurrence.*

CO 035. PREVALENCE OF IMMUNE-RELATED PNEUMONITIS IN PATIENTS WITH NON-SMALL CELL LUNG CANCER UNDER IMMUNOTHERAPY

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Introduction: The introduction of immunotherapy as treatment option for cancer patients brought the attention to potential immune-related adverse events (irAE). One of such events is pneumonitis, of particular significance not only because of difficulties related to its diagnose, especially in patients with concurrent lung cancer, but also due to its potential lethality.
Objectives: To summarize characteristics of cancer patients with a diagnosis of Non-small Cell Lung Cancer (NSCLC) and confirmed post-immunotherapy pneumonitis.
Methods: Descriptive study including all patients with NSCLC under immunotherapy (Nivolumab, Prembrolizumab, Atezolizumab) diagnosed with post-immunotherapy pneumonitis between 2016 and 2020. T-student and Mann-Whitney tests were applied for continuous variables and the chi-square test was used to compare categorical variables.
Results: Of a total of 184 patients, 26.6% (n = 49) were diagnosed with irAE; of these, there were 7 confirmed cases of pneumonitis (14.3%). The majority (n = 6) were male, with a mean age at the beginning of immunotherapy of 67.3 ± 6.8 years. Six patients were classified with an ECOG-PS 1. Five were active smokers, with the other two being former smokers. Four patients had a histological diagnose of Adenocarcinoma, while the other 3 were confirmed

cases of Squamous Cell Carcinoma. Three patients presented a strong (≥ 50%) PD-L1 expression. At the time of the start of immunotherapy, 3 patients had extrathoracic metastasis [liver (n = 1); bone (n = 1); multiple (n = 1)]. Three patients developed pneumonitis under Nivolumab, 2 under Pembrolizumab and the other 2 under Atezolizumab; there were no statistically significant differences between the type of immunotherapy and the development of pneumonitis (p = 0.71). Five patients (71.4%) had been treated with chemoradiotherapy prior to immunotherapy; there was a statistically significant relation between the development of pneumonitis and previous exposure to thoracic radiotherapy (p = 0.002). Median time between the end of the previous line of treatment and start of immunotherapy was significantly higher in the group that developed pneumonitis (10 weeks *vs*. 34 weeks; p = 0.006). Median immunotherapy duration in the pneumonitis group was 22 (1;88) weeks. According to the CTCAE classification, four patients were diagnosed with Grade 3 pneumonitis, two with Grade 2 and one with Grade 1. There was a statistically significant relation between more severe irAE (Grade > 2) and pneumonitis - of the 12 higher grade irAE, 4 were cases of pneumonitis (p = 0.05). Immunotherapy was terminated due to the irAE in 5 patients; the other 2 patients also suspended immunotherapy, but because of disease progression. Progression-free survival (PFS) was significantly higher for patients that developed irAE, including pneumonitis [median PFS: 78 weeks (95%CI, 2.21-186.71); p = 0.015]; there were no statistically significant differences in overall survival (p = 0.31). All 7 patients died; none of the deaths were directly caused by the pneumonitis.
Conclusions: Although usually described as an ominous complication, the development of post-immunotherapy pneumonitis did not significantly impact the survival of these NSCLC patients. Previous exposure to thoracic radiotherapy and a longer time interval between the end of the previous treatment line and the start of immunotherapy were associated with the development of this irAE.

Keywords: *Adenocarcinoma. Squamous cell carcinoma. Immune-checkpoint inhibitor. pneumonitis.*

CO 036. THE UTILITY OF THE PAN-IMMUNE-INFLAMMATION VALUE AS A PROGNOSTIC TOOL IN NON-SMALL CELL LUNG CANCER PATIENTS UNDER IMMUNOTHERAPY

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Introduction: The onset of immune checkpoint inhibitor therapy has changed the way we treat cancer patients. As with other types of cancer, response to immunotherapy in non-small cell lung cancer patients is not always the expected, pointing towards the need of prognostic biomarkers capable of identifying those patients with most benefit from this therapy. The Pan-Immune-Inflammation Value (PIV) is a new biomarker developed as a potential predictor of survival in multiple types of solid tumors.
Objectives: To identify prognostic biomarkers of favorable response to Immune-Checkpoint Inhibitors in NSCLC patients, including the application of the PIV in this population.
Methods: Retrospective study including all patients diagnosed with NSCLC under Immune-Checkpoint Inhibitor (Nivolumab, Pembrolizumab, Atezolizumab) between 2016 and 2020 in a tertiary hospital. Demographic, clinical, and analytical data was collected, including the registry of blood samples at three different timeframes: pre-treatment, 2-3 weeks after the start of immunotherapy and 2 months after the start of immunotherapy. The PIV was then calculated using the following formula: neutrophil count (10^3/mL) × platelet count (10^3/mL) × monocyte count (10^3/mL))/lymphocyte count (10^3/mL). Patients were stratified according to the PIV in two groups (best, < median; worst, ≥ median). Survival was determined using Kaplan-Meier curves and compared by log-rank test. A Cox regression model was used for multivariable analysis.
Results: We included 184 patients, 77.7% males, with a mean age at the start of immunotherapy of 66.9 ± 9.54 years. At the start of treatment, 41.8% had an ECOG Performance Status of 0. The majority (67.4%) had a histological diagnosis of Adenocarcinoma and staged as IVB (56.5%) at the start of immunotherapy. The median PIV in the 3 timeframes was as follows: 743 (pre-treatment), 867 (2-3 weeks of treatment) and 872 (2 months of treatment). Patients with a high PIV showed, for all considered timeframes, a significantly inferior median overall survival (OS) when compared with those in the more favorable group [OS pre-treatment: 32 (95%CI 24.61;39.39) vs. 56 (95%CI 29.32;82.67) weeks; OS 2-3 weeks of immunotherapy: 28 (95%CI 19.09;36.90) vs. 79 (95%CI 50.57;107.43) weeks; OS 2 months of immunotherapy: 31 (95%CI 23.37;38.62) vs. 93 (95%CI 75.45;110.55) weeks; p < 0.001]. Similarly, stratification according to PIV also revealed a statistically significant difference in progression-free survival (PFS) at 2-3 weeks of immunotherapy [PFS: 22 (95%CI 12.39;31.61) weeks vs. 9 weeks (95%CI 7.60;10.40), p < 0.001]. When included in a multivariable logistic regression model adjusted for possible confounders (age, sex, ECOG-PS, type of immunotherapy and treatment line), the PIV calculated at 2-3 weeks after the start of immunotherapy maintained its statistical significance in stratifying the patients with worse prognosis (HR 1.960; p < 0.001).
Conclusions: The PIV was capable of predicting overall survival and progression-free survival in NSCLC patients under immunotherapy, highlighting its potential as a prognostic biomarker when applied to assess which patients will benefit the most from immune-checkpoint inhibitor therapy.

Keywords: *Adenocarcinoma. Squamous cell carcinoma. Immune-checkpoint inhibitor. PIV. Prognosis.*

CO 037. INFECTIOUS COMPLICATIONS OF LUNG CANCER: FROM EMERGENT SURGICAL INTERVENTION TO CONSERVATIVE APPROACH

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Introduction: Infectious complications are frequent throughout the clinical course of lung cancer, the majority of which are respiratory tract and tumor infections. We present a series of cases reporting infectious complications of lung cancer, with approaches ranging from most invasive to conservative.
Case reports: Case 1: 57-year-old female (PS 0), current smoker (40 pack-year), was hospitalized with fever, dyspnea, and a productive cough. She had history of COPD GOLD 2 and Diabetes, and was previously evaluated in Pulmonology after a right lower lobe mass (4.9 × 3.9 cm) was identified. Investigation determined a Lung Adenocarcinoma diagnosis (PD-L1 < 1%), with no apparent distant metastization. At admission, Thoracic CT documented mass size increase, now involving the middle lobe, with a central area of necrosis and cavitation. She was started on antibiotics (Ceftriaxone). Owing to progression to septic shock, the patient underwent emergency bilobectomy. After 25-day hospitalization, staging was completed in outpatient setting (Stage IIA). The case was rediscussed in Multidisciplinary Team Meeting (MDTM). At 6-month follow-up, under adjuvant chemotherapy. Case 2: 64-year-old male (PS 1) complaining of significant weight loss, anorexia and asthenia. He was a smoker (50 pack-year), with known exposure to asbestos. Thoracic CT revealed a left lower lobe mass (8.5 × 8 cm) with central necrosis, hilar ipsilateral and infracarinal adenomegalies. After admission, he underwent Flexible Bronchoscopy (FFB) with endobronchial biopsies and a Squamous-Cell Carcinoma (PD-L1 0%) diag-

nosis was established. On the 6th day of hospitalization, he developed fever and a productive cough. Imaging re-evaluation revealed an extensive cavitation central to the known mass, with an irregular thickened wall and air-fluid level. Despite 14-day antibiotic therapy (Piperacillin-Tazobactam, Vancomicine), considering unfavourable progression, left lower lobectomy was performed. After discharge, staging with FDG-PET revealed increased uptake in multiple abdominopelvic adenopathies and a suspicious hepatic node (Stage IVb). The case was rediscussed in MDTM. At 3-month follow-up, under adjuvant chemoimmunotherapy. Case 3: 78-year-old man (PS 3), current smoker (55 pack-year), was admitted for fever, oliguria and disorientation. He had been referred to Pulmonology Consultation for investigation of a right lower lobe mass (9.6 × 6.8 cm) and had undergone FFB with endobronchial biopsies before admission. Follow-up CT revealed an intratumoral abscess, with an irregular enhancing wall, and ipsilateral loculated pleural effusion. Suspicious hepatic, skeletal and encephalic lesions were also documented. Stage IVb disease was assumed. Pleural fluid diagnosed empyema – a chest drain was placed and antibiotics were started (Piperacillin-Tazobactam and Ciprofloxacin, directed to later identified Citrobacter Braakii and Enterobacter Cloacae). Considering the patient's frailty, he was deemed unfit for surgery. Percutaneous drainage was unsuccessfully attempted. Unfavourable clinical progression ensued, and the patient died during hospitalization. Postmortem diagnosis of Undifferentiated Carcinoma was obtained.
Discussion: In up to one-third of patients, an underlying lung tumor is the cause of pulmonary cavitation or abscess. Surgical intervention, including in patients without known curative indication, might be necessary. Multidisciplinary discussion is crucial. Preoperative PS ≥ 2, hypoalbuminemia and anemia are known poor prognostic factors. Clinicians should have a high suspicion whenever diagnostic findings are suggestive of these complications, considering the high morbidity and mortality associated, irrespective of approach.

Keywords: *Lung cancer. Infectious complications. Thoracic surgery.*

CO 038. NEXT-GENERATION SEQUENCING TO DISTINGUISH MULTIPLE PRIMARY LUNG CANCERS FROM INTRAPULMONARY METASTASIS

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Introduction: In patients with non-small cell lung carcinomas (NSCLC) with different lung lesions, the clinical-radiological distinction between multiple primary lung cancers and intrapulmonary metastases is difficult. Thus, histological characterization is essential, and molecular analysis with the application of next-generation sequencing (NGS) allows for resolving ambiguous cases.
Objectives: To analyse demographics and clinical features of patients with non-squamous NSCLC with lung lesions compatible with intrapulmonary metastases or multiple primary lung cancers evaluated by NGS.
Methods: Retrospective observational study in patients with non-squamous NSCLC with multiple synchronous or metachronous pulmonary nodules biopsied, whose samples underwent molecular evaluation by NGS, in the period from 2016 to 2021. All patients with molecular confirmation of intrapulmonary metastases or multiple primary lung cancers with the same histological subtype were included. Patients' demographic data and smoking habits, staging and characteristics of the primary tumour, anatomical location and characteristics of the assessed pulmonary nodules, and therapeutic implications were analysed.
Results: 54 patients were included with a total of 59 nodules analysed in addition to the primary lung tumour: 36 pulmonary nodules whose molecular diagnosis revealed to be different primary lung cancers and 23 pulmonary nodules that consisted of intrapulmonary metastases. The results are summarized in the table.
Conclusions: Patients whose pulmonary nodules were different primary lung cancers had non-squamous NSCLC with lowest T and N stages and smaller primary lung lesions at diagnosis, compared to patients with nodules compatible with intrapulmonary metastases. In most patients with multiple primary cancers, the radical treatment was possible and had a longer mean survival compared to patients with intrapulmonary metastases.

Keywords: *Non-Squamous non-small cell lung carcinomas. Metastases. Multiple primary cancers. Next-Generation Sequencing.*

CO 039. DIAGNOSIS OF VENTILATOR-ASSOCIATED PNEUMONIA: AGREEMENT BETWEEN ENDOTRACHEAL ASPIRATION AND BRONCHOSCOPY

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Introduction: Ventilator-associated pneumonia is a common nosocomial infection in Intensive Care Units, therefore its etiologic diagnosis is critical and may be reached by endotracheal aspiration (ETA) or by bronchoscopy, either bronchoalveolar lavage (BAL) or respiratory secretions (RS). ETA is cost-effective, less invasive and easy to perform, while bronchoscopy has potential complications and may not be promptly available. This study assessed the agreement between ETA and bronchoscopy (BAL and RS) in the diagnosis of ventilator-associated pneumonia.
Methods: This retrospective observational study included patients admitted in an intensive care unit level 3, between January 2011 and June 2021 with a presumed ventilator-associated pneumonia diagnosis, who underwent a bronchoscopy and had an ETA performed < 48 before/after the bronchoscopy. Percentage of agreement and Cohen's kappa (k) were used.
Results: A total of 65 patients (71% males, 63 ± 15y) were included in this analysis. ETA had a microbiological isolation in 31.8% of the cases, BAL in 34.9%, RS in 26.3%, and the combination of BAL and RS in 34.8%. The percentage of agreement between ETA and BAL was 67% (k = 0.28 [95%CI -0.01-0.58]); between ETA and RS was 77% (k = 0.42 [95%CI 0.16-0.69]); and between ETA and bronchoscopy (BAL or RS) 76% (k = 0.46 [95%CI 0.23-0.68]). The most common pathogens isolated were *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. Only one minor complication post bronchoscopy was reported.
Conclusions: We found a moderate agreement between ETA and bronchoscopy. This shows that in some patients it may be useful to use both diagnostic methods. Further studies and with a larger sample are needed to compare the microbiological agents isolated among the two diagnostic methods.

Keywords: *Pneumonia. Bronchoscopy mechanical ventilation.*

CO 040. HYPERTHERMIC INTRATHORACIC CHEMOTHERAPY. A NEW WEAPON HAS BEEN DEPLOYED IN PORTUGAL

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Introduction: Thymoma is a rare tumour, being the most frequent neoplasm of the anterior mediastinum. Radical surgery is the gold-standard in every stage, with a recurrence rate up to 30% in locally advanced tumours. Complete resection in recurrences is reported in less than two-thirds of cases. A new therapeutic strategy has emerged: the hyperthermic intrathoracic chemotherapy (HITHOC), a high concentrated dose of warmed chemotherapy, introduced and

circulated in the thorax. HITHOC has been used as adjuvant to radical surgery to improve local control of pleural tumours. In this report, we present a clinical case of the use of HITHOC as adjuvant of surgery for the treatment of pleural thymoma metastasis.
Case report: A 42-year-old woman diagnosed with Masaoka stage III thymoma, and Good's syndrome in 2018, underwent radical surgery resection, achieving a focal microscopic invasion of the surgical margins (R1). In 2020, follow-up chest computed tomography showed a pleural mass in the posterior costophrenic recess. Pleural biopsy was performed, and the anatomopathology was compatible with thymoma metastasis. The patient was started on chemotherapy treatment with cyclophosphamide, doxorubicin and cisplatin, having completed six cycles, with weak response. In a multidisciplinary discussion, the decision was to perform surgical resection and HITHOC. The procedure was performed under general anaesthesia, one lung ventilation and lateral position during surgery and supine position during HITHOC. The patient underwent metastectomy through video-assisted thoracoscopic surgery, followed by HITHOC. Pre and postoperative hydration and forced diuresis were performed to prevent kidney injury. We utilised LivaNova S5 heart-lung machine, a 5th generation perfusion system. The pleural space was progressively filled with the preloaded Hemosol B0®, using two 32F chest tubes, warmed up to 42 ºC, adding cisplatin at a dose of 150 mg/m^2. The infusion was carried out for sixty minutes at a flow of 1,500 mL/min. The procedure was uneventful.
Discussion: Surgical resection is the cornerstone in the management of thymomas, even in advanced stages, often as a part of multimodal strategy. The most recent strategy is the HITHOC. This technique is based on the synergy between hyperthermia and some cytotoxic drugs. Local administration of the chemotherapeutic agent also allows greater concentration of the drug locally, with less systemic toxicity. HITHOC is performed using a roller pump and a heat exchanger, connected to inflow and outflow chest tubes to perform the perfusion. The amount of perfusate varies from 1,500 to 3,500 mL according to body surface square metres. Cisplatin may be used as a single agent at 100-175 mg/m^2 or combined with other chemotherapeutic therapies. The most common complications associated are renal insufficiency, intraoperative arrhythmias, empyema, thrombocytopenia and bleeding, with an overall incidence of 2%. HITHOC has not yet been widely used, but it has been proven to be effective and safe. It is known to prolong patient's median survival length, especially in the patients with thymoma. To our knowledge, this is the first application of HITHOC in Portugal and in this regard, we hope to implement HITHOC as a standardised procedure in our Cardio-thoracic centre.

Keywords: *Hyperthermic intrathoracic chemotherapy. Thymoma. Mediastinal Tumors.*

CO 041. LUNG INVOLVEMENT IN RHEUMATOID ARTHRITIS: THE CURRENT PORTRAIT OF A NATIONAL COHORT

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Introduction: Lung involvement is expected in 7-80% of rheumatoid arthritis (RA) patients and almost all lung compartments can be affected. Lung disease remains an important cause of morbimortality in RA, and raising awareness for this complication is crucial. We aim to characterize lung involvement in a nationwide cohort of RA patients, identify factors associated with lung disease and analyze the current standard of care in interstitial lung disease (ILD) treatment.
Methods: Observational, retrospective, multicenter study of patients prospectively followed in the Rheumatic Diseases Portuguese Registry (Reuma.pt). Data were collected until February 2022. Lung involvement was defined by the presence of imagiological/histopathological changes described in the spectrum of RA-lung disease. Parametric tests were used for group comparisons and logistic regression analysis to evaluate demographic and clinical features independently associated with lung disease.
Results: In total 9,415 RA patients were included, 7,473 (79.4%) female, with a mean age at last visit of 62.4 ± 13.7 years. Mean disease duration was 16 ± 11.4 years. Lung disease was documented in 298 (3.2%) patients and the median interval between articular and pulmonary symptoms was 5 [IQR 1-15] years. The distribution of the different lung manifestations is represented in graphic 1. Twelve patients had more than one type of lung involvement. Smoking (OR = 2.1; [1.4-3.9]), positive anti-citrullinated peptide antibodies (ACPA) (OR = 2.1; [1.2-3.6]) and older age (OR = 1.05; [1.03-1.07]) were positively associated with lung disease, whereas previous treatment with methotrexate (MTX) (OR = 0.32; [0.22-0.46]) and tumour necrosis factor inhibitors (TNFi) (OR = 0.48; [0.32-0.7]) had a negative association with RA-lung disease. From the 6,313 patients receiving MTX, only 1 developed acute pneumonitis. Although it is not possible to identify a causal relationship, ILD diagnosis seems to have had an impact on the distribution of prescribed biologics. In RA-ILD patients, TNFi were the most prescribed biologics before ILD diagnosis (27 patients; 15.9%), followed by tocilizumab (TCZ; 6 patients; 3.5%) and rituximab (RTX; 3 patients; 1.8%). After ILD diagnosis, RTX became the most prescribed biologic, in 62 (34.1%) patients, followed by TCZ (15 patients; 8.2%) and abatacept (ABA; 7 patients; 3.8%). Antifibrotics were used in 12 patients with RA-ILD (6 nintedanib, 6 pirfenidone).
Conclusions: The percentage of RA patients with lung involvement in our sample was lower than that reported in literature. Apart from missing data related to the retrospective nature of the study, this can also be explained by the fact that most patients are diagnosed only after becoming symptomatic, leading to disease underreporting. ILD was the most prevalent manifestation. Smoking, positive ACPA and older age were positively associated with the presence of lung disease, whereas previous treatment with MTX and TNFi seem to be protective. After ILD diagnosis, there was an increase in RTX and ABA prescription in RA-ILD patients, which might be related to the encouraging results that these drugs have showed in RA-ILD treatment. Despite the small number of patients treated with antifibrotics, these drugs start to be considered an alternative/adjunct option for RA-ILD treatment.

Keywords: *Rheumatoid arthritis. Interstitial lung disease. Airways disease. Bronchiectasis. Lung nodules. Pleural serositis. Methotrexate. Antifibrotics.*

CO 042. THE IMPORTANCE OF EARLY RECOMPRESSION IN DECOMPRESSION ILLNESS

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Introduction: Decompression illness is caused by the formation of nitrogen bubbles in tissues or blood vessels after pressure is reduced. This pathology may occur in divers during ascent to the surface, in aviation by rapid ascent in altitude while in unpressurized aircraft or even in the event of cabin depressurization. Symptoms appear in the first few hours and are dependent on bubble location. The most common involvement includes osteoarticular and neurological, however these bubbles can reach the arterial circulation (arterial gas embolism) and cause potentially fatal ischemic injuries. Treatment includes recompression with hyperbaric oxygen in order to reduce the volume of the bubbles and allow their dissolution back into the tissues and blood.

Objectives: Review cases of decompression illness undergoing recompression therapy in a hyperbaric chamber in the last 10 years. As well as to evaluate predictors of symptom resolution after the first treatment of recompression in patients undergoing diagnosed decompression illness.
Methods: We evaluated a retrospective cohort of patients with decompression illness diagnosis who underwent recompression treatment in a hyperbaric medicine center between January 2011 and January 2022. We performed a sequential analysis and inferential statistic considering two groups (partial resolution of symptoms *vs.* total resolution of symptoms after completion of a recompression treatment in a hyperbaric chamber).
Results: A total of 46 patients were included, median age was 39,0 [17-62] years and 39 (84,8%) were male. Causes of decompression illness include recreational diving accidents (20, 43.5%), professional diving (22, 47.8%), hyperbaric chamber (2, 4.3%), spearfishing (1, 2.2%) and aviation (1, 2.2%). The group that showed partial resolution of symptoms after completion of a recompression treatment in a hyperbaric chamber included 18 (39.1%) individuals. There are no statistically significant differences between the group with partial resolution and the group with total resolution of symptoms in age, sex, previous decompression illness, presence of known patent foramen ovale, repetitive dive, history of flight in 24h post-dive, omitted decompression, maximum dive depth, total dive time, time to onset of symptoms, presence of gas embolism or recompression table used. The group with partial resolution of symptoms has a higher prevalence of type 2 decompression illness (77.8 *vs.* 32.1%, p-value 0.003), with neurological involvement (66.7 *vs.* 28.6%, p. -value 0.01). On the other hand, the group with partial resolution of symptoms has a higher prevalence of delayed recompression, more than 24 hours after reaching the surface (77.8 *vs.* 42.9%, p-value 0.02).
Conclusions: Complete resolution of symptoms in patients with decompression illness after hyperbaric oxygen therapy is associated with early recompression. Thus, the importance of early diagnosis and timely referral is highlighted, with the need to create referral channels for specialized centers with pre-hospital involvement.

Keywords: *Decompression illness. Hyperbaric oxygen therapy. Gas embolism.*

CO 043. INFLUENZA VACCINATION AT ULS GUARDA: ADHERENCE OF HEALTH PROFESSIONALS IN THE PRE-COVID AND POST-COVID ERA

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Introduction: Influenza is an infection caused by the influenza virus, mainly affecting the respiratory tract. Annual vaccination is the most effective strategy to prevent infection and its complications, and is recommended by the WHO for specific groups. In Portugal, health professionals are one of the populations considered a priority group for vaccination, with the following national coverage, per season: 52.0% in 2018/2019; 58.9% in 2019/2020; 62.9% in 2020/2021; and 64.2% in 2021/2022. The COVID-19 pandemic has forced the adoption of unprecedented measures around the world to mitigate the spread of the SARS-CoV-2 virus. The impact of the pandemic on vaccination programs has been studied. With this work, we intend to evaluate the effect of the pandemic on health professionals' adherence to influenza vaccination.
Objectives: Compare flu vaccination coverage in health professionals, in the pre-COVID-19 and post-COVID-19 seasons, at the Local Health Unit of Guarda.
Methods: Data on the vaccination of health professionals were collected through the registration platform of the Occupational Health Service and the Local Vaccination Coordinating Group of Local Health Unit of Guarda. Vaccination periods from October 1 to March 20, from the 2018/2019 - 2019/2020 (Pre COVID-19) and 2020/2021 - 2021/2022 (Post COVID-19) seasons were analyzed.
Results: In the 2018/2019 season (1,553 eligible professionals) and in the 2019/2020 season (1,489 eligible professionals) vaccination coverages of 35.7% and 36.9%, respectively, were achieved. Only one Primary Health Care Unit (PHCU) reached 100% vaccination coverage in all professional groups, in both seasons. In the 2020/2021 season (2,277 eligible professionals) and in the 2021/2022 season (2,505 eligible professionals) there were vaccination coverages of 40.9% and 38.4%, respectively. For all seasons, except for 2021/2022, we observed that: the professional group with the highest adherence to vaccination was the professional group Physicians, with a decrease over the four periods analyzed (from 52.8% in 2018/2019 to 42.0% in 2021/2022); and PHCUs shows greater adherence to vaccination than Hospital Units. The professional group Nurses had the lowest vaccination coverage in all analyzed periods.
Conclusions: The vaccination coverage of Local Health Unit of Guarda professionals was lower than the national one in all analyzed periods. Despite the increase in vaccination coverage among health professionals at Local Health Unit of Guarda from the pre-COVID-19 to the post-COVID-19 period, it was found that professional groups and services that previously had high vaccination coverage decreased their adherence to vaccination. Thus, it is necessary to investigate the reasons for these changes, and to consider the implementation of strategies that encourage vaccination adherence among professionals, of high importance for their own health and for the quality of the provided care.

Keywords: *Vaccination. Flu. Influenza. Healthcare workers. COVID-19.*

CO 044. CT-GUIDED TRANSTHORACIC BIOPSY: DIAGNOSTIC YIELD AND COMPLICATIONS OF HOSPITAL DE SANTA MARIA, CENTRO HOSPITALAR UNIVERSITÁRIO LISBOA NORTE

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Introduction: Computed tomography (CT)-guided transthoracic needle biopsy (TTNB) is a minimally invasive procedure that allows the diagnosis of lung, pleural, mediastinal or chest wall lesions. It is considered the technique of choice in the diagnosis of peripheral thoracic lesions due to its high diagnostic yield (64-97%) and low complications' rate.
Objectives: Retrospective analysis of a University Hospital Center of consecutive TTNB, lesion characteristics, diagnostic yield and complications.
Methods: Retrospective observational study of patients undergoing TTNB at the Radiology Department of CHULN between November 2019 and June 2022. Data were collected from consultation of clinical records and statistical analysis was performed with SPSS® software.
Results: 207 BATT were performed in 196 patients, 126 (60.9%) were male and mean age was 65.7 ± 13 years. The distribution of lesions submitted to biopsy included 80.7% pulmonary, 9.2% mediastinal, 8.7% pleural and 1.4% bone. Most of the lesions biopsied were solid (78.8%) or subsolid (9.7%) pulmonary nodules. The median of the largest diameter of the lesions was 30 mm (Q1 = 20 mm and Q3 = 59 mm). Most lung lesions had pleural contact (57.2%). Biopsies were performed using the coaxial technique (19G introducer), with 97.1% of core biopsies (20G), 10.6% of aspiration cytology (22G) and 8.2% of cytology and core biopsies. The diameter of the parenchyma crossed by the needle was 56.2 ± 23.7 mm and 3.4 ± 1 samples were taken per procedure. The diagnostic yield was 87.9% in all procedures and, with repeated TTNB in 10 patients, the total diagnostic yield was 91.9% per patient.
The most common diagnoses were primary neoplastic lesions 61.8%, metastases 13.5%, lymphoproliferative diseases 3.4%, interstitial

lung diseases 1.9%, tuberculosis 3.9% and nonspecific findings 5.3%. Diagnostic yield was associated with larger lesion size (p < 0.001), larger solid component (p < 0.001), larger number of punctures (p = 0.027) and the use of core biopsy (p = 0.023). Complications occurred in 20.3% of procedures: pneumothorax in 11.6% (0.5% of chest drainage treated as an outpatient), alveolar hemorrhage 6.8% and hemoptysis 2.9%. All procedures were performed in an outpatient setting. There was one death from an unidentified cause at autopsy. Complications were associated with smaller lesion size (p < 0.001), smaller solid component (p < 0.001) and greater number of punctures (p = 0.016).
Conclusions: TTBN is a safe technique with high diagnostic yield. The diagnostic accuracy is related to the size of the lesions, in particular to their solid component, the number of punctures performed and the use of the core biopsy technique. Smaller injuries are associated with a higher rate of complications.

Keywords: *CT-guided transthoracic biopsy. Diagnostic yield. Interventional radiology.*

CO 045. SURVIVAL OF PATIENTS WITH LUNG CANCER, OPERATED BY ROBOTIC SURGERY IN THE LAST 6 YEARS

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Introduction: Thoracic surgery has evolved in recent decades with the adoption of increasingly less invasive surgical techniques. Robotic thoracic surgery (RATS) is the most recent. As such, the results of the safety of the technique and patient survival are not yet robust and it is important to evaluate them.
Objectives: The main objective of this study is to evaluate the overall survival of patients operated for lung cancer in the last 6 years by robotic surgery, selected from a universe of 127 surgeries performed by this technique for various pathologies.
Methods and results: We performed a retrospective analysis of the files of the 127 RATS performed between 2016 and 2022. Statistical analysis was performed using STATA® 16 software. We identified 88 anatomical resection surgeries for lung cancer in 87 patients; 58.6% (n = 51) male, with a mean age of 66.1 ± 7.5 years [40-85]. Among the surgeries performed 42% (n = 37) were anatomical segmentectomies and the remaining 58% (n = 51) were lobectomies. There was only one conversion to thoracotomy, for technical reasons. Patients stayed on average 4.2 ± 2 days with the chest tube and the average length of stay was 5.7 ± 3 days. The most frequent histology was Adenocarcinoma of the lung, 80.6%, (n = 71) and the surgeries were performed in various stages, but most were Stage I 76% (IA - 59%; IB - 17%). The average lesion size was 16.4 ± 10 mm. In the evaluation of overall survival, 83 patients in our population are alive, with a survival rate at 1 year - 96.32%; CI 95% [89-99] and at 5 years - 93.31%; CI [85-97].
Conclusions: These data underline that robotic surgery for performing lobectomy or anatomical segmentectomy for the treatment of lung cancer is a safe and feasible technique, with very favourable survival, especially in the early stages.

Keywords: *Thoracic surgery. Rats. Lung cancer. Survival.*

CO 046. HOSPITALIZATION OF PATIENTS WITH GROUP 3 PULMONARY HYPERTENSION IN AN INTERMEDIATE CARE UNIT

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Introduction: Pulmonary hypertension (PH) is as a frequent complication of severe and advanced chronic respiratory disease (CRD). It is associated with poor prognosis and may be a referral criterion for lung transplant (LT).
Objectives: To characterize the population of patients under 65 years of age with PH of group 3 of the World Health Organization clinical classification admitted to an Intermediate Care Unit over 5 years.
Methods: Systematic review of hospital discharge notes and the computerized clinical file.
Results: 17 patients, 9 men. Median age 59 years (IQR 46-62). Average length of stay 22 days (IQR 17-24). In the previous year, at least 11 patients had visits to the emergency department for respiratory complaints, as well as hospitalizations in the past year: 9 patients were admitted one (n = 5); two (n = 3) and four times (n = 1). The underlying disease was chronic obstructive pulmonary disease in 47% of cases, with very severe (n = 5), severe (n = 1), moderately severe (n = 1) and moderate (n = 1) obstruction. 53% of patients had diffuse lung parenchymal disease: bronchiolitis obliterans (n = 2), systemic sclerosis (n = 2), interstitial lymphocytic pneumonia (n = 1), desquamative interstitial pneumonia (n = 1), rheumatoid arthritis (n = 1) and idiopathic pulmonary fibrosis (n = 1). One patient presented sequelae of pulmonary tuberculosis. Twelve patients were followed in a day care hospital, the majority under long-term oxygen therapy (n = 14) and non-invasive ventilation (NIV) (n = 8). PH diagnosis was confirmed by right heart catheterization (RHC) in 9 cases. The rest had high probability echocardiograms. 53% presented severe or non-measurable (n = 1) decrease in DLCO. Three patients were on dual (n = 2) or triple (n = 1) specific vasodilator therapy (SVT). In one of the cases, SVT was started during hospitalization. Most patients under SVT (75%) presented DLCO < 30%. The reason for hospitalization was exacerbation of the underlying disease in 65% of cases (8 associated with infectious cause) or decompensated right heart failure (n = 6). NIV was newly instituted in 3 patients as well as high-flow oxygen therapy in other 3 patients. One-year mortality was 41% (3 inpatients and 4 in a 1-year period). LT was not performed due to: death (n = 4), smoking habits (n = 3), low adherence to therapy (n = 3), obesity (n = 2), previous graft *versus* host disease (n = 2), high surgical risk (n = 2), cancer under investigation (n = 1).
Conclusions: Hospitalizations in context of group 3 PH are frequent, prolonged and associated mortality is high, as it is corroborated in this analysis. Most patients underwent RHC, which has been facilitated by the existence of a referral center for PH in the institution. As expected, patients under SVT were scarce and had severe PH with severely decrease or non-mensurable DLCO, a vascular phenotype marker. In face of CRD progression despite therapeutic optimization, LT is the last resource. Despite the age range, no patient was transplanted. Reasons for it included circumstances potentially reversible such as smoking and obesity, therefore actions in this direction could be improved. Furthermore, early diagnosis of HTP in CRD may also contribute to the timely referral of these patients to LT centers.

Keywords: *Group 3 pulmonary hypertension. Hospitalizations. Lung transplantation.*

CO 047. HYBRID OPERATING ROOM INTRAOPERATIVE CT-GUIDED LOCALIZATION OF PULMONARY NODULES: COIMBRA THORACIC GROUP EXPERIENCE

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Introduction: Small pulmonary nodules (< 1 cm in size) and ground glass opacities (GGOs) requiring histological characterization have dramatically increased. Although the characterization of some of these nodules can be made using computed tomography (CT)-guided percutaneous biopsy, excisional biopsy using thoracoscopy is frequently required. A hybrid operating room (HOR) is a high-tech-

nology space, which integrates CT scan in the operation room. It is capable of providing real-time imaging, facilitating simultaneous intraoperative percutaneous metallic marker placement and resection procedure of non-palpable lung nodules in the same room with a one-stop concept, thus avoiding the potential complication associated with traditional workflow performed in radiology suite, including wire dislodgment, pneumothorax or hemothorax, and discomfort of the patient. We report our initial experience with simultaneous single-stage localization and removal of non-palpable undiagnosed pulmonary nodules.
Methods: Retrospective analyses of all patients who underwent image-guided surgery workflow for intraoperative marker-guide lung resection in our institution's HOR, from September 2019 to August 2022. Data collected included demographics, imagological features, surgical aspects, pathology and outcomes. All patients were intubated with a double-lumen tube and placed in lateral decubitus under general anesthesia. CT scan was performed for nodule localization and targeting with metallic marker in cooperation with a radiologist. Immediate lung resection was then performed by our team.
Results: A total of 10 patients (3 males and 7 females) underwent 11 image-guided lung resections. The lesion size ranged from 4-39 mm (mean: 15 mm); 4 lesions were GGOs, 2 subsolid, 4 small pulmonary nodules (< 1 cm) and 1 deep pulmonary nodule. Lesion localization was performed with coil in the first 3 cases (2 of them with additional water blue dye solution) and the remaining with hookwire. Seven lung resections were performed by video-assisted thoracoscopic surgery (VATS), 2 required conversion to thoracotomy and 2 thoracotomies were initially performed for technical reasons. In 3 patients with intraoperative diagnosis of lung cancer, a lobectomy was performed (3 VATS). A total of 4 lobectomies and 7 wedge resections was achieved. Results of pathological examination revealed 6 primary lung cancers, 3 osteosarcoma lung metastases and 2 with no evidence of malignant cells. Median postoperative length of stay was 5 days (range: 2-11 days). The 3 patients with coil placement show retained metallic material in postoperative imaging studies with no evidence of lung nodules recurrence at 6-month follow-up CT scan. No major complications were observed.
Conclusions: Hybrid theatre offers a safe and effective tool centralizing simultaneous location and resection of non-palpable nodules enhancing diagnostic yield with low procedural complications. To our knowledge we are the first Portuguese Thoracic group that has introduced this innovative surgical approach into their clinical practice. Efforts have been tailored to increase intraoperative marker-guide VATS procedures in our institution, due to its potential for significantly shortening the time from diagnosis to curative treatment of non-palpable nodules.

Keywords: *Hybrid operating room. Intraoperative computed-tomography-guided location. Lung nodules.*

CO 048. SURGERY IN BENIGN TRACHEAL DISEASE – WHEN DOES A SURGEON TAKE ACTION?

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Introduction: Tracheal benign disease is a clinical area frequently associated with controversy regarding approach and therapeutic choices. Usually, these patients are first referred and observed by intervention pulmonology and otorhinolaryngology after initial diagnosis. Bronchoscopy and its associated techniques are the gold standard in diagnosis and lesion characterization, and in most cases the first therapeutic intervention to address acutely symptomatic patients with tracheal stenosis. In the case of tracheoesophageal fistula it's extremely useful in defining the exact location and extension of the fistula to help design the therapeutic strategy. In both situations there might be a place for surgical intervention with a curative intent and excellent clinical outcome, in selected patients. We hereby present two clinical examples of benign tracheal disease – post-intubation tracheal stenosis and tracheoesophageal fistula – treated in a multidisciplinary setting at our centre, including Thoracic Surgery, that clearly illustrate the need for discussion in complex cases.
Case reports: Case 1: M, 52 yo, diagnosed with grade III post-intubation tracheal stenosis. Referred to our centre after 2 dilatation procedures and placement of tracheal prosthesis. After prosthesis removal we identified a 2 cm long concentric stenosis, 2cm below the vocal chords. The patient was submitted to segmental tracheal resection with primary anastomosis by cervicotomy, and was discharged with no signs of obstruction. Case 2: M, 55 yo, presenting with dysphagia for 1 month. Endoscopy showed a tracheoesophageal fistula of the cervical oesophagus caused by a swallowed dental prosthesis. The foreign body was moved to the stomach and an oesophageal metallic prosthesis was placed. The patient was then referred to thoracic surgery, the oesophageal prosthesis removed and proposed to surgical treatment. The patient was submitted to fistula repair with primary oesophagus closure, partial tracheal resection with primary anastomosis and muscle interposition by cervicotomy. Gastrotomy by laparotomy was performed to retrieve the foreign body. The patient was discharged with no symptoms and feeding orally. In both cases, 1 month post-surgery bronchoscopy evaluation showed good scar evolution with no upper airway stenosis. Team evaluation and timely referral of these patients was key to offer a surgical treatment with excellent results, recovery of upper airway patency and quality of life improvement.
Discussion: Considering the complexity of these cases, an effort should be made to evaluate each situation in a multidisciplinary setting, including upper airway surgeons. Early observation by such a team enhances the ability to offer patients the treatment with best clinical outcomes. Quality of life and return to previous condition should be a primary goal.

Keywords: *Trachea. Tracheal stenosis. Tracheoesophageal fistula. Tracheal surgery.*

CO 049. PET-CT SUVMAX AND ENDOBRONCHIAL ULTRASOUND FEATURES FOR PREDICTION OF MALIGNANCY

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Introduction: Lung cancer is the leading cause of cancer-related deaths worldwide, accounting for 1.8 million deaths in 2020. Non-small cell lung cancer (NSCLC) is currently associated with a 5-year survival rate of 26%, while that of advanced NSCLC ranges from only 2.8% to 14.6%. Accurate clinical staging of the mediastinum is therefore critical in determining the appropriate treatment and initiating it as early as possible. Being knowledgeable of the imagiological features of nodes on CT and its SUVs on PET, the next step is often EBUS-TBNA for puncturing suspicious mediastinal adenopathies.
Objectives: Analyze EBUS-TBNA performed for diagnosis and/or staging purposes and determine predictors of malignancy in endobronchial ultrasound features and PET SUVmax levels.
Methods: Prospective analysis of all adults submitted to EBUS-TBNA at a tertiary hospital in Portugal, from April 2021 to May 2022. Exclusion criteria were referral from an outside hospital or refusal to give informed consent. For statistical analysis, patients were assigned to 3 groups: suspected malignancy (diagnosis and/or staging), staging of diagnosed malignancy or suspected benign disease.
Results: A total of 132 EBUS (71% male, mean 62 years old) were analyzed. Most patients were current/former smokers (65.9%).

Among those with suspected benign disease, no lymph node puncture resulted in a diagnosis of malignancy (including lymphoproliferative disorders). Regarding patients who underwent EBUS for staging purposes only, SUVmax and lymph nodes' short axis size were independent factors associated with malignancy, as evidenced by multivariate analysis (p < 0,001 and p = 0,001, respectively). SUVmax revealed an AUC of 0.881 (vs 0.706 for node size), with no adenopathy being malignant if SUVmax < 2.85 (sensitivity 100%, specificity 55.7%) or short axis < 4.3 mm (sensitivity 100%, specificity 4.1%). Evidence of vascularization on EBUS was also more common in those with malignancy (32.0 *vs.* 17.4%; p = 0.066), as was the occurrence of indistinct borders (36.0 *vs.* 27.3%; p = 0.380) and the absence of central hilar structure (0% *vs.* 7.4%; p = 0.159). Furthermore, knowing that the adenopathy is vascularized, the AUC of SUVmax is of 0.927. Regarding lymph node status, there was higher rate of malignancy in N1 nodes (21.9%), than in N2 (19.7%) or N3 (9.3%) nodes, although not statistically significant (p = 0.259). Regarding patients with suspected malignancy who underwent EBUS for diagnosis and/or staging purposes, SUVmax and short axis' size were also independent factors for malignancy (p < 0,001 and p = 0,047, respectively). SUVmax revealed an AUC of 0.838 (*vs.* 0.772 for node size), with no adenopathy being malignant if SUVmax < 1.85 (sensitivity 100%, specificity 14.3%) or short axis < 4.2 mm (sensitivity 100%, specificity 6.7%).
Conclusions: SUVmax on PET-CT and node size on EBUS, besides being the most objectively assessed characteristics, were also the best predictors of malignancy both for patients with suspected malignancy and those with malignancy who performed staging EBUS. This study reinforces the importance of performing a timely EBUS-TBNA for staging suspicious lymph nodes on PET-CT in order to minimize under/overestimation of regional node status of patients with lung cancer.

Keywords: *EBUS-TBNA. Bronchoscopy. PET-CT. Suvmax. Lung cancer.*

CO 050. ROLE OF FLOW CYTOMETRY IN THE DIAGNOSIS OF NEOPLASMS BY EBUS-TBNA

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Introduction: Performing EBUS-TBNA allows the diagnostic clarification of mediastinal adenopathies. The diagnostic sensitivity by EBUS-TBNA for mediastinal lymphomas is described between 48-98%. The diagnostic importance of flow cytometry (FC) in the diagnosis and subclassification of non-Hodgkin lymphomas is known. However, the role of FC in the diagnosis of solid neoplasms is not well established and is currently an adjuvant technique to the results obtained by pathology.
Objectives: Determine the diagnostic profitability of flow cytometry for neoplasms in patients undergoing EBUS-TBNA.
Methods: Retrospective analysis of 120 samples (120 patients) of EBUS-TBNA sent for flow cytometry between June 2018 and June 2022 at a tertiary care hospital. TBNA samples were sent for flow cytometry if hematologic neoplasia and/or mediastinal adenopathies of unknown etiology were suspected. The result obtained by flow cytometry was compared with the final established diagnosis.
Results: Of the 120 patients analyzed, 6 non-Hodgkin lymphomas were diagnosed: 2 Diffuse Large B-cell Lymphomas not otherwise specified (NOS), 1 Primary Mediastinal Large B-cell Lymphoma, 1 Follicular Lymphoma, 1 Nodal Marginal Zone lymphoma, and 1 BALT. We obtained diagnoses, by flow cytometry, of 5 of the 6 neoplasms described, with a diagnostic yield of 85%. Only BALT lymphoma was not identified by this method, however, this only has lymph node involvement at an advanced stage of the disease. A Hodgkin's Lymphoma was also diagnosed only by pathology. However, flow cytometry is not used to identify this disease. Regarding solid neoplasms, pathology identified 19 Non-Small Cell Lung Cancers (NSCLC), 6 Small Cell Lung Cancers (SCLC) and 4 metastases. Of these samples, two cases of SCLC and two cases of NSCLC were excluded from the FC analysis because they did not meet the conditions for analysis (lack of cells, contamination with peripheral blood). From the remaining samples, 3 out of 4 (75%) and 3 out of 17 (17%) SCLC and NSCLC cases were detected, respectively. None of the patients with metastasis was identified. Patients with primary lung cancer had significantly higher T-lymphocyte counts than the others (p = 0.007), with correspondingly lower B-lymphocyte counts (p = 0.002). A ROC analysis was performed for the CD3/CD19 ratio in these patients, which showed an AUC of 0.725, making it acceptable to use this ratio as a measure of suspicion for lung neoplasia.
Conclusions: In our sample, the flow cytometry diagnostic yield in the diagnosis of non-Hodgkin's lymphoma was 85%, as already described in the literature. In solid neoplasms, the CD3/CD19 ratio may be a good predictor of the presence of lung neoplasms, which will be better characterized in the future. Careful selection of cases to be sent for flow cytometry and close contact with the laboratory are imperative to optimize the profitability of this technique.

Keywords: *EBUS-TBNA. Flow cytometry. Adenopathy. Lymphoma.*

CO 051. LENT SCORE FOR VALUATION OF MORTALITY FROM MALIGNANT PLEURAL EFFUSION

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Introduction: LENT score assesses the survival of patients with malignant pleural effusion (MPE) through four variables: pleural fluid (PF) LDH, ECOG, neutrophil-lymphocyte ratio (NLR) and tumor type. It stratifies patients into 3 levels: low risk of mortality (median survival: 319 days), moderate (median survival: 130 days) and high (median survival: 44 days). The aim of this study was to compare the expected survival by the LENT score of patients with MPE when evaluated by the Interventional Pulmonology Unit (IPU) for pleurodesis and the real survival.
Methods: Retrospective analysis of MPE evaluated at the IPU of a secondary hospital and submitted to pleurodesis, between 2012 and 2021. The demographic and clinical variables analyzed were age, gender, ECOG, etiology, PF LDH and NLR, LENT score and survival were calculated. Survival was estimate since the time from thoracentesis performed prior to pleurodesis to date of death. Patients were classified by LENT score risk groups as low, moderate or high. Quantitative variables with normal distribution are expressed as mean and standard deviation and the others as median and quartiles (P25-P75). The median survival of each group was compared with that predicted using the Wilcoxon test for one sample. Data were analyzed using IBM SPSS Statistics® version 23.0.
Results: A total of 102 patients were enrolled, 2 were excluded due to impossibility of calculating LENT score. 44% were male, ages ranged between 43 and 94 years, with a mean of 71.7 ± 11.8 years. 52% of MPE were caused by lung cancer, 10.8% breast cancer, 7.9% gastric cancer, 5.9% colorectal cancer and 3.9% ovarian cancer. 4% had a score 0-1 (low risk) and the median survival was 124 days (105-124), and the sample was too small to apply the test. 74% had a score 2-4 (moderate risk), the median survival was 95 days (28-230, p-value 0.895). 22% had a score 5-7 (high risk), survival was 34.5 days (16-73.5; p-value 0.958).
Conclusions: In our sample, the survival of moderate and high risk patients was lower, with no statistically significant difference, than predicted by LENT; which can be justified by not having considered survival since the diagnosis of MPE, but since the evaluation by the UPI to perform pleurodesis. It also has the limitation of including

only MPE submitted to pleurodesis, therefore greater in volume, relapsed and/or symptomatic with an impact on quality of life. Even so, and even though the patients in each group are heterogeneous and the stratification does not consider age and molecular characteristics of the tumor (such as the presence of mutations with targeted therapy), LENT is particularly useful in identification of patients with a poor vital prognosis in short time, in which invasive interventions such as placement of chest drainage and hospitalization may not provide clinical benefit given the short survival. Thus, in these patients, other palliative strategies can be considered, namely placement of a chronic drain on an outpatient basis, repeat thoracentesis or pharmacological palliation of dyspnea.

Keywords: *Malignant pleural effusion. Pleurodesis. Lent.*

CO 052. RADIAL EBUS AND CONE BEAM CT – EXPERIENCE IN THE DIAGNOSIS OF PERIPHERAL LUNG LESIONS

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Introduction: The diagnostic yield of bronchoscopy for peripheral lung lesions is generally low and highly variable between published series, even when associated with the use of fluoroscopy. The endobronchial ultrasound with a radial probe (radial EBUS) has improved the diagnostic yield of conventional bronchoscopy for peripheral lesions, with values reported in the literature between 60-70%. Cone-beam computed tomography (Cone Beam CT) is an additional tool that can be added, with a relevant impact on the final diagnostic capacity.
Objectives: To analysis the diagnostic yield of bronchoscopy for peripheral lung lesions, using radial EBUS, Cone Beam CT and fluoroscopy. As a secondary aim, to evaluate the variables (imagiological and endoscopic) that were associated with greater diagnostic yield.
Methods: Retrospective analysis of the bronchoscopies performed at the Clinical Center of the Champalimaud Foundation, using radial EBUS, Cone Beam CT and fluoroscopy, for the diagnosis of peripheral lung lesions, during the period 2017-2021; clinical, imagiological and endoscopic data were collected. After defining the diagnostic yield for this period, data from the years 2017-2018 were excluded, considering an initial learning curve with impact on the results. Statistical analysis was done using the IBM® SPSS® Statistics program (descriptive statistics, t test and Fisher's exact test); statistical significance was assumed for p-value < 0.01.
Results: During the period 2017-2021, 423 exams were performed with the following distribution number of exams/diagnostic yield: 2017 - 31/38.7%; 2018 - 55/67.3%; 2019 - 145/75.9%; 2020 - 95/80%; 2021 - 97/80.4%. The mean age of the patients was 68.2 years (± 10) and 52.2% were male. The complication rate was less than 0.5%. Considering the period 2019-2021: 337 exams were performed, with an overall diagnostic yield of 78.3% (76.5% with malignant neoplastic etiology). In 42.5% of the procedures without diagnosis, a bronchial path to the lesion was not identified. The pulmonary lesions had the following dimensions: < 20 mm - 33.5%, 20-29 mm - 24.3%, 30-49 mm - 29.4%, ≥ 50 mm- 12.8%; regarding the pattern of the lesions: in 75.7% it was solid, 11.3% subsolid, 6.2% consolidation, 4.5% solid with cavitation and 2.4% ground glass; most of the lesions were located in the upper lobes: 32% in the right upper lobe and 28.5% in the left upper lobe; the mean distance from the lesions to the pleura was 19 mm (± 16.5). The type of radial EBUS sign was concentric in 48.7% of cases, eccentric in 39.2% and no identifying a lesion in 12.2%. Statistical analysis showed a significant relationship between greater diagnostic yield and the increasing size of the lesions, as well as with the type of radial EBUS sign that was obtained (concentric compared to the others); the relationship between diagnostic yield and the pattern of the lesion, its location and its distance to the pleura, was not statistically significant.
Conclusions: The presented results show that the combined use of radial EBUS and Cone Beam CT with bronchoscopy, allows achieving a great diagnostic yield for the diagnosis of peripheral lung lesions, with a good safety profile.

Keywords: *Bronchoscopy. Radial EBUS. Cone Beam CT. Diagnostic yield.*

CO 053. BENIGN TRACHEAL AND BRONCHIAL STENOSIS – A REVIEW OF 8 YEARS

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Introduction: Benign tracheal stenosis following endotracheal intubation or tracheostomy is frequent. Other causes of benign tracheobronchial stenosis are rare, such as tuberculosis or sarcoidosis. Bronchoscopy is the diagnostic method of choice and may have also therapeutic purposes.
Methods: Retrospective study of patients with tracheal (group A) or bronchial (group B) stenosis who underwent rigid bronchoscopy (RB) between 01/01/2013 and 06/30/2022. Characterization of the stenosis as to its location, cause, type (simple or complex), and severity. In group A, stenosis severity was stratified according to Myer *et al.*'s classification: I (≤ 50%), II (51-70%), III (> 70%), and IV (complete obstruction). Demographic data, accessory techniques performed, placement or removal of stents, and complications were analyzed.
Results: The study included 42 patients: 40 in group A and 2 in group B. The median age at diagnosis was 66 years, most of them being female (62%, n = 25). Annually, on average, 4 RB were performed. Most RB were made between 2013-2018 (54%, n = 23), it is noteworthy that since the beginning of the COVID-19 pandemic, only 16 endoscopic exams were accomplished, 10 of which were after tracheal intubation due to pneumonia to SARS-CoV-2. In group A, stenosis was caused after tracheal intubation (90%, n = 36), associated with tracheostomy (8%, n = 3) and by granuloma in the context of tuberculosis (3%, n = 1), more frequently in the upper third of the trachea (48%). Most had complex stenosis (55%, n = 22), and the degree of stenosis was classified as: I – 58% (n = 23), II – 8% (n = 3), and III – 35% (n = 14). The mean number of accessory endoscopic techniques was 2/patient, the most frequent being mechanical dilation (MD – 90%, n = 36); in 6 patients no therapy was performed as the degree of stenosis was insignificant. Laser photocoagulation was executed in 17 patients (43%) and application of topical dexamethasone in other 16 patients (40%). An average of 2 RB, 2.1 MD, and 1 laser photocoagulation were required for stenosis clearance. A prosthesis was placed in 33 patients (83%), and 57% (n = 19) had complex stenosis. In 42% (n = 14) of the patients, the stent was placed in the first RB, and the remaining (58%, n = 19) after the previous MD. The prosthesis was removed in 12 patients. Of these, 3 had restenosis and 2 were referred for surgery. The 2 patients of group B presented: one with bronchial leiomyoma that occupied 50% of the left main bronchus and another with endobronchial granuloma due to tuberculosis that occupied 70% of the lumen of the right main bronchus. They were removed by laser photocoagulation and cryotherapy, with good results.
Conclusions: Benign tracheal stenosis was much more frequent than bronchial stenosis, the leading cause being endotracheal intubation. Mild severity was the most frequently observed with MD since it was the most used accessory technique. Interventional bronchoscopy was effective in the treatment of most benign tracheal or bronchial strictures. In most complex strictures, stent placement was necessary.

Keywords: *Benign tracheal stenosis. Benign bronchial stenosis. Endotracheal intubation. Rigid bronchoscopy. Stent.*

CO 054. THORACOSCOPY IN THE DIAGNOSIS OF INTERSTITIAL LUNG DISEASE DIAGNOSIS

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Introduction: Interstitial lung diseases (ILDs) are a heterogeneous group of diffuse parenchymal lung disorders of known or unknown cause, with varying degrees of inflammation or fibrosis, associated with substantial morbidity and mortality. Thoracoscopy allows selective biopsy of multiple lung segments, thereby increasing the diagnostic yield in interstitial lung disease.
Methods: A retrospective study was undertaken to evaluate the efficacy and safety of lung biopsies by medical thoracoscopy in the diagnosis of undefined interstitial lung disease (ILD), between 2015 and first 6 months of 2022.
Results: Twenty-three patients, 13 (56,5%) females and 10 (43,5%) males, underwent thoracoscopic lung biopsy to diagnose interstitial lung disease, who remained without a definitive diagnosis after multidisciplinary reunion and flexible bronchoscopy with bronchoalveolar lavage (BAL) and transbronchial lung biopsy (TBLB). The mean age was 63 years (36-78 yrs). Three-port video-assist thoracoscopic surgery (VATS) technique was performed, with rigid thoracoscope, and general anesthesia with selective intubation. Wedge biopsies with auto-suture (n = 22, 95,7%) or biopsies using electrocautery (n = 1, 4,3%) were performed. Biopsies were performed in 2 lung lobes in 12 cases (52.2%) and in only 1 lobe in 11 cases (47.8%), with no significant difference in the establishment of the histological diagnosis. The median length of chest tube duration was 4 days (range, 1 to 18 days). The pathologic diagnosis was usual interstitial pneumonitis in 9 patients. 5 patients had hypersensibility pneumonitis, 3 had nonspecific interstitial pneumonia, 1 had desquamative interstitial pneumonia and 1 had histology compatible with sarcoidosis. One patient had "smoking related changes". In three patients biopsy was inconclusive. In 12 cases the histology was compatible with the initial clinical hypothesis. Post-operative complications were reported in 6 (26,1%) patients, such prolonged air leaks, subcuneous emphysema, acute respiratory failure, and haemoptysis. No patients needed ICU admission and there was no short-term mortality (30 days postprocedure) in the study group.
Conclusions: This retrospective analysis showed that thoracoscopic lung biopsy by medical thoracoscopy was a powerful diagnostic tool for ILD patients who continued unclassified even after BAL and TBLB and multidisciplinary reunion, and it is safe with appropriate patient selection and well-trained pulmonologists. In 87% (n = 17) of the patients in this group was possible to determine the diagnosis, with 26,1% (n = 6) of complications and a 30-day mortality rate of 0%. It is important to emphasize that the indication for medical thoracoscopy in ILD has decreased since 2020, when cryobiopsy began to be performed at Hospital Fernando da Fonseca.

***Keywords**: Thoracoscopy. Interstitial lung disease.*

CO 055. COMPARISON OF DEFINITIVE PLEURAL INTERVENTIONS IN THE MANAGEMENT OF MALIGNANT PLEURAL EFFUSIONS

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Introduction: Management of recurrent malignant pleural effusions (MPE) non-responsive to systemic treatment is a challenge. Definitive pleural interventions such as pleurodesis are used in an attempt to reduce the morbidity associated with this prevalent complication.
Objectives: To compare different definitive pleural interventions in the management of recurrent MPE.
Methods: Retrospective study including patients diagnosed with MPE between 2012 and 2018 in a tertiary hospital. Three types of definitive pleural intervention were considered - Chest-tube drainage plus Pleurodesis (CP), Medical Thoracoscopy plus Pleurodesis (TP) and Indwelling Pleural Catheter (IPC) placement. T-student and Mann-Whitney tests were applied for continuous variables and the chi-square test was used to compare categorical variables. Survival was determined by Kaplan-Meier curves and compared by log-rank test. A multivariate analysis was performed using Cox proportional hazard model.
Results: We included 371 patients with MPE, of which 110 were submitted to a definitive pleural intervention (47 patients to CP, 43 patients to TP and 20 patients to IPC). More than half (52.7%) the patients were male, with a mean age of 63.05 ± 13.77 years. The majority (66.4%) proceeded with systemic treatment concomitant to the pleural procedure. Patients who underwent pleural intervention were submitted to more thoracentesis (3 *vs*. 2, $p < 0.001$) and to a higher fluid drainage per procedure (1500 *vs*. 1,400 mL, $p < 0.001$). Median overall survival was 95 days (95%CI, 73.8-116.2) and was significantly different between each definitive pleural intervention ($p = 0.015$): 133 days (95%CI, 115.7-150.3) for patients submitted to CP, 142 days (95%CI, 89.3-194.7) in the group that underwent IPC and 237 days (95%CI, 120.3-353.7) in cases managed with TP. After adjusting for confounders (age, sex, ECOG-PS and systemic treatment), the multivariate analysis did not identify definitive pleural interventions as an independent predictor of survival ($p = 0.053$). TP was associated with a lower cumulative hospital stay (OR: 0.24; 95%CI, 0.07-0.84; $p = 0.018$). The most frequent complication was pneumothorax (17.4%); there were no statistically significant differences in the rate of complications between the different procedures. Early relapse (≤ 30 days) of the effusion occurred in 45.8% and 55.6% of patients submitted to CP and TP, respectively. CP was associated with a more favorable radiologic response (OR: 6.18, 95%CI 1.88-20.38; $p = 0.003$), defined as persistence of opacity at the level of the hemidiaphragm of lower on chest x-ray. Patients in which the definitive intervention failed had a significantly longer time interval between the confirmation of MPE and the procedure itself (16 days [IQR: 33] in the successful group *vs*. 30 days [IQR:68] in the failure group; $p = 0.003$).
Conclusions: Despite having no relationship with prognosis, complete resolution of MPE was achieved in about half of patients submitted to a definitive pleural intervention, highlighting their potential as a palliative procedure for patients with recurrent non-responsive effusions. Earlier intervention was associated with better outcomes.

***Keywords**: Malignant pleural effusions. Pleurodesis. Chest-tube drainage. Thoracoscopy. Indwelling pleural catheter.*

CO 056. DIAGNOSTIC YIELD OF ULTRATHIN BRONCHOSCOPE *VERSUS* ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY IN PERIPHERAL LUNG NODULES

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Introduction: Peripheral lung nodule (PLN) diagnosis is becoming challenging in the last years. Molecular analysis is now mandatory when it comes to adenocarcinoma, which is the most frequent lung tumor, and therefore larger tissue samples are required. Bronchology has developed different techniques to meet these demands such as radial EBUS (rEBUS), ultrathin bronchoscopes (UTB) and

Electromagnetic Navigation Bronchoscopy (ENB). The aim of this study was to compare the diagnostic yield of UTB plus rEBUS with ENB plus rEBUS.
Methods: Retrospective analysis of patients' clinical files from January 2019 to February 2022. Diagnostic yield from ENB plus rEBUS and UTB plus rEBUS was compared. Categorical variables are presented as frequencies and percentages, and continuous variables as mean and standard deviation, or medians and interquartile ranges for variables with skewed distribution. All reported p-values are two tailored, with a p value of 0.05 indicating statistical significance. Normal distribution was checked using Shapiro-Wilk test or skewness and kurtosis. Continuous variables were compared using Student's t-test or Mann-Whitney test if normal distribution was not verified. Categorical variables were compared with Fisher's exact test or the Chi-square test, as appropriate. Statistical analysis was performed using IBM SPSS Statistics v26.
Results: 431 patients were identified, 365 and 66 from UTB and ENB group, respectively. Mean age was 66.5 ± 10.6 years old with no statistical differences between the two groups - UTB (X = 66,7 ± 10.6), ENB (X = 65.4 ± 10.2) (p = 0.341). 266 (61.7%) were males and the choice of the exam was independent of patients sex (χ^2 (1) = 3.433; p = 0.064). The majority of the nodules were located at the right upper lobe (RUL) (n = 176, 40.8%), but there were some differences between the choice of device according to location. More often UTB was chosen for RUL (42,9 *vs.* 29%) and right inferior lobe (21.4 *vs.* 18,2%), while ENB for the left upper lobe (27.3 *vs.* 17.9%) (p = 0.45). Both techniques were applied independently of pleura-to-lesion distance (χ^2 (1) = 1.006; p = 0.316) or nodule size (p = 0.518). Median nodule size was 22 (IQR 14) mm, the smallest lesion with only 7 mm. ENB demonstrated superior diagnostic yield compared with UTB (66.7 *vs.* 53.1% χ^2(1) = 0.356; p = 0.042). Bronchial secretions and brushing were applied indiscriminately in both groups, proximal bronchial biopsy (BB) and transbronchial needle aspiration (TBNA) were performed more with UTB (12.3 *vs.* 1.5%; p = 0.009 and 26.6% *vs.* 13.6%; p = 0.025, respectively) and transbronchial biopsy (TBB) with ENB (97 *vs.* 70.7%; p > 0.001). The most common diagnose was adenocarcinoma for both groups (25.5% UTB, 25.8% ENB).
Conclusions: The diagnostic yield of ENB was statistically significantly higher than UTB. That might be due to ENB superiority itself, but some confounding factor may have contributed – it was a retrospective study, the two samples had different sizes and our results in the UTB arm were slightly below the literature. This last confounder might be partially explained because our center receives patients that have previously had a bronchoscopy with no diagnostic results. Further studies are needed to elucidate and validate these results, preferably with a larger ENB arm.

Keywords: *Electromagnetic navigation bronchoscopy. Ultrathin bronchoscope. Radial EBUS. Diagnostic yield.*

CO 057. DIAGNOSTIC VALUE OF PLEURAL FLUID FLOW CYTOMETRY IN MALIGNANT PLEURAL EFFUSIONS

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Introduction: Analysis of pleural fluid by flow cytometry is rapid and informative. It is particularly useful for neoplasis with possible pleural involvement, and bares a diagnostic as well as staging potential.
Methods: A convenience sample of 31 patients with pleural effusion under aetiologic investigation was gathered in a central hospital over the course of one year. Every patient was submitted to thoracocenthesis and analysis of the pleural fluid as regards biochemistry, differential cell count, immune phenotyping by flow cytometry and cytopathology (with cell block for imunocytochemical analysis) The results from the flow cytometry that were suggestive of neoplasm were accompanied and compared with those from cytopathology.
Results: The patient's median age was of 69 years old and 13 of the patients were female. The majority of effusions (n = 29) were unilateral on presentation. On ultrasound, the same number was large, anechogenic and simple. The median of the time period from admission to thoracocenthesis was 3.5 days. This was merely diagnostic for only 2 patients. Macroscopically, 16 of the pleural effusions were serious (mostly clear) and 14 serosanguinolent. All effusions except 2 exhibit criteria for their classification as exudates. Likewise, all effusions had a predominance of mononuclear cells apart from one, which was attributed to a Meigs' syndrome. Flow cytometry revealed that the majority exhibited a positive CD4+/CD8+ ratio. In 10 subjects, the flow cytometry suggested a neoplastic effusion secondary to pleural involvement by immunoproliferative B cell neoplasm, whose cells were larger than normal and positive for immune markers specific of the given neoplasm. Interestingly, 8 of these patients did not obtain a cytopathological diagnosis suggestive of liquid neoplasm in the same pleural fluid sample. In 19 patients, the flow cytometry led to the suspicion of solid neoplasm by identification of non-hematopoietic lineage cells. These were present in either residual populations (< 1%) or, on the contrary, were the dominant cell population (> 50%). The majority was positive for EpCAM, cytokeratines, and CD200, whilst being negative for CD45. The lack of specificity of these markers did not allow to discern between likely primary tumours based on immune phenotyping alone. In these patients, cytopathology had additional diagnostic value in a minority of patients. In the patients in which a solid neoplasm was eventually diagnosed, the most common primary tumours were the lung adenocarcinoma followed by the cholangiocarcinoma. Lastly, the cytopathological diagnosis of the neoplasms was obtained after a median of 11.5 days following admission (7 days following thoracocenthesis), but was suggested by flow cytometry after 24 h work hours.
Conclusions: In neoplastic pleural effusions, flow cytometry allowed for the diagnosis of lymphoproliferative neoplasms with a high sensitivity. In solid neoplasms, it was useful as a red flag through the identification of clonal cells, including for the patients in which the cytopathology was negative for the same sample.

Keywords: *Diagnosis. Immune phenotyping. Flow cytometry. Pleural effusion.*

CO 058. OCCUPATIONAL RESPIRATORY DISEASES – REPORTED CASES FROM OCCUPATIONAL HEALTH SERVICE OF A PORTUGUESE UNIVERSITY HOSPITAL CENTER

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Introduction: In Portugal, the impact of occupational respiratory diseases has been decreasing. This is due to the legislative measures implemented to improve working conditions and also to changes in the predominant sectors of activities in recent years. Pneumoconiosis, Occupational Asthma and Hypersensitivity Pneumonitis are among the best documented occupational respiratory diseases. However, in health professionals, it is necessary to be attentive to other types of pathologies, namely infectious diseases.
Objectives: Characterization of occupational respiratory diseases notified by an Occupational Health Service of a University Hospital Center, from 2005 to the 1st semester of 2022.
Methods: Observational, cross-sectional study with a retrospective analysis of occupational respiratory diseases reported by the Occupational Health Service of a University Hospital Center, with characterization of demographic (gender and age) and professional

(professional category and service) variables. The service variable was classified into "clinical service", "clinical support service" and "non-clinical services". Sample: Workers at a Hospital Center with occupational diseases notified during the study period (n = 848). Occupational respiratory diseases and COVID-19 with pneumonia were included. Occupational diseases of other etiologies and the rest due to COVID-19 were excluded.
Results: During the study period, 38 occupational respiratory diseases were reported (4,5% of the total occupational diseases), which corresponded to 36 workers, mostly female (71,1%). The mean age was 44,2 ± 12,9 years. Nurses (27,8%) and Operational Assistants (27,8%) were the professional categories with the highest notification of occupational respiratory diseases. There were more occupational respiratory diseases in Clinical Services (69,4%). Tuberculosis was the most notified occupational disease (55,3%, where 57,1% occurred more than 10 years ago). SARS-CoV-2 Pneumonia was the second most frequent (28,9%), a moderate to severe manifestation of COVID-19, where the average age of workers was higher (55,7 years). Asthma (5,2%) and Rhinitis (5,2%), where latex was the triggering factor, also occurred. A *Chlamydia pneumoniae* Infection and a Whooping Cough, in two doctors (33 and 26 years old, respectively) who provided unprotected care to infected patients also should be highlighted.
Conclusions: The jobs were adapted to the conditions of the workers, including replacement proposals in 5,3% of the cases. The most frequent professional categories are those with greater contact with risk factors (biological and/or chemical). A lower notification of Tuberculosis in recent years may result from a lower incidence in the community, as well as from the administrative and preventive measures applied, where the role of Occupational Health Service was and has been relevant. The low frequency of cases of occupational asthma may be related to the reduction in the use of latex gloves and their replacement by powder-free gloves with a low allergen content. However, other hospital risk factors that trigger asthmatic conditions must be considered and controlled. Although occupational respiratory diseases were infrequent, isolated cases of Whooping Cough and a Chlamydia pneumoniae Infection, as well as SARS-CoV-2 Pneumonia, recall the need for adequate use of protective equipment by workers, to prevent infectious diseases transmitted by droplets and/or microdroplets.

***Keywords**: Occupational respiratory diseases. Health professionals. Occupational health.*

CO 059. PRESENCE OF EXTRA-PULMONARY TREATABLE TRAITS IN PEOPLE WITH COPD INCREASES THE LIKELIHOOD OF RESPONDING TO PULMONARY REHABILITATION

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Introduction: Evidence suggests that people with chronic obstructive pulmonary disease (COPD) who have worse clinical status (e.g., higher symptom burden) at baseline respond better to pulmonary rehabilitation. Identification of treatable traits in this population might help to better distinguish responders from non-responders, which could aid optimisation of the intervention in the future. This study aimed to explore the impact of pulmonary rehabilitation on extra-pulmonary traits of people with COPD and whether the presence of these treatable traits at baseline influences the type of response (responder or non-responder) to pulmonary rehabilitation.
Methods: An observational retrospective study was conducted. A comprehensive extra-pulmonary treatable traits' assessment including symptoms (dyspnoea, fatigue, anxiety, and depression), functional status, balance, impact of the disease and health-related quality of life, was conducted before and after a 12-week community-based pulmonary rehabilitation programme. Pre-post differences between people with or without each TT were compared with independent samples t-tests or Mann-Whitney U tests. The proportion of responders between groups (with or without treatable traits) were explored with chi-square tests and odds ratio.
Results: A total of 102 people with COPD (70 [65; 75] years old, 78% male, FEV1 47 [36; 60]% predicted) were included. People with COPD had a median [min-max] of 3 [0-7] treatable traits per person and each responded on average to 5 [0-9] outcomes of pulmonary rehabilitation. People with identified treatable traits at baseline were more responsive than those without them in all outcomes ($p < 0.05$) except for the 1-minute sit-to-stand test. The presence of treatable traits increased the likelihood of being a good responder in all outcomes (OR: 1.72-19.95) except for the 1-minute sit-to-stand test ($p = 0.175$).
Conclusions: Identification of extra-pulmonary treatable traits in people with COPD showed potential to inform on pulmonary rehabilitation responsiveness and might therefore be an important strategy for patient selection, treatment personalisation and optimisation.

***Keywords**: COPD. Treatable traits. Pulmonary rehabilitation. Comprehensive assessment. Responder analysis.*

CO 060. EFFECTS OF PULMONARY REHABILITATION IN THE FUNCTIONAL STATUS OF PEOPLE WITH ILD – A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Interstitial lung diseases (ILD) are a disabling group of chronic respiratory diseases characterized by different degrees of lung inflammation and fibrosis. People with ILD frequently report a decline in their functional status with a significant impact on their daily life activities. Functional status is an individual's ability to perform normal daily activities required to meet basic needs and maintain health and well-being. It includes functional capacity which refers to one's maximal potential to realize a functional activity in a standardized environment and functional performance which refers to the activities people do during their daily life. Pulmonary rehabilitation (PR) has been shown to improve dyspnoea, exercise capacity and health-related quality of life in people with ILD, but its effects on the functional status of this population are widespread in the literature.
Objectives: To synthesize the evidence of PR in the functional capacity and functional performance of people with ILD.
Methods: A systematic review was conducted (CRD42022298584). Searches were performed in PubMed/MEDLINE, Scopus and Web of Science Core Collection databases for randomised controlled trials comparing PR with usual care in adults with ILD. Two independent reviewers assessed the titles, abstracts and full-texts according to the eligibility criteria, extracted and analyzed data and assessed the risk of bias with the Risk of Bias 2 tool.
Results: Eight studies were included comprising 297 individuals with ILD (mean age range: PR group 45-71 years old; control group 40-72 years old) with severe to very severe lung function (DLCO% predicted mean range: PR group 44-67%pred; control group 37-64%pred). Functional capacity was assessed with the 6-minute walk test (6MWT) (n = 8), 30-second sit-to-stand test (30sec STS) (n = 1) and 6-minute stepper test (6MST) (n = 1). Functional performance was assessed with the number of daily steps, with a pedometer (n = 1) or SenseWear Armband (n = 1), and the international physical activity questionnaire (IPAQ) (n = 1). Significant improvements in functional capacity measured with the 6MWT (n = 201, MD 55.8 m, 95%CI

[37.5; 74.1], p < 0.0001), the 30 sec STS (n = 32, MD 4.1 reps., 95%CI [2.3; 5.9], p < 0.0001) and the 6MST (n = 35, MD 69.0 steps, 95%CI [3.3; 134.7], p = 0.0394) were observed after PR compared with the control group. No statistically significant between-group differences in functional performance measures were observed.
Conclusions: Pulmonary rehabilitation showed significant positive effects on the functional capacity but not on the functional performance of individuals with ILD. Measurements were mainly focused on the 6MWD, and few other functional status outcome measures have been included in PR programs. A more comprehensive assessment of this meaningful health domain to individuals with ILD, namely of their functional performance, which reflects what people do in their daily life, is fundamental to include in the routine assessment of PR, to identify needs and optimize care for this population.

Keywords: *Pulmonary rehabilitation. Interstitial lung diseases. Functional status. Functional capacity. Functional performance.*

CO 061. FUNCTIONAL STATUS FOLLOWING PULMONARY REHABILITATION IN PEOPLE WITH AECOPD - A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) lead to a decline not only in the patient's lung function but also in other important health domains, such as functional status. Functional status includes functional capacity and functional performance. Functional capacity refers to one's maximal potential to realize a functional activity in a standardized environment. Functional performance refers to the activities people actually do during their daily life. Pulmonary rehabilitation (PR) is fundamental for COPD management, however, its effectiveness in improving the functional status (capacity and performance) during and after AECOPD is less known.
Objectives: To systematize the effects of PR in the functional status (capacity and performance) during or immediately after an AECOPD.
Methods: This systematic review was registered (no. CRD42022298593). Systematic searches for randomised controlled trials (RCTs) comparing PR (with, at least, exercise training and education and/or psychosocial support) with usual care in people during and/or after AECOPD were conducted in PubMed/MEDLINE, Scopus, and Web of Science Core Collection. Two independent reviewers assessed the titles, abstracts and full text of studies, extracted data and assessed the risk of bias with the Risk of Bias 2 tool. Mean and standardized differences (MD/SMD) were calculated to synthesize results. A statistical random effects model was applied in the meta-analysis.
Results: Eight studies were included. The total number of participants was 533, with an age range of 58-74 years and an FEV1%predicted of 35-56%pred. PR was conducted in inpatient (n = 3), outpatient (n = 4) and inpatient/outpatient (n = 1) settings with varying durations and frequencies. Functional capacity was assessed with six measures, the six-minute walk test (6MWT) (n = 3), incremental shuttle walk test (ISWT) (n = 2), the 2-minute walk test (2MWT) (n = 1), 5-repetition sit-to-stand test (5 STS) (n = 1), 30-second sit-to-stand test (30sec STS) (n = 1), and timed up and go (TUG) (n = 1). Functional performance was assessed with four measures, the functional independence measure (FIM) (n = 1), london chest activity of daily living (LCADL) (n = 1), activity of daily living dyspnoea (ADL-D) (n = 1) and stepwatch activity monitor (steps/day) (n = 1). Significant improvements were observed in functional capacity, measured with the 6MWT (n = 159, MD 91.5, 95%CI [23.5; 159.5], p = 0.008) after outpatient and in TUG (n = 32, MD -2.2, 95%CI [-3.9; -0.5], p = 0.009) after inpatient PR in the EG compared to CG. Functional performance, measured with the ADL-D and the LCADL (n = 160, SMD 1.0, 95%CI [0.8; 1.2], p < 0.0001), as well as with the FIM (n = 44, MD 7.5, 95%CI [2.1; 12.8], p = 0.006), improved significantly after inpatient PR in comparison to usual care. No other significant between-group differences were observed for functional capacity or performance.
Conclusions: Pulmonary rehabilitation improves functional status during or immediately after an AECOPD. Nevertheless, few studies with small samples and high heterogeneity of outcome measures and interventions exist, which hinders conclusions. Functional performance is less assessed than functional capacity. Inclusion of both is fundamental to tailor PR in AECOPD and ensure benefits translate not just to what people can, but also do in their daily life.

Keywords: *Chronic obstructive pulmonary disease. Pulmonary rehabilitation. Activities of daily living. Functional status.*

CO 062. INTENSITY AND SAFETY OF COMMUNITY-BASED PHYSICAL ACTIVITIES FOR PEOPLE WITH COPD

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Introduction: long-term maintenance of the benefits obtained with pulmonary rehabilitation (PR) in people with COPD is of upmost importance, yet highly challenging. Integrating these people in community-based physical activities (PAs), after PR, can be a promising strategy to maintain achieved benefits. Nevertheless, to confidently advise people with COPD to enrol these community-based PAs, clinicians must ensure those are safe and ideally are of at least moderate intensity (following PAs guidelines). This study aimed to explore safety and intensity level of community-based PAs (cardiofitness room, senior gymnastics, and aquatic gymnastics) in people with COPD, after PR.
Methods: an observational cross-sectional study, part of a larger trial (NCT04223362) was conducted. People with COPD that had finished a community-based PR programme, conducted in the Respiratory Research and Rehabilitation Laboratory (Lab3R) or in four primary health care centres (Aveiro, Estarreja, Oliveira do Bairro and Montemor-o-Velho), and that had a positive risk-benefit analysis regarding their inclusion on community-based PAs were included. Participants were given the opportunity to choose among the available community-based PAs (previously identified as adequate), the one(s), they wanted to try, and were then accompanied by a physiotherapist. During the community-based PAs, dyspnoea and fatigue perception were assessed every 20 minutes using the modified Borg 0-10 scale; and heart rate (HR) and percentage of peripheral oxygen saturation (SpO2) were constantly monitored. Participants wore the SenseWear Armband on the left triceps to estimate the Metabolic Equivalent Task (METs) of each community-based PA. The final community-based PAs intensity level was obtained by summing the intensity levels yielded by: dyspnoea and fatigue Borg scores, maximal HR percentage predicted (HRmax%predicted) (where HRmaxpredicted = 220-age), and METs; with 3-6 Borg scores, 64-76% of HRmax%predicted, and 3-6 METs identifying moderate intensities. For security standards, SpO2 below 88% and HRmax%predicted above 85% were considered. The occurrence of any adverse event during the PAs was registered.
Results: three community-based PAs were included, cardiofitness room (9 people with COPD, 68 ± 9 years, 100% men, 58 ± 21 FEV1%predicted), senior gymnastics (8 people with COPD, 70 ± 9 years, 75% men, 53 ± 11 FEV1%predicted), and aquatic gymnastics (6 people with COPD, 68 ± 10 years, 100% men, 49 ± 16 FEV1%predicted). Overall, the explored community-based PAs were classified as of moderate intensity. Only one participant presented a SpO2 below 88% on the cardiofitness room (lowest SpO2 registered was 86%) and the

HRmax%predicted was below 85% in all participants. No adverse event was registered.
Conclusions: Cardiofitness room, senior gymnastics, and aquatic gymnastics seem safe and of moderate intensity for people with COPD. Enrolment of people with COPD on these community-based PAs, following PR, should be advised, as these may facilitate the long-term maintenance of PR benefits, while promoting a more physically active lifestyle in this population. Nevertheless, caution is needed when interpreting these results, since intensity of PA is highly influenced by individual factors and patients' enrolment must be preceded by a careful patient selection to ensure their safety.

Keywords: *Physical activity. Maintenance. Pulmonary rehabilitation. Chronic obstructive pulmonary disease. Community.*

CO 063. UNRAVELLING THE RELATIONSHIP BETWEEN FUNCTIONAL CAPACITY AND PHYSICAL ACTIVITY IN PEOPLE WITH INTERSTITIAL LUNG DISEASE

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Functional capacity (FC) and functional performance are distinct domains of functional status. Low functional capacity (FC) is commonly reported in people with interstitial lung disease (ILD). However, the literature on functional performance - possible to be objectively measured quantifying the physical activity (PA) levels - and on the relationship between FC and PA of this population is still scarce. Thus, this study aimed to: i) characterise the PA levels; ii) explore the relationship between FC and PA; and, iii) determine the distribution across the four quadrants of FC and PA of people with ILD. A retrospective cross-sectional study was conducted. PA levels were assessed with accelerometry (Actigraph® GT3X+), through steps/day and time spent in moderate-to-vigorous (MVPA) PA. Participants wore the Actigraph® for, at least, 4 consecutive days (7:00am-10:00pm). FC was assessed with the number of repetitions performed in the 1-minute-sit-to-stand (1-minSTS). PA levels were compared between three ILD diagnostic categories (i.e., fibrotic Hypersensitivity Pneumonitis [fHP], Idiopathic Pulmonary Fibrosis [IPF] and Connective Tissue Disease-related ILD [CTD-ILD]) and severity, using the ILD-GAP Index model (0-3, ≥ 4). U Mann-Whitney and Kruskal-Wallis tests were used to compare groups. Spearman's Correlation was used to analyse the correlation between FC and PA. For the quadrants analysis, participants were divided into the following: 1) low FC (1-minSTS < 70% predicted) and low PA (< 5,000 steps/day or < 150 min/week of MVPA) – "can't do, don't do"; 2) preserved FC (1-minSTS ≥ 70%), low PA (< 5,000 steps/day/< 150 min/week of MVPA) – "can do, don't do"; 3) low FC (1-minSTS < 70% predicted), preserved PA (≥ 5,000 steps/day/ ≥ 150 min/week of MVPA) – "can't do, do do"; 4) preserved FC (1-minSTS ≥ 70%), preserved PA (≥ 5,000 steps/day/ ≥ 150 min/week of MVPA) – "can do, do do". Forty-nine volunteers were included (68 [63-76] years; 23 [46.9%] male, FVC 84 [69-95]% predicted; DLCO 57 [40-73]% predicted). PA levels ranged between 792-113,670 steps/day and 2-1,604 min. spent in MVPA. PA levels across ILD subtype were not different (p = 0.061-0.609) however, significant differences were found across disease severity (GAP0-3 = 41 GAP ≥ 4 = 8 steps/day p = 0.003, GAP0-3 = 41 GAP ≥ 4 = 8 MVPA p = 0.015). Significant, moderate and positive correlations were found between FC and PA for both, steps/day (rs = 0.53, p < 0.001) and MVPA (rs = 0.40, p = 0.005). Participants' distribution on the FC and PA (steps/day) quadrants was: 22 (45%) "can't do, don't do"; 7 (14%) "can do, don't do"; 7 (14%) "can't do, do do"; 13 (27%) "can do, do do". Participants' distribution between FC and PA (MVPA) quadrants was: 20 (41%) "can't do, don't do"; 5 (10%) "can do, don't do"; 9 (18%) "can't do, do do"; 15 (31%) "can do, do do". People with ILD tend to be physically inactive. PA levels decrease with ILD severity and there is a relationship between FC and PA in this population. Applicability of the FC-PA quadrant may guide personalised interventions to optimise outcomes of these meaningful domains in ILD.

Keywords: *Interstitial lung disease. Physical activity. Functional capacity.*

CO 064. ARE PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE MORE MOTIVATED TO EXERCISE AND BE PHYSICALLY ACTIVE AFTER PULMONARY REHABILITATION?

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Physical activity is highly important for the health status of people with chronic obstructive pulmonary disease (COPD) because it has shown associations with reduced risk of all-cause mortality and acute exacerbations. Pulmonary rehabilitation improves functional capacity in people with COPD, but benefits have not been consistently observed in physical activity levels. Recently, it has been shown that motivation to exercise can be a precursor to the adaptation of more active lifestyles however, it is unknown whether pulmonary rehabilitation influences the motivation to exercise of people with COPD and whether this motivation contributes to increase physical activity. Therefore, this study aimed to explore i) motivation to exercise; ii) the relationship between motivation to exercise and physical activity and iii) the distribution across the four quadrants of motivation to exercise and physical activity, in people with COPD after pulmonary rehabilitation. An observational cohort study including people with COPD who undertook a 12-week community-based pulmonary rehabilitation program was conducted. Motivation to exercise was assessed with the global rating of change scale at the end of pulmonary rehabilitation. Global rating of change scale consists in a Likert scale composed by 11 points, ranging from -5 to 5 (-5, means "much worse"; 0, means "unchanged"; 5, means "much better"). Participants who scored 2 points or more were considered "motivated to exercise" (ME). Physical activity levels were evaluated pre- and post-pulmonary rehabilitation through accelerometry data (participants wore an Actigraph during seven days, 24 hours). A minimum of 8h (480 min) per day for four days was established for wear time validation. The minimal clinically important difference of 600 steps per day was used to identify "improvers on physical activity" (IPA). Spearman's (rs) correlation coefficient was used to determine the association between motivation to exercise and change in physical activity. We categorized participants in four motivation to exercise-physical activity quadrants: ME and IPA, ME and non-IPA, non-ME and IPA, non-ME and non-IPA, after pulmonary rehabilitation. Forty-one people with COPD (71 ± 7 years; 93% male; BMI 28 ± 6 kg/m^2; 57 ± 17 FEV1%predicted) were included. After pulmonary rehabilitation, most participants were ME (n = 35; 85%), but less than half were IPA (n = 18; 44%). No correlation between these two variables (rs = 0.132, p = 0.412) was observed. Participants distribution on the motivation to exercise-physical activity quadrants was: 15 (37%) "ME and IPA"; 20 (49%) "ME and non-IPA"; 3 (7%) "non-ME and IPA" and 3 (7%) "non-ME and non-IPA". After pulmonary rehabilitation, most participants were motivated to exercise but nearly half did not change the physical activity levels. Changing physical activity behavior is highly challenging, and research on which interventions can effectively modify it is still needed. Additionally, future studies including a more comprehensive assessment of motivation to exercise are required to confirm our results.

Keywords: *Physical activity. Exercise. Motivation. Pulmonary rehabilitation. Chronic obstructive pulmonary disease.*

CO 065. THE ROLE OF MUC5B PROMOTER VARIANT IN FIBROTIC HYPERSENSITIVITY PNEUMONITIS

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Introduction: The MUC5B promoter variant rs35705950 is the common genetic variant that confers the greatest risk for idiopathic pulmonary fibrosis (IPF). As IPF and fibrotic hypersensitivity pneumonitis (fHP) present phenotypic resemblances we aim to analyse the role of this MUC5B single nucleotide polymorphism (SNP) in susceptibility and prognosis of fHP.
Methods: A retrospective study was undertaken using 64 IPF patients, 67 fHP patients and 74 controls. Genotype frequencies of the MUC5B rs35705950 SNP in the three groups were analysed. The χ^2 test or Fisher exact test were used to assess genotype differences between groups and logistic regression to analyse association with disease susceptibility. Survival was analysed with time (in months) from diagnosis to dead censored by the end of follow-up. Survival was determined by Kaplan Meier curves and compared by log rank test.
Results: The MUC5B rs35705950 GT and TT genotypes were more frequently in IPF and fHP subjects than in healthy controls (GT: 59.4% *versus* 54.5 *versus* 17.6%, TT: 15.6 *versus* 10.6% *versus* 2.7%; $p < 0.001$). However, when comparing MUC5B rs35705950 GT and TT genotypes between IPF and fHP subjects no significant differences were noticed ($p = 0.405$). The odds ratios (OR) for IPF among subjects with MUC5B rs35705950 GT and TT genotypes were 10.78 (95% confidence interval [CI], 4.66-24.91, $p < 0.001$) and 18.44 (95%CI, 3.67-92.76, $p < 0.001$), respectively. The OR for fHP among subjects with MUC5B rs35705950 GT and TT genotypes were 7.10 (95%CI, 3.20-15.75, $p < 0.001$) and 8.98 (95%CI, 1.74-46.45, $p = 0.009$), respectively. The median follow-up time was 43.5 (IQR 28.0-67.5) months in IPF subjects and 25.0 (IQR 18.0-59.5) months in fHP subjects ($p = 0.025$). Thirty-six IPF subjects (56.3%) and 23 fHP subjects (34.3%) died during the follow-up ($p = 0.012$). Survival analysis did not show any association between the different MUC5B rs35705950 genotypes with IPF ($p = 0.275$) or fHP ($p = 0.846$). Regarding fHP, no association was found between UIP pattern ($p = 0.803$) or honeycombing on high-resolution computed tomography ($p = 0.317$) and survival.
Conclusions: No significant differences were found in genotypic distributions of the MUC5B rs35705950 SNP between IPF and fHP group. As described for IPF, the genotypes that contain T allele of SNP MUC5B rs35705950 are associated with fHP susceptibility, suggesting potential similarities in the fibrotic pathogenic mechanisms underlying both diseases. The individual analysis of genotype distributions for the MUC5B promoter SNP rs35705950 did not unravel a role of genetics in prognostic stratification of fHP.

Keywords: *IPF. Fibrotic HP. Genetics. MUC5B. Diagnosis. Survival.*

CO 066. INCLUSION CRITERIA FOR PRESCRIBING ANTIFIBROTICS IN PROGRESSIVE FIBROTIC INTERSTITIAL LUNG DISEASE AND THEIR IMPACT ON OUTCOME- A RETROSPECTIVE ANALYSIS

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Introduction: The INBUILD study showed a decrease in forced vital capacity (FVC) decline in patients on Nintedanib with progressive fibrotic interstitial lung disease (PF-ILD). The defined inclusion criteria encompassed clinical (symptomatic worsening), functional (decrease in FVC) and radiological parameters (greater extent of fibrosis). This study aims to evaluate the inclusion criteria considered and their influence on the evolution of patients.
Methods: Retrospective analysis of patients with PF-ILD (idiopathic pulmonary fibrosis excluded) under antifibrotic treatment at the ILD consultation at Centro Hospitalar de São João, Porto.
Results: Sixty-seven patients were identified with a mean age of 69.91 years, 53.7% (n = 36) of whom were women. Hypersensitivity pneumonitis was the most common ILD (68.7%), followed by connective tissue disease-related ILD (CTD-ILD) (20.9%). In these, rheumatoid arthritis (42.9%; n = 6) and systemic sclerosis (42.9%; n = 6) were the most common. The radiological pattern of usual interstitial pneumonia was found in 35 patients (53%). Most patients were on immunosuppressive therapy when the antifibrotic was started, the most common being mycophenolate mofetil in 67.2% (n = 45). Most patients were on nintedanib (85.1%, n = 57) and the rest on Pirfenidone. The criteria used to initiate the antifibrotic, as defined in the INBUILD study, were clinical and radiological progression (CRP) in 38.8% (n = 26), clinical or radiological progression, and decrease in FVC of 5-10% (C/FRVC) in 25.4% (n = 17) and a drop in FVC > 10% (FVC10) in 35.8% (n = 24), in a period of 2 years. After initiation of antifibrotic therapy, the PCR group presented an average decrease in FVC of 7.11% (0.30L) at 6 months and 7.60% (0.20L) at 12 months, while for the C/RFVC group, the decrease was 4.54% (0.09L) at 6 months and 5.83% (0.15L) at 12 months. The FVC10 group had a functional improvement of 1.30% (0.04L) and 1.7% (0.06L) at 12 months. There was no statistically significant difference between the fall in FVC in these groups at 6 months ($p = 0.127$) and at 12 months ($p = 0.492$). However, comparing the FVC10 group with the others, a smaller decline in FVC at 6 months is evident ($p = 0.06$).
Conclusions: In the analysis of subgroups of the INBUILD trial, the inclusion criteria FVC10 study showed a greater prevention in the fall of the absolute value of FVC. The real-life results obtained in this study are in line with the evidence previously demonstrated, highlighting the importance of functional decline in the selection of patients who benefit most from antifibrotic agents.

Keywords: *PF-ILD. Progressive fibrosis. Inbuild. Nintedanib.*

CO 067. IMPACT OF AZATHIOPRINE USE FOR 5 YEARS IN PATIENTS WITH HYPERSENSITIVITY PNEUMONITIS, ONE CENTER EXPERIENCE

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Introduction: Hypersensitivity pneumonitis (HP) is a heterogeneous disease characterized by an inflammatory reaction to exposure to a sensitizing antigen. Azathioprine (AZA) is a cell cycle inhibitor used in the treatment of many inflammatory interstitial lung diseases, notably fibrotic HP (fHP), although it has not been prospectively tested in randomized controlled trials. Recently, results have been published on its efficacy at 12 and 24 months, with no data beyond this period.
Objectives: To evaluate the evolution of lung function and the safety profile of the drug in patients diagnosed with fHP undergoing treatment with AZA for 5 years.
Methods: This cohort included patients diagnosed with fHP who had completed 5 years of treatment with AZA. The diagnosis of patients was based on the rules in force. The characterization of the sample was based on demographic data, smoking, lymphocyte count in BAL. The biannual reassessments throughout the treatment were based on FVC, TLC, DLCO, gait test and paO2. Data were analyzed using the SPSS platform, with the Wilcoxon test and t test.
Results: From a cohort of 46 patients, stabilization criteria were found in 78% (n = 36) of patients after 1 year and in 76% (n = 35)

after 2 years. After 5 years, 43% (n = 20) of the patients remained functionally stable. Regarding the parameters analyzed at diagnosis, there were no associations with stability at 5 years, with only a trend towards significance in relation to lymphocytosis (p = 0.06). In this group of 20 patients, a functional improvement in FVC and TLC of 8% and 12%, respectively, was observed up to the 3rd year of treatment with AZA. Improvement in FVC, TLC and distance covered in the gait test after 12 months of treatment were significantly associated with a favorable immunosuppression response at 5 years compared to the other included patients (p < 0.05).
Conclusions: In the evaluation of this cohort of patients with fHP, it is observed that most patients have disease progression, in a variable time, despite immunosuppressive therapy. However, these results also suggest that there is a subgroup of patients with an underlying inflammatory component that appears to be the most determinant and that is associated with a prolonged favorable response to immunosuppression. The evolution of respiratory functional parameters seems to be of crucial importance for the identification of these patients.

Keywords: *Hypersensitivity pneumonitis. Azathioprine. Lung function.*

CO 068. RISK FACTORS FOR ACUTE EXACERBATIONS OF HYPERSENSITIVITY PNEUMONITIS

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Introduction: Acute exacerbations (AE) of interstitial lung diseases are associated with bad outcomes. In hypersensitivity pneumonitis (HP), there is little evidence regarding factors associated with their development.
Objectives: Identification of risk factors for AE in patients with Fibrotic HP (fHP)
Methods: The authors conducted a retrospective analysis of 119 HP patients followed at our center between 2012-2017. We defined AE as worsening of dyspnea within a 30-day period, with new bilateral lung infiltration and no evidence of other causes of dyspnea, leading to hospitalization.
Results: Seventeen patients were excluded for not having fHP (n = 102). The median age of our population was 69 years (min 34 - max 89), the majority were female (55.9%, n = 57) and 64.3% (n = 63) were never-smokers. Regarding the radiologic pattern, 60.2% (n = 62) patients had Usual Interstitial Pneumonia "like" radiological pattern on HRCT. A total of 15 (13.0%) patients developed AE of fHP in a median 36 months of follow-up. Patients with AE were younger (59.8 ± 10.0 years) than those without AE (69.2 ± 11.3 years), p < 0.01, had lower FVC% pred (69.8 *vs.* 85.7, p = 0.024) and lower FEV1%pred (74.9 *vs.* 90.3, p = 0.032). Patients who reported exposure to mold had a higher rate of AE (23.5 *vs.* 9.0%, p = 0.041). Lower age, FVC%pred, FEV1%pred and exposure to mold were independent risk factors for development of AE in a univariate analysis (p < 0.05). Exposure to mold remained a significant risk factor for AE even after adjusting for FVC%pred, FEV1%pred and age (OR 3.79, p = 0.037). A total of 8 patients died during the AE admission (53.3%). From the remaining patients, 2 died within 2 and 50 months after the AE.
Conclusions: A worst lung function, lower age, and a patient report of exposure to molds were factors associated with the development of AE. This entity was associated with high in-hospital mortality. The identification of an exposure etiologic factor may lead to definition of strategies to avoid exacerbations, and a better recognition of risk factors can enable strategies for early recognition and management of AE.

Keywords: *Fibrotic hypersensitivity pneumonitis. Acute exacerbation. Interstitial lung disease.*

CO 069. PREDICTIVE FACTORS OF NOSOCOMIAL INFECTION IN THE CRITICALLY ILL PATIENT DURING COVID-19 PANDEMIC

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Introduction: Nosocomial infection is one of the main complications of the critically ill patient and a major determinant of morbidity and mortality.
Objectives: To perform a comparative analysis of a critically ill population regarding nosocomial infection rates covering a pre-COVID-19-pandemic period and during the pandemic surge. To identify predictive factors of nosocomial infection in the critically ill population.
Methods: Retrospective cohort study of 316 patients discharged from a Respiratory Intensive Care Unit during the second semester of 2020 and the first and third trimesters of 2021. European Centre of Disease Prevention and Control (ECDC) diagnostic criteria were used for the analysis of nosocomial infection incidence both global and by infection subtype. The analysed parameters were: age; sex; severity (APACHE II); average length of stay; admission due to COVID-19; syndromatic diagnosis; type and duration of ventilatory support; presence of central venous catheter (CVC); rate of nosocomial infection and distribution by subtypes; incidence of nosocomial infection; specific risk factors for nosocomial infection (HIV infection; transplant recipient; chronic corticotherapy (prednisolone ≥ 20 mg daily or equivalent during the three weeks prior to admission); solid tumor or hematologic malignancy). The statistical analysis was performed using IBM® SPSS® v28. For group comparison, the authors applied t Student test or U Mann-Whitney test for continuous variables and chi-square test or Fisher exact test for categorical variables (as appropriate). A p value < 0.05 was considered statistically significant.
Results: In our cohort, 16.1% of patients developed a nosocomial infection: 40% pneumonia, 25% tracheobronchitis, 18,3% urinary tract infections and 16.7% primary bacteremia (1 CVC-related). The global incidence of nosocomial infection was 20.8 episodes/1,000 days of hospitalization, the incidence of ventilator-associated pneumonia was 11.6/1,000 days of invasive mechanical ventilation (IMV) and the incidence of primary bacteremia was 4,5/1000 days of hospitalization. The multivariate analysis identified the following as predictive factors of nosocomial infection: COVID-19 diagnosis (OR 3.38), longer length of stay (OR 1.23) and presence of endotracheal tube or tracheostomy (OR 4.97).
Conclusions: The incidence of nosocomial infection was high in this cohort mostly due to respiratory tract infection. There was no correlation with higher severity evaluated by APACHE II. Patients who developed nosocomial infection were mainly admitted due to COVID-19, had longer length of stay, higher prevalence of ARDS and acute kidney injury, increased need for ventilatory support (especially IMV) and longer duration of IMV. In addition to the classic risk factors, COVID-19 diagnosis was one of the main predictors of nosocomial infection. This may be due to specific characteristics of this disease as well as immunomodulatory interventions, namely high dose systemic corticotherapy.

Keywords: *Nosocomial infection. Critically ill patient. COVID-19.*

CO 070. THE IMPACT OF NOSOCOMIAL PNEUMONIA ON INDIVIDUALS HOSPITALISED FOR COVID-19

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Introduction: COVID-19 is a disease caused by infection with the SARS-CoV-2 virus, requiring hospitalisation when It´s moderate or severe. Healthcare-associated infection (HAI) is a localised or sys-

temic condition resulting from an adverse reaction to the presence of an infectious agent that was not present on admission to hospital. Nosocomial pneumonia (NP) is the one that occurs 48 hours after hospital admission, and may be ventilator-associated (VAP) when it occurs 48 hours after orotracheal intubation or non-ventilator-associated (NVAP).
Objectives: To describe the impact of nosocomial respiratory infections in individuals hospitalized for COVID-19.
Methods: Retrospective and descriptive study of patients hospitalised with COVID-19 in a hospital in northern Portugal during 2020.
Results: The sample consists of 1,110 individuals, of whom 20.63% (n = 229) acquired HAIs, 5.68% (n = 13) by bacteraemia with 38. 5.68% (n = 13) of them were due to bacteremia with 38.5% (n = 5) of deaths, 31.88% (n = 73) due to urinary tract infection (UTI) with 12.3% (n = 9) of deaths; 62.44% (n = 143) due to NP (PNAV 54.15% (n = 124) and PAV 8.29% (n = 19)) with 32.16% (n = 46) of deaths. Of the latter, only in 5.59% (n = 8) the pathogen was isolated, highlighting that most were gram negative bacteria (7 isolations of gram negative and 1 gram positive). Individuals with NP 62.23% (n = 89) were males with a mean age of 74.09 (± 13.49). These individuals had a severity index level 1 in 1.39% (n = 2), level 2 13.99% (n = 20), level 3 37.53% (n = 54) and level 4 46.85% (n = 67). The most frequent comorbidities found were: high blood pressure 64.33% (n = 92), cardiac arrhythmias 20.28% (n = 29), heart failure 17.48% (n = 25), ischemic heart disease 11.18% (n = 16), COPD 11.89% (n = 16) and asthma 4.89% (n = 7). Respiratory support was also analysed and it was found that among individuals with NP, 92.3% (n = 132) used ventilatory support: 58.04% (n = 83) oxygen therapy; 13.29% (n = 19) Invasive Mechanical Ventilation (IMV), 12.59% (n = 18) HELMET-CPAP; 4.16 (n = 6) Non-Invasive Ventilation (NIV); 2.7% (n = 4) High Flow Oxygen Therapy (HFO) and 1.39% (n = 2) Extracorporeal Membrane Oxygenation (ECMO). The Odds Ratio of mortality in the individuals with PN is 2.44 (95%CI 1.25-4.77).
Conclusions: The study reveals a high incidence of HAIs in individuals hospitalized for COVID-19 with NP being the most frequent. Individuals at higher risk of developing NP were older men with several comorbidities, including cardiovascular diseases. Most of them are empirically treated with conventional oxygen therapy. Patients with NP have a mortality risk 2.44 times higher. It is important to boost research on nosocomial infection in patients hospitalised with COVID-19 and to promote research on hospital infection prevention and control measures in order to implement protocols that contribute to reduce the incidence of HAIs.

Keywords: *COVID-19. Infection. Nosocomial pneumonia. Mortality.*

CO 071. CLINICAL AND FUNCTIONAL DESCRIPTION OF PATIENTS WITH POS-COVID SYNDROME IN A PORTUGUESE HOSPITAL

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Introduction: The persistence of physical, mental or social symptoms in individuals beyond 12 weeks after a COVID-19 infection, without other defined causes characterizes the Post-COVID Syndrome.
Methods: A descriptive retrospective study of individuals with Post-COVID Syndrome in order to characterize the clinical and respiratory changes, was carried out.
Results: The sample was composed of 100 individuals, 60% (n = 60) males and 40% (n = 40) females. The most frequent comorbidities were: high blood pressure 40% (n = 40), asthma 18% (n = 18), diabetes mellitus 14% (n = 14) and chronic obstructive pulmonary disease 11% (n = 11). 42% (n = 42) developed a moderate or severe COVID-19 requiring hospitalization, of these 26% (n = 26) were considered severe. The mean time to evaluation was 304.44 (95%CI, 52-754) days after infection. 46% (n = 46) of the sample had a reduction on the 1-Minute Sit-To-Stand Test (1MSTS), of these 30% (n = 30) were obese, 13% asthmatic and 14% with high blood pressure, but only 3% (n = 3) had ≥ 4% desaturation. Of these, 61% (n = 31) of the individuals were hospitalized. The Mann Whitney test showed that there were no differences between hospitalized and non-hospitalized individuals. There was no correlation between 1MSTS test frequency and respiratory disease comorbidities: asthma, chronic obstructive pulmonary disease (COPD), and obstructive sleep apnea syndrome (OSAS). The analysis of respiratory function revealed: FEV1: 6% (n = 6) reduced, RV: 11% (n = 1) reduced, TLC 10% (n = 10) reduced, DLCO: 30% (n = 30) reduced, MIP: 45% (n = 45) reduced, MEP: 38% (n = 38) and P 0.1: 1% (n = 1) reduced and 64% (n = 64) increased. The Kruskal-Wallis test reveals that there are significant differences in static volumes: RV, TLC, RV/TLC and DLCO with $p < 0.05$ between individuals with mild COVID-19 and those with moderate or severe.
Conclusions: The impairment of physical capacity can occur in individuals with mild as well as in severe or moderate COVID-19, affecting mostly middle-aged adults with various comorbidities. Reduced respiratory muscle pressures may persist for a long time after infection. The damage caused to the lung parenchyma by the infection may result in a restrictive pattern with altered diffusion capacity that may persist for several months, especially in individuals with moderate or severe COVID-19, so monitoring of respiratory functional capacity over a long period is extremely important.

Keywords: *Post-COVID syndrome. 1-minute sit-to-stand test. Respiratory function test. Maximal respiratory pressures.*

CO 072. FACTORS ASSOCIATED WITH COVID-19 MORBIDITY AND MORTALITY IN LUANDA, ANGOLA IN THE FIRST YEAR OF THE PANDEMIC

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Introduction: COVID-19, coronavirus disease 2 related to severe acute respiratory syndrome (SARS-CoV-2), rapidly spread across all continents, exponentially increasing the number of infected individuals and thousands of deaths worldwide. The impact of SARS-CoV-2 infection in Africa is still unclear. In comparison to Europe and North America, morbidity and death rates are lower. Several factors have been proposed, including geographical variation in virus impact, environmental factors, differences in population age distribution, genetic and immunological mechanisms of the host, limited testing capacity in resource-limited regions, underreporting due to stigma, and the impact of infectious diseases such as malaria, HIV infection, and tuberculosis.
Objectives: Study clinical characteristics and factors associated with COVID-19 morbidity and mortality in Luanda, the capital city of Angola.
Methods: A cross-sectional study was conducted at the Military Hospital in Luanda, with all patients who were admitted to the emergency services and admitted to the hospital wards with a clinical history suggestive of COVID-19 from March 2020 to March 2021. The survey includes sociodemographic and clinical data. The chi-square test, Fisher's exact test, or logistic regression were performed and considered significant when $p < 0.05$.
Results: The sample included 1,683 patients aged ≥ 18 years, 64% men, with a mean age of 46.33 ± 14.60 years. RT PCR for SARS-CoV-2 was positive in 39.4% of the cases. Patients ≥ 46 years old and with a level of education of ≥ 12 years had a significantly higher chance

of having a positive RT PCR. Approximately 58% of positive patients had at least one comorbidity. Arterial hypertension and other cardiovascular diseases [aOR 95%CI: 1.75 (1.37-2.23) p < 0.001], as well as diabetes mellitus [aOR 95%CI: 1.96 (1.38-2.79) p < 0.001] were associated with a higher risk of infection, however, liver disease [aOR 95%CI: 0.20 (0.07-0.57) p = 0.002], cerebrovascular disease [aOR 95%CI: 0.24 (0.12-0.46) p < 0.001], HIV infection [aOR 95%CI: 0.26 (0.12-0.52) p < 0.001], pulmonary tuberculosis [aOR 95%CI: 0.33 (0.12-0.94) p = 0.037] and its sequelae [aOR 95%CI: 0.34 (0.13-0.87) p = 0.025] were associated with a protective effect. There was no significant association between SARS-CoV-2 infection and asthma, allergic rhinitis, chronic obstructive pulmonary disease (COPD), or smoking. About 14% of positive patients died. Most deaths occurred in patients ≥ 46 years, particularly > 65 years, with less education and unemployed. Working as a healthcare practitioner considerably reduced the risk of COVID-19 mortality [aOR 95%CI: 0.21 (0.05-0.89) p = 0.034]. The main comorbidities significantly related to mortality were only malignant diseases [aOR 95%CI: 12.00 (1.42-101.52) p = 0.023]. There was no significant association between COVID-19 mortality and HIV infection, pulmonary tuberculosis and its sequelae, asthma, allergic rhinitis, COPD, or smoking.
Conclusions: This study offers crucial information on COVID-19 infection and mortality in Angolan adults. Infectious diseases were associated with a protective effect for SARS-CoV-2 infection and were not associated with mortality, while chronic respiratory diseases were not associated with infection or mortality by COVID-19. Future studies with a broader breadth and depth should be conducted to better elucidate these aspects.

Keywords: *Angola. COVID-19. Morbidity. Mortality. Associated factors.*

CO 073. THE WANING OF COVID-19 VACCINES EFFECTIVENESS OVER TIME: A TEST-NEGATIVE CASE-CONTROL STUDY

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Introduction: Vaccines against COVID-19 demonstrated high effectiveness, however, concerns have been raised regarding the waning of this protection and immune evasion capacity of new variants, like Omicron. This study intended to evaluate the waning of COVID-19 vaccines effectiveness against symptomatic infection and moderate-severe disease defined by hospitalisation over 24 hours, UCI admission, and death.
Methods: We performed a test-negative case-control study. Participants were adults resident in the Alto Minho region, Northern Portugal, who had at least one symptom present in the WHO COVID-19 case definition and seek healthcare at a public emergency department of Alto Minho from November 1st, 2021 to March 2nd, 2022, the fifth pandemic wave in Portugal, Omicron-predominant. Cases were individuals who tested positive for SARS-CoV-2 and controls were individuals with a negative test. A multivariate logistic regression model was used to estimate OR adjusted for age and municipality of residence, as they were considered confounders (p < 0,05 or change in the OR of, at least, 5%); then we calculated vaccine effectiveness.
Results: We included 1,059 eligible patients (522 cases and 537 controls) with a median age of 56 years old. The effectiveness of the primary series against symptomatic infection was 85% (95%CI 59-95%) 14-90 days after last dose, 70% (95%CI 35-86%) 91-120 days after last dose, 41% (95%CI 27-73%) 121-179 days after last dose and 15% (95%CI 43-50%) more than 180 days after last dose. The effectiveness of primary series and a booster dose was 77% (95%CI 59-88%) 14-42 days after last dose, 79% (95%CI 58-89%) 43-70 days after last dose and 62% (95%CI 28-80%) more than 70 days after last dose. The effectiveness of the primary series against moderate-severe disease was 82% (95%CI 49-94%) 14-179 days after the last dose and 80% (95%CI 49-92%) over 180 days after the last dose.
Conclusions: These results corroborate the concept of waning immunity. The effectiveness lowered to less than 50% between 4 and 6 months after the last dose. Therefore, this is likely to be the appropriate time for a booster to restore immunity. However, the effectiveness of COVID-19 vaccines against hospitalisation, UCI admission, and death only decreased residually. Understanding the waning of immunity against severe disease will require the accumulation of more data over time.

Keywords: *COVID-19. Vaccines. Effectiveness. Case-Control.*

CO 074. EFFECTIVENESS OF PRIMARY VACCINATION AGAINST SARS-CoV-2 IN NURSING HOMES

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Introduction: Long-term care facilities, like nursing homes (NH), are especially vulnerable to the spread of viral infections. The COVID-19 Pandemic confirmed it, with frequent outbreaks of SARS-CoV-2 infection in these institutions, with numerous cases identified among residents and professionals. The resident's clinical history, their social dependence, the institution's structural characteristics, the professional training and the Institution's practices, are factors that can influence the spread of respiratory infections, like COVID-19. The emergency approval for the use of the first COVID-19 vaccine, Comirnaty (BNT162b2), was essential to the pandemic control. In the first months of 2021, large-scale campaigns for immunization against the disease began worldwide and, due to the increased risk of severe COVID-19 in the elderly, several countries included this group as a priority. Portugal was amongst them, and considered NH residents and professionals as a priority vaccination group. Despite the undeniable benefits of vaccination, studies on the effectiveness of COVID-19 vaccines in this population are scarce, especially in the elderly population (usually underrepresented in clinical trials). This study aimed to estimate the effectiveness of BNT162b2, against SARS-CoV-2 infection, in NH residents/professionals, in the ULS da Guarda (ULSG) intervention area.
Methods: It was conducted a retrospective cohort study, who included NH residents and professionals, with complete primary vaccination by BNT162b2 (2 doses with a 21 day interval), identified as risk contacts in NH outbreaks, between 15/03 and 16/10/2021. Time at Risk variable was calculated as the period between 14 days after primary vaccination and the date of the positive result (if infection), or the last day of observation (16/10/2021), in patients who have never been infected. A survival model was constructed considering the time at risk until SARS-CoV-2 infection (event). A Cox regression was applied to estimate the hazard ratio between NH professionals and residents.
Results: Between 15/03 and 16/10/2022, 11 SARS-CoV-2 outbreaks in NH were identified, in the ULSG area. This study included 534 individuals: 327 residents (61.2%) and 207 professionals (38.8%), with a mean age of 84.9 years and 45.5 years, respectively. The overall effectiveness of BNT162b2, for the prevention of SARS-CoV-2 infection, after 6 months of follow-up (186 days), was 82.8% (95%CI 79.6-86.1%), and at the end of follow-up period (maximum 258 days) was 27.9% (95%CI 18.1-41.0%). At 6 months, the vaccine effectiveness (VE) verified in residents was 79.6% (95%CI 75.3-84.1%), and 88.2% in professionals (95%CI 83.8-92.9%). The hazard ratio between these groups was 2.08 (95%CI 1.53-2.84, with p < 0.001): the probability of a resident developing an infection before a professional was 67.5% (95%CI 60.5-74.0%).
Conclusions: At 6 months, the VE results in our study were in agreement with what is described in the literature. The differences found

between residents and professionals reinforce the need to carry out studies specifically aimed at these groups, making surveillance and monitoring of VE important, especially if preventive measures were already softened after vaccination periods.

Keywords: *COVID-19. Vaccination. Vaccine effectiveness. Nursing homes.*

CO 075. ROLE OF EOSINOPENIA IN PATIENTS UNDER BIOLOGICAL THERAPY IN THE SEVERITY OF COVID-19: ANALYSIS OF A CENTRAL HOSPITAL

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Introduction: Several studies have shown that patients with severe SARS-CoV-2 infection had reduced eosinophil values compared to those with mild infection. It was therefore considered that the antiviral effect of eosinophils could be implicated in the severity of coronavirus disease 19 (COVID-19).
Objectives and methods: The objective of this study was to evaluate whether eosinopenia caused by treatment with anti-interleukin-5 monoclonal antibodies was associated with greater severity of COVID-19 in patients with severe asthma. This is a retrospective study, having the data obtained from the consultation of the clinical files of patients followed in a consultation for severe asthma.
Results: Of the 114 patients with severe asthma, 43% (n = 49) had COVID-19, of these 71.43% (n = 35) were women and 28.57% (n = 14) were men. Most (n = 47) were under biological therapy: 53.19% (n = 25) on Omalizumab, 29.79% (n = 14) on Mepolizumab, 10.64% (n = 5), on Benralizumab and 6.38% (n = 3) under Dupilumab. Regarding the severity of COVID-19, 55.10% (n = 27) had mild disease, 40.82% (n = 20) moderate disease and only 4.08% (n = 2) severe disease. We evaluated whether the severity of COVID-19 in patients under biological therapy was related to whether or not it was eosinophil-depleting (Mepolizumab/Benralizumab *vs*. Omalizumab/Dupilumab), and there was no statistically significant relationship between the type of therapy and disease severity (p = 0.372).
Conclusions: In our work, the data obtained showed that in patients with severe asthma under anti-interleukin-5 monoclonal antibodies, the eosinopenia caused by them did not influence the severity of the SARS-CoV-2 infection. However, the evaluation of a larger number of patients will be necessary for definitive conclusions.

Keywords: *Severe asthma. COVID-19. Monoclonal antibodies. Eosinophils.*

CO 076. IMPACT OF COVID-19 ON LUNG FUNCTION OF ASTHMATIC PATIENTS UNDER BIOLOGICS: ANALYSIS OF A CENTRAL HOSPITAL

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Introduction: Management of severe asthma and their exacerbations during the coronavirus disease 2019 (COVID-19) pandemic has been a challenge.
Methods: The objective of this work is to evaluate changes in lung function in severe asthma (SA) patients (pts) under biological therapy, after COVID-19 infection. Retrospective study of pts with SA under biological therapy followed in a severe asthma unit. Patients' data was obtained from clinical records.
Results: Fifteen patients underwent lung function tests after COVID-19 infection. Patients were mostly women (66.7%, n = 10) with mean age of 58 years. 40% (n = 6) were allergic asthma, 20% (n = 3) eosinophilic asthma and 40% (n = 6) eosinophilic and allergic asthma. Cardiovascular co-morbilities were: arterial hypertension, dyslipidemia and diabetes. Biological therapy was: omalizumab (n = 10; 66.67%), mepolizumab (n = 3; 20%), dupilumab (n = 1; 6.67%) and benralizumab (n = 1; 6.67%). No patients had clinical sequels from the infection. Mean spirometry values were, before and after COVID-19, respectively: forced vital capacity (FVC) 102%/100% predicted (p = 0.379); forced expiratory volume in the first second (FEV1) 80%/82% of predicted (p = 0.415); FEV1/FVC 66%/67% of predicted (p = 0.374). No significant difference was noted.
Conclusions: In our study we verified that lung function maintained stable despite the infection by COVID-19, probably due to the compliance of treatment with biological therapy, allowing control of their asthma and thus lower risk of severe exacerbation.

Keywords: *Asthma. Biologic therapies. COVID-19.*

CO 077. HOSPITALIZATION DUE TO COVID-19 IN YOUNG PATIENTS: A GENERAL HOSPITAL'S PANORAMA

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Introduction: Although old age is a well-documented risk factor for severe SARS-CoV-2 infection, a relevant number of hospitalizations in younger patients led to the investigation of potential characteristics that might contribute to potentially severe COVID-19 cases that may lead to hospital admission. The main goal of this study was the characterization of the population of individuals with 50 or less years of age that were admitted due to COVID-19, between January and August 2021 in the Hospital de Torres Vedras' Pneumology ward, comparing it with data from recent literature.
Methods: Retrospective descriptive analysis of the population of individuals with ages between 18 and 50 years old hospitalized due to COVID-19 in a general hospital, throughout a period of 8 months, that represented 25,6% (n = 42) of all hospitalizations due to COVID-19 (n = 164). SPSS (version 24) was used for the statistical analysis.
Results: In the analyzed population, 28 (66.7%) were male, with an average age of 40,3 years (standard deviation ± 9,1), 27 (64,3%) were born in Portugal, 5 (11,9%) were born in India, 4 (9,5%) in Brazil and the others were born in other European and Asian countries. Regarding past medical history, 39 (90,5%) were non-smokers and 11 (26,2%) had a previous record of respiratory disease, being asthma the most frequent (n = 5; 11.9%), followed by obstructive sleep apnea (n = 2; 4,8%) and history of multiple respiratory infections ((n = 2; 4,8%). 10 (23,8%) had cardiovascular disease, with hypertension (n = 9; 21,4%) and dyslipidemia (n = 5; 11,9%) being the most frequent. In the studied population, 6 (14,3%) individuals were obese and 3 (7,1%) were overweight. The average number of the hospitalization duration was 10,1 days (standard deviation ± 6,1), and the longest lasted 31 days. The average symptom duration at presentation was 5,4 days (standard deviation ± 2,3). Of all the individuals that developed respiratory failure, 25 (59,5%) required conventional oxygen therapy, 6 (14,3%) required high-flow nasal cannula oxygen therapy, 6 (14,3%) required non-invasive ventilation and 1 (2,4%) required mechanical ventilation. 2 individuals required intensive care unit admission. No deaths were recorded. The statistical analysis was not conclusive regarding correlation between epidemiologic data, past medical history and clinical severity.
Conclusions: This study allowed the characterization of severity in young individuals admitted due to COVID-19 in Centro Hospitalar do Oeste. Unlike many systematic reviews and meta-analyses, none of the studied variables correlated with disease severity. However, relevant co-morbidities were identified in the studied populations, such as hypertension and asthma, as described in literature.

Keywords: *COVID-19. Young. Comorbidity. Hospitalization.*

CO 078. ORGANIZING PNEUMONIA (OP) AFTER SARS-CoV-2 INFECTION: PATIENT PROFILE AND ASSESSMENT OF PULMONARY SEQUELAE

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Introduction: SARS-CoV-2 infection is responsible for a variety of pulmonary manifestations in the acute phase and sequelae (diffuse and fibrotic changes). Some studies have tried to understand epidemiology, risk factors, and prognosis. We analyzed the profile of patients who were hospitalized for COVID-19 (CHULN) who developed a pattern of organizing pneumonia (OP) and its evolution.
Methods: A retrospective study was carried out, through the analysis of the clinical files of patients referred to the "post-COVID-19 Follow-up" appointment (December/2020 to May/2021). The profile of patients with OP was characterized and an analysis of the imaging data and the pulmonary function tests (EFR) was performed over a one-year evaluation (follow-up: 3-6 months; 12 months).
Results: A total of 123 patients were referred during that period, and 92 patients were included, 65% were male, with a mean age of 63 ± 13 years, and 33% had previous or active smoking habits. The most relevant comorbidities were hypertension (55%), diabetes mellitus (DM) (30%), and heart disease (21%). Excess weight/obesity was observed in 82% (BMI of 31 ± 6 kg/m^2). The duration of hospitalization was 24 ± 12 days. The disease was classified as moderate/severe in 69%, and 21% required hospitalization in an intensive care unit. Invasive mechanical ventilation was used in 14%, BiPAP in 9%, CPAP in 12%, and HFNC in 28%. Initial chest CT showed pulmonary involvement of "25-50%" in 58% of cases and "> 50%" in 36%. DM was significantly associated with disease severity (p = 0.019; OR: 3.846; 95%CI 1.192-12.412). EFR performed at 3-6 months and 12 months showed a restrictive pattern in 30% and 17%, respectively, with a decrease in DLCO (33% and 17%). Patients with moderate/severe disease showed a slight decrease of DLCO in 20% and moderate in 10%, in the annual assessment. Ground glass opacities (GGO)/consolidations (C) were observed in 77% of patients with moderate/severe disease at 3-6 months (54% in mild disease). In addition to disease severity, age was also associated with the maintenance of GGO (p < 0.05). At 12 months, no consolidations were described in any of the groups. Moderate/severe disease had a higher risk of maintaining OpVD (p = 0,002; OR: 16,000; 95%CI 1,876-136,441), with 50% still having OpVD (different from 6% in mild disease). Linear densification (62%) and fibrosis (12%) were seen in mild disease at 3-6 months, similar to moderate/severe disease. Patients with initial extension "> 50%" on CT were more likely to have fibrosis at 12 months (p = 0.028), with fibrosis being documented in 28% of patients with moderate/severe disease.
Conclusions: Patients with OP associated with COVID-19 progressed favorably, despite mostly having moderate/severe disease, and may present changes in EFR (particularly decreased DLCO) and imaging (GGO, linear densification, and fibrosis) at 12-month follow-up, depending on disease severity and initial imaging extent.

Keywords: *SARS-CoV-2 infection. COVID-19. Organizing pneumonia. Evolution.*

CO 079. CARDIOPULMONARY EXERCISE TESTING IN THE ASSESSMENT OF PATIENTS WITH POST-COVID-19 SYMPTOMS

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Introduction: Dyspnoea and exercise intolerance are frequently reported symptoms several months after SARS-CoV-2 infection, and the exact pathophysiological mechanisms are yet to be determined. In the absence of a recognisable cause on resting evaluation, cardiopulmonary exercise testing (CPET) can be used to accurately evaluate post-COVID-19 dyspnoea, with variable results that include, among others, dysfunctional breathing and muscle deconditioning.
Methods: A retrospective study of patients with persistent dyspnoea and fatigue post-COVID-19 that performed a CPET between March 2021 and June 2022 was conducted. Patients were characterized according to demographic and clinical data obtained through clinical process review, including World Health Organization's (WHO) COVID-19 disease severity classification, time elapsed between acute disease and CPET performance and CPET results obtained. Then, a descriptive analysis of the collected data was made for each WHO's severity group.
Results: Ten patients performed CPET during this period [(median age, 54 years (IQR 12), female gender, 60%)]. According to WHO's classification, six patients had mild disease (group L) and four had severe disease (group G). Female gender was more prevalent (90%) and patients were younger (median age, 49 years) in group L. Two patients in each group had smoking history. Comorbidities were similar in both groups, with obesity, essential hypertension, diabetes, asthma and depression being the most frequent. Only patients from group G had thoracic imaging changes, with residual post-infectious parenchymal involvement. Diffusing lung capacity for carbon monoxide was slightly reduced in two patients from group L. No echocardiographic abnormalities or anaemia were detected in any patient. Time elapsed between COVID-19 diagnosis and CPET performance was inferior in G group [median time, 203 days (Q25-Q75: 153-272) *vs.* 519 days (Q25-Q75: 228-718)]. Average peak oxygen consumption (VO2) was similar in both groups (21,7 *vs.* 21,2 mL/kg/min and 81 *vs.* 84% of predicted value, respectively for group G and L), and was reduced in four patients. Two patients from group G had normal exercise performance. The other two had abnormal patterns, one with cardiocirculatory limitation and the other presenting obesity related pattern. Exercise patterns documented in group L were dysfunctional breathing (disproportionate hyperventilation) with exercise (n = 3) and muscle deconditioning (n = 3) (one patient presented both limitations); one patient had a normal exercise performance.
Conclusions: Our results are similar to those found in literature that correlate post COVID-19 dyspnoea with dysfunctional breathing (including disproportionate hyperventilation) and muscle deconditioning as common response patterns, either in severe or mild disease. Early recognition of these patterns through CPET allows the right diagnosis to be made and accurate treatment strategies. We recognise, however, the need for further research in this area.

Keywords: *COVID-19. Dyspnoea. Cardiopulmonary exercise testing.*