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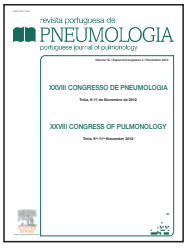

ORAL COMMUNICATIONS

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CONNECTIVE TISSUE DISEASES AND INTERSTITIAL LUNG DISEASES

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Introduction: Interstitial pneumonitis (ILD) are the most common type of lung involvement by connective tissue diseases (CTDs), which may be their presentation form in some cases. Despite several types of pneumonitis observed, fibrosing subtype of nonspecific interstitial pneumonitis (NSIP) is the most frequent and therapeutic approach depending of severity degree of respiratory function and/or chest imaging.
Objectives: Characterization of patients with CTDs and ILD in regard to demographic data, clinical manifestations, immunological markers, pulmonary function tests, chest imaging and treatment.
Methods: Retrospective study including patients with ILD in the context of CTDs seen in diffuse lung diseases outpatient university hospital. Statistical analysis was performed with SPSS 18.0.
Results: 52 patients were included, 86.5% females, aged 60.9±10.3 years and non-smokers (86.5%). The most common CTDs were: Rheumatoid Arthritis (RA) 36.5% (19), Systemic Sclerosis (SS) 34.6% (18), Systemic lupus erythematosus (SLE) 13.5% (7), dermatomyositis/polymyositis 9.6% (5) and Sjögren's syndrome (SS) 5.8% (3). At the time of detection of pulmonary involvement, patients had CTD diagnosis for 12±9.3 years and this period was longer in LES and SS. In 75% of patients there were respiratory symptoms, which appeared 3.3±3.1 years before the diagnosis of lung involvement and dyspnea (55.8%) and dry cough (19.2%) were the most common symptoms. The crackles on auscultation were present in 55.8%. The most frequent respiratory functional pattern was a restrictive pattern (15.4%) and decreased in diffusion of CO (51.9%), and both changes were more evident in SS. The imaging patterns observed were NSIP (51.9%), Usual interstitial pneumonia (28.8%) and Organizing pneumonia (13.5%), with pulmonary involvement less than 20% in 90.4% of cases. In bronchoalveolar lavage (BAL) 40.0% had lymphocytosis, 54.3% neutrophilia and 28.6% had eosinophilia. In 40.4% of patients started therapy directed to the pulmonary involvement, with the remaining patients maintained vigilance only. There were no statistically significant correlations between pneumonitis type and respiratory functional pattern or BAL.
Conclusion: The data obtained in this patient group are coincident with the published series, namely the RA and SS as CTDs more frequent and NSIP as the predominant pneumonitis type. The period between the onset of respiratory symptoms and the diagnosis of pulmonary involvement is long, suggesting the need to raise autoimmune diseases consultation awareness of the respiratory involvement. The different types of interstitial pneumonitis showed no differences in the severity degree defined by respiratory functional patterns or any association to a specific cell pattern in BAL.

Keywords: *Connective tissue diseases. Interstitial pneumonitis.*

METALLOPROTEASES 1 AND 7 AS POTENTIAL IDIOPATHIC PULMONARY FIBROSIS (IPF) DIAGNOSIS BIOMARKERS

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Introduction: Although the majority of IPF patients enclose typical clinical and radiologic features that support the diagnosis, there are some patients that require surgical lung biopsy to clarify atypical clinical or radiologic presentations. Metalloproteasis 1 and 7 had been described as potential IPF biomarkers, but they were never tested in comparison with the main IPF differential diagnosis as Usual Idiopathic Pneumonitis (UIP) other than IPF or fibrotic non specific interstitial pneumonitis (NSIP), either idiopathic or secondary forms. Aim: Evaluation of MMP1 and MMP7 as IPF diagnostic biomarker in comparison with UIP other than IPF and NSIP.
Material and methods: Patients with IPF, UIP other than IPF, idiopathic NSIP and secondary NSIP evaluated at Diffuse Lung Diseases outpatient clinic were included. Blood was drawn from participants using standardized phlebotomy procedures and after written consent. Plasma or serum was separated by centrifugation, and all specimens were immediately aliquoted and frozen. Assays were performed using Luminex xMAP technology (Luminex Corporation) in 96-well microplate format. SPSS Vs 18.0 was used for statistical analysis.
Results: One hundred patients were included, 42 with IPF, 21 with UIP other than IPF, 12 idiopathic NSIP and 25 secondary NSIP. MMP1 was significantly higher in IPF patients in comparison with

other patients (*P*=.005). Considering the subgroups of the control group, we didn't found a significant distinction regarding UIP other than IPF (*P*=.095). On contrary, MMP1 was significantly higher in IPF than NSIP (*P*=.004), but only in secondary forms (*P*=.003), not in the idiopathic ones (*P*=.197). MMP7 was significantly higher in IPF patients in comparison with other patients (*P*=.001). Considering the subgroups of the control group, we found a significantly higher MMP7 in IPF patients in comparison with UIP other than IPF (*P*=.002) or NSIP (*P*=.005) either considering idiopathic (*P*=.023) or secondary forms (*P*=.021).
Conclusions: In this series, the data about MMP1 and MMP7 seems to confirm a putative role as IPF biomarker for these two proteins, namely in what MMP7 is concerned, since a significant association with IPF persists in comparison with its main differential diagnosis.
This study had the financial support of Boehringer Ingelheim Lda.

Keywords: *IPF. Biomarkers. Metalloproteases.*

COPD: GOLD 2011 AND IMPLICATIONS IN CLINICAL PRACTICE

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Introduction: The GOLD guidelines-Global Initiative for Chronic Obstructive Lung Disease are indications internationally recognized for COPD. Since its first publication there have been several updates but it was recognized that lacked a multidimensional classification system which would translate into a more individualized treatment. This review was published in December 2011 containing significant changes in terms of classification, therapy and comorbidities. Despite representing an advance its implications for clinical practice are still unknown.
Objective: Application of the classification system-GOLD 2011 to patients with COPD, correlating its components (FEV_1, symptoms, exacerbations) and comparison with the previous system (2010), evaluating the clinical implications.
Methods: Longitudinal study including patients with COPD (FEV_1/FVC<0.7 after bronchodilator) followed in CHTMAD Pulmonology consultation who performed pulmonary function tests (PFR) from March to August 2012.Were excluded patients with other obstructive diseases and missing data. There were evaluated symptoms, spirometry and exacerbation history by telephone interview and consultation of clinical process. Patients were staged according to GOLD 2010 and 2011 and evaluated the changes in the classification and therapeutic indication.
Results: Sixty-five patients were evaluated (69.2% men, mean age 68.8±10.7years), 58.5% with smoking habits. According GOLD 2010, 49.2% were stage II, 23.1% stage III, 13.8% stage IV and 13.8% stage I. According GOLD 2011, 40% belonged to group B, 38.5% group D, 15.4% group A and 6.2% group C. The averaged CAT was 17.8±10.1. The CAT items that had higher scores were those of "dyspnea on exertion" (69.9±31.5%) and "energy" (55.1%+30.4). The "sleep" item had the lowest score (29.9+34.7%). There was a history of exacerbations in 49.2% patients. There was a low negative linear association (r =−0.39) between FEV_1 and CAT score (*P*=.001). With an increase of airflow obstruction exacerbations were more frequent and more severe, however there was no statistically significant association between the number of exacerbations and FEV_1. There was a moderate positive linear association (r=+0.47) between the number exacerbations and CAT score (*P*<.001). The short-acting bronchodilators (SABD) for symptomatic relief were indicated in 13.8% according GOLD 2010 and 15.4% according GOLD 2011, regular treatment with long-acting bronchodilators (LABD) in 49.2% (GOLD 2010) and 40% (GOLD 2011), LABD with inhaled corticosteroids (ICC) in 26.2% (GOLD 2010) and 33.8% (GOLD 2011) and LABD with ICC and oxygen therapy in 10.8% according both GOLD. The new GOLD classification would lead to pharmacological change in 21.5% patients.
Conclusion: The application of the new GOLD classification is more complete and easily feasible. As already described there is a weak correlation between the degree of airflow obstruction and symptoms, which reinforces its inclusion as part of the classification system. Exacerbations become more frequent and more severe with increased airflow obstruction. Implementation of the new GOLD resulted in pharmacological indications changes in 21.5% of patients which reinforces the importance of its application.

Keywords: *GOLD-COPD. Therapy.*

EVALUATION OF *ANXA11* RS1049550 SINGLE NUCLEOTIDE POLYMORPHISM ASSOCIATION WITH SARCOIDOSIS SUSCEPTIBILITY

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Introduction: A recent genome-wide association study detected a strong association between Annexin A11 *(ANXA11)* polymorphisms and sarcoidosis susceptibility. *ANXA11* take part in several biological pathways, namely apoptosis and cellular proliferation.
Aim: Evaluation of *ANXA11* rs1049550 single nucleotide polymorphism (SNP) association with sarcoidosis susceptibility in a Portuguese population and after stratification for clinically distinct disease presentations and evolution.
Material and methods: A case-control study included 208 unrelated sarcoidosis patients (38.3±12.0 years, 58.7% women) and 197 healthy controls (31.8±7.0 years, 62.4% women). Samples were genotyped for *ANXA11* rs1049550 C/T (R230C) polymorphism using real time polymerase chain reaction (PCR) with TaqMan SNP genotyping assay. Allele frequencies were compared with Chi-square (or *Fisher* exact test when appropriate) and genotype frequencies with Chi-square for trend test. Odds ratio (OR) and 95% confidence intervals (95%CI) were calculated as association measures.
Results: The frequency of *ANXA11* rs1049550 T allele was significantly lower in sarcoidosis patients compared with controls (33.2% vs 44.9%; *P*<.001; OR=0.61, 95%CI 0.45-0.82). OR=0.52 and OR=0.44 for sarcoidosis were obtained respectively, in the carriers of one (genotype *ANXA11* CT) and two (genotype *ANXA11* TT) copies of *ANXA11* rs1049550*T allele (*P*<.001), normalised to the CC wild type genotype. When patients were divided in groups with (n=55) and without Löfgren syndrome (LS), there was no significant differences in the *ANXA11* T SNP frequency, but when they were compared with controls, this association persists only in the group without LS. There were no statistical differences regarding lung function impairment pattern, radiological stages (Scadding criteria) or extrathoracic involvement. An association between patients with neutrophils in normal range on bronchoalveolar lavage fluid profile (<4%) and the genotype *ANXA11* TT was noticed (31.8%; *P*<.045; OR=0.76; 95%CI, 0.56-1.04). Any significant association between *ANXA11* rs1049550 alleles with the different types of evolution, such as resolution, chronic stable or chronic instable, either considering two or five years of disease evolution, was not observed.
Conclusions: In this population an association between *ANXA11* rs1049550*T SNP and protection to sarcoidosis was observed, confirming previous data in populations from different geographic regions.

Keywords: *ANXA11. T Allele. Sarcoidosis.*

THE DIAGNOSIS OF SARCOIDOSIS IN THE ERA OF EBUS-TBNA

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Introduction: The recent development of endobronchial ultrasound, which enables real-time visualization of mediastinal structures and their combination with transbronchial needle aspiration (EBUS-TBNA), currently allows safe and effective punctioning of the mediastinal and hilar lymph nodes. The usefulness of the EBUS-TBNA in the diagnosis and staging of lung cancer is universally recognized. However, its importance in the diagnosis of benign pathology of the chest, including sarcoidosis, is progressively increasing.
Objectives: To evaluate the contribution of EBUS-TBNA for the diagnosis of sarcoidosis.
Materials and methods: Retrospective study of patients with pulmonary sarcoidosis followed in the Interstitial Lung Diseases Unit from March 2010 to August 2012 (population A) corresponding to the period of availability of EBUS-TBNA in our hospital. This population was compared with the population observed from January 2006 to February 2010 (population B). We assessed demographic characteristics, classification stages, histological examination, diagnostic techniques used and the need of surgical biopsy (mediastinoscopy/VATS/thoracotomy). The diagnosis of sarcoidosis was made based on clinical and radiological signs and whenever possible in demonstration of noncaseating granulomas.
Results: The study included 78 patients and its characteristics are described in the following table.

	Population A	Population B
Total	26	52
Female sex (%)	57.7	63.5
Mean age (age)	47.4	43.4
Stage (I/II/III/IV)	15/8/2/1	20/26/3/3

The diagnostic examinations performed and pathologic confirmation are described in the following table.

	Population A		Population B	
		Pathological confirmation		Pathological confirmation
Bronchial biopsy	5 (19.2%)	3 (60%)	10 (19.2%)	3 (30%)
Transbronchial biopsy	5 (19.2%)	4 (80%)	10 (19.2%)	7 (70%)
TBNA	1 (3.8%)	0	5 (9.6%)	3 (60%)
EBUS-TBNA	19 (73.1%)	19 (100%)	0	
Skin biopsy	1 (3.8%)	1 (100%)	7 (13.5%)	7 (100%)
Other lymph node biopsy	0		3 (5.8%)	2 (66.7%)
Mediastinoscopy	0		5 (9.6%)	5 (100%)
VATS	0		1 (1.9%)	1 (100%)
Thoracotomy	1 (3.8%)	1 (100%)	2 (3.8%)	2 (100%)
Total	26	25 (96.2%)	52	29 (55.8%)

In population B 28.6% of patients required surgical biopsy for diagnosis while in the population A only 3.8% underwent surgery. Since the introduction of EBUS-TBNA there are significantly more histopathological confirmations (P<.001) and less need for surgical biopsy (P=.03). No complications were observed in patients who have performed EBUS-TBNA.
Conclusion: The EBUS-TBNA is a valuable tool in the diagnosis of sarcoidosis, enabling greater pathological confirmation and less need for surgical biopsies with low rate of complications.

Keywords: *Sarcoidosis. EBUS-TBNA.*

PULMONARY HYPERTENSION IN IDIOPATHIC PULMONARY FIBROSIS: A NEW PHENOTYPE?

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Introduction: Idiopathic Pulmonary Fibrosis (IFP) is a progressive fatal diffuse parenchymal disease. Pulmonary hypertension (PH) in IFP has been increasingly recognized as a condition with significant prognostic relevance. PH usually develops in patients with advanced IFP however; there exists a subset of patients who develop PH at earlier stages of the disease.
Objective*:* Comparison of clinical, functional and radiological parameters in patients with IFP with and without PH at presentation.
Methods: Fifty three patients with IFP diagnosis according to the criteria of the ATS/ERS were included. PH was defined as a systolic pulmonary artery pressure (sPAP) above 35 mmHg (right heart catheterization was not done because there is no indication for PH therapy in IFP patients). Patients with left heart disease were excluded. A comparative study between patients with and without PH regarding clinical, radiological and functional parameters was done.
Results: From fifty three patients included, 60.4% were males, with a mean age at diagnosis of 69.2 years old (SD = 10.62). PH was present in 20.8% of patients at diagnosis. There were no statistically significant differences between the two groups of patients regarding to the time elapsed from onset of symptoms to diagnosis (P=.442) and to the presence of emphysema (P=.592). Patients with PH had a lower mean diffusing capacity of the lung for carbon monoxide (P=.035) and a lower PaO_2 (P=.049); no significant differences regarding other functional parameters were found, including FVC (P=.346), TLC (P=.406) or 6th minute walk test. There were also no statistically significant differences between the two groups of patients regarding to the score of fibrosis (P=.699).
Conclusions: In this study, the presence of PH at diagnosis did not correlate with the usual parameters that characterize disease severity, such as lung volumes and fibrosis score on HRCT. These data are consistent with the concept of IFP and PH in the early stages of the disease correspond to a distinct phenotype that is likely to result from different pathophysiological mechanisms and in future may condition other therapeutic approaches.

Keywords: *Idiopathic pulmonary fibrosis. Pulmonary hypertension. Phenotypes.*

INTERSTITIAL LUNG DISEASE IN SYSTEMIC SCLEROSIS

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Introduction: Interstitial lung disease (ILD) is a main cause of morbidity and mortality in Systemic Sclerosis (SSc) patients.

Objective: To assess the presence, severity and independent predictors of ILD in SSc patients followed-up in our hospital.
Methods: Transversal study including 24 patients (11 limited cutaneous, 9 diffuse cutaneous, 2 sine scleroderma and 2 overlap syndromes). Assessment included medication, smoking status, New York Heart Association Functional Class, pulmonary function tests (PFT), thoracic high resolution computed tomography scan (HRCT) and serum antibody profile. HRCT disease extent was classified according to Goh et al. and pattern according to Muller et al.
Results: 24 patiente were assessed, ILD was diagnosed in 40% (10 patients). Of these patients, 7 had extensive disease (>20% lung involvement) and ground glass opacities without fibrosis were the predominant HRCT pattern (70%); hypoxia was present in 40%. Mean FVC was 77.4% and mean KCO was 68.6. Scl70 positivity was an independent predictor of the presence of ILD (positive likelihood ratio 12.37; *P*=.007), extensive disease (+LR 19.10; *P*=.008) and of fibrotic pattern (+LR 17.37; *P*=.020).
Conclusions: As most ILD patients present with none or only minor symptoms, regular assessment of SSc patients with PFT and HRCT is crucial, particularly in Scl70 positive patients and those who are candidates to vasodilators and endothelin receptor antagonists.

Keywords: *Systemic Sclerosis. Intersticial disease. Autoimmune.*

PERCUTANEOUS TRANSTHORACIC BIOPSY GUIDED BY COMPUTED TOMOGRAPHY IN THE EVALUATION OF INTRATHORACIC LESIONS-RETROSPECTIVE STUDY

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Introduction: The percutaneous transthoracic biopsy (PTB) with core needle, guided by computed tomography (CT) has been used for histological evaluation of intrathoracic lesions as it has proven to be an effective and relatively safe technique.
Objective: Evaluation of indications, diagnostic yield and complications of CT-guided PTB to study intrathoracic lesions, in patients followed at Pulmonology Department.
Material and methods: Retrospective study, based on the review of clinical and imaging processes and histological results, of the CT-guided PTB performed in CHTMAD and requested by Pulmonology Department, during May 2011 (implementation of the technique in CHTMAD) to August 2012. Data related to patient, lesion and technical procedure were evaluated. Statistical analysis was performed using SPSS.
Results: There were performed 70 core biopsies in 67 patients (68.7% men, mean age 67.2+12.5years). They had smoking habits, past or present, 51.6% patients (nicotine load average: 55.6+34.7 pack year) and the majority (98.2%) had normal coagulation values. The indications for performing PTB were: solitary pulmonary nodule/mass (70.1%), multiple pulmonary nodules (9%), parenchymal condensation without response/evolution under drug therapy (7.5%), interstitial infiltrates (6%), pleural nodules/masses (3%), pleural thickening (3%) and mediastinal mass (1.5%). In 89.6% of cases were performed for suspected malignant disease and 10.4% for suspected interstitial lung disease. Radiologically lung lesions were mostly mass (52.2%) and nodules (32.3%) and 8.1% parenchymal condensations, 6% were located in the pleura and 1.5% in the mediastinum. Most were superficial (74.6%). This technique led to a diagnosis in 89.6% of cases, was inconclusive or insufficient material in 7.5% and 3%, respectively. The pathological examination concluded that it was malignant lesion in 53.3% of cases and benign in 46.7%. The inflammatory/nonspecific alterations (26.7%) were the most frequent benign lesions followed by interstitial lung disease (13.3%). There were no statistically significant factors associated with higher diagnosis rate. The PTB confirmed the initial diagnostic hypothesis in 55.2% patients and directed to another diagnosis in 34.3%, with diagnostic relevance in 89.6% of cases. Complications were detected in 24.2% biopsies, the most frequent pneumothorax (n=12; 17.1%), requiring drainage in 5 cases (7.1%) and hemorrhagic complications in 7.1%. The factors associated with a higher incidence of pneumothorax were deep location of lesion (*P*=.017), absence of pleural contact (*P*=.019) and age<65 years (*P*=.017).
Discussion/conclusion: The CT-guided PTB proved to be an effective technique, leading to a definitive diagnosis in majority of patients, a result similar to that found in the literature, especially in the diagnosis of malignancy and is also useful in the interstitial lung pathology. The complication rate remained at acceptable intervals, strengthening its security.

Keywords: *CT-Guided percutaneous transthoracic biopsy. Diagnostic yield. Complications.*

AMYLOIDOSIS OF THE AIRWAYS: "BRONCOSCOPHY SEMIOLOGY"

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Respiratory amyloidosis (RA) is a rare condition characterized by the deposition of extracellular insoluble protein in the sub-mucosa of tracheobronchial tree. It may involve different areas of the pulmonary tract, from larynx to alveoli, either in a localized or diffuse pattern. The mucosa of the airway may appear grossly yellowish edematous or haemorrhagic, diffusely distributed or in plaques, producing persistent hemophtysis and reduction in airway caliber with consequent atelectasis and recurrent pneumonia. We report on a series of seven patients, referred to our institution, between 2003 and 2011. These patients, three men and four woman, aged from 51 to 75 years, were identified for RA, from among approximately fourteen thousand records in the bronchoscopy database of our Department. The medical records were then reviewed to look for clinical symptoms, radiological patterns, bronchoscopic abnormalities, diagnostic procedures and therapeutic outcomes. Two patients had recurrent hemopthysis with respiratory infections, five patients had variable degrees of obstructive dyspnea and one case complained of relentless fatigue. Bronchoscopy disclosed multiple haemorrhagic submucosal infiltrations in two patients and another two patients showed tracheobronchial bottle-neck stenosis. Two patients had an endoluminal pseudo-tumoral obstructive mass and one paitent showed central extrinsic compression along with submucosal irregular infiltration. One patient had an otherwise normal bronchoscopy with a chest CT-scan showing a right upper lobe pulmonary nodule. Bronchoscopic biopsy forceps allowed the diagnosis of amyloidosis in all but one patient, in whom a diagnostic and therapeutic lobectomy was performed. Therapeutic bronchoscopy consisted in Nd-Yag laser coagulation with bronchscopic debulking and dilatation in three patients, and Argon-plasma coagulation in another patient. Tracheal stenting was also needed in one patient. From this small series we conclude that respiratory amyloidosis although uncommon can mimic many other diseases, including cancer. Flexible bronchoscopy with biopsy is the most important diagnostic tool in tracheo-bronchial amyloidosis. Interventional bronchoscopy is an important therapeutic procedure, namely in pseudo tumoral forms, benign airway stenosis or in controlling haemopthysis.

Keywords: *Tracheobronchial amyloidosis. Endobronchial abnormalities.*

TRACHEOBRONCHIAL STENTS-RETROSPECTIVE ANALYSIS

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Introduction: Central airways obstructions may have benign or malignant etiology. Regardless of the etiology it can seriously compromise the quality of life, and put patient`s life at risk. When indicated, the tracheobronchial stents leads to maintenance of structural stability of the airway, symptoms relief, and in patients with neoplastic obstruction, may prolong survival.
Objective: Review of five years experience using tracheobronchial stents in a central hospital.
Material and methods: Retrospective analysis of patients undergoing placement of tracheobronchial stents in a central hospital, between Jan/06 and Dec/10. The identification of patients was made by computer search and review of clinical files. We describe etiologic and anatomic features, bronchoscopic techniques performed, results and complications.
Results: We identified 86 patients, 17 (20%) were women and 69 (80%) men. The mean age was 61 years (24-88 years). Concerning smoking habits: 54 (63%) were smokers, 19 (22%) ex-smokers and 13 (15%) non-smokers. The etiologies were: 76 (88%) neoplastic (26 pulmonary and 50 extrapulmonary) and 10 (12%) non-neoplastic. Regarding the type of obstruction: 17 (20%) extrinsic compression, 6 (7%) infiltration, 32 (37%) mass and extrinsic compression, 26 (30%) infiltration and extrinsic compression, and 5 (6%) dynamic collapse. The sites of involvement were: Trachea (TC) in 52 (61%), TC and right or left bronchial tree 14 (16%), left bronchial tree 15 (17%) and right bronchial tree 5 (6%). The procedure was elective in 75 (87%) and emergent in 11 (13%). All procedures were performed with rigid bronchoscopy. Ninety-three stents were placed: 86 (92%) silicone and 7 (8%) metallic. The number of stents required per patient was: one in 80 (93%), 2 in 5 (6%) and 3 in 1 (1%). Concurrently the following additional techniques were performed: laser in 18 (21%), mechanical debridement in 27 (31%) and dilatation in 11 (13%). Bronchial patency was obtained in 84 (98%). At least one bronchoscopic revaluation was performed in 44 (51%) patients (1-16 revaluations). The stents were removed in 8 (9%) (5 malignant and 3 benign) and replaced in 8 (9%). The peri and post-procedure complications in patients who had at least one bronchoscopic reassessment in our center included: tumor obstruction in 10 (12%), stent displacement in 9 (11%), obstruction by clot in 3 (4%), tracheoesophageal fistula in 3 (4%), obstruction by mucus in 2 (2%), respiratory failure in 2 (2%), obstruction by granulation tissue in 1 (1%) and cardiopulmonary arrest in 1 (1%).
Conclusion: The neoplasms were the main indication for placement of tracheobronchial stents. High success rate in recanalization of the airways was obtained, which proves the usefulness of this technique for the relief of obstruction.

Keywords: *Tracheobronchial stents. Rigid bronchoscopy. Neoplasm.*

INFLUENCE OF EMPHYSEMA DISTRIBUTION IN PULMONARY FUNCTION PARAMETERS

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Pulmonary emphysema has distinct clinical and radiological features that can be independent of airflow obstruction severity. The aim of this study was to evaluate the impact of emphysema distribution on patients' clinical and functional features. Patients with emphysema were randomly selected. Lung emphysema predominance was analysed and patients classified according to a lung CT 5-point visual scoring system. The influence of emphysema distribution score on clinical and functional presentation was determined. Eighty-six patients were included, mean age 65.15±12.21 years-old, 91.9% were male, 98.8% smokers (62.70±38.39 pack-year) and 16.3% had Alpha1-Antitrypsin deficiency. Concerning GOLD stratification for flow limitation, 28.2% had stage 1, 22.4% stage 2, 29.4% stage 3 and 20% stage 4. Upper lung-predominant emphysema was present in 36% patients, 25.6% cases had moderately predominant emphysema in upper lung, 22.1% had moderately predominant emphysema in lower lung and the remaining 16.3% had homogeneous distribution. Moderately predominant emphysema in lower lung was associated to lower PaO_2/FiO_2 ratio, FEV_1, FVC, FEV_1/FVC, DLCO and DLCO/VA ($r= -0.456$ to $r= -0.603$, $P<.0005$). Patients with moderate lower lung predominancy are more probable to have $FEV_1<65\%$ than patients with upper lung predominant emphysema (OR 4.55, 95%CI 1.23-16.88; $P=.023$) and PaO_2/FiO_2 ratio<285 (OR 30.38; 95%CI,3.33-277.31; $P=.002$). Patients with homogeneous emphysema had lower 6-min walk distance ($F=5.007$; $P=.003$) and higher desaturation ($H=11.860$; $P=.008$). They had also higher RV/TLC, although without achieving significance ($P=.064$). Moderately predominant emphysema in lower lung was related to more severe disease than upper lung predominance. Patients with homogeneous emphysema had greater hyperinflation and worse exercise performance. Distribution of emphysema has an important impact on functional parameters and should be considered in disease evaluation.

Keywords: *Pulmonary emphysema. Pulmonary function test. Computed tomography.*

TELEMOLD PROJECT: A TELEMONITORING SYSTEM THAT COMBINES OXIMETRY AND PHYSICAL ACTIVITY QUANTIFICATION TO IMPROVE LONG TERM OXYGEN THERAPY

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Background: Standard assessment to long term oxygen therapy (LTOT) prescription involves periodic clinical tests (arterial blood gas, 6-min walk test and nocturnal oximetry) carried out in several hospital visits. However, there is some evidence that oxygen demand during daily activities may not be correctly estimated by such tests, when compared to continuous ambulatory oximetry.
Aim: To evaluate the clinical usefulness of a home telemonitoring system in LTOT optimization.
Methods: Thirty five respiratory failure patients (29 with LTOT, 6 under evaluation for LTOT) followed in a Universitary Hospital were real-time monitored with an oximeter sensor (Nonin Avant 4000 system) and an accelerometer (BioPlux motion). Signals were sent via Bluetooth to a mobile phone and then via 3G or GPRS to a server. Continuous and secure access to data through an Internet site was established.
Results: Each patient was monitored in average 7.6±4.5 days (range 2-19), in a total of 83.0±66.9 h (4.8-228.8). Percentage of valid records was in average 65.4±24.1% (0-100%). Percentages of rest, activity and sleep records per patient were, in average, 28.4±21.3%, 6.5 ± 5.5% and 59.3±24.6%, respectively. Significative desaturation during rest, activity and sleep was found on 2, 26 and 9 patients, respectively. Patient´s user-friendliness was fairly good (75.8% reported it as easy/very easy).

Conclusion: Our study suggests that a telemonitoring system combining oximetry and physical activity evaluation may improve LTOT through a more adequate oxygen flow prescription, namely during daily activities.
This project was funded with a grant by Fundação Vodafone Portugal.

Keywords: *Ambulatory oximetry. Respiratory failure. Physical activity.*

COPD: GOLD 2011 AND IMPLICATIONS IN CLINICAL PRACTICE

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Introduction: The GOLD guidelines-Global Initiative for Chronic Obstructive Lung Disease are indications internationally recognized for COPD. Since its first publication there have been several updates but it was recognized that lacked a multidimensional classification system which would translate into a more individualized treatment. This review was published in December 2011 containing significant changes in terms of classification, therapy and comorbidities. Despite representing an advance its implications for clinical practice are still unknown.
Objective: Application of the classification system-GOLD 2011 to patients with COPD, correlating its components (FEV_1, symptoms, exacerbations) and comparison with the previous system (2010), evaluating the clinical implications.
Methods: Longitudinal study including patients with COPD (FEV_1/FVC<0.7 after bronchodilator) followed in CHTMAD Pulmonology consultation who performed pulmonary function tests (PFR) from March to August 2012.Were excluded patients with other obstructive diseases and missing data. There were evaluated symptoms, spirometry and exacerbation history by telephone interview and consultation of clinical process. Patients were staged according to GOLD 2010 and 2011 and evaluated the changes in the classification and therapeutic indication.
Results: Sixty-five patients were evaluated (69.2% men, mean age 68.8±10.7years), 58.5% with smoking habits. According GOLD 2010, 49.2% were stage II, 23.1% stage III, 13.8% stage IV and 13.8% stage I. According GOLD 2011, 40% belonged to group B, 38.5% group D, 15.4% group A and 6.2% group C. The averaged CAT was 17.8±10.1. The CAT items that had higher scores were those of "dyspnea on exertion" (69.9±31.5%) and "energy" (55.1%+30.4). The "sleep" item had the lowest score (29.9%+34.7). There was a history of exacerbations in 49.2% patients. There was a low negative linear association (r =-0.39) between FEV_1 and CAT score (*P*=.001). With an increase of airflow obstruction exacerbations were more frequent and more severe, however there was no statistically significant association between the number of exacerbations and FEV_1. There was a moderate positive linear association (r=+0.47) between the number exacerbations and CAT score (*P*<.001). The short-acting bronchodilators (SABD) for symptomatic relief were indicated in 13.8% according GOLD 2010 and 15.4% according GOLD 2011, regular treatment with long-acting bronchodilators (LABD) in 49.2% (GOLD 2010) and 40% (GOLD 2011), LABD with inhaled corticosteroids (ICC) in 26.2% (GOLD 2010) and 33.8% (GOLD 2011) and LABD with ICC and oxygen therapy in 10.8% according both GOLD. The new GOLD classification would lead to pharmacological change in 21.5% patients.
Conclusion: The application of the new GOLD classification is more complete and easily feasible. As already described there is a weak correlation between the degree of airflow obstruction and symptoms, which reinforces its inclusion as part of the classification system. Exacerbations become more frequent and more severe with increased airflow obstruction. Implementation of the new GOLD resulted in pharmacological indications changes in 21.5% of patients which reinforces the importance of its application.

Keywords: *GOLD. COPD. Therapy.*

ASSESSING SYMPTOMS WITH MMRC OR CAT, WHICH FITS BEST?

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The newest GOLD guidelines recommends the use of the Modified British Medical Research Council (mMRC) questionnaire or the COPD Assessment Test (CAT) to assess symptoms in patients with COPD. Although easier to perform, the mMRC questionnaire only assesses disability due to breathlessness, while CAT is preferred because it covers the impact of COPD on the patient's daily life and well-being. Fifty-one patients with lung emphysema were included and underwent clinical and functional assessment. We also evaluated sleep quality and daytime sleepiness using the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS). Then, we compared the performance of both mMRC and CAT in predicting disease severity. Mean age was 63.45±11.87 years-old, 90.2% were male, 96.1% smokers (59.94±33.47 pack-year) and 15.7% had Alpha1-Antitrypsin deficiency. Median mMRC was 1 (0.5-1.5) and CAT 11 (3.5-18.5). Concerning GOLD stratification, 41.2% had stage A, 5.9% stage B, 25.5% stage C and 25.5% stage D. Of the two questionnaires, only mMRC was significantly correlated to PaO_2/FiO_2 ratio, $paCO_2$, FEV_1, FVC, FEV_1/FVC, RV/TLC and DLCO. However, when comparing the correlations of mMRC to each functional parameter, with CAT correlations to the same parameters, we only found significant differences regardin to DLCO (z= −2.06; *P*=.039). CAT correlated better with ESS and PSQI (*P*<.01), although without significant differences with mMRC correlations to the same scores. In addition to be faster and easier to perform, mMRC appears to be better correlated to respiratory functional severity, suggesting some advantages to be used routinely as a symptoms scoring tool. CAT was better correlated to sleep impairment in this group of patients.

Keywords: *Lung emphysema. Pulmonary function test. Symptoms assessment.*

PROFILE OF ADVERSE EFFECTS OF SIX-MINUTE WALK TEST IN PATIENTS WITH CHRONIC PULMONARY DISEASE

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Introduction: The 6-minute walk test (6MWT) is universally used in patients with chronic lung disease. The few existing studies suggest that complications of 6MWT are rare.
Objectives: To describe the technique of realization of 6MWT and to assess the frequency of adverse events during the conduct of 6MWT in patients with chronic pulmonary disease.
Material and methods: 264 patients referenced to perform a 6MWT in an Unit of Functional Exploitation and Rehabilitation were evaluated during 3 months, according to a standardized protocol (30-meter corridor, prior rest of 10 min, plain march, comfortable shoes, at the higher tolerated rate; supplemental O_2 was supplied at usual debit) that includes continuous SpO_2 and heart rate monitoring in real time.
Results: Most patients had interstitial lung disease (n=92, 35%); liquid O_2 for deambulation was assessed in 25 patients (10%). Adverse effects occurred in 77 patients (29%), most of the cases (33 patients) with deep desaturation (SpO_2<80%). In 23 cases (8.7%) the test was halted by patient request because of intolerable symptoms (intolerable dyspnoea in 18 patients, lower limb pain in 3, dizziness 1, chest pain 1). It was found significant desaturation (≥4% decrease in SpO_2 to <90%) in 35% of patients, this being statistically associated with prior SpO_2 and with lower distance covered (*P*<0.05).
Conclusions: The frequency of adverse events of 6MWT observed in this study was relevant, and profound desaturation was the

most common adverse effect. The authors suggest continuous SpO_2 monitoring, besides evaluation of prior SpO_2 and screening for heart disease, in patients with chronic respiratory disease proposed for conducting 6MWT.

Keywords: *Exercise test. Adverse effects. Pulmonary disease.*

COMORBIDITIES AND COPD-RELATION WITH THE FUNCTIONAL AND SYMPTOMATIC EVALUATION

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Background: Chronic obstructive pulmonary disease is one of the leading causes of mortality and morbidity worldwide. Due to its chronic nature, patients often have significant comorbidities, with impact on their respiratory disease and prognosis.
Aim: To evaluate the presence of comorbidities on patients with COPD and its relation with the spirometric staging by GOLD 2010 and the recent COPD assessment by GOLD 2011.
Material and methods: A group of consecutive COPD patients from our outpatient clinic was assessed using both 2010 and 2011 GOLD guidelines. The authors used Modified British Medical Research Council (mMRC) Questionnaire. A retrospective analysis of comorbidities was performed by reviewing the clinical records, and they were distributed according to 2010 and 2011 GOLD stages/groups.
Results: 45 patients were included; the mean age was 62±9 years and 73% were male. 49% patients were former-smokers and 40% current smokers; the smoking exposure was quantified in average of 57±27 pack/years. Of these patients, 15% didn't have any co-morbidity, 29% had one and 56% had at least two. About 51% had cardiovascular disease (87% of arterial hypertension, 13% of coronary artery disease, 9% of valvular disease and 9% of dysrhythmia), 20% had dyslipidemia, 16% had depressive disorder, 13% had obesity, 13% had type 2 diabetes and 9% had history of non-pulmonary oncologic disease. Respiratory failure was present in 27% of the patients (with cor pulmonale in 17%), all of them assessed in group D (GOLD 2011).
The co-morbidity distribution by GOLD stage/group is shown below (Table 1):

Table 1

GOLD stage (2010)		Comorbidities, n (%)		GOLD Group (2011)		Comorbidities, n (%)	
I	n=8	≥2	50%	A	n=9	≥2	33%
II	n=12	≥2	50%	B	n=11	≥2	64%
III	n=12	≥2	42%	C	n=3	≥2	33%
IV	n=13	≥2	77%	D	n=22	≥2	64%

Conclusion: Chronic obstructive pulmonary disease is often associated with co-morbidities, which are frequent even in lower stages of airflow limitation. Also, the distribution of comorbidities by 2011 GOLD assessment group, showed its predominance in the more symptomatic groups (B and D), emphasizing the need of its evaluation and control.

Keywords: *COPD. GOLD. Comorbidities.*

COPD ASSESSMENT: GOLD 2011 VS FUNCTIONAL STAGING

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Background: The 2011 revision of GOLD report establishes a new COPD assessment based on the patient's level of symptoms, spirometric classification and exacerbation history.
Aim: To compare and establish the differences between the classification of COPD patients using 2010 and 2011 GOLD guidelines.
Material and methods: A prospective study with a group of consecutive COPD patients from our outpatient clinic was performed; they were assessed according to the GOLD 2011 by answering COPD Assessment Test (CAT) and Modified British Medical Research Council (mMRC) Questionnaire; by a spirometric evaluation in the same day and by reviewing the history of exacerbations in the last year. This data was confronted with the 2010 GOLD COPD assessment of the same patients.
Results: 45 patients were included (mean age 62.3±9; 73% male). The results are shown below (Table 2).
Conclusions: Patients in 2010 GOLD stage IV were the group with a greater exacerbation history. With the revision proposed by GOLD 2011, patients were mostly placed in the groups with greater symptomatic impact (B and D-73% if assessed by mMRC; 82% if assessed by CAT). This shows the burden of disease in patient's life and the need of a better treatment management, which is one of the goals of the 2011 COPD assessment.

Keywords: *COPD. GOLD. Assessment.*

SMOKING BEHAVIOR TRENDS AMONG PORTUGUESE PHYSICIANS: A MAJOR TOBACCO CONTROL CHALLENGE

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Introduction and aims: All HCPs, and specially physicians, should be role models as non-smokers and systematically promote

Table 2

GOLD Stage (2010)		CAT≥10 (n)	mMRC≥2 (n)	Spirometric Grade (2011)		Exacerbations ≥ 2	2011 GOLD Group (with mMRC)	2011 GOLD Group (with CAT)
I	n = 8	3	2	1	n = 8	0	A-6 B-2	A-5 B-3
II	n = 12	11	9	2	n = 12	0	A-3 B-9	A-1 B-11
III	n = 12	10	9	3	n = 12	1	C-3 D-9	C-2 D-10
IV	n = 13	13	13	3 4	n = 8 n = 5	9	D-13	D-13

smoking cessation. Studies evaluating Portuguese physicians' smoking behavior are limited. In 2009, the authors carried out a conference-survey, using a convenience-sample methodology. Study-aims: 1) to describe and compare smoking prevalence and behaviour trends between younger and older physicians 2) to identify factors associated with smoking behavior.
Methods: Questionnaire-based cross-sectional study, conducted during two main national medical conferences, targeting hospital specialists (HS), primary care (GPs), young graduate physicians (YGs) and undergraduate medical students. All data were self-reported. Overall response rate was 64.0%. Sample: n=608: 58.0% GPs; 32.7% HS; 9.3% students and YGs; 62.7% female; mean age was 39.1 years (SD: 12.86; range: 21-70). Measures: standard WHO recommendations for tobacco use. We accessed nicotine dependence (ND) through "Fagerstrom's short-form test", and willingness to change behaviour. Data Analysis: Chi-square, McNemar and Man-Whitney tests, and multiple logistic regressions (MLR) were performed.
Results: Overall smoking prevalence was 20.6% (CI: 174-238%); 29.5% (CI: 34.6-46.4%) in males and 15.2% (CI: 116-188%) in females (*P*<.001). Smoking prevalence was not related to medical specialty. Of the smokers, 51.2% reported daily smoking, smoking in average 10.2 cigarettes a day (SD: 7.01); median age of regularly smoking was 18 years. Furthermore, the majority of smokers reported uptake of regular smoking during medical school. All these findings were neither age nor gender, nor region, nor specialty-specific. Most smokers (61.8%) reported low nicotine dependence (ND), independently of age, gender, region or specialty. The majority of the smokers (56.7%) had already tried to quit; 46.6% wanted to stop smoking, but only 33.8% reported needing cessation support to quit. MLR showed that daily smokers expressed more willingness to change behaviour (OR: 6.47; CI, 1.97-21.24; *P*=.002), as well as those reporting the most positive attitudes (PA) to being role models (RM) as non-smokers (OR: 10.19; CI, 1.14-91.56; *P*=.038). Being a non-smoker was predicted by reporting RM PA (OR= 5.03; 95%CI, 1.66-15.31; *P*=.004), being a female (OR= 2.13; 95%CI, 1.14-3.97; *P*=.018), and practising in the North of Portugal (OR= 2.84; 95%CI, 1.36-5.93; *P*=.005). Most GPs reported cessation support in their workplace settings, in contrast to hospitalists and medical students (*P*<.001). Age-gender specific analyses revealed that the majority of younger physicians (aged≤44) reported being never smokers (males: 62.7%; females: 77.6%); reported lower smoking rates and more occasional smoking; and earlier quitting-age than the general population, contrasting with older physicians (*P*<.001).
Conclusions: The findings suggest that smoking prevalence among Portuguese physicians is decreasing. Nevertheless, smoking rates remain high. Most physicians who smoke are not interested in quitting; neither consider they need cessation support to quit. Smoking cessation programs targeting medical schools and healthcare services should be a top priority. In addition, implementing comprehensive tobacco control measures and medical education on tobacco control remains a major challenge.

Keywords: *Tobacco use. Physicians. Smoking.*

TOBACCO CONTROL ATTITUDES AMONG PORTUGUESE PHYSICIANS: ARE THEY AWARE OF THEIR ROLE?

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Introduction and aims: Physicians should play a crucial role in tobacco control (TC). In 2008, Portugal implemented a partial smoking ban, full of ambiguities and exemptions, followed by poor enforcement. In 2009, the authors carried out a survey to evaluate physicians' TC attitudes and beliefs. Study objectives were as following: 1) to describe and compare TC attitudes between younger and older physicians, and primary care (GPs) and hospital specialists (HS); 2) to identify factors associated with TC attitudes.
Methods: Questionnaire-based cross-sectional study, conducted during two main national medical conferences, targeting HS, GPs, young graduate physicians (YGs) and undergraduate medical students. All data were self-reported. Overall response rate was 64.0%. Sample: n=608: 58.0% GPs; 32.7% HS; 9.3% students and YGs; 62.7% female; mean age was 39.1 years (SD: 12.86; range: 21-70). TC attitudes and beliefs accessed 4 items: 1) awareness of specific training in smoking prevention and treatment (undergraduate-UGT; graduate-GT); 2) home and car smoking behaviour and restrictions; 3) ETS and Smoke-Free policies (SFPs) beliefs; 4) agreement with SFPs in different settings. Data analysis: We performed Chi-square and McNemar tests, and multiple logistic regression (MLR).
Results: Most young physicians (<45 years) reported UGT, contrasting with older ones (*P*<.001). Most GPs reported GT (53.6%), contrasting with HS (22.1%), *P*<.001. MLR showed that GPs, non-smokers, younger physicians and females were more aware of training needs. Most physicians smoked in the home (71.3%) and in the car (62.8%), independently of specialty. The overwhelming majority of physicians reported that ETS was harmful (100%) and the major indoor pollutant (97%). Of the participants, 36.7% were fully aware of the smoking prevention law (*P*<.001); 54% that SFP would reduce tobacco consumption and disease burden (*P*<.001); 37% that SFPs could help smokers to quit (*P*<.001); 34.6% believed that SHS could be eliminated by ventilation systems; 81% reported low compliance with the partial ban. High levels of agreement with SFPs in workplaces (99%), public administration's buildings (99.5%), schools (99.0%) and healthcare premises (98.3%), were reported, even among smokers, and, to a significant lesser extent in other leisure settings such as shopping malls (94.2%), restaurants (93.0%), bars and discos (85.5%) (*P*<.001); and even less with outdoors bans in healthcare (81.2%) and schools (75.8%); *P*<.001. MLR showed that being a non-smoker, younger than 45, being a GP, reporting graduate training, reporting a smoke-free car or home, predicted more positive TC attitudes.
Conclusions: Few physicians were aware of the public health benefits of SFPs. Agreement to SFPs was high, but significant lower for leisure indoor settings and even lower for outdoors bans and private smoking restrictions. These findings suggest that Portuguese physicians' TC attitudes and knowledge do not correlate with their status as "role models". Poor engagement of physicians in TC policies may contribute to the current lack of comprehensive policies in Portugal, and undermine social norm change. Medical education in TC must become a top priority.

Keywords: *Tobacco control. Attitudes. Physicians.*

PREDICTORS OF SUCCESS IN SMOKING CESSATION-DATA FROM SANTA MARTA'S HOSPITAL SMOKING CESSATION CONSULTATION

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Introduction: Several factors may contribute for smoking cessation success, namely information given to the patient, patients' features and smoking addiction degree.
Aims: To evaluate the success rate of the Smoking Cessation Consultation (SCC) of our hospital and to determine which factors influence this consultation success.
Material and methods: Retrospective analysis of clinical files of patients that attended the SCC, for the first time, between January and June 2011, to evaluate the following: gender, literacy, smoking burden reduction in the month previous to the consultation, previous

smoking cessation attempts, dependence degree (Fagerström test for nicotine dependence), motivation degree (Richmond test), presence of anxiety or depression symptoms (Hospital Anxiety and Depression Scale) and pharmacologic treatment. The consultation success was evaluated 6 and 12 months after the D-day, through telephonic interview. A description analysis of the variables was made and their degree of association with the consultation success was analyzed using Pearson's Chi-Square Test for independence. We considered association statistically significant when $P<.05$.
Results: In the universe of 128 patients that attended to the SCC, 83 were successfully contacted by telephone. About 68% (n=56) were male, with a mean age of 50.2 years. Most had 5-12 years of education. About 50% had reduced their smoking burden in the month before the consultation, 86.7% had made previous attempts to quit smoking, sustained for ≥1 year in 21.7% of cases. In what concerns to nicotine dependence, 51.8% (n=43) of the patients were very dependent and only 13.3% (n=11) were highly motivated for quit smoking. Anxiety symptoms were identified in 37.3% of smoking patients and depressive symptoms in 6%. Only 54 patients (65.1%) completed the prescribed drug therapy: varenicline (37%), nicotine replacement therapy (24.1%), bupropion (22.,2%), nortriptyline (7.4%) or combination therapy of nicotine replacement therapy with bupropion or nortriptyline (9.3%). The success rate of consultation was 36.1% (n=30/83) at 6 months and 27.7% (n=23/83) at 12 months. The success was higher in males, in patients with a maintained previous attempt to quit smoking for over a year, in smokers with higher levels of motivation and those who underwent drug therapy. There was a statistically significant association between the degree of motivation of patients and the success of smoking cessation at 6 months (P=.022) and 12 months (P=.008), but therapy influenced consultation success only at 6 months (P=.032). No statistical significance was found for other variables.
Conclusion: Despite the limitations of this study, the motivation of smoking emerges as the most important predictive factor for successful smoking cessation. This factor is largely known as central to any behavioural change process and should be considered by health professionals during the smoking cessation process.

***Keywords**: Smoking. Smoking cessation. Motivation.*

CHARACTERIZATION OF THE POPULATION OF SANTA MARTA'S HOSPITAL SMOKING CESSATION CONSULTATION

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Introduction: Tobacco smoking is a serious public health problem and one of the most preventable causes of disease and death. Many smokers have the desire to quit smoking, so medical support for smoking cessation is very important.
Aim: To characterize the population of our Smoking Cessation Consultation (SCC).
Material and methods: Retrospective analysis of patients' features who were for the first time evaluated in our SCC in the period between January and June 2011. Age, gender, literacy, smoking history, co-morbidities, dependence degree (Fagerström test for nicotine dependence), motivation degree (Richmond test) and presence of anxiety and depressive symptoms (Hospital Anxiety and Depression Scale) were evaluated.
Results: One hundred and twenty eight patients were studied, 66.4% were male (n=85) and the mean age was 50.1±12.0 years. About 34% had up to 4 years of education, 39.8% had 5 to 12 years of education, 8.6% had technical education and 18% had a higher education. About 70% were active workers, 14.1% were unemployed and 17.2% were retired. Over 80% were told about SCC by their doctor. They started to smoke at the age of 15.4±4.7 years, smoked 23.8±12.9 cigarettes per day and their smoking burden was 33.4±46.7 pack-years. Only nine patients (0.1%) used other types of tobacco (cigars, cigarillos or pipe) and about 80% had frequent contact with other smokers. The most frequently mentioned reasons for smoking were pleasure, stress, automatism and socializing. Their strongest reason for giving up smoking was concern over health and they said that anxiety and weight gain were their main concerns with smoking cessation. About 47% reduced their smoking burden on the previous month to the consultation and more than 80% made prior attempts to quit smoking, with medical support in only 22.7% cases. Only 21 smokers (16.4%) were healthy. Cardiovascular risk factors were present in 72.9% of the patients, cardiovascular disease in 41.1%, respiratory disease in 36.4% and oncology disease in 0.04%. The mean score obtained in Fagerström test was 5.71±2.3 and 53.1% had a high degree of nicotine addiction (score of Fagerström test between 6 and 10). Many patients (68.8%) had a moderate motivation degree to quit smoking and only 15.6% were very motivated. About 40% had anxiety symptoms and 7.1% had depressive symptoms.
Conclusion: The population of our study has significant co-morbidities, high degree of nicotine dependence and important anxiety symptoms. These factors may be decisive for the success of smoking cessation and should be considered during clinical evaluation of smokers.

***Keywords**: Smoking. Smoking cessation. Smoking cessation consultation.*

FOLLOW UP OF A SMOKING CESSATION CLINIC IN A PULMONOLOGY DEPARTMENT BETWEEN 2007 AND 2012. COMPARATIVE ANALYSIS WITH A STUDY PERFORMED BETWEEN 1996 AND 2001

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Introduction: Worldwide tobacco is the leading preventable cause of death. Since tobacco use and exposure to tobacco smoke is responsible for high morbidity and mortality, promoting smoking cessation is of highest priority.
Aim: Analysis of the follow up of a Smoking Cessation Clinic (SCC) in a Pulmonology Department between 2007 and 2012. Comparison with results of a similar study conducted between 1996 and 2001 on the same Department.
Material and methods: Retrospective analysis of medical records of SCC between January 2007 and June 2012. Parameters evaluated: gender, age, educational level, associated diseases, age at smoking initiation, smoking burden (number of pack-years), prior attempts and the used method, degree of dependence (Fagerström Test for nicotine addiction), degree of motivation (Richmond Test), subjective motivations for smoking cessation, pharmacotherapy, success and abandonment rates.
Results: Three hundred sixty five patients (52.3% male) were studied with an average age of 47.9±11.5 years. Only 27.7% have a high school education. Medical history was identified in 86% of patients. Respiratory disease is the most frequent, present in 60.3% (COPD 35.3%, Asthma 11.8%, others 13.2%), and cardiovascular disease was recognized in 40.8%. As for psychiatric disorder, 36.7% of patients have depression, 47.4% have an anxiety disorder, 12.3% alcoholism, 1.6% have a bipolar disorder and 1.4% an eating disorder. The onset of smoking was on average at 16.9±5.2 years and the average smoking burden is 41.1±36.7 pack-years (greater than 50 pack-years of 29.0% patients). Men had an earlier onset of smoking (average 16±4.1 years in men, 18±6 years in women) and a higher tobacco intake (average 47.3 pack-years in men, average 34.3 pack years in women). Many patients (74%) reported prior attempts to quit smoking. The Fagerström Test revealed high dependency in 23.9% of patients and the Richmond Test showed high motivation only in 8.25%. The strongest reason for giving

up smoking was concern over health (77%). The Varenicline was prescribed for 41.4% of patients; in 53.6% was associated with an anxiolytic. Regarding the nicotine replacement therapy (NRT) were submitted 44.9% of patients. The preferred way of administration is skin patches (98.8%), associated with oral nicotine in 43.9% of patients. The NRT was associated with an anxiolytic in 60.4% of patients and with bupropion hydrochloride in 14%. In terms of follow-up, the smoking cessation rate at one year was 15.6% and overall drop-out rate was 73.4%. Concerning the patients who stopped smoking at one year, 47.6% used varenicline, 35.7% the NRT and 11.9% the bupropion hydrochloride. On a similar study conducted in SCC between 1996 and 2001, prior to the introduction of varenicline, the methods used were: NRT in 59% of patients, NRT+bupropion hydrochloride in 11%. The smoking cessation rate at one year was 25% and the overall dropout rate was 42%.
Conclusions: On the SCC considered the smoking cessation rate was reduced and the overall drop-out rate was very high. The low level of motivation, the high percentage of associated psychiatric pathology and the referrals to SCC of patients already with previous attempts to stop smoking within the Primary Health Care surely compete for these results. It is essential to reinforce adherence promoting the existence of multidisciplinary teams to enhance the therapeutic success.

Keywords: *Smoking cessation. Varenicline. Nicotine replacement therapy (NRT).*

SMOKING CESSATION IN THE INTERNED PATIENT

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The interned patient with respiratory complaints in the acute phase becomes more susceptible to the suggestion of changing habits. All health professionals have the responsibility of promoting healthy lifestyles and providing preventive care to society. Thus, it's up to all Health Team to encourage smoking cessation to patients who go through internment, improving their life quality. The hospital then becomes a window of opportunity for smoking cessation. In the Pneumology service of the Dr. Fernando Fonseca Hospital (FFH), there's a project that consists in monitoring the patient that starts the smoking cessation. In the initial nursing evaluation the smoking habits are assessed, being made a brief intervention, and is provided technical, intelligence and personal support to any smoker who has expressed willingness to quit smoking. It is implemented a nicotine replacement therapy according to the degree of dependence, previously evaluated through the adapted Fagerstöm Test. During the hospitalization the signals of under/overdosing are monitored, adjusting the therapy whenever necessary. After discharge, the patient is monitored through telephone contacts made on the 1st, 3rd, 6th and 12th moths after quitting smoking. The obtained data are cited in the Nursing Registries. Whenever it is needed, the patients that failed to achieve the goal of smoking cessation with the primary approach are forwarded to the Tobacco Appointment. It is made the semiannual statistical treatment to the patients inserted in the Project: Total Patients in Project-Male/Female, Patients who finished the project-with success/without success, Patients forwarded to the Tobacco Appointment.

Keywords: *Smoking cessation. Interned patient. Nicotine replacement medication.*

EVOLUTION OF ACUTE RESPIRATORY FAILURE WITH NONINVASIVE MECHANIC VENTILATION

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Introduction: The use of noninvasive mechanical ventilation (NIV) has progressively increased and is recognized as an effective treatment in respiratory failure in certain pathologies.
Objective: Characterization of patients that required NIV in acute respiratory failure (ARF) hypercapnic and evaluate its evolution relatively to specific pathology.
Methods: Prospective data registration during 4 years (2008-2012). Inclusion criteria: patients with ARF requiring NIV instituted by pulmonology department in the emergency department, in convencional ward or in a respiratory medicine monitoring unit of an university hospital. Exclusion criteria: postoperative respiratory failure, hypoxemic ARF patients, patients with home mechanical ventilation who have exacerbation, patients with direct admission in the Intensive Care Unit (ICU) and started NIV in the ICU. We performed an analysis of comorbidities, initial arterial blood gas severity and its evolution after NIV at 1 h, 4 h, 24 h, 48 h and mortality.
Results: There was a total of 273 episodes in 253 patients (s. Table 1). The main pathologies that started NIV were: 140 with COPD (51.3%), 73 with obesity-hypoventilation syndrome (OHS) (26.7%), 29 with congestive heart failure (CHF) (10.6%) and 17 with restrictive disease (RD) (6.2%). Patients with OHS and CHF were mostly women unlike the COPD and RD groups. The age was similar in all groups (71.1±13.8 years). In 23.3% of patients with OHS and 10.7% of COPD had an index of comorbidity of Chalson upper

Table 1

			COPD		OHS		CHF		RD	
			Mean ± SD	*P**	Mean ± SD	*P**	Mean ± SD	*P**	Mean ± SD	*P**
pH	Initiation		7.25 ± 0.06	< 0.001	7.24 ± 0.07	< 0.001	7.23 ± 0.08	0.034	7.27 ± 0.05	0.002
	After VMNI initiation	1 h	7.31 ± 0.08	< 0.001	7.31 ± 0.07	< 0.001	7.30 ± 0.09	< 0.001	7.32 ± 0.08	0.010
		4 h	7.35 ± 0.07	< 0.001	7.34 ± 0.07	< 0.001	7.33 ± 0.08	< 0.001	7.38 ± 0.08	0.003
		24 h	7.38 ± 0.07	< 0.001	7.37 ± 0.07	< 0.001	7.36 ± 0.10	0.440	7.35 ± 0.08	0.247
		48 h	7.40 ± 0.07	0.01	7.40 ± 0.07	0.015	7.37 ± 0.13	0.680	7.43 ± 0.05	0.064
pCO_2	Initiation		83.3 ± 19.2	< 0.001	84.6 ± 13.8	< 0.001	80 ± 26.3	0.325	87.3 ± 13.6	0.001
	After VMNI initiation	1 h	72.4 ± 17.6	< 0.001	71.1 ± 13.8	< 0.001	74.2 ± 18.6	0.002	72.0 ± 15.1	0.015
		4 h	66.1 ± 16.1	< 0.001	70.6 ± 17.3	0.198	66.9 ± 12.0	0.003	64.8 ± 13.0	0.052
		24 h	63.1 ± 13.8	0.005	63.1 ± 11.1	0.010	61.7 ± 10.9	0.008	67.6 ± 13.3	0.268
		48 h	61.5 ± 17.9	0.128	62.9 ± 11.6	0.251	64.3 ± 21.5	0.801	57.8 ± 16.8	0.036

**P* value as paired-samples t test.

than 5 (*P*<.05). There were no differences between the variables associated with severity of the initial episode. All groups had an improvement in pH and pCO_2 in all monitored phases (table 1). Patients with COPD and RD normalized pH at 4 h, while OHS and CHF only normalized at 24 h and no patient reached normocapnia up to 48 h. In 9.6% of OHS, 6.9% of CHF, 5.9% of RD and 2.9% of COPD (*P*>.05) needed endotracheal intubation. Length of hospital was similar in all conditions (16.7±13.3 days). Mortality was 52.9% in RD, 37.9% in CHF, 23.6% in COPD and 20.5% in the OHS (*P*>.05). Patients who needed NIV at home were 47.1% in RD, 26.0% in OHS, 15.0% in COPD and 3.4% in CHF.
Conclusion: The VNI is an effective treatment for acute respiratory failure, with arterial blood gas and clinical improvements. COPD and OHS are the most frequent pathologies, with no difference in presentation and mortality. CHF cases are heterogeneous and that may explain high mortality found. Once most RD patients were neuromuscular patients like ELA, with anterior refusal to intubation or tracheostomy, this explains high mortality.

***Keywords**: Non-invasive ventilation.*

NON-INVASIVE MECHANICAL VENTILATION IN ACUTE HEART DISEASE

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Background: Non-Invasive mechanical ventilation (NIMV) has been used as an adjunct to pharmacological therapy in the treatment of acute heart disease. The cardiovascular effects of NIMV include reduced in venous return (decreasing right ventricular preload) and left ventricular afterload, decreased respiratory effort and O2 consumption and improving gas exchange.
Objective: Evaluate the efficacy of NIMV in patients with acute heart disease and compare our results with published data.
Methods: Analysis of medical files of patients with acute heart disease undergoing NIMV with *Philips Respironics® V60*, from November 2011 to August 2012. Demographic data and the following parameters were evaluated: heart rate, systolic blood pressure (BP), $PaCO_2$ and arterial pH before and after 2 h of NIMV.
Results: From a total of 311 patients who underwent NIMV in context of acute respiratory failure, 76 patients underwent NIMV in context of acute or chronic decompensated heart disease. Mean age 77.4±9.1 years, 55% male. Presence of 1 cardiovascular risk factor in 14% and ≥2 in 56%. Chronic respiratory disease in 20% of patients. NIMV indications were: acute cardiogenic pulmonary edema (58%), acute or chronic decompensated heart failure (32%), post acute myocardial infarction (6%), post extubation (3%) and cardiogenic shock (1%). All patients were given standard pharmacological therapy combined with bi-level positive airway pressure (BiPAP) S/T. In most patients NIMV was started simultaneously with standard pharmacological therapy. The initial pressure settings used were 17±2 cmH2O for IPAP and 7±1 cmH2O for EPAP. Before NIV, 76% had hypercapnic respiratory failure, average PaCO2 63 mmHg, the maximum being 138 mmHg; decompensated respiratory acidosis (pH<7.35) in 75%, minimum pH 6.96 and PaO2/FiO2 ratio 223±71; heart rate 104±24 bpm; systolic BP 144±35 mmHg (220 mmHg maximum). Two hours after NIV, 46% with pH<7.35 (minimum pH 7.04), 68% with $PaCO_2$ >45 mmHg with decreasing average PaCO2 (52 mmHg) and PaO2/FiO2 ratio 196±33; 50%; heart rate 91±17 bpm; systolic BP 123±24 mmHg. Mean time to correction of acidemia was 9.3 h, with IPAP 18±2 and EPAP 7±1. Mean duration of NIMV was 4.2 days. One patient underwent invasive mechanical ventilation. There were no reports of major complications related to NIMV. The average hospital stay was 13.3 days. The mortality rate was 27% (mean age 79.3 years).
Conclusions: There was improvement in vital signs (HR and systolic BP) and blood gas parameters (pH and $PaCO_2$) with NIMV in combination drug therapy in the treatment of acute heart disease, speeding their resolution and reducing hospital stay and mortality. NIMV has been applied successfully in patients with critical values of hypercapnia that did not meet criteria for admission in intensive care unit particularly by the presence of multiple comorbidities.

***Keywords**: Non-invasive ventilation. Cardiac.*

HYPERGLYCAEMIA IN COPD EXACERBATIONS DEMANDING INVASIVE VENTILATION

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Rationale: In Intensive Care Units, hyperglycaemia has been associated with a poor outcome during non-invasive ventilation in respiratory failure due to Chronic Obstructive Pulmonary Disease (COPD) exacerbation. However, there are no similar studies concerning invasive mechanical ventilation (IMV).
Objectives: To determine whether hyperglycaemia predicts outcome of patients admitted to an Intensive Care Unit (ICU) for COPD exacerbation and submitted to IMV.
Methods: Patients admitted to the Respiratory ICU at Pulido Valente's Hospital during a period of 7 years for COPD exacerbation demanding IMV were retrospectively accessed. Random blood glucose levels were determined within the last 24 h prior to IMV. Hyperglycaemia was defined as ≥126 mg/dL. Other pertinent clinical data, including previously diagnosed diabetes, recent use of systemic costicosteroids and Body Mass Index (BMI) were also assessed. Poor outcome was defined as death, permanent tracheostomy or need to reintubate.
Results: A total of 89 patients (mean 69.01±10.44 years-old, 83.3% men) with exacerbated COPD (mean baseline FEV_1 39.61% of predicted) were invasively ventilated due to respiratory failure (mean pH 7.25, mean PaO_2/FiO_2 142.56). Mean BMI was 25.51±6.39 kg/m², 15.7% of the patients were under systemic corticosteroids and 20.2% were diabetic. Mean blood glucose level was 140.04±52.70 mg/dL. Hyperglycaemia was not significantly correlated to the APACHE score, respiratory failure severity (pH and PaO_2/FiO_2), systemic corticotherapy or BMI. Also, hyperglycaemia and poor outcome did not show a significant correlation (*P*>.05) but when considering only the variable death, a positive trend could be found in particular for glucose higher than 200 mg/dL (*P*=.1).
Conclusions: In this study, hyperglycaemia did not predict a poor outcome in respiratory failure due to COPD exacerbation. However, the authors point out some limitations. Data from a small sample retrospectively collected and blood glucose levels randomly determined may have misled the results. Further studies are needed in order to elucidate the positive trend between hyperglycaemia and mortality.

***Keywords**: Hyperglycaemia. Invasive mechanical ventilation. Chronic obstructive pulmonary disease (COPD).*

NOSOCOMIAL INFECTIONS AND MICROBIOLOGICAL ISOLATES IN A RESPIRATORY INTENSIVE CARE UNIT

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Background: Nosocomial infections are the leading complication in intensive care admissions and a useful tool in evaluating the quality of health care. Knowledge about dominant microbiological isolates

and pattern of resistance to antimicrobials is paramount in assuring the proper treatment of such infections, thus having a significant impact on mortality.
Aim: Analysis of nosocomial infections and predominant germs in a Respiratory Intensive Care Unit (RICU).
Methods: Retrospective study of patients admitted to our RICU during an eight-month period. Demographics, inpatient days, APACHE II score, invasive mechanical ventilation (IMV) duration and RICU mortality were analyzed. Community-acquired infections and nosocomial infections already present on ICU admission were appropriately excluded. The presence of infection was considered on the basis of clinical and microbiological data. Infections were grouped as follows: pulmonary/tracheobronchial (namely, ventilator-associated pneumonia, VAP), sepsis and urinary tract infections. Nosocomial infection rate and nosocomial infection risk calculation were performed and microbiology of all isolates checked. Pattern of resistance to antibiotics was assessed.
Results: Two-hundred and five patients were admitted during the study period. Age (years): 64±18. Male sex: 52%. APACHE II: 19±8. Inpatient days: 15±17. IMV duration: 16±21 days. ICU mortality: 33%. There were 79 nosocomial infections, corresponding to 46 infected patients (1.7 infections/patient). Pulmonary/tracheobronchial infections: 21 (26%), sepsis: 33 (42%) and urinary tract infections: 25 (32%). VAP was diagnosed in 8 out of 53 ventilated patients (15%). Nosocomial infection rate: 22.4%. Nosocomial infection risk: 3.1%/day. Microbiology: *Pseudomonas aeruginosa* 26%, *Candida albicans* 17%, *Escherichia coli* 14%, Meticillin-resistant *Staphylococcus aureus* (MRSA) 14%, *Klebsiella pneumoniae* 12%, other *Enterobacteriaceae* 9%, *Candida parapsilosis* 4%, *Acinetobacter baumanni* 1%, *Stenotrophomonas maltophilia* 1%, *Candida tropicalis* 1%. *Pseudomonas aeruginosa* pattern of resistance: ciprofloxacin 48%, piperacillin-tazobactam 35%, carbapenems 65%. Extended-spectrum beta-lactamase (ESBL) producing-*Enterobacteriaceae*: 34%. MRSA with vancomycin MIC (minimal inhibitory concentration) levels ≥1.5 μg/mL: 0%.
Conclusions: Length of ICU stay and IMV duration are fairly prolonged in our population. ICU mortality is high, though not surprising if one considers APACHE-adjusted mortality. Sepsis and urinary tract infections dominated nosocomial infections. VAP was diagnosed in 15% of ventilated patients. Most frequent isolates were *Pseudomonas aeruginosa*, *Enterobacteriaceae* and MRSA, as expected. Pseudomonal resistance to piperacillin-tazobactam and carbapenems is high and over a third of *Enterobacteriaceae* are ESBL producers, traducing selection of highly resistant strains by antibiotic overuse. In contrast, MRSA strains typically have vancomycin MIC levels below the cut-off associated with treatment failure.

Keywords: *Intensive care. Infection.*

ACUTE RESPIRATORY FAILURE IN PATIENTS WITH PULMONARY TUBERCULOSIS SEQUELAE: RESPIRATORY INTENSIVE CARE UNIT PERSPECTIVE

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Background: Tuberculosis sequelae are an important cause of chronic respiratory disease. Little is known about the impact of acute respiratory failure (ARF) needing ICU admission in this subset of patients.
Aim: To evaluate the outcome of patients with tuberculosis sequelae and ARF admitted to a Respiratory Intensive Care Unit (RICU).
Methods: Retrospective study of patients admitted to our RICU with tuberculosis sequelae during the last decade (n=85). Age, gender, APACHE II score, type of sequelae, cause of exacerbation, inpatient days, modality and duration of ventilatory support, type of ARF and RICU mortality were evaluated. Patients were divided in two groups based on outcome (alive/dead) and variables were compared between groups.
Results: Age (years): 72±9. Female sex: 54%. APACHE II: 25±8. PaCO2 (mmHg): 71±28, PaO_2/FiO_2: 222±81. Inpatient days: 15.8±18.4. Type of sequelae: pulmonary 66.7%, pleural and pulmonary 10.1%, post-therapeutic 11.6%, mixed 11.6%. Cause of exacerbation: infectious 48%, cardiac 18%, mixed 11%, undetermined/other 23%. Ventilatory support: invasive (IMV) 31%, noninvasive (NIV) 42%, both 24%, none 3%. ICU mortality: 42%. APACHE II (alive/dead): 23±6/28±9; *P*=.001. Ventilatory support (alive/dead): NIV 29/7, IMV 6/20, both 12/8, none 2/1, *P*<.001. Duration of ventilatory support (alive/dead): 13±16/21±20 days; *P*=.026.
Discussion: Patients admitted to our RICU with tuberculosis sequelae had an advanced age and were mainly women. Pleuro-pulmonary disease prevailed, but therapeutic sequelae are still very prevalent in our population. Most patients had severe ARF and needed at least one type of ventilatory support, NIV being the most frequently used approach. IMV was associated with higher mortality, as was prolonged ventilatory support. ICU mortality was elevated and correlated with APACHE II score.

Keywords: *Intensive care. Tuberculosis sequelae. Mechanical ventilation.*

HOSPITAL-ACQUIRED INFECTION IN A RESPIRATORY INTENSIVE CARE UNIT: IMPACT OF THE TYPE OF VENTILATORY SUPPORT

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Background: Hospital-acquired infection is one of the most frequent complications in Respiratory Intensive Care Units (RICU). Current knowledge suggests that the incidence of nosocomial infection is higher in patients submitted to invasive mechanical ventilation (IMV) rather than patients submitted to noninvasive ventilation (NIV).
Aim: To compare the incidence of hospital-acquired infection in a RICU in patients submitted to IMV vs NIV.
Methods: Retrospective analysis of all patients admitted to our RICU over a period of 9 months. Patients with no need for ventilatory support, patients submitted to both ventilatory modalities (IMV and NIV) and those who presented with nosocomial infection on ICU admission were excluded. We analyzed demographics, length of hospital stay, APACHE II score, type and incidence of nosocomial infections and ICU mortality. Patients were grouped based on type of ventilatory support and variables compared between groups. Infection was diagnosed based on clinical and microbiological criteria. Statistical analysis was performed with SPSS v.18.0.
Results: 119 patients were included (62M/57F), with a mean age of 72±15 years (27-98). Of those, 19% were submitted to IMV and 81% to NIV. Age (IMV /NIV): 67±16/73±14 years; P=.08. APACHE II (IMV/NIV): 26±12/20±6; P=.036. Length of hospital stay (IMV/NIV):9±8/11±8; P=.385. Nosocomial infection rate (IMV/NIV): 30.4%/13.5%; P=.065. Nosocomial infection risk (IMV/NIV): 4.3%/day/1.4%/day; P=.023. In the IMV group, 67% of nosocomial infections were pulmonary/tracheobronchial and 33% were sepsis. In the NIV group, 43% were sepsis, 36% were pulmonary/tracheobronchialinfections and 21% urinary tract infections. In the IMV group, Methicillin-resistant *Staphylococcus aureus* was isolated in 38% of patients, *Pseudomonas aeruginosa* in 25%, *Staphylococcus epidermidis* in 25% and *Candida albicans* in 12%. In the NIV group,

methicillin-resistant *Staphylococcus aureus* was isolated in 33%, *Pseudomonas aeruginosa* in 25%, *Escherichia coli* in 33%, *Klebsiella pneumoniae* in 17% and *Candida albicans* in 17%. Chi-square test for proportion differences between groups: χ^2 (5) = 7.058; P=.216. Mortality rate (IMV/NIV): 43.5%/33.3%; P=.467.
Conclusion: The majority of studied patients were submitted to NIV. This type of ventilatory support was associated to a lower risk of nosocomial infection incidence, mostly because of a lower prevalence of pulmonary/tracheobronchial infections. Despite both higher APACHE II score and incidence of infections in the IMV group, there was no meaningful difference in ICU mortality between groups, as one could eventually expect.

Keywords: *Nosocomial infection. Ventilatory mode.*

BREATHING *ACINETOBACTER BAUMANNII* - EXPERIENCE OF AN ICU

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Introduction: Acinetobacter baumannii a commensal bacillus of the oropharynx and skin, is responsible for causing nosocomial pneumonia, predominantly in patients with endotracheal intubation, prolonged mechanical ventilation, underlying lung diseases,prior broad-spectrum antibiotic treatment, recent majorsurgery, enteric feeding or who are being treated in an ICU.
Objective: To determine the clinical, epidemiological and resistance pattern of respiratory infection in patients with Acinetobacter baumannii in a ICU.
Methods: Retrospective study, were included patients admitted in this ICU for respiratory infection with isolation of A. baumannii in blood cultures, tracheal aspirate or bronchoalveolar lavage fluid, during the years 2001 to 2011.
Results: We included 19 patients, 73.7% males, with a mean age of 60±15 years, 31.6% were smokers or ex-smokers and 42.1% had moderate to severe alcohol habits. 78.9% had a history of cardiovascular disease, 31.6% diabetes, 10.5% cancer, 5.3% infection by the human immunodeficiency virus and 15.8% chronic respiratory disease. Seven patients (36.8%) had undergone a surgery recently. At the time of admission 84.2% had acute respiratory failure; the average of PaO_2/FiO_2 was 267.1±89.8. The mean APACHE II score was 19.5±6.3. Seventeen patients (89.5%) had isolation of A. baumannii in endotracheal aspirates, 1 (5.3%) in bronchoalveolar lavage, 2 (10.5%) in blood cultures, 10 (52.6%) in nasal swabs and 6 (31.6%) in the perineum. In 3 patients (15.7%) the respiratory infection was acquired in the community and in 17 patients (89.4%) were nosocomial, and 7 patients (36.8%) had ventilator associated pneumonia. Regarding the antibiotic resistance pattern, 94.7% showed resistance to carbapenems, 73.7% to aminoglycosides, 73.7% to piperacillin/tazobactam, 63.1% to ciprofloxacin, 42% to 2nd generation cephalosporins, 36.8% to 3rd generation cephalosporins, 10.5% to 4th generation cephalosporins, 5.3% to 1st generation cephalosporins, tobramycin, trimethoprim-sulfamethoxazole, and amoxicillin/clavulanic acid. Only 5 patients (26.3%) were treated empirically with appropriate antibiotic, only 1 of these died. The overall mortality rate was 57.9% (11 patients), and six died in the ICU. Patients who had at the time of admission acute respiratory failure had a higher mortality (68.8% vs 0%; *P*=.05).
Conclusion: During this time period only a small percentage of patients have respiratory infection to A. baumannii, being mostly nosocomial, with a pattern of resistance to carbapenems, aminoglycosides and piperacillin/tazobactam. The presence of acute respiratory failure at the time of admission was the only factor that was associated with higher mortality.

Keywords: *Respiratory infection. A. baumannii. UCI.*

AGREEMENT BETWEEN PRE AND POST SURGERY PATHOLOGICAL DIAGNOSIS IN PATIENTS WITH OPERATED NSCLC

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Background: For decades the simple division of pulmonary carcinomas into non-small cell lung cancer (SNCLC) and small cell lung cancer (NSCLC) was adequate for the selection of patients for appropriate therapy. Nowadays, histological features are associated with different responses to treatment and influence prognostic. Whereby, the classification of histological subtypes in cytology or biopsy material became mandatory.
Aim: The aim of our study was to evaluate the agreement between pathological diagnosis of small biopsies and surgical specimen in operated NSCLC.
Methods: Retrospective analysis based on medical records of patients with NSCLC operated, between January 1999 and July 2012. Agreement between pre and post surgery pathological diagnosis was evaluated and discordant cases were analysed.
Results: During the review period, 245 patients underwent surgery, of whom 32 (13.1%) didn't had previous pathological diagnosis. Mean age was 63.8±9.4 years and the male-female ratio 2.87:1. The final diagnoses obtained were: adenocarcinoma (n=160, 65.3%), squamous cell carcinoma (n=57, 23.3%), large cell carcinoma (n=17, 7.3%), adenosquamous (n=7, 2.3%), combined small cell carcinoma (n=2, 0.8%), pleomorphic carcinoma (n=1, 0.4%). The initial diagnosis was obtained by transthoracic biopsy in 172 patients (80.8%) and 41 (19.2%) through bronchoscopy (bronchial biopsy n=29, bronchial lavage n=9, bronchial brushing n=3). The initial diagnosis was NSCLC not otherwise specified (NOS) in 34 (16.0%) patients. The correct distinction between NSCLC and SCLC occurred in 100%. Oh the 213 patients with pre-surgical diagnosis, 195 (91.5%) had absolute agreement between pathological diagnosis of small biopsy and surgical specimen. In 18 (8.5%) patients there was no absolute agreement between the two diagnoses. The diagnoses in surgical specimen were: 3 combined carcinomas, 5 adenosquamous and the others were poorly differentiated carcinomas. No significant difference was found regarding the type of diagnostic biopsy, cytology or histology, in the subgroups with or without absolute agreement.
Conclusion: Agreement between pathological diagnoses of small biopsies, cytology or biopsy material, and surgical specimen was high. The majority of the discordant cases were due to the non representativeness of all components of the tumour in the biopsy material.

Keywords: *Lung cancer. Pathological classification. Small biopsies.*

LONG-TERM SURVIVORS OF LUNG CANCER NON-SMALL CELLS: CHARACTERIZATION AND CLINICAL FACTORS ASSOCIATED

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Introduction: Lung cancer (PC) remains the leading cause of death from cancer. Non-small cell lung cancer (NSCLC) accounts for 80% of patients with lung cancer and in most cases the tumors are inoperable at the time of diagnosis. Despite advanced NSCLC have

a high and early mortality, there are a subgroup of patients with long survival.
Objectives: To characterize patients with CPNCP with survival greater than 5 years and evaluate associated factors.
Material and methods: We evaluated patients with stage IIIB or IV NSCLC, referred to a lung oncology unit of a tertiary hospital between July 2002 and June 2007.
Results: Of a total of 749 patients, 23 patients (3%) survived 5 or more years, median age 63 years, 12 male. The median survival time was 75 months (60-121 months). All had performance status (PS) of 0 or 1 and the most common histological type was adenocarcinoma (12 patients); 18 patients (78%) had stage IIIB tumors. As a first choice therapy, it was instituted chemotherapy (CT) containing platinum in 15 patients (65%), followed by radiotherapy (RT) in 13 (56%). RT was first option in 2 patients (9%). Erlotinib was used as 1st line therapy in 2 patients (9%) and in 2nd or 3rd line in 14 (61%). Two patients (9%) received neoadjuvant chemotherapy. Twelve patients are alive (52%).
Conclusions: Results suggest that in this group of patients with advanced NSCLC, long survival may be associated, in addition to other possible factors, to a good PS and a to a initial directed treatment.

Keywords: *Non-small cell lung cancer. Long-term survival.*

EFFECTIVENESS OF CHEMICAL PLEURODESIS: TALC SLURRY VS TALC POUDRAGE

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Introduction: Malignant pleural effusion due to lung or non-lung cancer signals advanced disease and is associated with limited survival as well as shortens life expectancy; malignant pleural effusions are frequently recurrent, comprising a hard burden to the patient: repeated thoracocenteses, volume and electrolyte depletions and progressive patient deterioration. Pleurodesis, using an interpleural chemical agent, is widely practiced to obliterate the pleural space, prevent fluid (re-)accumulation and improve breathing. Of the many chemical agents, talc is now supported as the agent of choice by many clinical studies. Nevertheless, there is not a consensus of the optimal route of administration: bedside slurry or thoracoscopic poudrage.
Objective: Compare slurry talc effectiveness with talc insufflation by thoracoscopy effectiveness in malignant pleural effusion.
Methods: Retrospective study. Inclusion criteria: all patients with hospital admission between 2009-2011 with the codification of "Pleural Effusion" in neoplastic context submitted to chemical pleurodesis with talc. Thirty day, 90-day and lifetime effectiveness were analyzed (effectiveness defined as non-recurrence of pleural effusion with the need for drainage). Data were recovered from the Hospital informatics database.
Statistical analysis: descriptive data is presented as frequency, mean and standard deviation. Categorical variables were compared using the Fisher exact test. Continuous variables were compared using the Mann Whitney test. Program used: EpiInfo version 7.1.0.6 (CDC).
Results: Twenty two patients included (16 women); 14 lung cancers (LC) (10 adenocarcinoma+4 mesothelioma) and 8 non-lung cancers (NLC) (7 breast cancer+1 Meigs syndrome); overall mean age: 65years (LC: 68.5 years/NLC: 58.9 years); *Slurry talc* group (7 LC+5 NLC) Thoracoscopy group (7 LC+3 NLC); mean admission time for slurry talc group was 21 days and for talc poudrage group 14 days (*P*=.25); mean admission time between pleurodesis and discharge: 5.8 days in *slurry talc* group and 10.7 days in thoracoscopy group (*P*=.16); mean time between pleurodesis and drain removal: 3.6 vs 7.8 in *slurry talc*/thoracoscopy group (*P*=.09); 30-day, 90-day and lifetime effectiveness of slurry talc were 83.3%, 75% and 75% and of talc poudrage 80%, 85.7% and 71.4%; there was no significant difference in 30-day, 90-day and lifetime effectiveness of both procedures (*P*=.63/*P*=.55/*P*=.66, respectively).
Conclusion: The present study shows no statistical difference between slurry talc and talc poudrage. The heterogeneity and the reduced size of the sample, as well as different health-disease states may concur to the results obtained.

Keywords: *Pleurodesis. Effusion. Oncology.*

LUNG CANCER WITH PREVIOUS LYMPHOPROLIFERATIVE DISORDER: A DIFFERENT DISEASE?

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Introduction: Lymphoproliferative disorders' (LD) survival rates are growing, contrary to lung cancer (LC). Consequently there is an increase in the incidence of late complications related to LD treatment, such as cardiovascular disease, lung or thyroid lesions and secondary neoplasms namely lung cancer.
Objectives: To characterize a population with previous LD who were diagnosed with LC and compare it to a population with a diagnosis and no history of LD.
Material and methods: Retrospective study reviewing the clinical files of patients with LC (with or without a history of LD), diagnosed by the Pulmonology Service of our hospital from 1992 to July 2012. We collected data on histology and staging of LC, date of diagnosis, treatment, performance status and survival. We compared the data obtained in a group of patients with diagnosis of LC and previous LD-Group A-and patients with LC and no LD)-Group B. Descriptive statistics were used for demographic classification. Parametric and non-parametric tests were used to compare variables. Survival was calculated with Kaplan Meyer method.
Results: Group A consisted of 48 patients (71%) with a mean age of 51±17.33 years and 60.6±12.56 years at the time of the LD and LC diagnosis respectively. The median time between the 2 diagnoses was 6.5 years (1month-33years) and in 13 patients the 2 neoplasms were synchronous. 36 patients (75%) were smokers or ex-smokers. Adenocarcinoma-ADC (48%) and squamous cell carcinoma-SCC (31%) were the most frequent LC diagnosis. The patients presented ECOG PS 0/1 in 71% of cases (38 patients), 2 in 10% (2) and over 2 in 8% (4). 27% were in stage I, 6% at stage II, 19% at stage III and 46% were at stage IV. In Group B, 1669 patients (82% men) were identified with a mean age of 65 years (±11.18 years) at the time of LC diagnosis. The vast majority of patients had a smoking history (80%). ADC (39%) and SCC (29%) were the most common histological diagnoses. The patients presented ECOG PS 0/1 in 73% of cases, 2 in 14% and greater than 2 in 12%. 12% were in stage I, 5% at stage II, 32% at stage III and 49% were at stage IV. Comparing the groups we found in group A younger age (*P*=.03), more female gender (*P*=.03),more advanced stage at presentation (*P*=.02) smoking habits, histology and PS were similar.as well as survival Group A= 10.8 months group B 10 months.
Conclusion: In this series the differences found were younger age and more advanced stage of LC at the time of diagnosis in the LD

group. Lung cancer in patients with a history of LD appears to be comparable to that of the general population in prognosis.

Keywords: *Lung cancer. Lymphoproliferative disorders.*

TREATMENT OF SUPERIOR VENA CAVA SYNDROME WITH ENDOVASCULAR STENT: EXPERIENCE OF 12 CASES

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Introduction: Superior vena cava (SVC) syndrome (SVCS) is a serious complication often caused by malignancies, such as advanced lung cancer. The goal of treatment of SVCS is palliation with symptomatic relief as soon as possible, allowing a better quality of life. The use of endoluminal stents should be considered in patients who have failed conventional treatment with radio-or chemotherapy and in whom the symptoms are acute and so severe that immediate treatment is needed.
Aim/methods: The purpose of our study is to show the efficiency of percutaneous stent in SVC for relieving SVCS. Ti this end, we performed a review of the clinical records of 12 patients with SVCS, admitted to the Department of Pneumology II in the last 4 years, who underwent SVC stenting.
Results: In this study were included 12 patients with SVCS. Most patients were male (83.3%) and the mean age was 60.1±11.1 years. The SVCS was caused by 7 adenocarcinoms, 4 small cell carcinoms and 1 mesoteliom. All patients had advanced stage disease (75% stage IV, 16.7% stage IIIB and 8.3% stage IIIA) and had undergone chemotherapy and/or radiotherapy and steroid therapy. On average, the interval between diagnosis of lung cancer and SVCS was 8.3±11.6 (range 0 to 36 months). The most common symptom was dyspnea (8 patients) and the most common signal was swelling of neck, head and harm. The pathophysiological mechanism of SVCS was direct compression of the SVC by mediastinal invasive cancer (58.3%), lymph node compression of SCV (16.7%), thrombosis of the SVC (16.7%) and tumor growth and thrombosis (8.3%). SVCS symptoms were relieved immediately and completely in all patients. In 2 patients the procedure was repeated, due to relapse.
Conclusion: Most of our cases were secondary to lung cancer. Endovascular treatment provided a rapid relief of symptoms. The chemo and radiotherapy are usually the first-line treatment of SVCS, but endovascular treatment should be considered in the treatment strategy due to rapid relief of symptoms, restoration of venous return and improved quality of life.

Keywords: *Superior vena cava syndrome. Stent. Quality of life.*

LUNG CANCER: ENDOBRONCHIAL FEATURES

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Rational: Lung cancer is usually detected in an advanced stage and half of these patients present with central airway involvement. Although in the last twenty years chest CT scan and particularly endobronchial ultrasonography have revolutionized diagnostic an staging of lung cancer, the ability for direct observation of the disease and the impressive improvement of videobronchoscopic image quality, prompted the bronchoscopists for a better semantic definition of the abnormalities based on anatomic, physiologic and pathologic concepts, allowing for better diagnosis of the lesions, better selection of the diagnostic instruments for an adequate sampling of the tumor.
Objectives: The aim of this study was to evaluate the clinical, radiological, bronchoscopic and pathologic profile of lung cancer patients.
Methods: We performed a retrospective analysis of clinical, radiological and bronchoscopic abnormalities, of histopathologically proven cases of bronchogenic carcinoma admitted in our hospital from January 2009 to December 2011. Medical records and database reports were reviewed looking for location and pattern of radiologic and bronchoscopic abnormalities, diagnostic procedures and results.
Results: Our study included 372 lung cancer patients, of whom, 283 were males (76%) with an average age of 66±11.04 years. Taking the patient sample as a whole, this series included 148 adenocarcinoma, 114 epidermoid carcinomas, 48 non-small cell carcinomas and 34 small cell carcinomas. More frequent in both upper lung lobes, the most common radiological presentations were: tumor mass in 55%, pathologic mediastinal lymph nodes in 21%, multiple lung masses in 12% and a solitary pulmonary nodule in 18.4% of the patients. Bronchoscopic abnormalities were found in 291 patients (78.2%), with 93 (31.9%) patients showing an endobronchial tumor mass, 91 patients (31.3%) with airway wall infiltration, 69 patients (23.7%) with indirect evidence of extra luminal tumor and 35 (12%) patients with inflammatory findings. An exofitic central tumor mass, although more common in epidermoid carcinomas (33.3%), was also quite frequent in small cell carcinomas (32.4%) and adenocarcinomas (15.5%). Airway wall infiltration was more frequent in small cell carcinomas (47.1%) when compared with adenocarcinomas (24.3%) and epidermoid carcinomas (23.7%). Signs of extra luminal tumor, were equally present in all tumor types although more frequent in adenocarcinomas. Although uncommon in the majority of central tumors, inflammatory abnormalities are more frequently associated with adenocarcinomas. Bronchoscopy was deemed normal in 40 patients with adenocarcinoma, 17 patients with epidermoid carcinoma, 2 patients with non-small cell carcinoma and 3 patients with small cell carcinoma.
Conclusion: Our study confirms international data with an overall male predominance in the sixth decade of life, and with adenocarcinoma and epidermoid carcinomas as the most prevalent pathologic groups. However, despite of their traditional peripheral location, 64% of the adenocarcinomas in this series, showed endobronchial evidence of the disease. Extra-luminal tumors and Inflammatory changes of the mucosa demand respectively adequate transbronchial procedures and a closer examination of the airway wall abnormalities for tissue sampling.

Keywords: *Lung cancer. Bronchoscopy. Semiology. Diagnosis.*

BRONCHOPLASTIC RESECTIONS AS TREATMENT FOR PATIENTS WITH PULMONARY NEOPLASMS

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Pulmonary resections with bronchoplastic techniques as a treatment for patients with neoplasms are considered a form of measurement of quality of a General Thoracic Surgery department. Segmental bronchial resections and sleeve lobectomies in benign endobronchial pathology, low grade tumors and Non Small Cell Carcinoma (NSCC), allow less impact on respiratory function, without compromising a complete microscopic (R0) resection. Survival is similar to those of patients undergoing pneumonectomy, with less impact on the quality of life of the patient. Bronchoplastic resection is the only way to provide a surgical treatment with curative intent in selected patients, with lung function tests that are incompatible

with pneumonectomy. We present 17 cases of bronchoplastic resections: 11 sleeve-lobectomies, 2 double-sleeve lobectomies, 2 segmental bronchial resections (left main bronchus and secondary carina of left main bronchus), 1 partial bronchial resection with direct suturing, 1 sleeve segmentectomy of the lingual, performed between 2004 and 2012 at the Cardiothoracic Surgery Department of the Santa Marta Hospital in Lisbon. Pathological results showed low-grade tumors (typical carcinoid tumor, mucoepidermoid tumor), as well as high-grade malignant tumors primary of the lung (NSCC) or metastatic. The authors analyze the short and medium term results. This type of surgery should be performed with the intent of sparing lung parenchyma, without compromising a complete microscopic resection, and should always be offered to the patients if the localization of the tumor permits.

Keywords: *Sleeve lobectomy. Bronchoplastic resection. Lung cancer. Endobronchial tumor.*

OUTCOMES OF SUBLOBAR RESECTION VERSUS LOBECTOMY FOR EARLY STAGE NON-SMALL CELL LUNG CANCER

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Background: The role of nonanatomic wedge resection in the management of early-stage non-small-cell lung cancer (NSCLC) continues to be debated. Anatomic lobectomy with extensive lymph node dissection has been regarded as the standard procedure. In high-risk patients, however, wedge resection has been attempted as a salvage procedure, and, recently, indication for limited resection has been extended to selected cases with early-stage NSCLC. Clinical judgment based on comorbidities remains the main decision factor. In fact, sublobar resections spare pulmonary function and offer a method of increasing resection rates in patients with lung cancer and limited functional operability. Previous studies demonstrated an increased local recurrence rate following wedge resection compared to lobectomy. However, a prognostic impact of this observation has never been shown and is still under debate.
Methods: The clinical records of 121 patients who underwent surgical resection of NSCLC between 2008 and 2011 at our center were retrospectively reviewed for age, sex, functional parameters, comorbidities, type of resection, tumor size, pathology and final staging.Lobectomy (n=101) was the standard of care for patients with adequate cardiopulmonary reserve. Wedge resection (n=20) was reserved for patients with cardiopulmonary impairment prohibiting lobectomy. Patients undergoing pneumonectomy or futile thoracotomy were excluded. Patient outcomes, operative morbi-mortality, overall survival and follow-up duration were evaluated concerning their distribution between the two groups.
Results: A total of 100 (83%) patients underwent lobectomy, and 21 (17%) underwent wedge resection. Indications for wedge resections were advanced age in 30%, severe concomitant diseases in 35% and poor pulmonary function in 35%. The median follow-up duration was 27 months. Analysis demonstrated the wedge resection groups to be significantly older (71.1 vs 62.8 years old), to have more severe perioperative morbidity (39% vs 21%) and to have reduced pulmonary function (FEV_1: 66% vs 89%) despite a higher incidence of treatment for chronic obstructive pulmonary disease when compared with patients having lobectomy. The mean hospital stay was significantly less in the wedge resection groups (7.3 vs 11.0 days) because prolonged air leak was greater in lobectomy group (10.5% vs 26.1%). There were no operative deaths among patients having wedge resection; however, a 1% operative mortality occurred among patients having lobectomy (P=.62). Overall survival (27 mo.) was similar in both groups: 85% for the sublobar resection group and 90% for the lobar resection group (P=.65). However, wedge resection group had smaller tumors (25.0 vs 32.5 mm) and less nodal disease (7.7% vs 13.5%).
Conclusion: Wedge resection appears to be a practicable surgical treatment of early-stage NSCLC for selected patients with cardiopulmonary physiologic impairment and associated comorbidities. Although the overall difference in survival between patients undergoing lobectomy and those undergoing wedge resection was not significant, lobectomy group had more advanced (high-grade) disease (tumor size and nodal disease). Therefore lobectomy remains the surgical treatment of choice for patients who have adequate physiologic reserve, however, randomized trials are necessary to confirm the superiority of lobectomy over wedge resection for early-stage lung cancers.

Keywords: *Lung. Cancer. Surgery.*

BENIGN LUNG TUMORS: PRESENTATION, DIAGNOSIS, AND OUTCOME

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Background: Benign tumors of the lung are uncommon and can be diagnostically challenging.
Methods: Retrospective analysis of the clinicopathologic data and outcome of patients with benign lung tumors diagnosed in the last 10 years.
Results: 72 patients were included, 68% male, mean age 55±15.2 years. Most of the patients (61.1%) were assymptomatic. In 23.6% of patients with endoscopic abnormalities appeared respiratory symptoms such as shortness of breath and obstructive pneumonia. CT scan showed a solitary pulmonary nodule in 73.6% of cases. Endoscopic abnormalities were found in 16 patients, all of them were submitted to bronchial biopsy (BB). Tumors were localizated at the right main bronchus (n=3), right lower lobe bronchus (n=3), left lower lobe bronchus (n=3), left upper lobe bronchus (n=3) and trachea (n=5). Most lesions appeared as exophytic lesion or polyps and in 3 cases occurred bronchial bleeding post-biopsy, controled with local measures. BB was diagnostic for hamartoma in 7 cases, papilloma in 4 cases, granular cell myoblastoma in 3 cases, leiomyoma in 1 case and inflammatory pseudotumor in 1 case. In 7 cases, bronchial biopsy removed the entire tumor-papilloma in 3 cases, hamartoma in 2 cases, leiomyoma in 1 case and granular cell myoblastoma in 1 case. Transthoracic needle biopsy (TNB) was performed in 26 patients and was diagnostic for hamartoma in 13 cases and mixoid tumor in 1 case. Forty seven patients were treated surgically: sleeve (n=3), right lower lobectomy (n=11), right upper lobectomy (n=3), left lower lobectomy (n=6), medium lobectomy (n=1) and segmentectomy (n=23). Pathological diagnosis revealed 32 hamartomas, 5 solitary fibrous tumors, 2 lymphangiomas, 2 adenomas, 1 chondroma, 1 myofibroblastic tumor, 1 papilloma, 1 inflammatory pseudotumor, 1 granular cell myoblastoma and 1 desmoid tumor. In 18 cases, although diagnostic confirmation (10 cases by BPT and 8 cases by BFC), has not been performed surgical therapy. In 11 cases surgical treatment was refused by the patient. Other causes for not performing surgical intervention were follow-up abandonment (n=3) and death by causes unrelated to the tumor (n = 4).
Conclusion: Benign lung tumors are usually assymptomatic and do not pose a significant health problem. The purpose of surgical intervention for benign lung tumors is to avoid missing potentially malignant lesions. In some situations, these tumors can be diagnosed and treated endoscopically.

Keywords: *Benign lung tumors. Outcome.*

INVASIVE AND NONINVASIVE VENTILATION IN ADULTS HOSPITALISED WITH ASTHMA IN PORTUGAL-NATIONWIDE DATA FROM 2000-2010

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Introduction: Recent European Respiratory Society recommendations have reported a lack of evidence for the use of noninvasive positive pressure ventilation (NPPV) in severe asthma exacerbations.
Objective: To describe the use of invasive ventilation (IV) and NPPV in patients hospitalised due to asthma in Portugal from 2000 to 2010.
Methods: Retrospective study of inpatient records with principal diagnosis of asthma, age >17 years, in acute care hospitals of the national healthcare system (n=85) in mainland Portugal, with discharges between 2000 and 2010 (n=17 446). Analysis of all episodes that included IV and NPPV that were identified using ICD-9-CM (codes 93.9x and 96.7x). The Charlson/Deyo index, a comorbidity risk adjustment measurement, was used.
Results: In 1 041 episodes (6%) ventilatory support was needed: NPPV 2.3% and IV 3.6%. NPPV use increased from 17 to 79 cases, mainly after 2007, while IV use decreased over the years. Length of stay (days) was similar in both ventilation procedures. Mortality for IV was significantly higher than for NPPV (15% vs 2.2%). (Table 1).
Conclusion: NPPV is increasingly used in severe asthma exacerbations. Patients treated with NPPV have a lower mortality rate despite of being older and having an increased comorbidity risk index. Prospective studies are strongly needed.

Keywords: *Severe asthma exacerbations. Noninvasive positive pressure ventilation. Invasive ventilation.*

NEW TECHNIQUES FOR EVALUATE ASTHMATIC PATIENTS-^{1}H NMR

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Background: Given the heterogeneity in asthmatic patients an improved characterization of asthma phenotypes is necessary. Being urine an easy collectable sample and a huge depuration via, its analysis in asthmatics may add valuable information. Proton Nuclear magnetic resonance (^{1}H NMR) spectroscopy provides detailed information about the metabolic composition of body fluids, and combined with multivariate statistics (metabolomics), may reveal new metabolic signatures of disease states[1,2].
Aim: Explore the potential of NMR metabolomics as a noninvasive approach for monitoring asthma status and identify the most representative metabolites. We hypothesized that metabolic activity of asthmatic patients would differ between exacerbations vs stable disease state.
Methods: patients were enrolled after provided written informed consent approved by the board of research ethics of Hospitais da Universidade de Coimbra. Five asthmatic patients recruited from emergency department, with a clinical asthma exacerbation diagnose were enrolled. Two urine samples from each asthmatic patient (one sample in exacerbation period and one sample in stable period) were collected. Standard ^{1}H 1D spectra were acquired on a Bruker Avance DRX-500 spectrometer and subjected to Principal Component Analysis (PCA). The main metabolites contributing for class separation in PCA (stable vs exacerbated) were identified and integrated in order to assess their variation between the two states.
Results: Amongst the metabolites identified are several amino acids and derivatives (e.g. alanine, carnitine, acetylcarnitine, creatine, glycine, dimethylglycine, histidine, 3-methylhistidine, lysine, threonine), organic acids (e.g. acetate, citrate, formate, hippurate, lactate, malonate, 2-hydroxyisobutyrate, 2-hydroxyisovalerate),

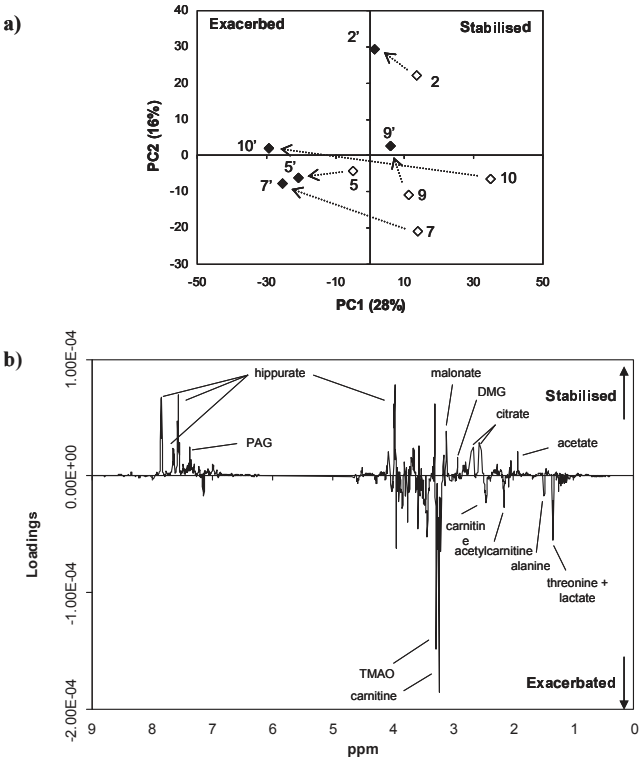

Figure 1. Principal Component Analysis (PCA) applied to ^{1}H NMR urine spectra: *a)* PC1 vs PC2 scores scatter plot; the arrows highlight the direction of change from stabilised (open symbols) to exacerbated (full symbols) conditions for each subject); *b)* PC1 loadings plot explaining the separation observed in the scores map (positive loadings-compounds increased in stabilised condition; negative loadings-compounds increased in exacerbated condition).

Table 1. Characteristics of adults hospitalised with asthma who needed ventilatory support

	NPPV (n=407)	IV (n=634)
Gender: male/female	115 (28.3%)/292 (71.7%)	284 (44.8%)/350 (55.2%)
Age: median (P25-75)	64.9 (57.0-75.0)	52.2 (37.0-69.0)
Comorbidities: Charlson/deyo index	0.93	0.49
No comorbidities	169 (41.5%)	427 (67.4%)
Length of stay (days): median (P25-75)	9.0 (6.0-13.0)	8.0 (4.0-16.0)
In-hospital mortality (n= 104, 10%)	9 (2.2%)	95 (15%)

amines (e.g. dimethylamine, trimethylamine-N-oxide), and other metabolites such as glucose and creatinine. The PCA scores scatter plot shows that most subjects at stable condition lie in the positive side of PC1, whereas the scores corresponding to exacerbated samples are located towards negative PC1 (fig 1a). Analysing PC1 loadings plot we can suggest an explanation for this separation (fig 1b): we infer from these results that threonine (and/or lactate), alanine, carnitine, acetylcarnitine and trimethylamine-N-oxide (TMAO) are increased in the exacerbated condition, while acetate, citrate, malonate, hippurate, dimethylglycine and phenylacetylglutamine are decreased, when compared with stable condition.

Conclusions: A number of metabolites involved in the TCA cycle and/or related to oxidative stress have been found consistently altered in the exacerbated state compared to the stable condition. Although requiring validation in an enlarged sample cohort, these results show the potential usefulness of ^{1}H NMR metabolomics in the monitoring of asthmatic patients, which is crucial for allowing a timely therapeutic approach.

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Keywords: *Asthma. Biomarkers. Urine.*

URINE METABOLOMICS APPLIED TO EXACERBATIONS IN ASTHMATIC PATIENTS

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Background: Clinical manifestations and treatment responses in patients with asthma are heterogenic being necessary an

Table 1. List of specific compounds selected for multivariate analysis.

	^1t_R [a] (s)	^2t_R [a] (s)	Compounds	CAS Number	RI_{calc} [b]	$RI_{lit.}$ [c]
Alkanes	90	0.34	2-methylpentane	107-83-5	587	558
	102	0.34	Hexane[d]	110-54-3	600	600
	222	0.43	4-methylheptane	589-53-7	738	765
	276	0.41	Octane[d]	111-65-9	800	800
	324	0.45	2,4-dimethylheptane	2213-23-2	819	822
	498	0.43	Nonane[d]	111-84-2	900	900
	666	0.41	2,2,4,6,6-pentamethylheptane	13475-82-6	991	997
	684	0.42	Decane[d]	124-18-5	1000	1000
	840	0.46	Undecane[d]	1120-21-4	1105	1100
	972	0.43	Dodecane[d]	112-40-3	1200	1200
	1098	0.47	Tridecane[d]	629-50-5	1300	1300
	1212	0.48	Tetradecane[d]	629-59-4	1401	1400
	1314	0.45	Pentadecane[d]	629-62-9	1500	1500
	1416	0.46	Hexadecane[d]	544-76-3	1601	1600
	1464	0.48	2,6,10-trimethylpentadecane	3892-00-0	1651	1649
	1512	0.51	Heptadecane[d]	629-78-7	1701	1700
	1602	0.46	Octadecane[d]	593-45-3	1808	1800
	1686	0.50	Nonadecane[d]	629-92-5	1901	1900
	1770	0.49	Eicosane[d]	112-95-8	2001	2000
Aldehydes	126	0.55	3-methylbutanal	590-86-3	628	646
	132	0.53	2-methylbutanal	96-17-3	635	646
	150	0.62	Pentanal[d]	110-62-3	656	697
	276	0.97	Hexanal[d]	66-25-1	800	800
	504	0.98	Heptanal[d]	111-71-7	904	899
	606	0.76	2-ethylhexanal	123-05-7	958	955
	690	0.81	Octanal[d]	124-13-0	1004	1001
	846	0.82	Nonanal[d]	124-19-6	1105	1098
	978	0.80	Decanal[d]	112-31-2	1205	1204
	1104	0.73	Undecanal[d]	112-44-7	1306	1291
	1218	0.73	Dodecanal[d]	112-54-9	1407	1407
	1428	0.72	Tetradecanal	124-25-4	1613	1611
	1614	0.76	Hexadecanal	629-80-1	1815	1819

[a]Retention times in seconds (s) for first (^1t_R) and second (^2t_R) dimensions.
[b]RI: retention index obtained through the modulated chromatogram.
[c]RI: retention index reported in the literature for one dimensional GC with a −5%.
[d]Compound confirmed by chemical standards.
Phenyl-methylpolysiloxane GC column or equivalent and for a comprehensive GC×GC system with HP-5 for the first dimension.

improved characterization of asthma phenotypes. A large number of studies have demonstrated that increased oxidative burden occurs in airways diseases. The urine metabolic profile reflects the overall organism health status and hence is an interesting biofluid for the development of new faster and non-invasive methodologies.
Aim: Unveil possible effects on stress oxidative markers (aliphatic aldehydes and alkanes), derived from asthmatics-exacerbation vs stable state-applying a high sensitive methodology.
Experimental: twelve asthmatic patients recruited from emergency department (ED), with asthma exacerbation diagnosis, were enrolled (two excluded).
Urine analysis: Two urines of each patient (exacerbation and control state) were collected into sterile cups, centrifuged at 1500*g* for 10 min and stored at −80 ºC until analysis. Urines were analysed by solid phase microextraction followed by comprehensive two-dimensional gas chromatography-time of flight mass spectrometry (SPME/GC×GC-ToFMS)[1].
Data analysis: For characterization and distinct feature extraction of sample groups profiles (stable vs exacerbation), peak areas of aliphatic aldehydes and alkanes were used to perform explorative multivariate analysis Principal Component Analysis (PCA). Dataset consisted of 60 observations (3 replicate analyses from 20 urine samples, from 10 individuals, each one considered at two clinical states-stable and exacerbation) and 32 variables (peak areas of aliphatic aldehydes and alkanes) Table 1 (p. 106). Scores scatter plot was used to visualize and explore the relationships among samples, whereas the loading profile plot was used to inspect the variables (metabolitos) that contribute mostly for the observed group separation.
Results and discussion: Mean age population: 50.2 years (maximum, 71-minimum, 22); 5 female and 5 male, all under combined inhaled therapy with corticosteroids (ICS) and long acting beta-adrenergic (LABA). A comparison of different urine samples was carried out to unveil possible effects of disease state (stable vs exacerbation). PCA was applied to data matrices comprising aliphatic aldehydes and alkanes, which are end-products of lipid oxidation resulting from oxidative stress associated to asthma. In 9 individuals the aldehyde and, especially, the alkane content consistently increased in the exacerbation state compared to the stable condition. For subject 9 (C9 and E9), no significant change was observed between stable and exacerbation states. This can be explained by severity of his chronic disease (severe asthmatic patient) leading to a high and constant burden of oxidative stress. We hypothesize that oxidative state is at a higher extent in exacerbation condition. Further, aldehydes and alkanes can be formed in inflammatory response induced by the immune system leading to production of activated leukocytes, causing cells to uptake oxygen releasing reactive oxygen species, which can damage lung tissue in asthma.
Conclusions: In spite of our limited number cases, the present work results suggest that oxidative stress is a fundamental factor in the exacerbation condition. Further clinical approaches may be explored, allowing a timely therapeutic approach and/or future antioxidant therapy to prevent the broad damage effects associate to this state.
Acknowledgements: The financial support of the Research Unit 62/94, QOPNA (Project PEst-C/QUI/UI0062/2011 and PTDC/QUI-QUI/117803/2010) is acknowledged.
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Keywords: *Asthma exacerbations. Metabolomics. Urine.*

HOSPITAL ADMISSIONS OF ASTHMATIC PATIENTS IN A PNEUMOLOGY DEPARTMENT: AN 8-YEAR REVIEW

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Background: The goal of asthma care is to achieve and maintain clinical control. Despite all the treatments and guidelines available, asthma can still lead to hospital admission.
Aim: To evaluate the patients hospitalised due to asthma in the Pneumology Department of Hospital Santa Marta during an 8-year period (2004-2011).
Methods: A retrospective study of the patients hospitalised due to asthma was performed and demographic and clinical data were collected.
Results: There were 171 hospitalisations of 97 patients (23% with ≥2 admissions); 74% were female and the mean age was 51.6±17.3. About 57% of hospitalisations were due to exacerbation in severe asthma patients and 24% due to patients with no follow-up on our outpatient clinic. The mean days of hospitalisation was 9.8±5.3. The number of admissions had a mild predominance in winter (31%) and remained stable over time, with a transient increase in 2008-2009. The main causes of admission were infection (66%), need of therapeutic adjustment (21%) and poor compliance to treatment (11%). Of the 97 hospitalised patients, 14.4% were smokers and 11.3% former smokers. Regarding morbidity: 47% were obese, 41% had a concomitant respiratory disease (22% rhinitis, 12% bronchiectasis), 38% had cardiovascular disease, 10% had hypothyroidism and 9% had gastroesophageal reflux disease.
Conclusions: Despite all the advances in asthma management, there are still a considerable number of patients who need hospitalisation. We should emphasize the need to evaluate and control patients' comorbidities, to promote a better compliance to treatments and also to encourage a correct follow-up of patients at the outpatient clinic.

Keywords: *Asthma. Hospitalisations. Comorbidities.*

USING ACT AND CARAT FOR THE ACCESSMENT OF ASTHMA CONTROL: EQUIVALENT OR COMPLEMENT RESULTS?

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Introduction: Asthma and allergic rhinitis are diseases often associated. According to international guidelines for asthma control, a combined approach of both conditions is recommended. The Asthma Control Test (ACT) is the most commonly used test to assess asthma control, but lacks an evaluation of the upper airway disease component. Recently a Portuguese group created a new test to assess the control of both components, the CARAT (Control of Allergic Rhinitis and Asthma Test).
Aim: With this work we aimed to evaluate asthma control in patients with associated rhinitis, by using ACT and CARAT tests, and compare results.
Methods: We performed a prospective study with a group of consecutive adult patients with allergic rhinitis and asthma from our outpatient clinic. The control of the disease was assessed using both ACT and CARAT.
Results: Forty patients were evaluated (70% female, mean age 53 years). According to their answers, 17% of the patients had ACT controlled asthma and 45% had ACT uncontrolled asthma. In both groups CARAT results were equivalent. In the 38% patients with ACT

partially controlled asthma, CARAT results were as follow: 31% had a controlled CARAT test; 23% had an uncontrolled CARAT test due only to an uncontrolled upper airway component; 15% had only uncontrolled lower airway component and 31% had both airway components uncontrolled.
Conclusion: A tool able to assess both asthma and allergic rhinitis control was lacking. In our patients, using the CARAT was useful mainly in the partially controlled asthma population by helping to differentiate those in whom uncontrolled rhinitis was the main cause of the uncontrolled asthma and also by helping to direct treatment.

Keywords: *Asthma. Rhinitis. Control.*

ASTHMA AND COPD: QUALITY OF LIFE

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Introduction: The impact on quality of life of respiratory diseases such as asthma and COPD is significant, both in social or emotional and physical, but not only explained by respiratory functional repercussion. Goals: To compare the quality of life of patients with persistent asthma and COPD patients in similar functional profiling (FEV_1 between 50 and 80% of expected).
Methods: This study included 13 consecutive patients with COPD and 13 consecutive patients with moderate and severe persistent Asthma, all under chronic daily therapy, followed in outpatient Pulmonology or Immunoallergology of our Center. All functional criteria showed similar spirometric (FEV_1 between 50 and 80% of the theoretical value). Patients answered a health related quality of life survey (SF-36), which includes 36 questions assessing eight components: physical functioning (PF), role-physical (RP), body pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE) and mental health (MH), summarizing the results in two components, the physical (PCS) and mental (MCS). Was also evaluated characteristics such as tobacco exposure and more frequent symptoms. Statistical analysis was performed using SPSS v19.
Results: Of the 13 asthmatic patients, 5 were male with a mean age of 51.9±12. Of the 13 COPD patients, 11 were males presenting higher average age than the asthmatic group (65.6±9.8). The asthmatic group had FEV_1 values slightly less severe than the COPD group (62.6±6.4; 56.9±4.5), a statistically significant difference (t-test *P*=.015). As for smoking habits, 12 asthmatics and 7 COPD were non-smokers. For symptoms such as dyspnea, wheezing, coughing, and chest tightness results were similar in two groups: 10/9 patients; 8/8 patients, 5/5 patients, 2/1 patients. Regarding survey results, patients with persistent asthma had average lower values for all 8 parameters (PF 42.3±25.8/63.9±24.2; RP 30.8±30.4/76.9±27.9, 34.6±BP 22.8/67.3±25.6; GH 32.2±16.8/53.2±21.5, 45.7±VT 24.4/65.7±13.8; SF 63.5±26.3/92.3±14.1; RE 46.1±37.4/71.8±44.8, 53.2±23.5 MH/76±13.5). These results are statistically significant (t-test *P*<.03), except for RE. Also for the summarized parameters the differences were significant (PCS 31.1±9.9/42.7±7.4; MCS 43.5±12.7/53.4±8.9). These results do not seem to be explained by the age difference, since no correlation was documented between quality of life and age.
Conclusions: Patients with persistent asthma, even with functional values slightly less severe than patients with COPD showed higher disease impact both in physical, mental and social aspects.

Keywords: *Asthma. COPD. Quality of life.*

REACH STUDY-COMMUNITY ACQUIRED PNEUMONIA: SIMILARITIES AND DIFFERENCES BETWEEN PORTUGAL AND OTHER EUROPEAN COUNTRIES

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Context: The REACH study (REtrospective study to Assess the Clinical management of patients with cSSSI or CAP infections in the Hospital setting [NCT01293435]) was a retrospective, observational, multicentre study, that was conducted in 10 European countries (Germany, Belgium, Spain, France, Greece, Netherlands, Italy, Portugal, United Kingdom and Turkey). It included retrospective data from 2039 patients hospitalized due to Community Acquired Pneumonia (CPA) in 128 sites. Portugal has included 121 (5.9%) patients from 8 sites.
Objective: Characterize the clinical management of patients hospitalized with moderate to severe CAP patients and compare Portugal to other participating countries.
Results: The median age of the 121 Portuguese patients was 68.5 years, with a gender distribution of 52.9% males. Co-morbidities were recorded for 85.1% of the patients, 28.1% of which was congestive heart failure, and 26.4% had chronic respiratory disease.19.0% of the patients had been treated with antibiotics in the previous 3 months and 11.6% had criteria that matched for healthcare-associated pneumonia (HCAP). The aetiology diagnosis was established in 14.9% and in 55.6% of these the isolated microorganism was *Streptococcus pneumoniae*. In 3 of the patients, with criteria for infection acquired in health care, a methicillin resistant *Staphylococcus aureus* (MRSA) was identified. 9.9% of the patients were hospitalized in the intensive care unit and the hospital mortality rate was 15.7%, with an average stay in hospital of 15.6 days. The registry of CURB-65 score was only present in 10.7% of medical records. In the global 2039 patients sample, the median age was 64.5 years, with a gender distribution with 58.7% males. Co-morbidities were recorded in 78.4% patients, with chronic respiratory pathology in 33.8%. Treatment with antibiotics in the previous 3 months was recorded in 19.4% and 12.0% had HCAP criteria. The aetiology diagnosis was established for 28.4% and *S. pneumonia* accounted for 39.3% of the isolate and MRSA 2.1%. 13.6% of patients were hospitalized in Intensive Care Unit and hospital mortality was 7.2%, with an average stay in hospital of 12.1 days. CURB-65 score was present in 25.8% of medical records.
Conclusion: In REACH study, Portuguese patients showed many similarities with the other patients included in the European study (eg. demographic characteristics, co-morbidities, aetiology pattern). However, differences also occurred regarding duration of hospitalization, diagnosis and hospital mortality rate.
This study was funded by AstraZeneca.

Keywords: *Community acquired pneumonia. Epidemiology. Mortality.*

ENVIRH PROJECT (ENVIRONMENT AND HEALTH IN CHILDREN DAY CARE CENTRES): PRELIMINARY RESULTS OF THE VIROLOGY STUDY

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The project Environment and Health in children day care centres has the purpose of studying the health impact of indoor air environment in children in day care centres. One of the key points in this study is to find out the real role of virus infections in

respiratory conditions at day care centre level. To accomplish this point, the study included parents contact to the research team whenever a child had symptoms of respiratory infection, in order to collect respiratory samples for virology analysis. As comparison group, children with respiratory infection who went to a hospital emergency department were also included. Two groups of children with respiratory infection were studied: those who stayed at home or at the day care centre, and those who went to the emergency department of the Hospital da Luz. The study was conducted between February and May 2011(first phase) and October 2011 and April 2012 (second phase). Naso and oropharyngeal swabs were collected from children with reported fever and respiratory infection. Detection of Influenza A and B, Parainfluenza 1-4, Adenovirus, Human metapneumovirus, Respiratory syncytial virus, Rinovirus, Enterovirus, Coronavirus and Bocavirus were performed by multiplex PCR and RT-PCR techniques. Overall, 103 samples were collected from children between 5 months and 5 years, 67 out of these from children who stayed at home or at the day care centre and 36 who went to the hospital emergency department. Forty-seven (35 mono-infected) and 32 (26 mono-infected) samples were positive, respectively from the first (home/day care centre) and the second (hospital) groups. Influenza A (H3) was the most frequently detected virus in this study.
Conclusions: in this study, an alert system for the fast diagnosis of viral respiratory infections of children who stayed at home or at the day care centre, was evaluated. Parents´ adherence was below the expectations, except during the flu epidemic, which contributed for the high prevalence of the influenza A (H3) virus in this study. There was a significant statistical difference between the rates of positive specimens collected at home/day care centre and at the hospital, being higher the last.
Financiado pela Fundação para a Ciência e Tecnologia-ENVIRH Project PTDC/SAU-ESA/100275/2008.

Keywords: *Virus. Infection. Environment.*

INVASIVE PNEUMOCOCCAL DISEASE-CHARACTERIZATION OF AN HOSPITAL POPULATION

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Introduction: The recent development of pneumococcal vaccines led to a marked decrease in the incidence of invasive pneumococcal disease (IPD) in developed countries. Still, the DPI remains an important cause of morbidity and mortality, most commonly manifesting as acute otitis media (AOM), community-acquired pneumonia (CAP) and meningitis.
Objectives: Description of a population with IPD. Identification of mortality related factors.
Methods: Retrospective and descriptive study, based on clinical file consultation. We included patients with microbiological identification of Streptococcus pneumoniae in biological samples, analyzed at the Hospital of Vila Real in the year 2008. Statistical analysis was performed using the SPSS 20.
Results: We included 75 patients, 70% were male. Mean age was 59±27 years. The majority of isolates was obtained from sputum (53%), blood (28%), pus (9.3%) and bronchial aspirate (8%). Macrolide resistance was found in 6% of the strains, penicillin resistance in 5% and fluoroquinolone resistance in 1%. More than 85% of the specimens showed no resistance to antibiotics. About half of the samples were collected in the emergency room and almost 70% during the autumn/winter. Sixty patients (80%) required hospitalization. DPI frequently presented as CAP (55%), acute bronchitis (16%), OMA (8%) and empyema (3%). Of the 46 patients with CAP, 11 had parapneumonic effusion, mostly uncomplicated. Pneumococcemia was identified in 21 patients. The most common comorbidities: chronic lung disease (42.7%), cardiac insufficiency (28%), malignant disease (27.9%), diabetes (14.7%), cerebrovascular disease (13.3%) and chronic liver disease (10.7%). Approximately 25% of hospitalization was complicated by superinfection. Eight patients were admitted to the intensive care unit. Overall mortality was 25.3% and mortality among hospitalized patients was 31.6%. In only 5% of the patient's we found record in the clinical file of prescribing or recommending pneumococcal vaccination after infection. Data analysis show as that mortality was statistically associated with bacteremia (*P*=.006), diabetes (*P*=.002) and cerebrovascular disease (*P*=.001).
Conclusions: Identification of pneumococemia, cerebro vascular disease and diabetes as factors associated with mortality DPI. High mortality rate found probably relates to selection bias, resulting from the fact that all acquired samples were obtain from a population who needs hospital observation. The small number of patients vaccinated after DPI suggests devaluing of this form of secondary prophylaxis.

Keywords: *Pneumococcal disease. Mortality. Vaccination.*

BRONCHIECTASIS: REVISITING AN ANCIENT PATHOLOGY!

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Introduction: The bronchiectasis cause recurrent lower respiratory infections determining a worsening of lung function, respiratory failure and pulmonary hypertension with consequent chronic morbidity and premature death. These events lead to in progressive deterioration on the quality of life of affected patients.
Aim: Characterization of a group of patients with bronchiectasis followed in a Pulmonology Clinic.
Material and methods: Retrospective review of clinical, microbiologic, radiologic and spirometric findings of 22 patients with bronchiectasis confirmed by high-resolution Computed Tomography (CT) scan. We assessed demographic data, smoking habits, symptoms, associated morbidities, imaging characterization, steroid treatment, pulmonary function tests, microbiological profile, antibiotics and hospital admissions.
Results: The average age of studied patients (72.7% female, 27.3% male) is 54.4±21.8 years, the majority being non-smokers (81.8%). As for predominant symptoms, 100% of patients have productive cough, 68.2% have dyspnoea and 59.1% have hemoptysis. Regarding the types of bronchiectasis on radiologic findings they were cylindrical in 40.9% of patients, cystic in 27.3% and cylindrical/cystic in 31.8%. We emphasize the concomitant presence of inflammatory infiltrates in 63.6% of patients. Paranasal sinus CT scan confirmed the diagnosis of sinusitis in 45.5% of patients. With regards to the usual therapy, 81.8% of patients were being treated with inhaled corticosteroids. During the follow-up, 36.4% of patients were treated with at least one course of systemic corticosteroids. Pulmonary function testing results showed obstructive pattern in 52.7% of patients (average FEV_1 50.4%). Three patients were not submitted to spirometry and only one patient showed a normal spirometry. In 28.6% of the patients there was a significant decline of lung function. On sputum culture the Pseudomonas aeruginosa was the most commonly isolated microorganism (86.2% of patients) followed by Haemophilus influenzae (50% of patients). A variety of pathologic microbial flora has also been isolated, the most relevant: *Haemophilus parainfluenzae, Proteus mirabilis, Streptococcus pneumonia, Staphylococcus aureus* meticilina sensível and *Stenotrophomonas maltophilia.* Regarding the patients with microbiological isolation of Pseudomonas aeruginosa there is chronic colonization by this agent in 45.7%, and 86.7% had at least one hospitalization caused by the respiratory infection, which illustrates the association of this agent with the severity of disease. Regarding the antibiotherapy,

the empirical therapy prescribed was changed in 50% of patients; 22.7% of them needed subsequent adjustments according the microbiological profile. In the context of infected bronchiectasis, it required hospitalization 72.7% of patients.
Conclusions: Productive cough, dyspnea and hemoptysis are the most common presenting symptoms. Obstructive type spirometric abnormality is present in most patients, and it is clear a faster decline in lung function. *Pseudomonas aeruginosa* and *Haemophilus influenzae* are the most frequently isolated microorganisms, although there is a variety of pathologic microbial flora. A systematic assessment of the microbiological cultures is essential, because of successive changes of the antibiotic susceptibility profile of the microorganisms. Bronchiectasis is an increasingly common diagnosis, based on radiologic findings, and clinicians should be aware for an accurate diagnosis and appropriate treatment of this disease and its complications.

Keywords: *Bronchiectasis. Pseudomonas aeruginosa. Spirometry.*

TUBERCULOSIS AND HEALTH-CARE WORKERS: IS THERE AN OCCUPATIONAL RISK IN PORTUGAL?

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Introduction: Health care workers (HCWs) in high income countries are considered to have little or no occupational risk for tuberculosis (TB). Portugal is a high income country but little is known about the impact of TB in its HCWs.
Objectives: Study the incidence and occupational risk of TB in HCWs in the north region of Portugal. Compare HCWs characteristics with the regional population. Evaluate potential risk factors.
Methods: We reviewed all notified TB cases among HCWs, from the period from Jan/06 to Dec/10, working in the national health system in the north of Portugal and recorded individual, professional and disease characteristics. HCWs incidence rates, occupational risks, TB and individual characteristics were calculated and compared with the regional population using Fisher's test or chi-square test. Correlation between HCWs district incidence and both TB hospital admittances and global district incidence was calculated with the Spearman (nonparametric) method.
Results: In 5 years, 89 TB cases were notified from a total of 42713 HCWs, from 17 hospital centers and 23 primary care centers. HCWs had an annual average TB incidence rate (IR) of 44.7/100000 and a significant occupational odds ratio (OOR) of 1.331 (95%CI=1.079-1.641). HCWs working in hospitals had the highest significant occupational risk, namely medical doctors (IR=78.7; OOR=2.372 [95%CI=1.587-3.544]) and nurses (IR=52.3; OOR=1.574 [95%CI=1.078-2.299]). Hospital medical doctors with the greatest number of cases were those working in internal medicine (5 cases; IR=140; OOR=4.218 [95%CI=1.749-10.17]). TB hospital IR were found to be correlated with hospital TB admissions (P=.026) but not with district TB incidence. No significant occupational risk was found for primary care HCWs or other hospital HCWs.
Cases had a median age of 30 years and 25.8% were male. TB cases in HCWs differed from regional cases as they were mainly in females (P<.0001) and had almost no individual risk factors, namely HIV infection (P=.0030). There were no differences regarding origin, retreatment, disease location, MDR-TB, culture or microscopy rates.
Conclusions: Our study shows that HCWs in the north region of Portugal have a significant occupational risk for TB, however, only hospital HCWs, namely doctors and nurses seem to share this increased risk, which is apparently related with TB admissions. Also, in contrast to the regional population, TB cases in HCWs were mostly in females with no individual risk factors, with the exception of the occupational exposure.

Keywords: *Tuberculosis. Public health. Epidemiology. Occupational risk.*

HYPERSENSITIVITY REACTION TO ANTITUBERCULOSIS DRUGS

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Introduction: Hypersensitivity reactions to antituberculosis drugs can cause a diagnostic and therapeutic problem.
Aim: Determine the frequency of hypersensitivity reactions to antituberculosis drugs, their clinical presentation and the diagnostic approach required.
Methods: A retrospective study was performed to identify patients suspected of hypersensitivity reaction, followed in pulmonology diagnostic center of Vila Nova de Gaia from January 2010 to June 2012.
Results: A total of 9 patients were suspicious of having hypersensitivity reaction, which corresponds to 1.5% of the total patients followed in this pulmonology diagnostic center with latent tuberculosis or active tuberculosis. Most of the patients were female (66.7%), with a mean age of 49.7 years. The most frequent drug responsible for the hypersensitivity reaction was isoniazid (36.3%) and rifampicin (27.3%). All the patients the patients had clinical symptoms that could be compatible with hypersensitivity reaction. One patient had only skin lesions and the others had a systemic reaction. The average time between the treatment start and the possible hypersensitivity reaction was 17 days. All patients went through an allergological study. After the allergological study the hypersensitivity drug reaction was confirmed in 3 patients and was probable in 4 patients. All the patients completed the treatment with a an alternative drug combination.
Conclusion: From the 9 patients with a suspected drug hypersensitivity reaction this was confirmed or probable in 7 (77.8%). In most cases this was a delayed hypersensitivity reaction. Identification of drugs responsible for hypersensitivity reaction, allowed the performance of an alternative regimen effective and safe. Antituberculosis drug hypersensitivity reactions are rare however it is important to recognize and know how to manage them.

Keywords: *Hypersensitivity reactions. Antituberculosis drugs.*

TUBERCULOSIS AND HIV/AIDS: EXPERIENCE OF 2001-2010 IN CDP SANTARÉM

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Tuberculosis (TB) and HIV/AIDS are two important sanitary problems that enhance each gravity and difficulty of control.
Material and methods: A retrospective study of the cases treated in a chest clinic, Centro de Diagnóstico Pneumológico de Santarém, in a period of 10 years, 2001 to 2010.
Results: In this period, of a universe of 640 new cases of TB followed in the CDP Santarém, were found 98 (14.4%) cases associated with HIV infection. Ninety two (93.9%) were male and 6 (6.1%) female; in the general group of patients the relation was 69.2% vs 30.8%. The age group of higher incidence was 35-44 years. As associated pathologies we found 2 cases of diabetes (2.3%) and 2 (2.3%) of chronic renal failure. The main group risk was drugadiction in 66 cases (70.4%), in communitary residences 34

(35.7%), presidiary 24 (15.3%), homeless 5 (5.1%) and immigrants 10 (12.2%). The forms of TB were 51 (52%) pulmonary, exclusively, and 47 (48%) extrapulmonary. In this group, there were 20 (20.4%) disseminated, ganglion 15 (15.3%), pleural 9 (9.2%), vertebral 2 (2%) and meningitis, CNS, ganglion intrathoracic one case each (1%). The results of treatment were of 71 (72.5%) success, 14 (14.3%) defeated, lost 8 (8.2%) and 5 (5.1%) transferred.

Keywords: *Tuberculosis. HIV/AIDS.*

MYCOBACTERIUM TUBERCULOSIS, HOW LONG DID YOU WALK?

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Introduction: Delay in diagnosis and initiation of TB treatment increases morbidity, mortality and risk of transmission.
Aim: To determine the time elapsed between the onset of symptoms until the first observation by a health professional and the time from the first observation to diagnosis.
Methods: We conducted a questionnaire-based survey to patients with active tuberculosis followed in the CDP treatment of Vila Nova de Gaia in the months of May and June 2012.
Results: We included 54 patients, 68.5% males, with a mean age of 48.5 years. Most patients were smokers or ex-smokers (70.4%). Ten patients were drug users (18.5%) and 9 (16.7%) were infected by human immunodeficiency virus. Fifty patients (92.6%) was diagnosed by passive screening, 3 patients (5.5%) during investigation of a radiological finding and 1 (1.9%) by contact screening. The first healthcare place that the patient went after the onset of symptoms was to emergency department 20 patients (37%), a general practitioner 17 patients (31.5%), a hospital consultation 9 patients (16, 7%), a private clinic 3 patients (5.5%), Chest Diagnosis Centre three patients (5.5%), a pharmacy 2 patients (3.7%). The median time from onset of symptoms and the observation by a health professional was 37 days. Patients with symptoms of anorexia and weight loss took longer to access to health care (53.5 vs 18.5 days; P=.01 and 51.7 vs 12.1 days, respectively). The patient was observed on average 3.2 times before the diagnosis was made. Considering 15 days as cutoff, patients who took less than 15 days to access to the health care system went mainly to the emergency department (48%), while patients who took more than 15 days were observed mainly by a general practitioner (52%; P=.027). The median time from the first consultation and diagnosis was 56 days (minimum 1 day, maximum 512 days). Patients with respiratory symptoms had on average a diagnosis faster than the others (37.9 vs 127 days; P=.013). Considering 15 days as a cutoff point, the majority of patients in whom the diagnosis was made in less than 15 days, were first observed in the emergence department (57.1%), while patients whose diagnosis took longer than 15 days were observed by a general practitioner (39.4%; P=.026). The median time from onset of symptoms and diagnosis was 92 days.
Conclusion: These results suggest the need to implement strategies for earlier diagnosis of tuberculosis.

Keywords: *Tuberculosis. Late diagnosis. Accessibility.*

TUBERCULOSIS AND ABANDON OF TREATMENT — 2002 TO 2011 IN CDP SANTARÉM

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Introduction: The correct and complete treatment of each case of tuberculosis (TB) is essential to achieve the progressive control of the disease. The abandon of treatment is a serious problem, causing relapses, more transmission of the disease and promoting the emergence of resistant strains.
Objective*:* Study the importance of the cases of abandon between the patients with TB followed in our service.
Material and methods: Retrospective study of cases of abandon in the patients with TB in a period of 10 years (2002 to 2011).
Results: In this 10 years period, were followed at CDP Santarém 665 patients (629 new cases and 36 relapses). There were 9 cases lost during the treatment (1.3%). The mean age was 34 years (minimum 26 and maximum 47). All these 9 patients were new cases and were male. In the main group the males were 68.9% vs 31.1%. There were 8 cases of pulmonary TB and one disseminated. HIV/AIDS is present in 7 cases (77.8%); 2 cases are HIV negative. In the main group this percentage was 14.3%. Drug addiction was present in 8 cases (88.9%), including all HIV+. Seven cases were residents in communities, one was a homeless and one was foreigner.
Conclusions: Although we had a low percentage of cases of abandon, 1.3% in this 10 years period, each case is a potential problem that we have to avoid; it is necessary to reinforce the organized intervention in collaboration with the other health and social services. The main problem associated is drug addiction.

Keywords: *Tuberculosis. Abandon. Drug addiction.*

TUBERCULOSIS INFECTION AND IGRA-THE EXPERIENCE OF A PNEUMOLOGIC DEPARTMENT

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The diagnosis and treatment of infection by *Mycobacterium tuberculosis* (MT) decreases the risk of developing active tuberculosis and their propagation on community. The IGRA (Interferon-Gamma Release Assays) test, as tuberculin skin test, help us on identification of the immunological response to MT and, together, do the diagnosis of tuberculosis infection. The authors reviewed all the data related to each patient in the CDP of Beja between 2008 and 2011 that realized the IGRA test presenting the results of this review and benefits of the utilization of this method of diagnose in the detection of Latent Tuberculosis.

Keywords: *Mycobacterium tuberculosis. IGRA (interferon-gamma release assays) test. Latent tuberculosis.*

RELATION BETWEEN ASTHMA CONTROL, BRONCHIAL HYPERRESPONSIVENESS AND AIRWAY INFLAMMATION

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Introduction: The goal in treating asthma is to obtain optimal control of the disease. Currently there are several tools that allow assessing the level of asthma control.
Objective: To evaluate the relation between asthma control, bronchial hyperresponsiveness and airway inflammation.
Methods: Cross-sectional study of patients with asthma and/or rhinitis that, in a 6 months period, went to a pulmonary function test laboratory to perform methacholine challenge and measurement of exhaled nitric oxide (FENO). Asthma control was assessed by application of two questionnaires: CARAT ("Control

of Allergic Rhinitis and Asthma Test") and ACT ("Asthma Control Test").
Results: We evaluated 35 patients, 57% were female with a median age of 34 years. Of these, 43% had asthma, 40% asthma and rhinitis and 18% rhinitis. Half of the patients had documented atopy and 22.9% were in regular treatment with inhaled corticosteroids. The average FENO value was 28.6 ppb. Eleven patients (31.4%) had a positive methacholine challenge. There was a statistically significant relation between total CARAT and ACT results (*P*=.03, r=0.361). However, no significant association was found between asthma control, methacholine challenge results and FENO value. Patients with positive methacholine challenge had higher average FENO values (40.1 vs 23.3), but this relation was not significant.
Conclusion: In this sample, methacholine bronchial hyperresponsiveness and FENO results do not seem to correlate with uncontrolled asthma.

Keywords: *Asthma control. Bronchial hyperresponsiveness. Airway inflammation.*

INFLUENCE OF MENSTRUAL CYCLE IN FRACTIONAL EXHALED NITRIC OXIDE

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The determination of fractional exhaled nitric oxide (FENO) is widely used as a biomarker of eosinophilic airway inflammation. Some studies suggest that nitric oxide (NO) is influenced by cyclical hormonal changes in women, but those are not consensual. Thus, according to the ATS/ERS (2005), record the individual characteristics of the patient during the exam, is recommended. However, the interpretation of the results does not take into account such influences. The aim of this study was to assess how FENO varies throughout the menstrual cycle. With this purpose, we studied a group volunteers within childbearing age, with regular menstrual cycle, non-smokers, who were not taking any medications-including hormonal contraception and food supplements-and who were not pregnant or breast-feeding. All participants reported not being aware of any condition that could affect the FENO. The presence of atopy was controlled by a skin prick test, having been excluded participants with positive test. We conducted four study visits, based on the periodicity of the cycle of each participant. In each visit, we made the determination of the FENO, the quantification of plasmatic levels of nitric oxide and nitrates (NO/NO_3^-) and the blood levels of hormone estradiol-17beta and progesterone. The evaluations occurred at morning, after overnight fasting. The participants were request to follow a low-nitrate diet in the previous day and refrained from vigorous exercise, for at least 1 h before the visit. We evaluated a total of 20 volunteers aged between 18 and 45 years (27.95±8.31), with a regular menstrual cycle of 28.75±1.45 days. We found a significant increase of FENO on secretory phase (17.97 ppb±5.8) compared with the menstrual and proliferative phase (16.48 ppb±3.6 and 15.95 ppb±2.8, respectively). No significant variations were found throughout the menstrual cycle in plasmatic levels of NO/NO_3^-, however, we found a positive correlation between FENO and plasmatic levels of NO/NO_3^- during ovulation. Finally, in our sample, the levels of oestradiol and progesterone are not predictors of FENO value nor of plasmatic levels of NO/NO_3^-. The results of this study show a variation of FENO over the menstrual cycle, nevertheless, the values remain within the reference range, reinforcing the reliability of this biomarker.

Keywords: *Fractional exhaled nitric oxide. Plasmatic levels of nitric oxide and nitrates. Menstrual cycle.*

CHARACTERIZATION OF BRONCHODILATOR RESPONSE BY SPIROMETRY AND PLETHYSMOGRAPHY

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Background: The bronchodilator response criterion is defined by ATS/ERS (2005) as an increase of FEV_1 and/or FVC ≥12% and 200 mL. However, there are other criteria that should be evaluated in order to better characterize the bronchodilator response.
Objectives: 1) To determine the lung function parameters obtained by spirometry and plethysmography, that have significant changes with the administration of bronchodilator. 2) To quantify the changes of the lung function parameters between pre and post bronchodilator. 3) To characterize the response to bronchodilator according to criteria found in literature.
Methods: The sample included 52 consecutive subjects who performed lung function tests, and in which was detected airway obstruction with subsequent administration of bronchodilator. The sample was considered as a whole and was also divided in accordance to the presence or absence of ATS/ERS (2005) bronchodilation criteria and the presence or absence of lung hyperinflation.
Results: All parameters increased or reduced significantly after administration of the bronchodilator (*P*<.05). Raw and the FEF's had the largest percentage of differences between the pre and post bronchodilator. For the whole sample, the criteria which were able to detect the largest number of subjects with a positive response to the bronchodilator were the increase of $FEF_{25-75\%}$ ≥10%, $FEF_{25-75\%}$ ≥20%, IC≥10% and the reduction of Raw≥10%. For the group with the presence of ATS/ERS (2005) criteria, the criteria which were able to detect the largest number of subjects with a positive response to the bronchodilator were the increase of IC≥10%, FVC≥350mL, $FEF_{25-75\%}$≥10% and the decrease of RV≥10%. For the group without the presence of ATS/ERS (2005) criteria were the increase of $FEF_{25-75\%}$≥10% and $FEF_{25-75\%}$≥20%. For the group with lung hyperinflation were the increase of $FEF_{25-75\%}$≥10% and IC≥10% and the decrease of RV≥10%. For the group without lung hyperinflation were the increase of $FEF_{25-75\%}$≥10% and $FEF_{25-75\%}$≥20%.
Conclusion: This study couldn´t define only one parameter that was considered "the best" to characterize a positive bronchodilator response, but suggested a combination of several parameters for a correct characterization of airway reversibility.

Keywords: *Airway obstruction. Bronchodilation. Reversibility.*

NEUROMUSCULAR DISORDERS APOINTMENT IN A PULMONOLOGY DEPARTMENT

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Background: Neuromuscular diseases with respiratory involvement are currently a challenge on Non-Invasive Mechanical Ventilation (NIV) practice. The use of NIV by Bi-level Positive Airway Pressure (BiPAP) or volume ventilation represents an efficient way to treat respiratory disturbances in neuromuscular patients, who also frequently need the use of a mechanical in-exsuflator (Cought-assist®). Compared to tracheostomy ventilation, NIV greatly simplifies administration of care, is more comfortable for patients and reduces costs.
Aim: Characterization of patients with neuromuscular disease flowed in Pulmonology outpatient clinic of CHAA during the period of one year.
Material and methods: Non-randomized,retrospective study about patients submitted to lung function evaluation in the Pulmonology

Service of the CHAA between 06/2011 and 07/2012. We analized diagnosis, gender, age, VNI modality, survival and % of patients with Cough-assist, gastrostomy (PEG) and tracheostomy.
Results: In the 28 patients, 43% were male and 57% female, median age 61.5 years. Considering the diagnosis, 39.3% had ALS, 21.4% inclusion body myositis, 10.7% myotonic dystrophy, 7.1% Pompe's disease, 3.6% MND, 3.6% Guillain-Barré syndrome, 3.6% Charcot-Marie-Tooth disease, 3.6% limb girdle muscular dystrophy, and diagnosis was inconclusive on 7.1%. 86% of the patients needed NIV support. Two required tracheostomy. The Cough-assist® was prescribed in 28.6% and 14% needed PEG. Four patients died.
Conclusions: The results show a predominant need for ventilatory and additional care support in patients with neuromuscular disease, that was determinant to create a multidisciplinary team (Pulmonologist, Cardiopneumology technician, Physioherapist, Neurologist, Psychologist, Gastroenterologist, Nutritionist and Cardiologist) for specific evaluation an follow-up to this group of patients.

***Keywords**: Neuromuscular diseases. Ventilatory support. Multidisciplinary team.*

DUCHENNE MUSCULAR DYSTROPHY — EXPERIENCE OF A CENTER

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Background: Duchenne muscular dystrophy (DMD) is an inherited disorder, X-linked recessive, characterized by a progressive loss in muscle strength. Chronic respiratory failure is an expected complication during the course of the disease and without ventilatory support patients died, on average, at age 19.
Objectives: Characterize the population of patients with DMD followed in Neuromuscular Respiratory Support Consultation of CHUC-HG, between 2000 and 2012. The effect of Noninvasive Mechanical Ventilation (NIMV) in survival of patients was evaluated.
Methods: Retrospective analysis of medical files of patients, with assessment of demographic characteristics, functional parameters and age at onset of NIMV, survival with NIMV and other complications of the disease. All patients were previously followed at Hospital Pediátrico de Coimbra, with early onset of NIMV soon as it has been documented nocturnal (by polysomnography) or diurnal hypoventilation. Clinical and functional evaluation was conducted quarterly. The measurement of ventilatory pressures was made targeting the normalization of blood gases.
Results: The study includes 26 patients, aged between 19 and 37 years. At the time of this study, 16 patients had died, mean age at the date of death of 22.0±3.0 years. Thirteen died of complications of cardiomyopathy (heart failure or arrhythmia). Currently are followed 10 patients in consultation, mean age 27.7±6.6 years. All patients required ventilatory support with bi-level positive airway pressure (BiPAP), mean age at onset of NIMV of 17.2±4.7 years. Patients who cooperated on spirometry at the beginning of ventilation, had an average forced vital capacity (FVC) of 31.3%, average maximal inspiratory pressure (MIP) of 2.6±1.0 kPa and average maximal expiratory pressure (MEP) of 2.6±0.9 kPa. Median survival time on NIMV was 77.0±11.3 months. Cardiomyopathy was documented in 57% of patients. Half of patients underwent spinal surgery and 12% required percutaneous gastrostomy placement.
Conclusion: The study showed that well conducted non-invasive mechanical ventilation radically altered the natural course of the disease. The bi-level mode was effective. The management of heart disease is the major challenge of the future.

***Keywords**: Duchenne. Noninvasive ventilation.*

COULD ENCOURAGEMENT INFLUENCE THE OUTCOME OF A 6 MINUTE WALK TEST?

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Introduction: The American Thoracic Society published in March 2002, a document that aimed to standardize the test march of 6 min (PM6m). It was determined that incentive should be applied to the patient once per minute during the test.
Objective: To determine the variation in performance of 6-min walk test applying continuous encouragement (PM6mIC).
Methods: We conducted a prospective study, which ran from April to June 2012 and consisted in application of PM6mIC in patients who had undergone a PM6m according ATS protocol between January and March of the same year. The PM6mIC only differs from PM6m in encouragement, which is continuous during the test. We excluded patients with therapeutic regimen changes in the interval between the two tests. Patients were not informed of the change in the protocol PM6m. In statistical analysis, we used IBM SPSS 20.
Results: We included 12 patients, 7 were male. Mean age was 55±12 years. Nine patients had pulmonary disease, 5 had interstitial disease, 2 with COPD and 2 with a history of extensive lung infections. The remaining had neuromuscular disease, without compromise in walking. Comparing the PM6mIC with PM6m, we found increased cardiac frequency at the end of the race, from 103±20 to 117±26, and respiratory rate of 27±5 to 29±5. The Borg scale for dyspnea increased from 3.75±2.4 to 4.25±2.5 and oxygen saturation at the end of the test decreased from 93.8±2.6 in PM6m to 90.6±4% in PM6mIC (*P*=.009). Nine patients showed desaturation during PM6mIC, 2 of them with normal PM6m. The average oxygen desaturation increased from 5.8±4.9% in PM6m to 7.3±4.3% in PM6mIC. Nine patients walked for longer distance in PM6mIC than in PM6m. The average distance traveled in PM6m was 451.7±50.8 m, 86±12% of the predicted distance. In PM6mIC mean values increased to 514.3±61.2 me 93±7%, respectively (*P*=.003). From the 7 patients identified with possible limitation of exercise capacity using PM6m, only 3 maintain that result in PM6mIC (*P*=.046).
Conclusions: This study provides evidence that the encouragement applied to patients during PM6m factor is variability in overall performance, in determining the possible limitation of exercise capacity and desaturation with exercise desaturation. PM6mIC oxygen desaturation found in patients with normal PM6m,which influence therapeutic strategy and prognosis, reports to limitations of the current protocol when applied to patients with mild to moderate cardiopulmonary disease.

***Keywords**: 6 min walk test. Encouragement. Impact.*

COMPARING FIXED PERCENTUAL VALUES AND THE 5TH PERCENTILE FOR FUNCTIONAL DIAGNOSIS OF AIRWAY OBSTRUCTION

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Introduction: Fixed criteria have been classically used to identify bronchial obstruction in patients with asthma or COPD. International guidelines actually recommend the preferential use of the lower limit of normality or LLN ("below the 5th percentile").
Objective: To compare the results of lung function (LF) obtained in clinical practice for diagnosis of airway obstruction, using fixed

percentage values vs the 5th percentile (the reference standard) as normality limits.
Methods: Retrospective analysis of LF (spirometry and body plethysmography) performed in 2011 by the authors. Those with criteria for airway obstruction considering the FEV_1/VC ratio<LLN were selected and divided by age groups. Among these, we analyzed FEV_1/VC, FEV_1, FVC, TLC and RV considering the 5th percentile and the fixed percentage values. Statistical analysis was performed with SPSS 20.0, using Cohen's Kappa test.
Results: During 2011, 1358 subjects underwent LF; 8 were excluded due to incomplete data. Overall, the agreement between the two criteria was kappa=0.655±0.035. Among the 124 patients who had obstruction diagnosed by LLN, 32 (26%) had a normal test with the 0.70 cut-off, and would be wrongly underdiagnosed. This occurred only in younger age groups, while in older ones a high rate of overdiagnosis (51 subjects-36%) was observed. Among patients with airway obstruction, the agreement of the 2 criteria for the remaining parameters was good, except for inflation diagnosed with TLC.
Conclusion: Using fixed percentage criteria for the diagnosing airway obstruction leads to a high rate of underdiagnosis in younger and overdiagnosis in older ages.

Keywords: *Asthma. Bronchial obstruction. Reference standards.*

LUNG FUNCTION IMPAIRMENT IN PATIENTS WITH PULMONARY SARCOIDOSIS

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Introduction: Sarcoidosis is a chronic granulomatosis disease of unknown cause with a predominant affectation of the lungs. Pulmonary function evaluation is one of the tests used to access the disease, and abnormalities are often present at the time of diagnosis. Although the most common change in patients with interstitial lung disease is a restrictive pattern associated to a decrease in diffusing capacity of the lung for carbon monoxide (DLco), in patients with sarcoidosis is often present other abnormalities.
Aim: We aimed with our work to functionally evaluate patients with pulmonary sarcoidosis referred to the outpatient clinic of Hospital de Santa Marta.
Methods: A retrospective analysis of the patients referred to the Intersticial Disease outpatient clinic with the diagnosis of sarcoidosis was made, in the period of January 2010 to June 2012. We evaluated demographics, clinical presentation and radiologic (changes in chest radiography) and functional changes at time of diagnosis.
Results: Forty-four patients with pulmonary sarcoidosis were selected-68% were female with an age average of 53 years (23-78 years). Of these, 34% were former smokers and 9% current smokers. The diagnosis was presumptive in 25% of the patients (n=11). The sarcoidosis stage distribution was: stage I 36%, stage II 18%, stage III 41%, stage IV 5%. Functionally, 33% had normal pulmonary function, 23% an obstructive pattern, 16% a restrictive pattern, 14% had just a decrease in DLco (adjusted to alveolar volume) and 6% had obstruction associated to restriction.
The table below resumes these findings.
Conclusion: In our patients no pulmonary function pattern was predominant, but an obstructive pattern was more common, associated to a superior age average. Smoking was transversal to all ventilatory patterns with an incidence of about 30%. Furthermore when we evaluated changes according to stages, no relation in particular was revealed and a considerable number of patients had normal pulmonary functional tests.

Keywords: *Sarcoidosis. Lung function.*

ALTERATIONS IN PLATELETS ACCORDING TO THE SEVERITY OF OBSTRUCTIVE SYNDROME OF APNEA-HYPOPNEA

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Introduction: There are important cardiovascular complications associated to Obstructive Syndrome of Apnea-Hypopnea (OSA). Platelets play a fundamental role in the development of atherothrombosis. Several studies show a relationship between the activation of platelets in OSA and an increase of its aggregation in the moderate and severe forms of this disease.
Objective*:* Evaluate the behavior of platelets parameters in the hemogram of patients with OSA.
Methods: Retrospective study using the database of 1330 patients referred to the Respiratory Sleep Pathology Appointment. Patients with diseases associated with OSA such as COPD and Obesity-Hypoventilation Syndrome, active hematological and neoplastic diseases or using anticoagulant or antiaggregant drugs were excluded. Hemogram was requested to every patients in the first appointment, being also included the patients with a previous hemogram up to three months before the appointment. The study sample was divided into four groups according to the Apnea-Hypopnea Index (AHI) obtained from the polysomnography or cardiorespiratory polygraphy study; Group 1: control (AHI<5 per hour), Group 2: patients with mild OSA (AHI 5-14 per hour), Group 3: patients with moderate OSA (AHI 15-29 per hour) and

	Normal n=18 (41%)	$FEV_1/FVC<70\%$ n=10 (23%)	TLC<80% n=7 (16%)	$FEV_1/FVC<70\%+TLC<80\%$ n=3 (6%)	KCO<80% n=6 (14%)
Age (average)	51	62	53	57	39
Sex (F)% (n)	77% (14)	60% (6)	57% (4)	33% (1)	83% (5)
Smoking (n)					
Non smoker	78% (14)	70% (7)	71% (5)	33% (1)	50% (3)
Smoker	6% (1)	—	—	33% (1)	33% (2)
Ex-smoker	17% (3)	30% (3)	29% (2)	33% (1)	17% (1)
Pack-years (average)	6	23	18	18	34
Stage% (n)					
I	33% (6)	50% (5)	43% (3)	—	33% (2)
II	22% (4)	—	29% (2)	33% (1)	17% (1)
III	44% (8)	40% (4)	14% (1)	67% (2)	50% (3)
IV	—	10% (1)	14% (1)	—	—

Group 4: patients with severe OSA (AHI ≥30 per hour). The platelets parameters were compared (platelets number, mean platelet volume (MPV), platelet distribution width (PDW) and plateletcrit [PTC]) between the different formed groups. Statistical analyses were made with chi2, t student, Mann-Whitney and ANOVA tests and Pearson's correlation, according to the indications, using SPSS v18 software.
Results: The final sample had 563 individuals. In the patients with OSA (Group 2, 3 and 4) comparing to the Group 1 (control), MPV was higher (10.3±1.2 fl vs 9.6±1.2 fl; *P*<.001) and the number of platelets was lower (228.3±56.6×10^9/L vs 247.3±60.6×10^9/L; *P*=.001) with statistical significance. In the patients with OSA, according to its severity, MPV was higher (Group 1: 9.6±1.2 fl; Grupo 2: 9.9±1.3 fl; Grou 3: 10.3±1.2 fl; Group 4: 10.4±1.1 fl; *P*<.001) and inversily, the number of platelets was lower (Group 1: 247.3±61×10^9/L; Group 2: 235.5±63×10^9/L; Group 3: 223.2±5×10^9/L; Group 4: 225±58×10^9/L; *P*<.001) with statistical significance. There were no differences between patients with OSA (Group 2,3 and 4) comparing to Group 1 (control), regarding PTC or PDW. It was found a significant correlation between AHI and MPV (r=0.2; *P*<.001) and between Dessaturation Index (DI) and MPV (r=0.15; *P*=.001).
Conclusions: 1) In the platelets of patients with OSA there were significant quantitative (lower number of platelets) and morphological (increased PMV) alterations comparing to control patients. 2) The alterations were progressive according to the OSA severity. 3) There was a significant correlation, although not strong, between MPV/AIH and MPV/DI.

***Keywords**: OSA. Platelets. Mean platelet volume.*

CLINICAL USE OF THE PORTUGUESE VERSION OF THE FATIGUE SEVERITY SCALE ON OBSTRUCTIVE SLEEP APNOEA PATIENTS

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Introduction: Current obstructive sleep apnoea (OSA) definition reefers daytime fatigue as a symptom to consider on when diagnosing. The use of scales might be of help characterizing these subjective symptom allowing quantification and standardization as well as evaluation of treatment response.
Aim: To evaluate the relation between fatigue scores and apnoea-hypopnoea índex (AHI) and the impact of CPAP treatment in that symptom.
Methods: All patients with suspected OSA referred to Centro Hospitalar de São João between Feb-Mar 2012 were considered eligible. During first appointment patients answered Fatigue Severity Scale (FSS) and Epworth Severity Scale (ESS) questionnaires, clinical history was collected and a polygraphic cardiorespiratory sleep study performed. If patients were started on CPAP treatment with good compliance (>70%/days, >4 h/night) after 3 months of treatment the FSS and ESS questionarais were repeated.
Results: 100 patients were eligible but only 88 were included (12 patients did not answered to both questionnaires or did not comply to CPAP treatment); 63 (71.6%) were male, with a mean age of 51.9±13.4 years. Mean values of FSS and ESS questionnaires was 34.64±14.5 and 8.47±5.0, respectively. In 24 (27.3%) patients OSA was excluded, OSA was diagnosed in 64 patients being mild in 25 patients (28.6%), moderate in 20 (22.7%) and severe in 19 (21.6%) patients. A statistically significant relation was found between FSS score and AHI (r−0.263; *P*=.05). Those patients with confirmed OSA but without excessive daytime sleepiness (ESS<10) (n=44), 43.2% had FSS>36. After 3 months of adequate CPAP therapy (n=27) a significantly reduction of FSS (*P*=.004) and ESS (*P*=.035) scores was found.
Conclusion: The Portuguese version of the Fadigue Severity Scale seems to be helpful evaluating symptoms related to OSA, specially monitoring the impact of CPAP treatment.

***Keywords**: Obstructive sleep apnoea. Fatigue.*

THE ROLE OF BIPAP-AUTO IN THE TREATMENT OF OSA

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Background: Continuous positive airway pressure (CPAP/APAP) is the therapy of choice for the treatment of obstructive sleep apnea (OSA). Not all patients can use APAP/CPAP therapy with adequate compliance. There is a need to develop more comfortable and cost efficiency modes. The use of Auto bi-level can be an alternative.
Aim: Evaluate efficacy of auto bi-level in OSA patients and if it can be a cost efficiency alternative CPAP/APAP.
Material and methods: We conducted a prospective, randomized trial to evaluate the efficacy and compliance of Auto bi-level comparing to APAP/CPAP in OSA patientsin the period of one year. The selection was made to obtain therapeutic gain in patients with moderate to severe OSA. Statistical analyses were made with MedCalc® software.
Results: 33 patients received CPAP/APAP and 12 Auto bi-level. 12 patients were transitioned onto an auto bi-level device. Groups were similar in terms of demographics, BMI and OSA severity. CPAP pressure was (11± 3.9 cm de H2O), APAP range from 4-16 cmH_2O (9.2±1.8) and in Auto bi-level from EPAP 4-18 cmH_2O (10.2±3.9) and IPAP 8-22 cmH_2O (13.1±3.9). The compliance was better on the Auto bi-level group (P=.29) not statistically significant.
Conclusions: Auto bi-level seems to be a promising ventilation mode that enables effective and comfortable treatment of OSA patients and reduces time and costs comparing to the usualtitration inlaboratory.

***Keywords**: Auto bi-level. OSA.*

OBSTRUCTIVE SLEEP APNEA IN PATIENTS WITH DIFFICULT TO CONTROL SEVERE ALLERGIC ASTHMA

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Background: Obstructive sleep apnea (OSA) is defined by upper airway obstruction during sleep and has multiple clinical consequences, being a factor that contributes to poor asthma control. Its prevalence in asthmatics has not been established, but it seems to increase with disease severity.
Objective: To evaluate the prevalence of OSA in a group of severe allergic asthma patients.
Methods: Thirty-two severe asthmatics followed by the Immunoallergology and Pneumology departments were systematically selected (72% female; mean age 52 years). All patients were being treated with omalizumab and/or systemic corticoids. Comorbidities, asthma control (asthma control test-ACT), medication, allergologic profile, sleepiness (Epworth scale) and sleep quality were assessed. All patients were screened for OSA with cardiorespiratory polygraphy (Embletta™).

Results: Nine patients (28%) met OSA criteria with a mean Apnea-Hypopnea of 15.6 h. Furthermore 20 patients (63%) had an elevated Oxygen Desaturation Index. The OSA subgroup had larger cervical and abdominal circumferences, as well as a significantly higher body mass index and blood pressure values when compared to the non-OSA subgroup. The number of asthma exacerbations in the last 6 months, monthly dose of prescribed corticosteroid, ACT and sleepiness score were the same between subgroups.
Conclusion: Despite the high frequency of OSA and nocturnal desaturations, these conditions did not affect asthma control significantly. Due to the clinical implications and the prognosis of OSA patients, this study suggests that OSA should be investigated in the management of patients with severe asthma.

Keywords: *Obstructive sleep apnea. Asthma. Cardiorespiratory polygraphy. Omalizumab.*

TRIPLE 0-A NEW RESPIRATORY SYNDROME?

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Introduction: There is a growing number of patients needing nocturnal ventilatory support, presenting with **o**besity-hypoventilation syndrome (OHS), chronic **o**bstructive pulmonary disease (COPD) and **o**bstructive sleep apnea (OSA). As these three comorbidities seem so prevalent together and, as these patients, in the light of their demographic characteristics and ventilatory needs, seem different from those with only one or two of the pathologies, a new respiratory syndrome can be emerging-the triple o syndrome (TOS).
Objective: To characterize TOS patients and compare their demographic characteristics and ventilatory needs with OHS patients.
Materials and methods: Forty-four patients with obesity (BMI>30 kg/m2), COPD (FEV_1/FVC<70) and OSA (AHI>5 h) were included. Exclusion criteria were pulmonary diseases others than COPD, alpha-1-AT deficit, bronchiectasis, Cheyne-Stokes Breathing, Complex OSA and Central Sleep Apnea. These patients were compared to 46 OHS patients. Both groups started ventilatory support between 2009 and 2011.
Results: TOS patients data: mean age 69.4±9.1 years, 84.1% were male, mean BMI 35.8±4.5 Kg/m2, mean Epworth 11.4±4.8, mean FEV_1 57.9±19.5% predicted, median AHI 36.3 h, median PaCO2 47.2 mmHg, median IPAP 18.0 cmH20, median EPAP 10.0 cmH20, median RR 14 cycles per minute, only 23.3% needed oxygen complement. When compared to OHS patients, TOS patients were older, leaner, the percentage of male gender was higher, had less severe OSA and lower RR when adapted to ventilatory support.
Conclusions: Triple O patients seem to be an individualized group, with different demographic characteristics when compared to OHS patients. The ventilatory needs were similar between both groups, but the RR and the mask used, mainly nasal, in TOS patients.

Keywords: *Obstructive sleep apnoea. COPD. Obesity.*

EVALUATION OF WIRELESS TELEMONITORING OF CPAP THERAPY IN OBSTRUCTIVE SLEEP APNEA-"TELEPAP" STUDY

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Background: In Obstructive sleep apnea (OSA) compliance rates with CPAP therapy are disappointingly low and since long-term adherence can be predicted by early CPAP use, effective interventions are needed to improve CPAP compliance among patients newly diagnosed with OSA.
Aim: To determine outcomes of telemonitoring CPAP compliance and efficacy data, compared with standard clinical care and active phone call care.
Material and methods: We performed a randomized controlled clinical study, in which 51 patients (42 males; mean age: 54 years old; mean Apnea/hypopnea index (AIH): 36.8 h) newly diagnosed with OSA were consecutively randomized to either standard clinical care (SC) (n=21), active weekly phone call care (PC) (n=18) or telemonitored clinical care (TC) (n=12) with the use of Restraxx™. All patients were submitted to a comprehensive educational program during APAP adaptation. Patients were followed for their first 4 weeks of treatment with APAP (AutoSetSpirit S8; Resmed™) and data regarding compliance and efficacy was analyzed.
Results: Patients randomized to TC used APAP an average of 5.0±1.8 h per night (hpn), SC patients averaged 5.1±2.5 hpn and PC patients averaged 3.9±2.6 hpn. Residual AIH was 5.3±3.0 in TC, 5.0±2.5 in SC and 5.6±3.8 in PC. No statistically significant differences were found between the groups regarding CPAP compliance or efficacy (P=.296 and P=.825, respectively).
Conclusions: In the presence of a comprehensive educational program during APAP adaptation, telemonitoring OSA patients didn't show benefits concerning compliance or efficacy. Standard clinical care, given its lower cost, should be privileged.

Keywords: *Sleep apnea syndrome. APAP therapy. Telemonitoring.*

INSOMNIA AS AN EXPRESSION OF OBSTRUCTIVE SLEEP APNEA SYNDROME-THE EFFECT OF TREATMENT WITH NOCTURNAL VENTILATORY SUPPORT

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Introduction: Obstructive sleep apnea syndrome (OSAS) and insomnia often coexist, and it is estimated that nearly a half of the ones that suffer from the first report symptoms of the second. In these patients, the exclusion of other causes of insomnia shows that it represents a manifestation of OSAS.
Objective: The aim of the study is to evaluate the effectiveness of nocturnal ventilatory support (NVS) in the treatment of insomnia secondary to OSAS.
Material and methods: To conduct the retrospective study, the authors reviewed the medical records of patients with insomnia and sleep obstructive apnea syndrome, which subsequently underwent NVS. Patients with psychiatric disorders, sleep movement disorders, psychophysiological insomnia, circadian rhythm sleep disorders, inadequate sleep hygiene, use and abuse of hypnotic agents, stimulants, antidepressants, anxiolytics and alcohol, were excluded. For the selected patients, the effects of NVS in terms of clinical signs and symptoms of insomnia, apnea-hypopnea index (AHI), Epworth Sleepiness Scale (ESS), and number of sleep hours were analysed, before and after treatment with NVS.
Results: After reviewing 1241 medical records, 65 patients were selected, with an average age of 60.9±10.044 years, and an average body mass index of 31.3±4.101 Kg/m^2. Twenty-two (39.3%) suffered from intermediate insomnia, 19 (33.9%) had initial insomnia, eight (14.3%) had the mixed type, and seven patients (12.5%) had terminal insomnia. The majority of patients (n=48; 85.7%) were treated with auto-adjusting positive airway pressure (APAP). The average time necessary for NSV adaptation was 171±84 days. Forty-four patients (78.6%) overcame insomnia; insomnia symptoms persisted in nine (16.1%), and three (5.4%) patients abandoned the medical consultation. This difference was statistically significant

(*P*=.001). There was an association between the type of insomnia and its resolution, that is, percentually, patients with the mixed type didn´t overcame insomnia symptoms (75%). Among patients who overcame insomnia, and the ones who didn´t, there was a statistically significant difference in the time needed to adapt to NVS. The patients who overcame insomnia needed an average of 161±61.4 days to adapt to NVS, while the ones who did not, needed 225±141 days, (*P*=.003). Before and after the initiation of NVS, patients slept an average of 5.29±1.37 and 6.37±1.55 h by night, respectively (*P*<.001). Among the patients who overcame insomnia, six didn´t fulfill the criteria of treatment adherence: five adhered more than 4 h/night in less than 70% of all nights (60.6±3.2%), and one patient adhered less than 4 h/night (3.5 h/night).
Conclusion: The treatment with NVS proved effective in the treatment of insomnia secondary to OSAS. This benefit was found even in patients who didn´t meet the criteria of NVS adherence.

Keywords: *Insomnia. Sleep obstructive apnea syndrome. Nocturnal ventilatory support.*

IMPORTANCE OF ALFA DELTA SLEEP, BUT NOT OBSTRUCTIVE SLEEP APNEAS, IN POTENTIAL CARDIOTOXIC CD4 LYMPHOCYTES

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Introduction: Sleep homeostasis influences the human immune system. Obstructive sleep apneas (OSA) have been shown to affect the inflammatory/immunological cascades with possible negative impact on the cardiovascular system. However, the relevance of a specific sleep pattern like alpha delta sleep (ad-sleep) on the immune system is still under investigation. Perforin and/or granzyme-B positive CD4 lymphocytes, which are necessary for the control of viral infections like the influenza virus H1N1, have been recently linked to the instability of atherosclerotic plaques in the coronary vessels and are therefore possible harbinger of acute coronary events. Here we present preliminary results pointing to the influence of alpha-delta sleep on cytotoxic CD4 lymphocytes.
Methods: In this study we investigated 80 participants by polysomnongraphic recordings.According to the apnea/hypopnea index (AHI) groups were classified as controls (C=AHI<15; n=44) and OSA patients (O=AHI ≥15 h; n=36). Ad-sleep was considered present if more than 40% of the slow wave sleep showed a superimposed alpha-rhythm with amplitude of 10 mV. Mononuclear cells (MNCs) were isolated via ficoll separation and further stained for the membrane antigens CD3 and CD4 and the intracellular proteins perforin (P) and granzyme B (GrB). Results are demonstrated as means±SEM. A *P*<.05 was considered statistically significant.
Results: We found ad-sleep in 15 participants (34%) of the C-group and in 6 patients (16%) with OSA. There were no statistically significant differences in terms of age or BMI in any of the tested groups. Table 1 demonstrates the results regarding the percentage of P or GrB positive cells.
Discussion and conclusion: To our knowledge this is the first study demonstrating that alpha delta sleep is associated with a specific pattern of cytotoxic lymphocytes. CD4 lymphocytes are considered helpers/regulators of the immune system and have a limited cytotoxic potential. An increased perforin/granzyme B dependent cytotoxicity in CD4 lymphocytes has been described in unstable arteriosclerotic plaques and activated systemic lupus erythematosus (SLE). Ad sleep is common in fibromyalgia and chronic rheumatic diseases. However, in this study we excluded patients with a known chronic inflammatory/mental disorder. It is therefore likely, that the ad pattern occurred in patients with chronic fatigue (CF) or not restoring sleep. The chronic fatigue syndrome has been associated with a reduced natural killer cell activity possibly related to a decreased perforin expression. Although this study did not investigate specifically CF our results support this assumption. Additionally we can show, that the potentially cardiotoxic CD4 lymphocytes are not increased in the presence of a significant OSA.
This work was supported by the Fundaçãopara a Ciência e a Tecnologia (FCT): PIC/IC/82991/2007.

Keywords: *Sleep pattern. Cytotoxic proteins. Fatigue.*

INFLUENCE OF OBESITY ON HEMODYNAMIC VALUES DURING 4 PERIODS OF STABLE N2 SLEEP

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Introduction: Obstructive sleep apneas (OSA) are associated with an increased risk to develop cardio-vascular diseases especially arterial hypertension. However, the impact of morbid obesity (obesity III/WHO) and the often associated alveolar hypoventilation is not yet fully understood. In these preliminary results we compare the hemodynamic values during sleep in patients with WHO class I obesity and class III obesity independent of respiratory events during sleep.
Methods: We investigated in 6 patients with obesity I (OI) and 6 patients with obesity class III (OIII) the systolic (sys) and diastolic (dia) blood pressure (BP), stroke volume (SV) and cardiac output (CO) by the non-invasive beat to beat analysis via Nexfin-HD→ device. As healthy controls we evaluated a group of 5 normal/overweight participants without OSA. In each patient we selected 4 epochs of 10 min stable NII sleep reaching therefore a total of 20 periods in controls and 24 in obese subjects. Results are demonstrated as means±SD. A *P*<.05 was considered statistically significant.

Table 1 Mean percentage of perforin or granzyme B positive cells within the CD3+CD4 lymphocytes.

	CD3+CD4+lymphocytes			
IAH AHI	AHI<15 h (n=44)		AHI ≥15 h (n=36)	
Ad sleep	No ad sleep (n=29)	Ad sleep (n=15)	No ad sleep (n=30)	Ad sleep (n=6)
% of P+cells	5.39±1.16	3.0±1.36	4.48±1.1	2.22±1.1
% GrB+cells	5.16±1.00*	2.60±0.68	5.2±1.8	1.92±0.81

*Statistically significant results.

Results: Anthropometric and respiratory data are demonstrated in table 1. Mean results of the hemodynamic parameters are listed in table 2. We did not detect any statistically significant difference between the 4 epochs analyzed in each sleep study.

Table 1

	Age (years)	BMI (kg/m^2)	AHI (h)	ODI (h)	T90 (%)
C	36±1.6	24.6±5.2	1.4±0.2	1.6±0.3	0.04±0.02
O I	47.4±1.3	33.8 ±	68.1±3.2	62.5±3.2	0.04±0.02
O III	46.7±2.5	46.6±9.3	66.5±4.9	60.2±5.4	21.2±5.9

BMI: Body mass index, AHI: apneia/hypopneia index, ODI: oxygen desaturation index, T90: % of SpO_2<90%. All values are significantly lower in controls when compared to OI and OIII (*P*<.001). Between O I and O III only the BMI reached significance (*P*<.001).

Table 2

	SBP (mmHg)	SD SBP (mmHg)	DBP (mmHg)	SV (ml)	CO (L)
C	104.9±1.7[a]+	5.9±0.2[a,b]	63.7±0.7[a]	101.6±1.6[b]	5.8±0.12[a,b]
OI	121.2±2.0[c]	15.3±0.5[c]	70.3±1.3[c]	97.5±2.0[c]	7.2±0.2
OIII	112.9±1.5	12.7±1.1	60.7±0.9	106.0±1.54	7.3±0.2

CO: cardiac output; DBP: diastolic blood pressure; SBP: systolic blood pressure; SD SBP: standard deviation of systolic blood pressure; SV: stroke volume.
[a]*P*<.05 C vs OI.
[b]*P*<.05 C vs O II.
[c]*P*<.05 O1 vs O2.

Discussion: We investigated the possible impact of obesity in hemodynamic values in periods of stable sleep. No significant differences were observed between the four epochs analyzed in each patient. We can conclude that during the hemodynamic stability. As described in previous publications we found in the group of healthy young subjects significantly lower hemodynamic values compared to older individuals with OSA. The increased cardiac output in obese OSA patients might be related to the cardiac anatomy with myocardial hypertrophy. In this case the stroke volume should have been increased simultaneously. Another possibility is that OSA patients develop an increased sympathetic activity which leads to a total increased in cardiac output. The difference in hemodynamic values in obese I compared to obese III needs to be further investigated. We can only speculate the possible existence of a paradoxical beneficial effect described for patients with morbid obesity and chronic diseases.

Keywords: *Blood pressure. Sleep. Obesity.*

AUTOMATIC RESPIRATORY SCORING, REALITY OR ILLUSION?

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Introduction: The need to reduce costs associated with sleep studies and its visual staging, as well as variability in intra-and interindividual scoring, has reasoned demand intense algorithms that allow automatic staging credible.
Aim: Evaluate the analysis and quantification of automatic respiratory scoring of the Alice 5-Philips Respironics® compared to conventional manual system, using the rules of "the American Academy of Sleep Medicine 2007" (AASM).
Methods: We analyzed 34 studies of individuals sleep test performed on Serviço Pneumologia I-Hospital Santa Maria with suspected Obstructive Sleep Apnea. Each record was subjected to 4 avaliations: Av1-Analysis of Alice 5 (PSG) automatic Analize; Av2-Alice 5Automatic Analyze without electroencephalogram (EEG)-"cardio-respiratory regist" (for this purpose the entire EEG classified as N1); Av3-manual Respiratory Scoring "cardio-respiratory regist"; AV4-manual polysomnography (PSG) Analysis. In each analysis were considered the apnea-hypopnea index (AHI), the respiratory disturbance index (RDI), obstructive apnea, central and mixed, the total number of hypopneas, desaturation (ODI), snoring index. Statistical analysis was performed using SPSS®. The descriptive statistics are presented as mean±standard deviation, and the t-test for paired samples. We considered a level of significance of 95%.
Results: Table 3 presents the results of comparative studies. When compared between the 4 evaluations, we found significant differences in AHI between assessments Av1-AV4 and AV4-Av3, with in the opposite result Av2-AV4. When comparing the avaluations Av1-AV4 we found significant differences in the number of obstructive apneas, hypopneas, central apneas and mixed apneas without significant changes in the total number of apneas. With respect to the desaturation index, there are significant differences when comparing the Av1, Av2 and Av3 to AV4. As for IDR, there are significant differences when compared the 4 avalitations.
Conclusions/discussion: In our analysis it was found that the automatic staging presented numerous flaws, the most significant difference are present at the classification of the apneas type on par with sub-accounting of hypopneas. This difference between automatic and visual staging may affect the decision between treating or not a patient with positive pressure, or even, the choice of ventilation mode. Regardless of the automatic reading system present itself as a fast method of marking the respiratory events, this work shows that this algorithm visual verification of events is still clearly needed. Despite the automatic reading system to present itself as a fast method of marking the respiratory events, this work shows that in this respiratory scoring algorithm a visual verification of respiratory events is still clearly needed.

Keywords: *Polysomnography. Automatic scoring. Breathing sleep-disordered.*

Table 3

	IAH	IDR	Total Apneias	ApCen	ApO	ApM	Hipo	ODI
Av1-Av4	t=−3.6 (*P*=.001)	t=−3.7 (*P*=.001)	t=−1.9 (*P*=.065)	t=2.28 (*P*=.029)	t=−2.4 (*P*=.02)	t=2.8 (*P*=.008)	t=−4.5 (*P*=.000)	t=−2.6 (*P*=.013)
Av2-Av4	t=−0.37 (*P*=.712)	t=−5.7 (*P*=.000)	t=0.7 (*P*=.486)	t=2.2 (*P*=.029)	t=−0.9 (*P*=.350)	t=2.8 (*P*=.008)	t=−1.4 (*P*=.151)	t=−5.3 (*P*=.000)
Av3-Av4	t=0.4-2 (*P*=.000)	t=−6.2 (*P*=.000)	t=2.0 (*P*=.044)	t=1.1 (*P*=.191)	t=1.3 (*P*=.184	t=2.2 (*P*=.033)	t=2.5 (*P*=.015)	t=−4.4 (*P*=.000)

AUTO REPORT OF A COMPLETE PSG, WILL BE CREDIBLE YOUR RESULT?

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Introduction: In the last years have seen the development of systems to record polysomnography (PSG) with the ability to self-diagnose. The application of the international rules for the manual scoring is lengthy, expensive and are subject to inter-and intra-operator variability. However, it is the knowledge of sleep labs professionals these systems have many flaws and that the result has little credibility.
Aim: Compare manual and automatic analysis of neurological and respiratory variables obtained through the program Alice 5, Respironics Philips®.
Methods: The study included 34 individuals with suspected sleep-disordered breathing and performed a conventional PSG in the sleep laboratory of the Department of Pulmonology I-Hospital de Santa Maria. Each record was subjected to two analyzes: 1-Automatic analysis of Alice 5 (PSG); 2-manual PSG Scoring according to the criteria of the American Academy of Sleep Medicine-AASM. In each analysis was considered the percentages of the different sleep stage (N1,N2,N3,REM); arausals index, total number of apneas (central, obstructive and mixed), total number of hypopneias, apnea-hypopnea index (AHI), respiratory disturbance index (RDI), snoring index, duration of saturation below 90% (T90) and arterial desaturation index (ODI). Statistical analysis was performed using SPSS®. The descriptive statistics are presented as mean±standard deviation, as the t-test for paired samples.
Results: Table 1 presents descriptive statistics of the variables considered in the 2 reviews. It was found that significant differences between the two scorings (table 2). With exception of REM sleep all mean sleep stages values and mean the arousal index were statistically significant. It appears that the alorythm of Alice has an excellent sensitivity to recognize REM sleep, however overestimates the fast rhythms leading to an unlikely increase in N1 sleep Regarding the respiratory analysis we found significant different results for AHI, IDR, number of obstructive-and mixed apneas as well as hipopneias and ODI. Although clearly diverse the number of total apneas and central apneasDid not reach statistically significance.
Conclusions/discussion: The "Alice 5" program showed serious different results in the staging of sleep and respiratory events. Taking into account the experience of the scorer it seems more likely that the automatic scoring algorithm is not yet sufficient to reach results of the human eye. Surprisingly even the desturation index was different at closer reavaliation indicating an insufficient sensitivity to the demanded 4% fall in the oxygen saturation. A therapeutic decision based on the automatic computed results appears questionable.

Keywords: *Polysomnography. Automatic analysis. Scoring.*

THE EXPRESSION OF THE PER2 CLOCK GENE IS UP-REGULATED IN NON-TREATED OSAS PATIENTS AND NORMALIZES ITS MRNA LEVELS UPON POSITIVE PRESSURE TREATMENT

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Background: The obstructive sleep apnea syndrome (OSAS) is a frequent sleep disorder that constitutes an independent risk factor for the development of metabolic syndrome and cardiovascular diseases. Nuclear receptors (NRs) are critical integrators of key cycles and metabolic pathways of human physiology. Most exhibit circadian variation at the mRNA and protein levels that can be controlled or influenced by master clock genes, which in turn are modulated by sleep/vigilance cycles.
Objectives: Our goal was to investigate if the expression levels of mRNA coding for clock genes is altered in non-treated OSAS patients and if it can be corrected by standard positive pressure treatment.
Methods: Peripheral blood was collected from male patients diagnosed with severe OSAS (AHI≥30 h) before treatment initiation. Collections were always performed between 8 and 10am. Blood was then used to perform routine biochemical analyses and to isolate peripheral blood mononuclear cells (PBMCs). RNA was isolated and qPCR used to measure mRNA levels of genes associated with the central circadian pacemaker including Clock, Bmal1 and three Period genes (Per 1, 2, 3). The selected patients were then followed up at 1, 3 and 6 months after therapy initiation with positive pressure and the mRNA level of relevant genes tested at

Table 1

	%N1	%N2	%N3	%REM	Index Microd	IAH	IDR	Ap Tot	Ap C	Ap O	Ap M	Hipo	Index Ronco	ODI
Av1	39.3±21.1	42.3±18.6	8.3±12.4	9.8±7.7	30.2±17.717	19.9±17.7	19.6±17.2	29.2±18.2	3.1±2.6	21.1±19.2	4.9±3.5	36.5±34.6	10.8±9.4	18.9±16.6
Av2	17.1±11.9	55.4±12.7	17.9±10.1	9.6±4.5	36.2±17.3	27.0±26.5	33.4±25.0	47.9±46.7	0.6±0.5	45.7±44.5	1.7±1.2	102.2±99.9	27.0±26.5	24.6±23.1

-Av1-"Alice5" complete polysomnography (PSG) automatic scoring; Av2-PSG manual scoring; % N1-time percentage N1, N2% N2 time-share;% N3-time percentage N3;% REM REM-time percentage; Microd index-arousals index; AHI-apnea-hypopnea index, RDI, respiratory disturbance index, Ap-Tot total number of apneas. C-central of apneas, Rev. O-number of obstructive apnea, M-number of mixed apneas; Hypo-Number of hypopneas, ODI, oxygen desaturation index.

Table 2

	%N1	%N2	%N3	%REM	Microd Index	IAH	IDR	Tot Apneias	ApCen	ApO	ApM	Hipo	ODI
Av1-Av2	t=6.5 (*P*=0.000)	t=−3.6 (*P*=0.001)	0.3 (*P*=0.000)	t=0.25 (*P*=0.798)	t=−2.661 (*P*=0.012)	t=−3.6 (*P*=0.001)	t=−3.7 (*P*=0.001)	t=−1.9 (*P*=0.065)	t=2.8 (*P*=0.065)	t=−2.4 (*P*=0.008)	t=2.6 (*P*=0.013)	t=−4.5 (*P*=0.000)	t=−2.6 (*P*=0.013)

these points. Patients with addiction habits, cancer, hematological disorders, shift work were excluded from analysis.
Results: After testing the mRNA expression levels of clock genes in non-treated OSAS patients, we found Per2 to be reproducibly over-expressed in 6 out of 8 patients (75%), from 1.5 to 2.5-fold over a reference control. Strikingly, in all 6 patients found to have Per2 increased levels we observed positive pressure treatment-induced decrease of expression of this gene beginning at 1-3 months post-treatment initiation and normal expression values at 6 months.
Conclusion: We have identified the Per2 clock gene as possible marker of OSAS because it is over-expressed in non-treated patients and its expression levels normalize upon *positive pressure* treatment. This finding is likely the first molecular marker of the disease and can possibly be used to monitor therapy efficacy. It remains to be determined if Per2 is directly associated with the increased susceptibility of OSAS patients to the development of metabolic syndrome and cardiovascular disease.

Keywords: *OSAS. Circadian clock. Per2.*

CLINICAL CHARACTERISTICS OF WORKERS WITH EXCESSIVE TIREDNESS

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Introduction: Excessive daily sleepiness (EDS) may result in periods of lack of attention or moments of sleep in situations where individuals should be awake and alert. EDS is common on daily clinical practice, although may be couched in terms such as "tiredness" or "fatigue". Multiple causes are related to EDS: sleep disturb (insufficient sleep, fragmented sleep, inadequate sleep), disorders of alertness, circadian disorders, central nervous system disorders, psychiatric disorders and drugs.
Objective*:* To analyse clinical findings and symptoms related to EDS.
Material and methods: This analysis was performed during occupational health clinic of industry workers between January 2011 and June 2012. A self-evaluation questionnaire delivered to all the workers of the company was used to select patients with symptoms related with disturbed sleep: snoring, apneas and excessive daily tiredness. Our population includes 69 individuals with different working schedules: non-shift white-collar workers with regular work schedule (8-16 h) and blue-collar fixed shift workers (morning (6 h-14 h), evening (14 h-22 h) and night [22 h-6 h]). Individuals were evaluated for risk factors for sleep disturb and EDS.
Results: In our population median age was 37 years (21-59). 68.1% were females. Prevalence of roncopathy was 69.6%, apneas was 8.6% and excessive daily tiredness 30.4%. Obesity and presenced apneas were more common among non-shift workers. Use of sedatives was more common among shift workers. There were no differences between median hours of sleep, although non-shift workers presented a more frequently irregularity of sleeping schedules. (Table 1).
Conclusion: Different risk factors for excessive tiredness/ sleepiness may be present. Primary clinical evaluation is crucial to establish most probable differential diagnosis in order to establish an adequate diagnostic strategy and to avoid unnecessary exams.
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Keywords: *Excessive daily sleepiness. Occupational health. Clinical findings.*

DISTURBED SLEEP RELATED COMPLAINTS IN OCCUPATIONAL HEALTH CLINIC

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Introduction: Disturbed sleep and sleepiness at work are considerable problems because they affect workers safety, well-being and performance. Despite growing interest regarding disturbed sleep and excessive sleepiness among shift workers, epidemiologic data are scarce. A negative impact in sleep and general quality of life is easily explained by the disruption of sleep-awake cycle, light-darkness and other endogenous biologic rhythm which occurs in rotative shift workers. Mechanism, prevalence and impact of disturbed sleep in fixed shift workers (often working in extreme schedules) is less well known.
Objective: To analyse prevalence of symptoms related to disturbed sleep among industry workers: non-shift white collar and fixed shift blue collar.
Material and methods: This analysis was performed during occupational health clinic of industry workers between January 2011 and June 2012. It was used a self-evaluation questionnaire delivered to all the workers of the company. Our population includes 167 individuals with different working schedules: non-shift white-collar workers with regular work schedule (8-16 h) and blue-collar fixed shift workers (morning (6 h-14 h), evening (14 h-22 h) and night [22 h-6 h]). Individuals were evaluated for symptoms related with disturbed sleep: snoring, apneas and excessive daily tiredness.
Results: In our population median age was 33 years (19-59). 70.7% were females. Prevalence of snoring was 29.3%, apneas was 4.8% and excessive daily tiredness 12.6%. Although none of the inquired individuals reported accidents related to excessive daily tiredness, 7.8% referred to have ever fall asleep during labour or while driving. Although tiredness was more common among shift workers, witnessed apneas was more frequently reported by the non-shift white-collar.

Table 1.

Schedule	Central (8-16 h)	Shift workers (fixed)	All
Nr of workers	17	52	69
Median age (minimum-maximum)	36 (26-59)	37 (21-54)	37 (21-59)
Male/Female	0.7	0.41	0.47
Median BMI (minimum-maximum)	25.15 (23.53-33.59)	24.78 (21.08-28.52)	24.97 (21.08-33.59)
Apneas	17.7%	5.7%	8.6%
Drugs	11.8%	21.2%	18.8%
Psychiatric disorder	11.7%	3.84%	5.79%
Median hours of sleep (minimum-maximum)	7 (5-8)	7 (5-9)	7 (5-9)

Schedule	Central (8-16 h)	Shift workers (fixed)	All
Number of workers	41	126	167
Snoring	29.3%	29.4%	29.3%
Witnessed apneas	9.7%	3.2%	4.8%
Excessive daily tiredness	9.8%	13.5%	12.6%
Fall asleep during labour or while driving	4.9%	8.7%	7.8%

Conclusion: Fatigue and sleepiness were more prevalent among shift workers even with fixed schedules. White collar sedentary workers also presented sleep disorder complaints and more frequently with witnessed apneas. Routine evaluation for complaints related to sleep disorders should be performed in occupational health clinic.

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***Keywords**: Disturbed sleep. Sleep related complaints. Prevalence. Occupational health.*

THE IMPORTANCE OF CONDUCTING A SURVEY OF SLEEPING IN SCREENING OF PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction: The Sleep Study Laboratory (SSL) of the Pulmonology I Department of the CHLN uses a screening questionnaire for patients proposed to conduct a sleep study, since 2010. Its aim is to know the habits and sleep problems according to the patient himself and serve detailed clinical information for interpretation of polysomnographic recordings (PSG). This questionnaire includes: 1) identification, age and anthropometric data of patients, 2) habits, 3) usual schedule of work and sleep schedules; 4) general questions about the sleep and specifics for obstructive sleep apnea syndrome (OSAS), restless legs syndrome, narcolepsy and epilepsy; 5) comorbidities and medication; 6) sleepiness scales.

Aim: To evaluate the usefulness of this questionnaire as a screening tool for patients with OSAS and differentiate the sickest.

Methods: Prospective study of a group of patients followed in SSL of the CHLN who answered a questionnaire and, subsequently, underwent PSG and pupillographic sleepiness test (PST). Statistical analysis was performed by SPSS *(Chi-Square Tests, ANOVA, ROC Curve*).

Results: The study included 97 patients, 34 females, mean age 54.4±12.2 years. The body mass index (BMI) was 31.2±6.4 kg/m^2. Most patients had been driving (n=71), were not smokers (n=77), without alcohol habits (n=52) and consuming caffeinated beverages (n=72). Only 9 patients worked per shift. The main comorbidities were arterial hypertension (AHT) (n=51), hypercholesterolemia (n=47), rhinosinusitis (n=44), diabetes mellitus (DM) (n=26), hypertriglyceridemia (n=22) and depressive syndrome (n=20). Questionnaire adherence was high, with 99.2% of the total questions answered. Sixty three patients had OSAS (apnea-hypopnea index (AHI) >5 h) with a mean AHI 25.2±23.5 h. In PST, the mean pupillary unrest index (PUI) was 6.8±3.3 mm/min and in patients with OSAS 7.5±3.6 mm/min. From statistical analysis, no correlation was found between age, BMI and habits with the OSAS. The shift work was not associated with OSAS (*P=.040*). About comorbidities, the AHT (*P=.038*), DM (*P=.003*) and hyperuricemia (*P=.039*) were the diseases with the greatest association with OSAS. On the other hand, rhinosinusitis shown to be an independent factor of increased upper airway resistance (*P=.005*). Only one of the asked questions, "Usually do naps during the day", correlated with OSAS (*P=.038*), however, we found a statistically significant association when the specific questions of OSAS with AHT and DM (*Sig 0.009; AUC 0.658*) or AHT, DM and BMI (*sig. 0.012; AUC 0.666*). The ESS was the only scale that showed a positive relationship with OSAS (*Sig 0.003*).

Conclusion: Despite extensive and embracing, we do not found discriminatory power in our questionnaire between patients with OSAS and without OSAS patients in a population referred for sleep study. Although it is important to extend the sample, the result is in agreement with the literature data on the fact that the clinical alone cannot differentiate patients with OSAS.

***Keywords**: OSAS. Sleepiness scale. Polysomnography. Pupillographic sleepiness test.*