ABSTRACTS

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13–16 January 2021

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8th INTERNATIONAL WORKSHOP ON LUNG HEALTH

Treatable Traits: a look forward

Presidents:

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Important note:
The abstracts in this book are listed in alphabetical order (first author, last name).

Treatment Response among Asthmatics With & Without Reversible Airflow Limitation

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Background: Asthma is a chronic airway disorder associated with variable airflow limitation that is triggered by different stimuli. We aim to determine the treatment outcomes (improvement of FEV1 and number of asthma exacerbations) associated with the presence of airflow reversibility.

Methods: We conducted a retrospective cohort study, which included all adults diagnosed with asthma and performed a Pulmonary Function Test (PFT) at a tertiary care center in Saudi Arabia from January 2015 to December 2018. Smokers and patients with comorbidities that might affect the PFT were excluded. Exacerbations were defined as the need to use oral corticosteroids. A comparative analysis was carried out using the chi-square test.

Results: 154 subjects were included, of which 42 subjects had reversibility and 112 did not. Asthmatics with baseline reversible airflow limitations had significant worsening of FEV1 during follow-up, compared to those with no reversibility, with a mean difference of 19.96mL (P-value = 0.0206). There was no significant association between having reversibility and experiencing an asthma exacerbation (P-value 0.23).

Conclusion: Reversibility of airflow was associated with significant worsening of FEV1, without significant effect on exacerbations, during follow-up of asthmatic patients. ❑

Association between physical activity and risk of hospitalisation in bronchiectasis

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Background: Patients with bronchiectasis have an inactive lifestyle compared to healthy peers, but its association on hospital admission has not been explored. Therefore, the aim of this study was to investigate the association between (i) steps per day and (ii) sedentary time with hospitalisations due to an exacerbation in adults with bronchiectasis.

Methods: A prospective observational study was conducted. We collected baseline lung function, quality of life, exercise tolerance, severity of bronchiectasis and physical activity (PA). PA was objectively assessed during a week using the SenseWear armband and the results were expressed in steps per day and sedentary time. Number of hospitalisations due to a bronchiectasis exacerbation and time to the first event were recorded after 1-year follow-up.

Results: We analysed 64 patients with bronchiectasis of whom 15 (23%) were hospitalised during the follow-up. Hospitalised patients showed poor baseline clinical and severity outcomes, less number of steps per day walked and more sedentary behaviour in comparison to with non-hospitalised group. Patients who walked ≤6,290 steps per day or spent ≥7.8 hours per day in sedentary behaviour had an increased risk of hospital admission due to an exacerbation of bronchiectasis at 1-year follow-up (*Table 1*). Specifically, ≥7.8 hours spent in sedentary behaviour was associated with 5.9 times more risk of hospital admission in the following year.

Conclusions: Low levels of PA and high sedentary time at baseline were associated with higher risk of hospital admission due to an exacerbation of bronchiectasis. Further studies are needed to validate these findings and eventually to include them as items of severity scores. ❑

A rare case in a rare disease

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Although alpha-1 antitrypsin deficiency (AATD) is generally considered to be rare, the fact is that the disease is under-recognized. In Portugal the $M_{Palermo}$ is a rare variant with an increased risk of hepatic disease even when in heterozygosity, with non-deficiency alleles and was found to be the most widespread in Portugal of the rare variants. The $M_{Wurzburg}$ is a variant of severe deficiency affecting the 369 proline codon. The $M_{Wurzburg}$ is a rare variant causing an 80% reduction in proteín serum levels that has been associated to SERPINA1 liver inclusions that can cause liver disease as pulmonary disease. This mutation also rare has a europeran distribution but few cases are reported in Portugal. We herein present a case of 3 family members with AADT. The youngest one with 42 years old was first admitted in pulmonology outpatient clinic after tested for alpha-1 antitrypsin althought he had no history of respiratory complains and physical examination is nonrelevant. He presented with blood levels of 72mg/dL (Rv: 88-174 mg/dL). He was a former smoker and has a profissional activity in cement factory since 2015. A genotype was requested and showed a M1Mpa (Mpa - Mpalermo). As a follow up the family members were adviced to be tested. The mother, 65 years old, with no respiratory complains had a alpha-1 antitrypsin blood level of 17 mg/dL. Her genotype was ZMpa, which is an association extremely rare. Having a Z mutation added to a even more rare Mpalermo mutation is seldom described. On evaluation a CT scan was done that showed no alterations. The father, 69 years old, also with any respiratory complains has a alpha-1 antitypsin level of 112 mg/dL. As the father's levels were normal we expected a normal genotype specially when dealing with a «rare» disease. However, the father's genotype was a M1Mw (Mw - Mwurzburg). More family members are to be tested.

In conclusion, AATD is a rare disease mainly because it is not sought even in pulmonary medicine. Its true incidence is still to be known. When a diagnosis is made in a family member one should never forget that this is a genetic codominat dificiency. The incidence of having a mutation can be rare but belonging to a family that presents 3 rare mutations is a rarer condition. ❑

Prevalence of small fiber neuropathy related symptoms in patients with sarcoidosis in a outpatient setting

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Background: Small fiber neuropathy (SFN) is a condition that affects small myelinated (Aδ) and unmyelinated (C) fibers of the skin. SFN can occur in several diseases such as diabetes, paraneoplastic syndromes and sarcoidosis, among others. In sarcoidosis, the presence of SFN-related symptoms impacts significantly patient's quality of life. Despite great efforts in clinical research, the relation between sarcoidosis and SFN remains poorly understood.

The aim of this study was to investigate the prevalence of small fiber neuropathy (SFN)-related symptoms in patients with sarcoidosis.

Methods: The © SFNSL (Small Fiber Neuropathy Screening List): ild care foundation (www.ildcare.nl) was administered during follow-up visits. The study was conducted between March 2020 and September 2020. Demographics, clinical and radiologic data were also retrospectively collected. The study was approved by the Ethics Committee of the University Hospital of Padova (4280/AO/17).

Results: 42 adult outpatients were enrolled. 26 patients (62%) obtained a score above 11, indicative of probable or highly probable SFN, and 16 did not (38%). SFN was significantly associated with female gender (p=0.0037), symptoms at onset (p=0.01), presence of fatigue or muscle dizziness (p=0.007) and dyspnea (p=0.005). In addition, patients with SFN symptoms were younger, although this difference only trended toward statistical significance (p=0.053). Conversely, patients with hypercalcemia/hypercalciuria were less likely to have SFN-related symptoms (p=0.017). In univariate and multivariate analysis, the presence of symptoms at onset increased significantly the risk of SFN-related symptoms (p =0.013, OR:10.7, 95%IC 1.64 – 69.8).

Conclusion: Symptoms of SFN are highly prevalent in patients with sarcoidosis and are associated with reduced quality of life. Early recognition and appropriate management of SFN may improve patients quality of life. ❑

Table 1:

Table 1 Clinical and radiological features of the overall population and of the two subgroups

	Total: 42	SFNSL < 11 (16)	SFNSL > 11 (26)	p
Sex (male)	25 (60%)	14 (87%)	11 (42%)	**0.0037**
Age (years)	52.9 ± 10.85	54 ± 10.7	52 ±11.1	0.71
BMI (Kg/m^2)	25.9 (18.4 – 38.7)	25 (21 – 31)	26 (18 – 39)	0.81
Age at diagnosis (years)	45 ± 11.2	49.2 ± 9.8	42 ± 11.3	0.053
Smoke history (yes)	24 (57%)	9 (56%)	15 (58%)	0.92
P/y (pack/years)	2.5 (0 – 40)	2.7 (0 – 25)	2.5 (0 – 40)	0.98
ACE (U/l)	40 (8 – 195)	40 (8 – 119)	43 (8 – 195)	0.6
TLC (L)	5.2 (3.1 – 8.4)	6.3 (3.1 – 8.4)	4.9 (3.1 – 7.3)	0.061
TLC (%)	90 (44 – 119)	88 (44 – 119)	93 (55 – 113)	0.45
DLCO (%)	82 (32 – 115)	86 (32 – 115)	82 (53 – 108)	0.69
FVC (L)	3.8 (1.6 – 6.3)	4.3 (2.5 – 6.3)	3.5 (1.6 – 5.7)	0.17
FVC (%)	102 (47 – 132)	97 (52 – 132)	102 (47 – 128)	0.54
mMRC >2	13 (31%)	1 (6%)	12 (46%)	**0.005**
Fatigue/muscle dizziness (yes)	19 (45%)	3 (19%)	16 (61%)	**0.007**
Symptoms at onset (yes)	26 (62%)	6 (37.5%)	20 (77%)	**0.01**
Comorbidities				
• DM / dyslipidaemia	4 (9.5%)	1 (6%)	3 (11%)	0.57
• Cardiovascular	16 (38%)	7 (47%)	9 (35%)	0.55
• Cancer	7 (17%)	2 (12%)	5 (19%)	0.57
• Thyroid	7 (17%)	1 (6%)	6 (23%)	0.15
• GERD	9 (21%)	1 (6%)	8 (31%)	0.06
Extra-pulmonary localizations				
• Cardiac	3 (7%)	1 (6%)	2 (7.7%)	0.86
• Bone	2 (5%)	2 (12.5%)	0 (0%)	0.29
• Nervous	1 (2,5%)	0 (0%)	1 (4%)	0.72
• Ocular	4 (9%)	1 (6%)	3 (11%)	0.57
• Liver	4 (9,5%)	2 (12.5%)	2 (7.7%)	0.61
• Spleen	5 (12%)	2 (12.5%)	3 (11%)	0.92
• Hypercalcemia/ hypercalciuria	8 (20%)	6 (37%)	2 (7.7%)	**0.017**
1 line therapy (yes)	19 (45%)	7 (43.7%)	12 (46%)	0.47
2 lines therapy (yes)	10 (24%)	2 (12.5%)	8 (31%)	0.17
Scadding 0	6 (14%)	1 (6%)	5 (19%)	0.24
Scadding 1	12 (28%)	4 (25%)	8 (31%)	0.68
Scadding 2	13 (31%)	7 (44%)	6 (23%)	0.16
Scadding 3	9 (21%)	4 (25%)	5 (19%)	0.66
Scadding 4	2 (5%)	0 (0%)	2 (8%)	0.86

GERD: gastroesophageal reflux disease, DM: diabetes mellitus, ACE: angiotensin converting enzyme.

RISING STAR

The Prognostic role of MUC5B rs35705950 genotype in patients with Idiopathic Pulmonary Fibrosis (IPF) on antifibrotic treatment

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Background and aim: A common variant located in the promoter region of MUC5B (rs35705950) is the strongest risk factor for sporadic and familiar IPF, as well as a predictor of outcome. However, there are no data on the effect of MUC5B rs35705950 genotype on the prognosis of IPF patients on antifibrotic treatment. The aim of this study is to determine, in a phenotypically well-characterized population of patients with IPF treated with antifibrotics, the impact of MUC5B rs35705950 genotype on disease progression and survival.

Methods: 88 IPF patients on antifibrotic treatment were followed-up from 2014 until transplantation, death or end of follow-up (December 2019). Disease progression was defined as a forced vital capacity (FVC) loss ≥5% per year. All patients were genotyped for MUC5B rs35705950 by PCR amplification and Sanger sequencing.

Results: Out of 88 patients, 61 (69%) carried the mutant T allele (TT or TG) and 27 (31%) did not (GG). Patients carrying the GG genotype had higher smoking history (30 vs. 10 PY; p<0.001) and lower FVC at treatment start (2.32 vs. 2.86L, p=0.02; 68 vs. 78%, p=0.05) compared to TT/TG genotype. Respiratory failure (RF) at rest occurred later in patients with the TT/TG genotype (31 vs. 24 months, p=0.04). Moreover, carriage of the MUC5B rs35705950 T allele was not associated with a faster decline in FVC. Conversely, at the end of the follow-up, overall survival in carriers of the TT/TG genotype was longer compared to that of the GG genotype carriers (HR 0.40, 95% CI 0.18–0.91; p=0.006). FVC (L) at baseline and time to occurrence of respiratory failure at rest were independent predictors of worse prognosis.

Conclusions: In IPF patients on antifibrotic treatment, carriage of the MUC5B rs35705950 T allele is associated with longer survival, highlighting the usefulness of MUC5B genetic data in clinical decision making. ❑

The effect of smoking on nutritional status and the severity of the disease in patients with COPD

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Introduction: Chronic obstructive pulmonary disease (COPD) is an urgent problem of modern pulmonology. Patients with more severe bronchial obstruction and body mass index (BMI)<25 kg / m2 have a higher risk of death compared with patients with COPD who are overweight and even obese.

The aim: To determine the effect of smoking on indicators of nutritional status in patients with COPD.

Materials and methods: A study included 95 patients with COPD. Patients were divided into two groups depending on the status of smoking: smokers and non-smokers.Criteria for inclusion in the study: verified diagnosis of COPD in clinical groups B and C, stable phase. The exclusion criteria from the study were: patients over 80 years old, history of acute cardiovascular events, clinically significant heart rhythm disturbances, previously diagnosed diabetes mellitus, kidney diseases, cancer, surgical operations during the last year.The program Statistica 10.0 was used.Everyone underwent an assessment of the severity of COPD and a study of nutritional status.

Results.

Table. 1. Clinical characteristics of control groups

Characteristics	Group I (non-smokers)	Group II (smokers)	p
Age, y M (SD)	55,8 (6,7)	58,3 (8,1)	0,1
Dyspnea severity mMRS, M (SD)	2(1;3)	3(2;4)	0,047
Exacerbation rate (SD)	1(1;2)	1(1,3)	0,6

Table. 2. Spirometry indices in the examined patients.

Characteristics	Group I (non-smokers)	Group II (smokers)	p
FVC, % Me [25 %-75 %]	85,0 (77,0-92,0)	87,5(70,0-96,0)	0,8
FEV1, % Me [25 %-75 %]	51,0 (44,0 -62,0)	45,0 (34,0 -59,0)	0,04
FEV1%M Me [25 %-75 %]	54,5 (37,0-65,0)	48,0(54,0- 62,0)	0,3
MEF 75, % Me [25 %-75 %]	53,0 (41,6-68,6)	43,0 (31,3-56,4)	0,6
MEF 50, % Me [25 %-75 %]	19,5 (25,5-51,5)	40,0 (18,7-55,2)	0,2
MEF 25, % Me [25 %-75 %]	22,0 (23,8-48,0)	31,0 (15,4-34,7)	0,6
PEF, % Me [25 %-75 %]	54,5 (37,0-65,0)	50,5 (30,7,0-65,0)	0,5
IC_F, % Me [25 %-75 %]	57,5 (47,2-69,6)	52,5 (17,7-65,0)	0,8

Table. 3. Indicators of nutritional status in the examined patients with COPD.

Characteristics	Group I (non-smokers)	Group II (smokers)	p
Age, y M(SD)	55,8 (6,7)	58,3 (8,1)	0,1
Body mass , kg Me [25 %-75 %]	87,0 (82,0-88,0)	78,0(71,7-93,3)	0,7
BMI, Me [25 %-75 %]	26,3(25,0-30,0)	26,6(23,9-30,3)	0,9
Fat tissue, % Me [25 %-75 %]	25,05(24,6- 25,1)	35,1(31,1-37,5)	0,001
Muscle tissue , % Me [25 %-75 %]	39,9(34,5-44,9)	20,8 (16,8-29,7)	0,002
Visceral fat , % Me [25 %-75 %]	10,5 (8,0-12,0)	8,0 (5,5-11,0)	0,2
Waist circumference , sm M(SD)	95,5 (1,5)	91,5 (1,7)	0,3

Conclusions: Patients suffering from COPD have a violation of nutritional status. Smoking patients develop sarcopenic obesity, which progresses with an increase in the degree of nicotine addiction, correlates with the "pack / year" index and is a predictor of increased mortality in this category of patients.Increased bronchial obstruction in smokers with COPD is observed with an increase in smoking history, the number of cigarettes smoked and with a decrease in body weight.Reducing the pool of muscle tissue can be considered as an early predictor of more frequent exacerbations in smoking patients with COPD. ❑

The features of frequent exacerbators phenotype in patients with bronchiectasis in Ukraine

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Background: Exacerbations are the key predictors of the progression of bronchiectasis and mortality rising. Traditionally, the presence of *Pseudomonas aeruginosa* in sputum, underweight, low pulmonary function and previous hospitalizations are predictors of more frequent exacerbations. The objective was to determine if there are other factors of more frequent exacerbations in patients with bronchiectasis in Dnipro region of Ukraine.

Materials and methods: 76 patients with confirmed bronchiectasis by HRCT were included. Exacerbations frequency during the previous year was calculated by medical documentation analyzing. Microbiological detection of sputum samples was conducted by conventional bacteriological methods. Weight and visceral fat (VF) were measured by «Body composition monitor Omron BF511» for the static weighing and body mass index (BMI) was calculated. The methods of descriptive and non-parametric statistics were used to process the results.

Results: The median age was 56(38.5:65.5) years, 25 were men (32.9%). 39 patients (51.3%) had 0-2 exacerbations in previous year and were included in G1. 37 patients (48.7%) had 3 and more exacerbations per previous year (frequent exacerbators) and were included in G2 for analysis. The median BMI in G1 was 22.3(20.4;25.1)kg/m^2, in G2 – 26(21.6;28.4)kg/m^2, p=0.028. According to the results of the BMI calculation, the patients in were distributed as follows: in G1 underweight (≤18.5 kg/m^2) – 2 (5.1%) patients, in G2 – 4 (10.8%), p=0.56; normal weight (18.5-25 kg/m^2) in G1 – 26 (66.7%), in G2 – 12 (32.4%), p=0.006; overweight (25<BMI≤30 kg/m^2) in G1 – 11 (28.2%), in G2 – 21 (56.8%), p=0.012; obesity class I (30<BMI≤35 kg/m^2) in G1 had 3 (7.7%) patients, in G2 – 7 (18.9%), p=0.06. The median VF in G1 was 5(4;9)%, in G2 – 9(5;13)%, p=0.039. Asthma was a comorbid condition in 12 patients in the group of frequent exacerbators (32.4%), while no one patient from G1 had comorbid asthma, p=0.0001. 8 patients from 12 (66.7%) with asthma in G2 also had an overweight, the median BMI was 26(22;30.5) kg/m^2, the median exacerbation frequency was 4(3;7.5) per year.

Conclusions: Almost half of patients with bronchiectasis in Ukraine are frequent exacerbators. Based on the data received it is possible to assume that high percentage of VF and overweight in general could be factors which lead to more frequent exacerbation in patients with bronchiectasis in Ukraine even more then underweight. In turn, the presence of comorbid asthma also is one of the predictor of more frequent exacerbations. This indicates the need for lifestyle modifications to correct BMI in order to reduce the number of exacerbations. Patients with comorbid asthma and overweight require special attention to predict further high exacerbations frequency. ❑

COPD: Alfa-1 antitrypsin (AAT) serum concentration and the airway obstruction

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AAT hereditary deficiency is proved risk factor for COPD. However, only 1 % of patients (pts) with COPD have genetically determined AAT deficiency.

Aim: to evaluate serum AAT in pts with stable COPD and study whether severity of airway obstruction depends on the serum AAT concentration. Study population. Stable pts with confirmed COPD (GOLD I-IV). Exclusion criteria were gastrointestinal comorbidity, malignancy, systemic connective tissue diseases and any signs of acute inflammation.

Methods: AE history during past year, post-bronchodilator spirometry (by Masterlab, Viasis), serum AAT (by kinetic immune turbodimetry) were evaluated in all pts.

Results: 45 stable patients (pts) with COPD (GOLD I-IV) (41 (91%) men) made the study sample. Medium AAT serum concentration were within normal ranges (189,54 [147.60-209.24] mg/dl). However, in 9 pts (20 %) AAT concentration was low (under 150 mg/dl) and in 6 pts (13 %) it was borderline (150-160 mg/dl).

The difference in AAT was statistically significant in groups with different GOLD stages (p = 0.009). FEV1 positively moderately correlate with serum AAT concentration (R = 0.415, p = 0.006).

Conclusion:

1. 20 % of pts with stable COPD have low serum AAT concentration despite normal genetic profile.
2. Serum AAT concentration negatively correlate with severity of airflow limitation ❑

Hypodiagnosis of Primary antibody deficiencies in patients with COPD, Sarcoidosis and Chronic Rhinosinusitis

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Background/aim: PAD represent the most common immunodeficiencies in humans. Patients display a- or hypo-gammaglobulinemia resulting mainly in recurrent and severe respiratory tract infections. A major problem for PAD patients is their diagnosis delay, leading to severe and/or irreversible complications, ranging from chronic rhinosinusitis (CRS), to more severe conditions such as chronic obstructive pulmonary disease (COPD) and bronchiectasis. PAD patients also exhibit an increased incidence of autoimmunity, lymphoproliferation and malignancy. Granulomatous inflammation is a common characteristic among PAD patients (approximately 10%) and it can be presented as interstitial lymphoid hyperplasia in lungs (GLILD), a condition difficult to be distinguished clinically from sarcoidosis (2,3).
The aim of our study was to investigate a possible PAD hypodiagnosis in patients with chronic obstructive pulmonary disease (COPD), sarcoidosis and chronic rhinosinusitis with/without nasal polyps in order to provide an accurate diagnosis and an improved patient management.
Methods: We enrolled 284 patients (male/female: 185/99, mean age: 60.8 years, range: 18-86), 148 patients suffered from COPD, 35 patients from chronic rhinosinusitis and 101patients had an initial diagnosis of sarcoidosis. IgG, IgM, and IgA levels were determined by commercially available immunonephelometric assays (Immulite-2000, Siemens Medical Solutions, Llanberis, Gwynedd, UK), according to the manufacturer's instructions. In case of low IgG and/or IgA levels, IgG-subclasses were determined. PAD patients were further evaluated by immunophenotyping and molecular studies.
Results: Totally, 24 patients out of 284 (8,5%) displayed IgG levels below the reference values. After further IgA and IgG subclasses analysis, and following the respective diagnostic algorithm based on clinical/laboratory data, it was shown that finally six patients (2.1%) fulfilled the criteria for PAD diagnosis; namely three patients for common-variable-immunodeficiency (CVID), one for selective IgA deficiency (sIgAD), one for combined IgA and IgG4 deficiency (IgAD/IgG4D) and one for combined IgG2/IgG4 deficiency. Specifically, a 48-year-old male patient with a 5-year history of COPD, displaying bronchiectasis (with an additional history of meningitis and upper respiratory infections for the last 30 years) and another 75-year-old female initially diagnosed with sarcoidosis, under corticosteroid treatment, also suffering from diabetes mellitus type II and hypothyroidism, displayed undetectable Ig levels. A 37-year-old female with chronic rhinosinusitis with nasal polyps (CRSsNP) and a history of lymphoma displayed severe hypogammaglobulinemia, and was finally diagnosed with CVID. A 64-year-old patient with COPD had sIgAD, one patient with sarcoidosis (suffering from hypothyroidism and having been subjected to thyroidectomy) exhibited IgAD/IgG4D. Finally a 22-year-old male patient with CRSsNP was shown to have combined IgG2D/IgG4D, without any comorbidities. CVID patients received Ig-replacement treatment with a subsequent clinical improvement.
Conclusion: The early diagnosis of PAD is important for the clinical management and follow-up of patients especially when chronic steroid treatment is needed that could lead in severe complications especially on the ground of immunodeficiency. Early initiation of immunoglobulin replacement treatment can reduce the frequency of infections and prevent end-organ damage such in patients with chronic rhinosinusitis, or COPD and bronchiectasis . We conclude that PAD hypodiagnosis is a common clinical problem and awareness for early diagnosis should be encouraged. ❑

Effects of Erdosteine Administration On Oxidative Stress Level and Duration of Exacerbation in Asthma-Copd Overlap

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Objective: To study the effectiveness of erdosteine administration as additional therapy in reducing oxidative stress level and duration of exacerbation in asthma-COPD overlap.
Methods: The study population consisted of 30 patients with confirmed asthma-COPD overlap, divided into erdosteine group (n=15) – received oral erdosteine 300 mg twice daily added to standart therapy during exacerbation period and control (non-erdosteine) group (n=15). Measurements of serum levels of fibrinogen and high-sensitivity C-reactive protein (hs-CRP), oxidative stress, using malondialdehyd (MDA) level, serum antioxidant capacity and oxidative protein modification were done. Duration of exacerbation, spirometry, 6MWD and asthma-control questionnaire (ACQ) were evaluated. All measurements were performed at hospital admission, at day 10 and at 3 month after exacerbation.
Results: Baseline demographic characteristics, oxidative stress biomarkers levels, systemic inflamation, and exercises capacity were not significantly different between groups. After hospital discharge, MDA concentration in erosteine group significantly decreased compared to control group (by 14.5%). After 3 month there was continuing reduction in oxidative stress level in both group, but more prominent in erdosteine group (MDA level was 4.53±0.18 and oxidative proteine modification level was 1.37±0.09 compared to baseline 6.09±0.22 and 1.65±0.15 respectively). Serum antioxidant capacity 3 months after exacerbation increased more in erdosteine group (by 3.5% compared to control). Mean exacerbation duration was lower in erdosteine group by 29.8% (9.1 and 13.01 days respectively). There was no difference in hs-CRP level between groups and hs-CRP did not correlate with spirometry. No significant difference was observed between groups in ACQ measures after 3 month. Fibrinogen level decreased more in erdosteine group (by 3,1%) at day 10, but after 3 month there were no significant difference between groups. An increased in 6MWD was observed to be greater in erdosteine group after hospital discharge and, especially, after 3 month.
Conclusions: Erdosdeine administration added to standart therapy during exacerbation due to respiratory infection in patients with asthma-COPD overlap can potentially accelerate recovery period, decrease level of oxidative stress, and, therefore, increase exercise capacity. ❑

Outcome of Non-Invasive Ventilation in Patients of Acute Respiratory Failure: Hospital based Single Center Study

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Introduction: Non-invasive ventilation (NIV) is a method of ventilator support or delivery of positive pressure into the lungs usually through a face mask, mostly initiated before severe acidosis occurs. NIV failure requiring invasive mechanical ventilation (IMV) in decompensated Chronic Obstructive Pulmonary Disease (COPD) patients is low, but, in critical patients, it is as high as 60%. Acute respiratory failure (ARF) is a common reason for admission to intensive care unit (ICU). Pandey R et

al study revealed that out of 28 patients, 27 received bi-level and most common cause was chronic obstructive pulmonary disease with type 2 respiratory failures in 67.8%.

Aim: This study was done to assess the outcome of NIV among patients with acute respiratory failure despite any cause and to assess the duration of its use, stay in ICU and failure rate of NIV. Such type of study result is scarce in our country.

Methods: This was an observational, prospective, cross-sectional, single center study conducted at Chitwan Medical College Teaching Hospital over the period of 6 months starting from January 2019. Arterial blood gases were assessed prior, after starting and at discontinuation of NIV. NIV was delivered by ventilator via face mask. All patients above age 15 years who presented to the hospital, diagnosed to have ARF by ABG were included and admitted in Medical Intensive Care Unit (MICU). All details of clinical parameters and ABG findings during admission were recorded as per the proforma before putting the patient in NIV. Appropriate statistical tests (Chi-square) were performed and the statistical significance of the results were assessed.

Results: 35 patients with median age being 73 years (Range: 39- 89 years), of 60.0 % females among which 74.3 % were current smokers. Arterial blood pH prior to admission ranged from 7.11-7.39 and 7.06-7.41 among NIV success and failure, respectively. Similarly, Pco2 ranged from 54.0-127.5 and 29.5-105.9 among them, respectively. Two hours after ventilation pH ranged from 7.12-7.43 and 7.05-7.30 respectively in success and failure group. Most common disease condition requiring NIV was 77.1% COPD. NIV failure was observed in 54.3 % and it was not significantly associated with working diagnosis (Chi-square = 3.81, P = 0.43). Out of NIV failure group(n=19) 57.8 % were intubated and 42.1% patient left the intervention. The median duration of NIV use among success group was 17h (6h-56h) and failure group 10 h (2h-57h).

Conclusion: Usage of NIV among ARF patients was associated with lower intubation and ICU mortality rate. COPD patients showed most benefit with NIV. Whereas patients suffering from Interstitial Lung disease, Lung Cancer had less benefit, with NIV failure of 57.8%. The median duration of NIV use among success group was 17 h and failure group 10h.

Key Words: Acute Respiratory failure; Chronic Obstructive Lung Disease; Non-invasive ventilation ❑

N-terminal pro-B-type natriuretic peptide predicts the severity of pulmonary hypertension in chronic obstructive pulmonary disease

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Pulmonary hypertension (PH) is a common complication of chronic obstructive pulmonary disease (COPD) that has an important implication on its prognosis. PH carries the risk of more frequent hospitalizations and shorter survival. However, it is often overlooked due to the difficulty in diagnosing. Echocardiographic assessment of PH may be subject to errors because of poor visualization of the heart due to emphysema, while right heart catheterization (RHC) is an invasive method. The aim of our study was to examine whether some routinely evaluated noninvasive parameter can predict which patient has pulmonary hypertension and requires invasive diagnostic procedure.

Methods: The study included 59 COPD patients (38 men, 21 women, age 60.9 ± 11.1), with RHC confirmed PH. The following tests were performed: complete blood count (CBC), N-terminal pro-B-type natriuretic peptide (NT-proBNP), troponin T, arterial blood tests, pulmonary functional test.

Results: The results of descriptive statistics are presented as mean +/- SD. The parameters obtained by catheterization of the right heart were as follows: mean right atrium pressure (mRA) 10,7 +/- 5,33 mmHg, mean pulmonary artery pressure (mPAP) 46,68 +/- 13,66 mmHg, mean wedge 12,87 +/-13,66 mmHg, cardiac output (CO) 5,34 +/- 1,21 L/min, cardac index (CI) 2,8 +/- 0,6 L/min/m2. The prevalence of mild pulmonary hypertension was 17% (10/59), moderately 36% (21/59) and severe 47% (28/59). Pulmonary function parameters were: FVC 64,40 +/- 21,29 %predicted, FEV1 46,08 +/- 20,77 %predicted, FEV1 / FVC 0,54 +/- 0,12, DlCO 37,97 +/- 21,26 %. Laboratory parameters were: erythrocytes 5,13 +/- 0.64 x 1012/L, hemoglobin 150,6 +/- 20,0 g/L, hematocrit 0,46 +/- 0.6, troponin T 14,05 +/- 20,04 ng/ml, NT-proBNP 1806 +/- 2191,69 ng/L, pH 7,43 +/-0,38, PaO2 65,78 +/- 9,3 mmHg, PaCO2 44,16 +/- 10,58 mmHg, PaO2/FiO2 289,5 +/-55,84. A significant correlation was found between mPAP and NT-proBNP (R = 0.311, p = .037).

Conclusion: NT-proBNP is released as a result of atrial and ventricular wall stretching. In addition to being a marker of left heart failure, its elevated value may also indicate a load on the right heart. There are few studies on its value in identification of pulmonary hypertension in COPD patients, and their results indicate that NT-proBNP has relatively good sensitivity and specificity (1, 2). The results of our studies are consistent with those mentioned above and suggest that NT-proBNP could predict the severity of pulmonary hypertension in COPD. Further research is needed to assess its value as a screening tool for noninvasive detection of PH in COPD patients. ❑

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Evolution of lung function, gas exchange and radiological patterns after discharge in patients with severe COVID-19 pneumonia: a monocentric, observational, prospective study.

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Background: The burden of coronavirus disease 2019 (COVID-19) pandemic is further increased by possible functional and radiological sequelae. The aim of our study was to assess the changes in pulmonary function tests (PFTs), gas exchange and radiological features after two months from discharge in patients hospitalized for COVID-19 pneumonia.

Methods: This was a prospective, monocentric, observational cohort study. Consecutive adult patients admitted to our high dependency respiratory unit with COVID-19 pneumonia between March and April 2020 underwent concomitant blood gas analysis, chest computed tomography (CT) and PFTs including spirometry and single breath diffusion lung capacity (DLCO), both when reaching respiratory stability during the hospital stay and 2 months after. Biochemistry and clinical variables were collected at hospital admission. CT scans were evaluated by two expert radiologists, and total severity score (TSS) was calculated [Li K et al. *Eur Radiol* 2020;30(8):4407-4416].

Results: 20 patients (mean age 58.2 years, SD 15.5; 70% males) were enrolled. In acute conditions, patients showed a reduction in vital capacity (VC) (71.7%predicted, SD 16.9) and in DLCO (56%pred, SD16.3), that was secondary to a prevalent decrease in alveolar volume (VA) (*Table 1*). Patients showed hypoxia and an increased alveolar-arterial (A-

a) gradient (*Table 1*). DLCO and VA correlated positively with PaO2/FiO2 ratio (r=0.476, P=0.034 and r=0.639, P=0.002) and negatively with the A-a gradient (r=-0.48, P=0.030 and r=-0.48, P=0.032), while D-dimer was negatively correlated with DLCO and the transfer factor (KCO) (r=-0.668, P=0.001 and r=-0.534, P=0.015). Prominent CT features were: peripheral (n=14, 70%) and/or multifocal (n=6, 30%) ground glass (GGO), crazy paving (n=6, 30%), consolidations (n=13, 65%) and fibrosis (n=12, 60%). TSS was 7.9 (4.0). Crazy paving was associated with a reduced VA/VC ratio (r=-0.459, P=0.021), while consolidations were negatively correlated with DLCO (r=-0.423, P=0.032). At the follow up visit, gas exchange parameters were normalized. Most patients showed a normalization of VC and FVC (n=15, 75%). DLCO and VA significantly improved (*Table 1*), although DLCO remained altered in 13 patients (65%) (*Figure 1*), which had a higher D-dimer at admittance (median, IQR vs. patients with normal DLCO: 3375, 607-5699 VS. 394, 200-733 FEU; P=0.008). At follow up, parenchymal consolidations decreased significantly (10% VS. 65%; P=0.001) and most alterations evolved in GGO and/or fibrosis (*Figure 2*). TSS did not change (P=0.118). Multivariate regression analysis (R2=0.730, P<0.001) showed that DLCO at follow up was independently predicted by D-dimer at admission (95%CI: -24.851;-1.853, P=0.026) and by VC%predicted measured during hospitalization (95%CI: 0.054;1.446, P=0.037).

Table 1:

	First PFT	Follow up PFT	p-value
Gas exchange			
FiO2, %	21 (21–32)	21 (21–21)	**0.008**
PaO2, mmHg	78 (71–88)	90 (87–100)	**0.002**
PaO2/FiO2, mmHg	316 (87)	443 (69)	**<0.001**
A-a gradient, mmHg	34 (19–101)	9 (4-19)	**<0.001**
Spirometry			
FVC, liters	2.61 (1.01)	3.22 (1.07)	**<0.001**
FVC, % predicted	69.6 (15.9)	87.4 (16.0)	**<0.001**
VC, liters	2.73 (1.09)	3.35 (1.10)	**<0.001**
VC, % predicted	71.7 (16.9)	87.4 (16.2)	**<0.001**
FEV1, liters	2.22 (0.91)	2.69 (0.87)	**<0.001**
FEV1, % predicted	75.1 (18.9)	91.3 (15.2)	**<0.001**
Lung diffusion capacity			
DLCO, mmol·min^{-1}·kPa^{-1}	4.98 (2.05)	5.95 (2.15)	**<0.001**
DLCO, % predicted	56.0 (16.3)	67.2 (18.0)	**<0.001**
VA, liters	3.88 (1.34)	4.54 (1.38)	**<0.001**
VA, % predicted	64.8 (14.0)	75.3 (16.1)	**<0.001**
KCo, mmol·min^{-1}·kPa^{-1}·l^{-1}	1.32 (0.36)	1.32 (0.28)	0.981
KCo, % predicted	89.1 (19.2)	91.7 (14.8)	0.358

Table 1. Lung function and gas exchange parameters during hospitalization and at follow-up. Normally and non-normally distributed data were compared with paired t-test and Wilcoxon test. PFT = pulmonary function test; FiO2 = fraction of inspired oxygen; PaO2 = arterial partial pressure of oxygen; A-a gradient = oxygen alveolar-arterial gradient; FVC = forced vital capacity; VC = vital capacity; FEV1 = forced expiratory volume in first second; DLCO = single breath diffusion lung capacity; VA = alveolar volume; KCO = carbon monoxide transfer factor.

Figure 1:

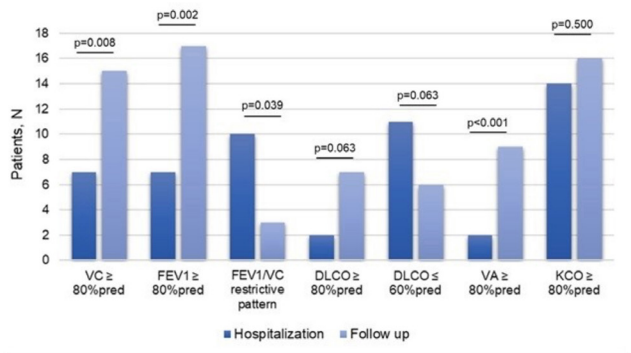

Figure 1. Proportion of patients experiencing a normalization or a persistent alteration of lung function at the follow up visit. VC = vital capacity; FEV1 = forced expiratory volume in first second; DLCO = single breath diffusion lung capacity; VA = alveolar volume; KCO = carbon monoxide transfer factor; pred = predicted values.

Figure 2:

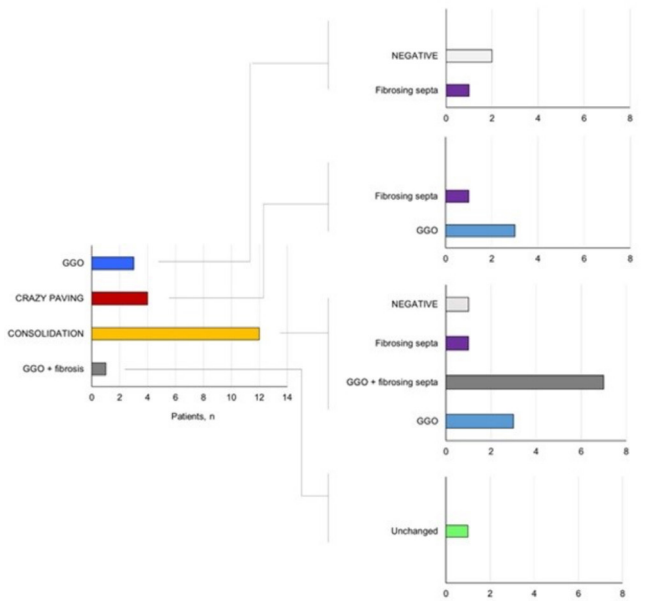

Figure 2. Changes in chest CT features from baseline to follow up.
GGO = ground glass opacities.

Conclusions: In COVID-19 pneumonia, parenchymal consolidations cause a restrictive pattern that often resolves after two months from the acute episode. The persistent reduction in DLCO could be secondary to the coagulopathy involving the lung capillary bed experienced during the acute phase of the disease. Dynamics of functional and parenchymal damage appear different, and need further investigation to ensure an adequate follow up in patients discharged after COVID-19 pneumonia.

Conflict of interest: none ❑

Physicians' Perspectives and Practice Patterns in India on the Diagnosis and Treatment of Interstitial Lung Disease (IN-ILD survey)

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Background: As per the GBD Study report, ILD was ranked at 40th position among all diseases with respect to global years of life lost in 2013, representing an increase of 86% compared with 1990.1 However, data on physicians' perspectives and practice patterns regarding ILD management in India is currently lacking.

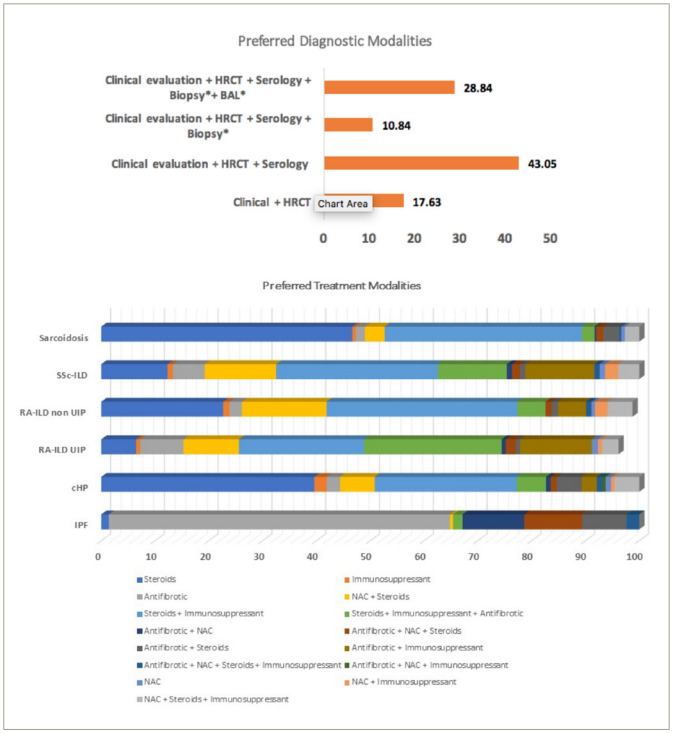
Objective and Methods: An anonymous survey questionnaire was administered to physicians attending CME programmes on ILDs in February 2020 to gauge physician behaviour and views on ILD diagnosis and treatment in India. Results are expressed as percentages based on the number of responses obtained.

Results: A total of 321 physicians managing ILDs participated in the survey. Chronic hypersensitivity pneumonitis (cHP) was ranked as the commonest ILD, followed by idiopathic pulmonary fibrosis (IPF), connective tissue-ILD and sarcoidosis. For ILD diagnosis, 43% of respondents reported using clinical, radiological plus serology data; additionally, biopsy use when indicated was reported by 39% of respondents (figure). 36% and 18% of physicians responded that 16–30% and 31–50%, respectively, of their

non-IPF ILD patients develop progressive fibrotic ILDs (PF-ILD), while 20% could not estimate the percentage of such patients. Transbronchial biopsy (50% of respondents) and transbronchial cryobiopsy (22% of respondents) were the preferred biopsy tools for idiopathic interstitial pneumonia diagnosis. 38% of respondents reported that in 41–60% of HP cases, the inciting antigen remains unidentifiable. Antifibrotics remain the mainstay for IPF treatment, while steroids + immunosuppressant were preferred by 23–37% of respondents to treat different ILDs (figure). 38% and 33% of respondents preferred mycophenolate mofetil and azathioprine, respectively, in >50% of their non-IPF ILD cases; 20% of respondents rated mycophenolate mofetil superior to azathioprine on both efficacy and safety parameters. 47% of respondents reported that 26–50% of their patients exacerbate at least once a year, while 17% opined that >50% of their patients exacerbate regardless of baseline severity. 50% of respondents opined that pirfenidone 1,800 mg/day was tolerated by >45% of their IPF patients, while 58% reported that only 15% of their IPF patients tolerated pirfenidone 2,400 mg/day. 65% of respondents reported using antifibrotics in most (>50%) of their advanced IPF patients. 72% of respondents confirmed using antifibrotics in their PF-ILD patients. Pulmonary rehabilitation was offered by 38% of respondents to all their ILD patients.

Conclusion: ILD management has improved significantly in India. Antifibrotics are now the mainstay in IPF. In non-IPF ILDs, steroids remain the mainstay, but a significant number of physicians now use immunosuppressants, with a slight preference for mycophenolate mofetil over azathioprine. Antifibrotic dosing remains sub-optimal in IPF. ❑

Figure: Diagnostic and treatment modalities for ILD (expressed as respondents' preference in %)



**when indicated*

Reference: 1. Biomed Research International 2015:123876v

[155] Untuned antiviral immunity in COVID-19 revealed by temporal type I/III 1 interferon patterns and flu comparison

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A central paradigm of immunity is that interferon (IFN) mediated antiviral responses precede the pro-inflammatory ones, optimizing host protection and minimizing collateral damage. Here, we report that for COVID-19 this does not apply. By investigating temporal IFN and inflammatory cytokine patterns in 32 COVID-19 patients hospitalized for pneumonia and longitudinally followed for the development of respiratory failure and death, we reveal that IFN-λ and type I IFN production is both diminished and delayed, induced only in a fraction of patients as they become critically ill. On the contrary, pro-inflammatory cytokines such as TNF, IL-6 and IL-8 are produced before IFNs, in all patients, and persist for a prolonged time. By comparison, in 16 flu patients hospitalized for pneumonia with similar clinicopathological characteristics to COVID-19 and 24 milder non-hospitalized flu patients IFN-λ and type I IFN are robustly induced, earlier, at higher levels and independently of disease severity, while pro-inflammatory cytokines are only acutely and transiently produced. Notably, higher IFN-λ levels in COVID-19 patients correlate with lower viral load in bronchial aspirates and faster viral clearance, and a higher IFN-λ/type I IFN ratio with improved outcome of critically ill patients. Moreover, altered cytokine patterns in COVID-19 patients correlate with longer hospitalization time and higher incidence of critical disease and mortality compared to flu. These data point to an untuned antiviral response in COVID-19 contributing to persistent viral presence, hyperinflammation and respiratory failure. ❑

RISING STAR

Expression of ACE2, the SARS-CoV-2 receptor, in lung tissue of patients with type 2 diabetes

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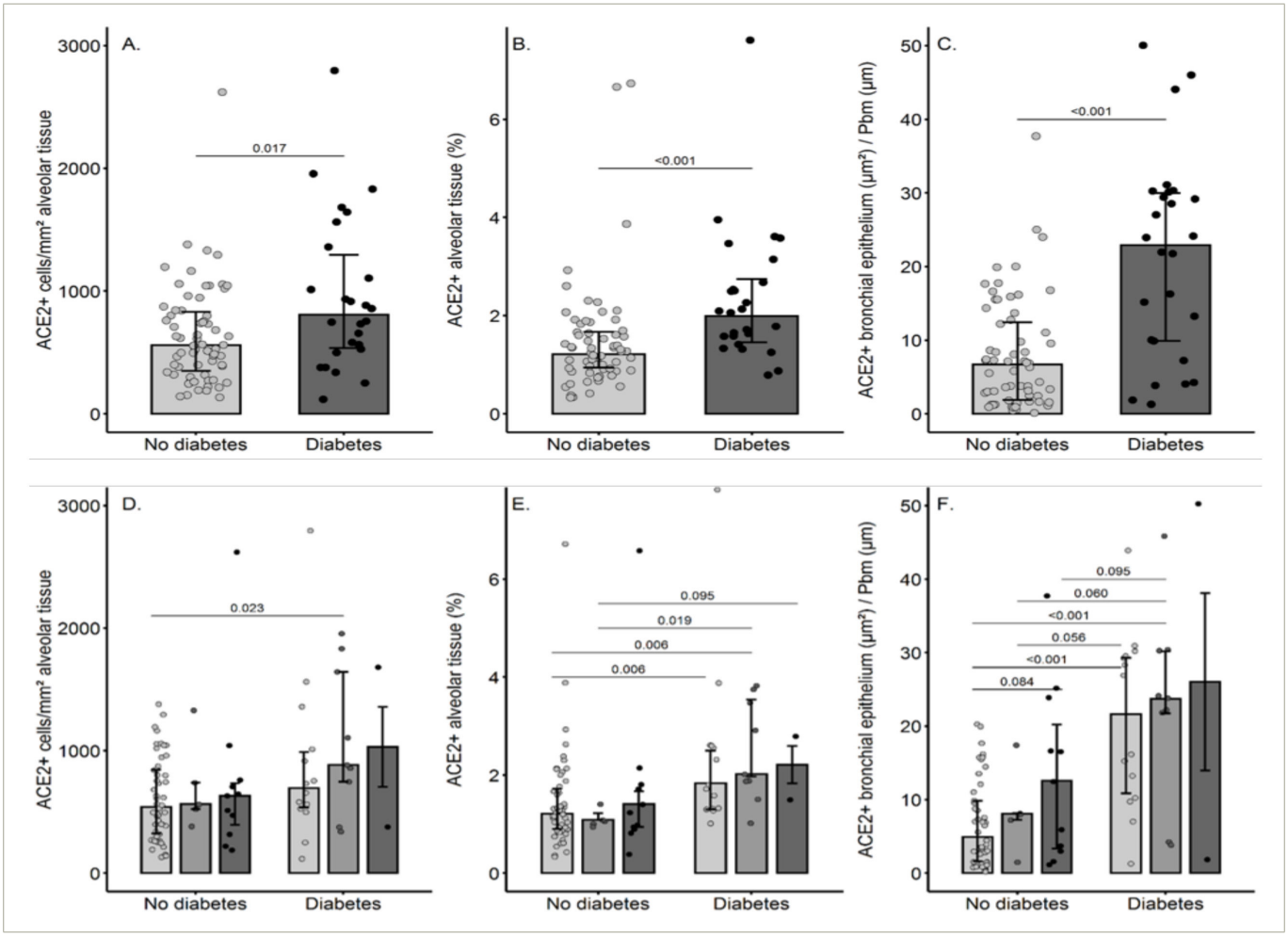
Background: Although severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can infect any individual, an increased risk for hospitalization and death due to COVID-19 is reported in older subjects, smokers and patients with comorbidities such as hypertension, chronic obstructive pulmonary disease (COPD), obesity and especially diabetes. It has been suggested that patients with diabetes exhibit increased infectivity for SARS-CoV-2 because of higher pulmonary ACE2 levels, the SARS-CoV-2 receptor. However, studies on human lung tissue and ACE2

Figure 1. Pulmonary ACE2 protein expression according to diabetes and RAAS-inhibitor use



Bar plots depict unadjusted median values of ACE2 expression in patients with (dark gray bar) and without diabetes (light gray bar), and stratified by patients without RAAS-inhibitor use (left bars), with ACE-inhibitor use (middle bars) and with ARB use (right bars). Error bars represent 25th and 75th percentiles. P values <0.1 are shown. Error bars represent 25th and 75th percentiles. RAAS-I = renin-angiotensin-aldosterone-system-inhibitors, ACE = angiotensin converting enzyme, ARB = angiotensin receptor-blocker. P values <0.1 are shown.

mRNA and protein levels are scarce. Second, it has been suggested that subjects with diabetes exhibit increased ACE2 expression because of renin-angiotensin-aldosterone-system (RAAS)-inhibitor use.

Aim: To compare pulmonary ACE2 mRNA and protein expression between subjects with and without type 2 diabetes. Second, to examine whether use of different types of RAAS-inhibitors (ACE-inhibitors and ARBs) confound the association between type 2 diabetes and ACE2 expression.

Methods: We studied ACE2 mRNA and protein expression in lung tissue samples of patients with and without diabetes that were collected between 2002 and 2020 from patients undergoing lobectomy for lung tumors. For RT-PCR analyses, samples from 15 subjects with diabetes were compared to 91 randomly chosen control samples. For immunohistochemical staining, samples from 26 subjects with diabetes were compared to 66 randomly chosen control samples. mRNA expression of ACE2 was measured by quantitative RT-PCR. Protein levels of ACE2 were visualized by immunohistochemistry on paraffin-embedded lung tissue samples and quantified in alveolar and bronchial epithelium. We compared ACE2 mRNA and protein expression between subjects with and without type 2 diabetes using multivariable linear regression analyses. Covariates included age, sex, Body Mass Index (BMI), current smoking, inhaled corticosteroid use, oral corticosteroid use, COPD, hypertension and atherosclerotic vascular disease (history of coronary, carotid or peripheral artery stenosis, myocardial infarction or stroke). Second, we additionally adjusted for ACE-inhibitor and ARB use.

Results: Pulmonary ACE2 mRNA expression was not different between subjects with or without diabetes. In contrast, multivariable adjusted protein levels of ACE2 were significantly increased in both alveolar tissue and bronchial epithelium of patients with diabetes compared with control subjects, even when additionally adjusting for different types of RAAS-inhibitors.

Conclusion: We show increased bronchial and alveolar ACE2 protein expression in patients with type 2 diabetes. Further research is needed to elucidate whether up-regulation of ACE2 expression in airways has consequences on infectivity and clinical outcomes of COVID-19. ❑

Correlation of Vitamin D deficiency with frequent exacerbations and hospitalization in COPD patients

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Background: Acute exacerbations in COPD are common and strongly influence disease severity and healthcare costs. Vitamin D deficiency is common among COPD patients and its role in disease exacerbations is

widely debated. Aim of study was to assess the relationship of serum vitamin D levels with COPD severity and exacerbation.

Methods: From Septtember 2018 to September 2019 102 patients with COPD entered into the study. All patients Serum 25-hydroxyvitamin D (25-OHD), spirometry, history and records of acute exacerbation of COPD and hospital admission during the previous year.

Results: The distribution of vitamin D status, including vitamin D deficiency, vitamin D insufficiency and vitamin D sufficiency was 15.7%, 22.5% and 61.8% respectively among COPD patients. A significant inverse relationship was found between vitamin D and COPD severity, acute exacerbation of COPD and hospital admission.

Conclusions: In COPD patient's vitamin D deficiency were related to more frequent disease exacerbations and hospitalization during the year previous to the measurement of vitamin D. ❑

Mycobacterium lentiflavum: clinical characteristics of pulmonary disease

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Introduction: Mycobacterium lentiflavum is a rare non-tuberculous Mycobacterium that has shown a multiple drug resistance and is often associated to cervical lymphadenitis in young children. It is placed in an intermediate position between rapidly and slowly growing mycobacteria. In this study, we intend to characterize the clinical features of its pulmonary involvment in adult patients.

Methods: Review of clinical files of 9 Mycobacterium lentiflavum pulmonary patients followed at Centro de Diagnóstico Pneumológico Dr. Ribeiro Sanches, Portugal, between January 2008 and December 2019.

Results: In this sample, there was only one male. All the patients had diffuse bronchiectasis on thoracic computed tomography, and the main radiological pattern was diffusely linear, which was seen in seven cases (77.8%); in the other two cases, the radiological pattern was nodular. Only one patient was immunocompetent. Among the other eight, one had undergone a right unipulmonary transplant, two underwent radiotherapy and chemotherapy for malignant neoplasm (tongue and lung) and the remaining five were on oral corticosteroid therapy. Only one patient died from an aggressive form of the disease, three became colonized to Mycobacterium lentiflavum and the other five seemed to have treated the infection.

Conclusions: Besides the low number of cases reported, it seems like the Mycobacterium lentiflavum tends to affect more females, immunocompromised people and patients with bronchiectasis and had a relatively non-agressive clinical course. ❑

Azathioprine versus Mycophenolate mofetil for lung transplant recipients in Portugal

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Introduction: Azathioprine and Micophenolate Mofetil are purine synthesis inhibitors and two of the major immunosuppressants for lung transplantation. The aim of this study is to compare the different clinical results between azathioprine and Mycophenolate Mofetil in lung transplant recipients (LTR) during the first year after transplant.

Methods: Review of clinical files of 125 LTR followed at Hospital Santa Marta, Portugal, between January 2015 and December 2018. Statistical analysis was performed using SPSS ® v24. Infection, mortality and acute rejection rates between the two groups were analyzed, as well as adverse events.

Results: 125 patients were included in this analysis, 64% male (n = 80). The average age was 48 y-o. Azathioprine was given to 68 LTR; Mycophenolate Mofetil to 57. There was more adverse events with azathioprine, but without a statiscally significative difference (14.7%, n=10 vs 12.2%, n=7, p=0.2). The incidence of acute rejection was lower in mycophenolate mofetil group (15,7%, n=8 vs 19.1%, n=13, p=0.01). The incidence of infection was comparable in both groups (44%, n=30, with azathioprine vs 43.8%, n=25, with mycophenolate mofetil, p=0.11). The mortality rates at one year between azathioprine and mycophenolate mofetil groups were not significantly different (8.8%, n=6 vs 7.0%, n=4, respectively, p=0.3). These results were independent of calcineurin inhibitors, corticosteroid dose and prophilatic antibiotics used.

Discussion: Compared with azathioprine, the use of mycophenolate was associated with a reduced risk for acute rejection, with a survival, adverse events and infection rates comparable to azathioprine, in this LTR group.

Development and Application of DOPS Checklists in Assessing the Skills of Emergency Bag Mask Ventilation and Endotracheal Tube Intubation

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Background: A checklist is list of action items which allows recording the presence/absence of each step which also can provide guidance to the user with the principal purpose to reduce the error and harm in stressful conditions with adhering to best performance. Direct Observation of Procedural Skills (DOPS) which is designed to evaluate practical skills under direct observation during procedure and provide feedback to performer. Aim of our study was to develop checklists of Emergency Bag Mask Ventilation for DOPS teaching, learning & assessment and Emergency Endotracheal Tube Intubation for DOPS teaching, learning & assessment for professionals which may decrease the stress related human errors, enhance the performer skills and ultimately contributing patient safety.

Methods: We studied fellows and residents (n=42) with mixed study method included literature reviews, webpages searching, expert group formation and consensus generating meetings. Initial checklists drafts were made through discussion on each step using Delphi method and final draft checklist made only after rating of 4 out of 5 by all the experts adapting mini-Delphi method. Regarding the content validity index, minimum 80% agreement was required to accept each step of a checklist. For each procedure all experts observed and marked the appropriate box according to the performance on a mannequin twice, before and after an informative lecture session with hands-on workshop.

Result: We developed separate checklists for Emergency Bag and Mask ventilation and Emergency Endotracheal tube Insertion as below in Annex-1 and Annex-2 respectively and a pilot study was done. The mean age of the participants (n = 42) was 29.83 ± 3.09 years, with 34 males (81.0 %) and 8 females (19.0%). Step no. 7 of Annex-1 and step no. 4 of Annex-2 had the least correlations with other items of the questionnaire.

Discussion: Checklists steps had acceptable internal consistency as demonstrated by Cronbach's alpha (Cronbach's alpha= 0.669 and 0.598 respectively). Baseline score of the students before the lecture session

and hands on workshop was lower for Annex-1 (17.07 ± 6.59 and 20.85 ± 8.16 respectively) when compared to the post session scores (35.19 ± 9.84 for Annex-1 and 35.76 ± 11.97 for Annex-2) but baseline scores were significantly higher in male (P = 0.038) and in those who had performed procedures > 10 times (P = 0.040). On multivariate regression analysis, improvement in the scores (for both Emergency ETT Intubation and Emergency BMV) after training was not associated with age, sex or year after medical graduation.

Conclusion: Thus implementing checklists will be a part of effective assessment as well as it may contribute towards sustained improvement in patient health care in stressful emergency situation with less harm to the patients. Limitations of our study are small number of study sample, single centered, observational type and convenience sampling. ❑

Annex-1

EMERGENCY BAG MASK VENTILATION FOR DOPS TEACHING, LEARNING & ASSESSMENT

Trainee's Name: Date: dd/mm/year

Years after medical graduation: 1 [ ] 2 [ ] 3 [ ] 4 [ ] ≥5 [ ]

Number of times procedure performed previously: 0-5 [ ] 6-10 [ ] 11-20 [ ] >21 [ ]

DOPS RATING SCALE	Poor	Borderline	Satisfactory	Good	Outstanding
1.	"Head- Tilt/Chin- Lift" or "Jaw Thrust" maneuver * [ ]	[ ]	[ ]	[ ]	[ ]
2.	Swift oral cavity inspection and suctioning as required [ ]	[ ]	[ ]	[ ]	[ ]
3.	Choosing correct size mask with assembling bag [ ]	[ ]	[ ]	[ ]	[ ]
4.	Holding and sealing the mask appropriately with non-dominant hand with bagging by other hand (if no appropriate personnel around) ** [ ]	[ ]	[ ]	[ ]	[ ]
5.	Holding and sealing the mask appropriately with 2 hands with supervision of bag mask ventilation done by others [ ]	[ ]	[ ]	[ ]	[ ]
6.	Ventilating at proper depth and rate (Not more than 1breath per 4 seconds) [ ]	[ ]	[ ]	[ ]	[ ]
7.	Each bag compression / ventilation over 1 second [ ]	[ ]	[ ]	[ ]	[ ]
8.	Notice Chest rise [ ]	[ ]	[ ]	[ ]	[ ]
9.	Releasing bag completely before next compression [ ]	[ ]	[ ]	[ ]	[ ]
10.	Watch all the time the patient and oxygen saturation and communicate about the situation with others [ ]	[ ]	[ ]	[ ]	[ ]

Name of Supervisor:---------- Signature----------

*Jaw Thrust maneuver for the suspected cervical injury patients.

** For creation of good seal, apply downward pressure on the mask with thumb and index fingers and to open the airway pull the patient's jaw up with 3rd, 4th and 5th fingers.

Annex-2

EMERGENCY ENDOTRACHEAL TUBE INTUBATION FOR DOPS TEACHING, LEARNING & ASSESSMENT

Trainee's Name: Date: dd/mm/year

Years after medical graduation: 1 [ ] 2 [ ] 3 [ ] 4 [ ] ≥5 [ ]

Number of times procedure performed previously: 0-5 [ ] 6-10 [ ] 11-20 [ ] >21 [ ]

DOPS RATING SCALE	Poor	Borderline	Satisfactory	Good	Outstanding
1.	Bag Mask ventilation with 100% O_2 for 3 to 5 min if possible &call help if situation appears difficult to handle [ ]	[ ]	[ ]	[ ]	[ ]
2.	Ordering intubation set & asking to check appropriate ET tube size [ ]	[ ]	[ ]	[ ]	[ ]
3.	Rechecking instruments & Premedication [ ]	[ ]	[ ]	[ ]	[ ]
4.	Positioning supine, head on small pillow, tilted head backwards (sniffing position)* [ ]	[ ]	[ ]	[ ]	[ ]
5.	Laryngoscopy** with neuromuscular blocking agent as required [ ]	[ ]	[ ]	[ ]	[ ]
6.	ET Intubation with concavity plane of ETT horizontally, maintaining the laryngoscope in the position till the black marker line of ETT at the levels of the vocal cords (ETT cuff well inside the vocal cords)*** [ ]	[ ]	[ ]	[ ]	[ ]
7.	Inflating the cuff to achieve air seal & fixing the ETT appropriately in reference to incisors [ ]	[ ]	[ ]	[ ]	[ ]
8.	If intubation is not possible within 30 seconds, Bag Mask Ventilation with 100% O_2 and call for help if re-intubation appears difficult [ ]	[ ]	[ ]	[ ]	[ ]
9.	Re-intubation and confirmation [ ]	[ ]	[ ]	[ ]	[ ]
10.	If difficulty, back to Bag Mask Ventilation and call for help [ ]	[ ]	[ ]	[ ]	[ ]

Name of Supervisor:---------- Signature----------

* With suspected cervical spine injury intubation should be performed without flexion & extension with an assistant stabilizing the head & neck in a neutral position.

** After opening the mouth with right hand fingers, insert the blade with the left hand from the right side of the mouth pushing the tongue to the left. If secretions are present, apply suction. Next place the tip of the laryngoscope blade in the depression between the base of the tongue and the epiglottis (in infants and small children, insert the blade beyond the epiglottis, using straight blade laryngoscope). Then to expose the larynx, lift the laryngoscope vertically upwards to the ceiling in the direction of the laryngoscope handle without levering the laryngoscope on the front top teeth.

*** If required, may ask the assistant to apply cricoid pressure to help visualization of the vocal cords.

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