98. Monitoring exacerbations of airway diseases

P897

Impact of checklist proforma on discharge and follow up care of patients admitted with COPD exacerbations

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COPD management involves a multidisciplinary approach with input from specialist nurses, physiotherapists and dieticians. In 2009, we audited 14 criteria (NICE guidance) and showed scope for improvement. A discharge checklist was introduced.

Aim: To assess impact of discharge proforma on care of patients admitted with COPD exacerbations.

Method: We audited COPD patients admitted over Mar-Aug '09 and Aug-Dec '10, pre and post introduction of discharge checklist. Data collected: physician and nurse follow up, oxygen assessment, smoking cessation, pulmonary rehabilitation, COPD alert cards, dietetic follow up, domiciliary physiotherapy, community matron follow up, discussion regarding future ventilation, information leaflets, vaccination advice and psychological support.

Results: Table shows comparative results.

Comparison of positive utilisation of resource

Criteria	2009, % (No. 50)	2010, % (No. 39)	p value
Respiratory Physician Follow Up	30	36	NS
Respiratory Nurse Follow Up	50	90	<0.01
Referral for Oxygen assessment	24	79	<0.01
Smoking Cessation referral	50 (No. 20)	80 (No. 10)	NS
Pulmonary Rehab referral	6 (No. 49)	26 (No. 23)	NS
COPD Alert Cards issued	2	51	<0.01
Dietetic referral	6	18	NS
Domiciliary Physiotherapy referral	12	3	NS
Community Matron referral	20	21	NS
Discussion regarding future ventilation	0	59	<0.01
Patient information leaflet given	4	69	<0.01
Flu vaccine advised	4	90	<0.01
Pneumococcal vaccine advised	4	90	<0.01
Psychological support offered	0	90	<0.01

Conclusions: Introduction of a discharge checklist led to significant improvements in referrals to respiratory nurse, oxygen assessment, COPD alert cards, leaflets and vaccination advice. We have continued to use this intervention in our hospital.

P898

COPD assessment test correlation with the increase of the inflammatory markers in COPD exacerbations

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Introduction: COPD is associated with systemic inflammation and it is a known fact that the COPD exacerbations are accompanied by an augmentation of the serum levels of the inflammatory markers. Aim of the study was to evaluate a correlation between the level of systemic inflammatory markers and COPD Assessment Test (CAT) score in patients with hospitalization COPD exacerbations.

Methods: The CAT test questionnaire was implemented in 53 patients COPD GOLD stage II-IV acute exacerbations.The score changes obtained were compared with the modification of usually serum inflammatory markers (erythrocyte sedimentation rate, CRP, fibrinogen).

Results: It was found that from the group of 53 patients, 14 had a score of >30, 31 had >20, 8 between 10-20 and none had a score< 10. Meanwhile, the serum inflammatory markers, were significantly altered from their initial value in 22 (41.5%) of the 53 subjects, 10 from the group who had the highest CA test score, 11 from the second group and 1 from the last group.

Conclusions: There is a level of correlation between the high values of serum inflammatory markers and the CA test scores, obvious in patients with moderate to severe exacerbations, presenting a higher CAT score (78.57%) in contrast (p=0.0108) with a weak association (12.5%) in patients with low score of the questionnaire and mild exacerbations.

P899

Detection of acute health status deterioration among COPD patients by monitoring COPD assessment test score

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Background: The COPD Assessment Test (CAT) is a valid and simple questionaire to quantify health status of COPD in routine clinical practice;therefore, it should play a role for detecting acute health status deterioration during monitoring visit.

Objective: To evaluated the discriminative properties of the CAT scores for detecting worsening and exacerbation of COPD patients in Thailand

Methods: The CAT questionaire was administered to 123 stable COPD patients attended at our chest clinic. These patients were monitored every 1-3 month interval for detecting worsening and exacerbation by using CAT score, physician and patient global assessment.

Results: A total of 237 visits among 123 patients, age 70.9±8.5 years, FEV1=47.9±18.4% predicted were followed. The mean score change in stable COPD was 0.28 (95%CI=-0.06-0.97) and 0.45 (95%CI=-0.06-0.97) by patient and physician global assessment. CAT scores were significantly higher at the time of worsening and exacerbation;the mean score changes were 5.97 (95%CI=4.68-7.24) and 9.25 (95%CI=6.70-11.79), respectively. The area under the ROC curve of CAT score for detection of acute health status deterioration was 0.92 (95%CI=0.88-0.96) and the cut-off point score at ≥12 had sensitivity, specificity and accuracy=76.74%,64.43% and 66.67%, respectively.

Conclusions: The CAT score change during monitoring visits is useful for detecting acute health status deterioration

P900

Use of COPD assessment (CAT) test in monitoring acute exacerbations

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Introduction: The COPD Assessment Test (CAT) is a new patient completed questionnaire that has recently been validated to provide a simple assessment of health status in COPD. It is known that patients with moderate to severe exacerbation score about 5 units higher on CAT [1] and hence it may be useful in diagnosing and monitoring exacerbations.

Methods: We administered the CAT at the time of presentation with exacerbation and at the time of discharge home. We also measured the FEV1 on both encounters.

Results: We have results of 102 patients (60 men and 42 women). The initial mean CAT score was 22.55 and it improved to 19.28 by the time of discharge, this is an improvement of 3.27 points in CAT score on recovery from exacerbation. Although the mean improvement in CAT was not as high as 5 points, the difference between the two Cat scores was highly significant (p 0.002). Mean FEV1 improved from 0.89 to 1L but the difference was not statistically significant (p 0.073). The full results are displayed in the table below.

Baseline characteristics and results

n	102
Male	60
Female	42
Mean age	71.2 years
Mean CAT on admission	22.55
Mean CAT on discharge	19.28
Mean FEV 1 on admission	0.89 L
Mean FEV1 on discharge	1.0 L
Change in mean CAT admission to discharge	3.27 (p=0.002)
Change in mean FEV1 admission to discharge	0.11 L (p=0.073)

Conclusions: CAT might be a useful tool in monitoring recovery from COPD exacerbation and could help to determine the optimum time for discharging patient from hospital. Larger studies are needed to validate this use of CAT.

References:

[1] Jones PW, Harding G, Berry P, *et al.* Development and first validation of the COPD Assessment Test. *Eur Respir J* 2009; 34: 648-54.

P901

Evaluation of high-sensitivity C-reactive protein in acute asthma

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Objective: High sensitivity C reactive protein (Hs-CRP) is an inflammatory marker known to be related to inflammation, infection, and cardiovascular disease. The aim of this study was to evaluate hs-CRP levels in serum of asthmatics and their relationship to pulmonary function tests, serum IgE levels, peripheral blood white blood cells (WBC) counts.

Methods: The study groups were 108 patients with acute asthma and 93 healthy volunteers. The levels of hs-CRP of 108 patients with acute bronchial asthma and 93 non-asthmatic control subjects were measured. Spirometry, serum immunoglobulin-E (IgE) measurement, WBC and counts were done in all the patients and control groups.

Results: Mean serum hs-CRP levels were significantly higher in patients with acute asthma compared with control (5.47±7.33 mg/l versus 1.46±1.89 mg/l, p<0.001). Among asthmatic patients, mean hs-CRP levels did not correlate with indices of pulmonary function (forced expiratory volume in one second/forced vital capacity and forced mid-expiratory flow), serum IgE level, eosinophil count and WBC.

Conclusions: Increase in serum C-reactive protein levels measured by high-

sensitivity assays may be associated with airflow obstruction in acute asthma, and may be useful as a sensitive marker and a diagnostic tool for detecting and monitoring airway inflammation in patients with acute asthma. In our study of patients with acute asthma, did not reveal any significant correlation between hsCRP and pulmonary function tests, total serum IgE, and peripheral blood white blood cells counts.

P902

Effects of home oximetry on chronic obstructive pulmonary disease exacerbations

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Background: A large proportion of patients with chronic obstructive pulmonary disease (COPD) require hospitalized care, often at a very high frequency.
Aims: We hypothesize that home monitoring with pulse oximetry (SpO2) would enable patients to detect exacerbations and start action plans earlier so as to reduce hospitalizations, and also to improve symptom control and quality of life (QOL) by encouraging safer home exercise.
Methods: We enrolled COPD patients from a university hospital. They were provided with SpO2 for 6 months and were educated on their use to augment action plans for exacerbations. Home exercise was measured with pedometers. The primary outcomes were hospitalization days, emergency department (ED) attendances and intensive care unit (ICU) days. We also measured QOL and 6 minute walk.
Results: We enrolled 26 patients with mean (SD) age 73 (9) years and mean FEV1 (SD) 47 (17)% pred. There were 84 (6) hospital days vs 50 (2) hospital days (p=0.16) at 6 months. There were 7 (1) ICU days at baseline vs none (p=0.12) at 6 months. The mean SGRQ score was 32 (16) vs 27 (14) at 6 months (p=0.003). The 6 minute walk test (207 (56) vs 212 (67) at 6 months) and pedometer steps (4007 (2706) steps vs 4421 (2969) steps) were also not significantly better. There was 1 death.
Conclusions: In a comprehensive care setting, self-monitoring of SpO2 in patients with severe COPD may have little effect on hospitalizations and quality of life.

P903

Clinical validity of blood and urinary desmosine as biomarkers for chronic obstructive pulmonary disease

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Background: Although the elevation of degraded elastin products in patients with COPD has been reported for many years, its clinical validity and utility remain uncertain due to technical difficulties, small study cohorts and unknown relationship between exacerbation and elastin degradation.
Aims and objectives: To determine the validity of urinary and blood total desmosine/isodesmosine (uDES and bDES) as disease phenotyping biomarkers for COPD and to evaluate their relationship to exacerbation status.
Methods: uDES and bDES were measured using validated isotopic dilution LC-MS/MS methods.
Results: Two cohorts consisting of a total of 390 subjects including the following groups: healthy volunteers, stable asthma, stable COPD and COPD during an exacerbation were investigated. Compared to healthy non-smokers, we found increased bDES levels in patients with COPD regardless of exacerbation status ($p<0.001$, ANOVA), but no differences in patients with asthma or healthy smokers. A similar observation was found for uDES except that the elevation of uDES levels was associated with an exacerbation in COPD patients (12±5 vs. 20±12 ng/mg creatinine for stable and exacerbation, respectively, $p<0.01$, t test). Such an increase in COPD patients during an exacerbation was closely related to inflammation associated proteinuria ($p<0.001$, Spearman correlation). Approximately 40% of patients showed an "accelerated elastin degradation" phenotype based on their bDES levels in both stable COPD and COPD during an exacerbation.
Conclusions: Our results strongly suggest that bDES is a valid biomarker for phenotyping "accelerated elastin degradation" subtype in COPD whilst uDES links to exacerbation.

P904

Clinical and functional assessment according to the exacerbating phenotype in COPD

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Objective: To establish the differences regarding effort test, lung function and quality of life questionnaires depending on the exacerbations.

Methods: A prospective study of patients, who were evaluated to be included in a Respiratory Rehabilitation (RR) programme, was carried out. We analyzed age, gender, BMI, smoking history, symptoms, comorbidities, quality of life questionnaires: St George's Respiratory Questionnaire (SGRQ) and Chronic Respiratory Questionnaire (CRQ) and anxiety-depression (HADS); spirometric values, 6 minutes walking test, maximal effort test, submaximal test, and the number and characteristics of the exacerbations during the previous year. We distinguished 2 groups: Frecuent exacerbating patients (>2 exacerbations per year) and non-exacerbating patients (≤2).
Results: We included 41 patients: 20 showed ≤2 exacerbation per year vs 21 showing >2. By comparing both groups, we coudn't find differences regarding age, gender, smoking history, BMI, symptoms, comorbidities or COPD severity classification (GOLD). There were no significant differences in HADS, although there were some in SGRQ (45.27±18.27 vs 65.76±14.48, $p<0.001$) and CRQ (91.06±21.78 vs 73.84±21.92, $p<0.034$). No differences in pulmonary function parameters or tolerance to effort were found. A subgroup (n:5) which, due to their severity could not complete some tests properly, showed no differences when analyzing the different variables, except in SGRQ.
Conclusions: 1. About half of patients who assisted our RR practice were frequent exacerbating patients.
2. Showing more exacerbations does not imply a worse tolerance to effort or a different clinical and functional profile, although it affects directly their quality of life.

P905

The number of exacerbations in children and adolescents with cystic fibrosis (CF) can be predicted by computed tomography (CT) bronchiectasis (BE) score and quality of life scores

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Background: CF is characterized by progressive BE and small airways disease. BE is related to the number of exacerbations and Health Related Quality of Life (HRQoL), assessed by the Cystic Fibrosis Questionnaire-Revised (CFQ-R).
Objective: 1) Investigate predictive value of BE score and CFQ-R respiratory domain score (CFQ-R resp) for exacerbations. 2) Determine added predictive value of CFQ-R resp on top of BE score to predict number of exacerbations in the year following.
Methods: Cohort study (July 2007 to Jan 2010) in clinical stable children and adolescents with CF, whom had routine chest CT and CFQ-R as part of their (bi-)annual examination. CT scans were anonymized and randomly scored using CFCT BE score, expressing BE as% of maximum score. CFQ-R was completed by children aged 6-13 years and their parents or by adolescents aged ≥ 14 years. Score-range 0-100, higher scores indicate better HRQoL. To compute predictive value of BE-score and CFQ-R resp the negative binomial regression was used and for added predictive value McFadden's R^2.
Results: CF patients (n=72); CFQ-Rs: child CFQ-Rs (n=40); parental CFQ-Rs (n=37); adolescent CFQ-Rs (n=32). Median CFQ-R resp score 83 (range 11-100) points. BE score positive predictive ($p<0.01$, $r_s=0.11$), CFQ-R resp negative predictive ($p<0.01$, $r_s=-0.04$) for number of exacerbations. Added predictive value of CFQ-R resp on top of BE score to predict number of exacerbations equalled 6%.
Conclusion: BE and HRQoL have potentialities to predict the number of exacerbations in CF. A point increase on the CFQ-R resp results in a 6% reduction of the number of exacerbations.

P906

Factors determining duration of hospital stay in patients hospitalized for acute COPD exacerbation

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Background: Factors associated with the length of hospitalization in patients admitted for acute exacerbation of COPD (AECOPD) have not been thoroughly evaluated.
Objectives: To evaluate the association between clinical and functional parameters and duration of hospital stay of patients admitted due to an AECOPD.
Methods: We studied prospectively 31 patients (20 men, 11 women), mean age 69.5 (±7.8) years, admitted to hospital for AECOPD. Pulmonary function tests including body box evaluation of lung volumes, Borg dyspnea score at rest, Visual analogue scale dyspnea score, 6 minute walking test (6 MWT), Chronic Respiratory Questionnaire (CRQ) total and 4 domains scores, Charlson index for comorbidities, blood gases on admission, were all parameters evaluated within 72h of admission. Frequency of exacerbations, long term oxygen therapy (LTOT) prior to admission and duration of hospital stay were also recorded.
Results: Mean duration of hospital stay was 8 days. Patients divided in 2 groups: (group 1 (18 patients): duration of stay < 8 days, group 2 (13 patients): duration of stay ≥ 8 days]. Patients in group 2 had lower FEV1% pred [34 (27, 39.2) vs 48

(30.5,56) p=0.034] and PEF% pred [37 (29, 53) vs 70 (53.5,84) p=0.050], higher Borg dyspnea score [7 (5, 8.5) vs 4.5 (2.5,5) p=0.001] and lower Total CRQ score [73.5 (58.3, 82) vs 79 (70,88) p=0.029]. Multiple regression analysis showed that lower FEV1% pred and higher Borg dyspnea score were indepentently associated with increased duration of hospital stay.
Conclusions: Functional impairment and dyspnea in patients admitted for AE-COPD have significant impact on the duration of their hospital recovery.

P907
VentCheck: Spot measurement of combined oximetry & cutaneous carbon dioxide to screen for type II respiratory failure in respiratory illness
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Aim: Combined oximetry & cutaneous capnography has shown to have good correlation with arterial blood gas (ABG). To evaluate feasibility of combined oximetry with cutaneous capnography to detect hypoxemia and hypercapnea in patients with respiratory illness in outpatient or inpatient setting.
Methods: 27 patients with respiratory illness underwent VentCheck analysis [on spot or bedside evaluation of oxygen saturation (SpO2) & cutaneous carbon-dioxide tension (PcCO2) using V-Sign ™ sensor]. Patients with PcCO2 > 45 mm Hg underwent ABG to confirm hypercapnea.
Results: 7 patients had PcCO2 > 45 mm Hg & mean PcCO2, arterial carbon-dioxide tension (PaCO2), SpO2 and standard deviation (SD) of PcCO2 were 53.75 mm Hg, 53.61 mm Hg, 95% and 10 respectively. Hypercapnea was detected in 7 patients (25%) using VentCheck analysis which prompted us to an ABG. Ventcheck analysis helped us to identify type II respiratory using a non invasive technique.

Table 1

	N	Mean PcCO2 (mmHg)	Mean PaCO2 (mmHg)
Diagnosis(in patients with PcCO2 > 45 mmHg)			
Chronic obstructive lung disease(COPD)	2	50.5	50.3
Interstitial lung diseases(ILD)	1	46	56.5
Obstructive sleep apnea(OSA)	2	48.3	44.6
Overlap Syndrome (COPD+OSA)	2	66.4	64.4
SD of PcCO2 is 10			
Diagnosis(in patients with PcCO2<45) mmHg			
COPD	7	34.9	
ILD	4	41.1	
OSA	2	38.1	
Overlap Syndrome (COPD+OSA)	2	34.7	
Pleural Effusion	2	35.1	
Pulmonary embolism	1	36.7	
Dyspnoea under evaluation	2	33	
SD of PcCO2 is 3.81			

Conclusion: VentCheck analysis is feasible & has potential role for spot analysis of ventilation in outpatient or inpatient setting in non invasive manner without any complications.

P908
Early detection of asthma exacerbations and the use of action points for treatment decisions in self-management plans
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Background: Written asthma action plans specify the level of symptoms or peak expiratory flow (PEF) (action points) at which to increase medication in order to prevent or reduce severity of exacerbations. Few currently used action points are validated. Our aim was to develop optimal action points for early detection of asthma exacerbations.
Methods: We analyzed daily morning PEF and symptoms from two studies. The development dataset consisted of 165 patients and 88 exacerbations (Taylor, Thorax 1998). Every week was coded "stable week" or "pre-exacerbation week". Potential action points were based on Quality Control Analysis of PEF or symptoms, or percentage personal best. Sensitivity and specificity for predicting an exacerbation and the number of days the exacerbation was diagnosed earlier were calculated. Optimal action points were based on these parameters. Their performance was compared to the published NAEPP action point in the validation dataset, consisting of 94 patients and 20 exacerbations (Smith, NEJM 2005).
Results: The main differences between action points were in false positive rate and early detection (Table 1). Combination of PEF+symptoms action points performed best, due to improved specificity and early detection.
Conclusion: Early detection of asthma exacerbations can be improved by combining symptoms and peak flow measurements over one week in a single action point.

Table 1

	Action Points	Early detection (d)	Sens (%)	Spec (%)
Development	Symp	2.9	88.5	86.3
	PEF	2.9	90.8	93.9
	Symp + PEF same day	1.4	80.5	98.3
	Symp + PEF 1 week	4.1	85.1	97.2
Validation	Symp	3.3	75.0	86.2
	PEF	4.2	100	92.5
	Symp + PEF same day	1.7	75.0	98.3
	Symp + PEF 1 week	5.1	75.0	97.4
	NAEPP	4.9	100	86.8

P909
Regular follow-up in severe asthma may reduce the rate of exacerbations and the FEV1 decline
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Thirtythree subjects with severe asthma (ATS Workshop 2000) were examined over a FU period. Two groups were obtained depending on the adherence to the proposed FU: 21 subjects (8 males, age 63.1±8.8 yrs, duration of disease 19.6±10.4 yrs) complied with regular follow-up every 3-4 months to measure FEV1, hypertonic saline induced sputum (group A), while 12 subjects (1 male, age 59.8±8.2 yrs, duration of asthma 21.2±14.8 yrs) performed on demand visits (group B). At each visit, physician could modify the pharmacologic treatment according to symptoms and other measures (functional findings, sputum eosinophilia).
No differences among the 2 groups were observed both at baseline and at the end of follow-up, for FEV1 and sputum eosinophilia and neutrophilia. A decrease in the rate of exacerbations and oral steroid cycles between baseline and the end of FU was found in the group A only. A significantly greater decline in FEV1 over the FU was observed in the group B with respect to group A.

	Group A			Group B		
	Bas.	FU	p	Bas.	FU	p
Duration of FU, months	38±17			22±12		0.01
FEV1, % pred.	78.4±18.8	74.5±23.3	ns	80.1±16.2	76.1±25.0	ns
Sputum Eos., %	16.5	27.0	ns	23.4	12.3	ns
	(0.0, 83.6)	(0.0, 61.8)		(0.0, 90.5)	(0.0, 93.3)	
Sputum Neu., %	42.2	28.4	ns	45.2	46.3	ns
	(1.5, 86.5)	(0.0, 87.0)		(0.5, 94.5)	(2.3, 94.4)	
No. exac. previous y	1.55±1.91	0.86±1.23	0.04	1.25±0.75	1.75±2.30	ns
No. cycle CS previous y	1.45±1.91	0.62±1.12	0.06	1.33±0.98	1.75±2.30	ns
Annual Decline FEV1, mL/y	–2.0±10.0			–182.0±64.0		0.01

Mean ± SD; for sputum cells median and range.

In conclusion, a regular FU with treatment adjustment obtains a greater control of asthma in terms of exacerbations and oral steroid cycles, and also of long-term FEV1 decline.

P910
Correlation of dyspnea and physiological impairment in COPD exacerbation
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Dyspnea is a primary symptom of COPD. The Medical Research Council (MRC) scale, Baseline Dyspnea Index (BDI), Visual Analogue Scale (VAS) and Borg scale are widely used for evaluation of limitation of activities due to dyspnea in patients with COPD. There is limited information on how these scales relate with parameters of physiological impairment.
To aim of the prospective study was to analyze the correlation between MRC, BDI, VAS and Borg dyspnea scales and multiple measures of physiological impairments in COPD exacerbation.
Forty five patients (age 62.7±9.9) with COPD exacerbation (GOLD stages III and mostly IV) were analyzed at admission to the hospital. Physiological impairments were assessed by spirometry (FVC, FEV1), body pletismography (TLC, RV, FRC, IC), respiratory muscle strength (PImax), arterial blood gas analysis (ABG) and 6-min walking distance (6MWD).
The correlation between MRC scale and FEV1 is r= -0.427 ($p<0.05$), FVC is r= -0.420 ($p<0.05$), PImax is r= -0.601 ($p<0.01$). The correlation between BDI and FEV1 is r= 0.493 ($p<0.01$), PImax is r= 0.613 ($p<0.01$), 6MWD is r= 0.569 ($p<0.05$). The correlation between Borg scale and FEV1 is r= -0.521 ($p<0.01$), FVC is r= -0.408 ($p<0.05$), PImax is r= -0.462 ($p<0.05$), TLC is r= 0.483 ($p<0.01$), RV is r= 0.410 ($p<0.05$), FRC is r= 0.443 ($p<0.05$). VAS has correlated with FEV1 (r= -0.385, $p<0.05$), PImax (r= -0.464, $p<0.05$) and 6MWD (r= -0.536, $p<0.05$). The correlation between dyspnea scales and ABG was not significant.
In our study all dyspnea scales have correlated with FEV1 and PImax. According to our results it could be concluded that Borg scale is a good tool for assesing dyspnea during exercize and the therapeutic response in COPD exacerbation.

P911

Serum uric acid and uric acid/creatinine ratio in exacerbations of COPD

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Background: Tissue hypoxia triggers the degradation of purine and Uric Acid (UA) is an end product of this metabolic pathway, and therefore may reflect the severity of hypoxia. Only a few studies have focused on the role of uric acid in patients hospitalized for exacerbations of COPD (ECOPD).
Objectives: To evaluate the associations of UA and Uric acid/Creatinine ratio (UA/Cr) with clinical parameters related to disease severity for patients hospitalized for ECOPD.
Methods: UA and UA/Cr and parameters related to the severity of ECOPD, including PaO_2/FiO_2 ratio, MRC dyspnea scale, and Saint George's Respiratory Questionnaire (SGRQ) were measured on admission. Patients underwent spirometry and 6-minute walking test (6MWT) on stable condition and were followed-up for 1 year.
Results: We included 153 consecutive patients (92.8% male, mean age 73.1 years). UA levels were higher in more severe disease according to GOLD stages (6.38±9.1 vs 6.59±0.6 vs 7.45±0.8 vs 8.90±1.2 mg/dL respectively; $p<0.001$), with similar classification of UA/Cr levels ($p<0.001$). On admission, UA presented significant correlations with PaO2/FiO2 (r=-0.163, p=0.44), MRC (r=0.630, $p<0.001$) and SGRQ total score (r=0.485, $p<0.001$). UA/Cr presented similar associations. Baseline levels of UA and UA/Cr presented significant negative correlations with 6MWD (r=-0/756 and r=-0.734, $p<0.001$) and all SGRQ domains on stable condition. Patients in the higher quartiles of UA and UA/Cr presented more ECOPD and hospitalizations in the year of follow-up, but did not present differences in mortality.
Conclusions: UA and UA/Cr levels present significant correlations with important variables expressing COPD severity both on exacerbation and on stable condition.

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Patient experiences of exacerbations in a real world setting: Global results from the Hidden Depths survey

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Background: There are many clinical trials in which COPD exacerbations have been studied but less is known about the real life patient impact.
Aim: To establish patient reported exacerbation frequency in a real world, global setting & investigate their emotional & physical impact.
Method: A cross-sectional online survey of clinician diagnosed COPD patients from 14 countries conducted from 09/07 to 02/09 2010. Patients were recruited from opt-in research panels with >18,000,000 members. 255,710 people were invited to participate in the survey. 75,233 respondents were screened. Patients self-classified their COPD severity using the MRC dyspnoea scale.
Results: 2,000 patients were interviewed (1231=MRC1&2 (M1-2) & 769=MRC3,4&5 (M3-5) & mean age of 53 years). 73% of M1-2 & 64% of M3-5 patients thought they controlled their COPD but reported 10 (M1-2) to 18 (M3-5) days in a 30 day month as negatively affected by COPD. Regardless of severity or treatment, the percentage of patients reporting exacerbations in the preceding year was high:

	0 events	1 or more event	2 or more events
M1-2	471 (38%)	760 (62%)	558 (45%)
M3-5	152 (20%)	617 (80%)	514 (67%)

27% of M1-2 & 52% of M3-5 patients who experienced exacerbations reported a hospitalisation & 6% of these M3-5 patients reported never recovering to their prior state of health. Patients also reported significant effects on their personal lives with 71%, 58% & 77% respectively reporting an effect on their sex life, relationship with partner & ability to socialise freely.
Conclusions: Despite recruiting a relatively young patient cohort on treatment, exacerbation frequency in the real world setting is high & the burden on patients is substantial.

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Impact of climate change on COPD in Berlin-Brandenburg – Developing a telemonitoring based approach for early intervention*

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Climate change affects human health. Especially patients with chronic lung diseases seem to be more influenced. Extreme weather, e.g. heat waves, leads to an increase of COPD exacerbations and hospital admissions. In this context a prospective investigation of risks due to climate change for moderate/severe COPD is required, which allow us to determine susceptible subgroups and the development of an early intervention system to prevent exacerbations.
Therefore we designed a combined clinical research module, based on telemonitoring of COPD patients and complex analyses of scaled regional atmospheric conditions (i.e. temperature, humidity, particulate matter) of the metropolitan area Berlin-Brandenburg. We implemented the validated BODE-Index into a telemonitoring system, including home spirometry, a Mobile Medical Assistant (MMA) for self-evaluation and a triaxial pedometer for the quantification of physical activity. This randomized clinical trail contains a cohort of 220 COPD patients, divided into a control group (visit every 3 month) and an intervention group (daily telemonitoring).
The implementation of the telemonitoring system for COPD has been started as proof of concept. Patient compliance is excellent and the system is well accepted. Concluding our results, this new approach for measuring the impact of climate change could lead to new interventional strategies and improve prognosis and quality of life in COPD. Nevertheless, further clinical research concerning the impact of climate change is strongly needed to improve the adaptive response in vulnerable patients with COPD.
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Sputum biomarkers in COPD exacerbations

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Sputum analysis may provide valuable information about inflammatory processes in COPD. In this longitudinal study we assessed the pattern of inflammatory cells and the levels of some putative biomarkers in the sputum of patients with COPD exacerbations.
Spontaneous sputum collection, fractional exhaled nitric oxide (FENO), lung function and blood gas measurements were performed in 22 ex-smoking COPD patients (mean age: 70.1±2.3 years, 12 males, 10 females) at hospital admission due to an exacerbation of the disease, and at discharge following treatment.
In most patients the sputum inflammatory cell profile at admission and discharge was similar ($p>0.05$). However, in patients with sputum eosinophilia (n=6) there was a significant decrease in the number of eosinophils by the end of the treatment (13.7±5.8 vs. 1.6±0.9, $p<0.05$). There was a close correlation between the number of sputum eosinophils and FENO level (r=0.65, $p<0.001$). Leukotriene (LT) B4, cysteinyl-LT and 8-isoprostane levels determined by EIA assays in the sputum supernatants showed marked variations and were not affected by the treatment ($p>0.05$). By contrast, prostaglandin E2 metabolite concentration was significantly reduced in samples obtained at discharge (36.1±9.6 vs. 22.4±6.5 pg/ml, $p<0.05$). Differentiation of COPD patients based on FENO level (cut off: 27 ppb) or sputum eosinophilia did not influence the overall findings with sputum biomarkers.
Our data suggest that some patients with COPD exacerbations show sputum eosinophilia that is diminished during hospital treatment without an effect on sputum biomarkers investigated in this study.