390. Diffuse parenchymal lung disease IV

P3670

Coagulation factor IX deficiency does not afford protection from pulmonary fibrosis in the experimental murine bleomycin model

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Introduction: Animal and human studies strongly suggest the importance of the coagulation cascade in acute and chronic lung injury. Indeed, beyond their role in hemostasis, coagulation factors can signal via their cellular receptors, the protease-activated receptors. We hypothesized that the absence of coagulation Factor(F)IX, which is essential for the activation of the coagulation cascade would reduce fibrosis development and progression.
Methods: We used the murine model of bleomycin-induced pulmonary fibrosis in wild-type (WT; n=14) and FIX deficient mice (n=13). After 14 days, we assessed markers of tissue fibrosis, inflammatory cell influx in the bronchoalveolar lavage fluid (BALF), and cytokines levels in the BALF, blood and lung homogenate of the animals.
Results: Mortality during the experiment was higher in the FIX deficient mice compared to wildtypes (23% versus 7%). The remaining FIX deficient mice (n=10) developed pulmonary fibrosis to a degree similar to WT (n=13). There was no significant difference in the Ashcroft score between WT and FIX deficient mice (4.011±0.4 versus 4.2±0.4), in the alpha-actin score (0.94±0.09 versus 0.70±0.07) and in the inflammatory cell number. In contrast, we observed in the plasma of the FIX deficient mice significant elevations in levels of cytokines IL-12, TNFα, IFNγ, MCP-1 and IL-6.
Conclusion: Mice with a congenital deficiency of FIX are not protected against bleomycin-induced pulmonary fibrosis. These data strongly argue against an important role of the blood coagulation cascade in the progression of pulmonary fibrosis, and raise important concernsabout the use of anticoagulant therapy in patients.

P3671

Aggravation of bleomycin-induced pulmonary fibrosis in senescence-accelerated mouse

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Objective: Idiopathic pulmonary fibrosis (IPF) is predominantly a lung fibrotic disease of older adults, and the process underlying aging might significantly influence the development of pulmonary fibrosis. Bleomycin-induced lung injury was investigated in murine models of accelerated senescence (SAMP8) and of normal aging (SAMR1). The levels of Th1/Th2 related cytokine were also measured.
Methods: Bleomycin or PBS was injected into the tracheal lumen of 12-month-old SAMP8, 4 and 12-month-old SAMR1 mice. Seven, 14 and 28 days after the injection, the mice were killed and the lungs were harvested for pathological examination, hydroxyproline assay and protein detect. Lung TGF-β1 expression was determined by western blot, and the levels of IL-4 and IFN-γ were detected by ELISA.
Results: The aggravated bleomycin induced lung injury was observed in 12-month-old SAMP8 compared with 4 and 12-month-old SAMR1. Twenty eight days after injection of bleomycin, Ashcroft score was significant higher in 12-month-old SAMP8 than in 4 and 12-month-old SAMR1 ($P<0.05$, respectively). Seven days, 14 days and 28 days after bleomycin injection, lung TGF-β1 expression was increased in 12-month-old SAMP8 and SAMR1 compared with 4-month-old SAMR1. Similarly, the level of IL-4 and the IL-4/IFN-γ ratio of the lungs tended to be higher in 12-month-old SAMP8 and SAMR1 than in 4-month-old SAMR1, but the differences were not statistically significant.
Conclusions: Bleomycin-induced pulmonary fibrosis in SAM was aggravated by aging. The old SAM with bleomycin-induced pulmonary fibrosis might be inclined to Th2-biased immune responses.
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P3672

Lung function progression in Langerhans cell histiocytosis

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LCH is a rare, multisystem dendritic cell disorder commonly involving the lungs. The natural history is variable with little lung function outcome data. In our database of 92 patients referred to AC for treatment, 51 patients were male; mean age at diagnosis was 31 (range 1-77) years (y). 17/92 patients, 10 male, mean age 31 y, had primary lung disease (PLLCH). 14/75 had systemic LCH with lung involvement (SLLCH). All PLLCH had smoked with mean 13 pack-y; 9/17 continued smoking after diagnosis. Initial lung function (n=15) showed mean %predicted FEV_1 76 (34-113)%, VC 81 (53-114)%, TLCO 67 (19-108)%. 2 patients had obstructive, 3 restrictive, and 3 mixed lung disease.
9/14 SLLCH patients were male, mean age 25y, 10 had smoked; mean 12 pack-y, 7 continued smoking after diagnosis. Initial lung function (n=9) showed mean FEV_1 83 (72-105)%pred, VC 89 (72-104)%, TLCO 76 (49-106)%.
In PLLCH (n=14) at mean follow up of 8 (range 1-16) y mean FEV_1 was 70 (30-103)%pred, VC was 84 (51-109)%, TLCO was 63 (17-105)%. Mean change in FEV_1 was -7 (-39 to +12)%, in VC was 1 (-19 to +14)%, in TLCO was -10 (-49 to +29)%. 11/17 patients received treatment. To date 3 have died, 10 are in remission and 4 have active disease.
In SLLCH (n=6) at mean follow up of 6 (2-22) y mean FEV_1 was 83 (66-101)%pred, VC was 92 (79-103)%, TLCO was 93 (82-94)%. Mean change in FEV_1 was -3 (-9 to +5)%, in VC was -1 (-11 to +12)% and in TLCO was 14 (-2 to +45)%. 12/14 patients received treatment. To date 1 has died, 8 are in remission and 5 have active disease.
LCH is rare but in this relatively small, selected series lung function is worse and declines more in patients who present with primary lung involvement than in those with lung involvement in systemic LCH.

P3673

Correlation between spirometry, six minute walk test and HRCT characteristics of patients with interstitial lung diseases in a tertiary care center in Sri Lanka

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Background: High Resolution Computed Tomography of Chest (HRCT) is a robust tool in the diagnosis of interstitial lung diseases (ILD), but its role as a tool of assessment of functional disability in ILD has not been assessed in Sri Lanka.
Objectives: To find out the correlation between spirometry, six minute walk test and HRCT characteristics of patients with ILDs
Methods: Study was done in chest unit, General Hospital, Kandy (GHK) from 1/2011 to 12/2011. Ethical clearance was granted by Ethical Committee of GHK. Patients with suspected ILDs on chest radiography and showed restrictive lung defect on spirometry underwent HRCT scan of the chest. Pathological findings of HRCT (parenchymal nodules, fibrosis, ground glass and mosaic perfusion) were given a score using the scoring system used by Ziora et al (Ann Agric Environ Med 2005, 12, 31–34). Six minute walking test was performed. Correlations were analyzed using Pearsons and Spearmans correlation coefficient.
Results: Twenty one patients {5 (23.8%) males, 16 (76.2%) females} with ILD were studied. There was a significant positive correlation between resting saturation and forced vital capacity (FVC) ($r = 0.52$, $p = 0.02$), resting saturation and forced expiratory volume in 1 second (FEV1) ($r = 0.549$, $p = 0.012$), six minute walk distance and FVC ($r = 0.505$, $p = 0.023$). There were no correlations between HRCT scores with spirometry, and six minute walk test parameters.
Conclusion: Although there was a correlation between spirometry and six minute walk test, pathological distribution described by HRCT showed no correlation with spirometry or six minute walk test in patients with ILD.

P3674

Uncommonly common? Common variable immunoglobulin deficiency 'masquerading' as sarcoidosis

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Introduction: Multisystem granulomatous inflammation can be a presenting feature or a complication of common variable immune deficiency (CVID).A proportion of patients diagnosed with 'sarcoidosis' may actually have underlying CVID, recognition of which may be associated with considerable diagnostic delay.
Method: 2 cases are presented to illustrate this along the results of an audit.
Case 1: LC presented aged 28 with chronic cough and deranged LFTs. HRCT showed multiple pulmonary nodules and generalised lymphadenopathy.Granulomas were seen on liver biopsy.A diagnosis of sarcoidosis was made.4 years later after several chest infections, severe panhypogammaglobulinemia was demonstrated and a revised diagnosis of CVID made.
Case 2: DG presented aged 29 with cough, breathlessness and generalised lymphadenopathy with bilateral hilar lymphadenopathy on chest x-ray.Sarcoidosis was diagnosed after lymph node aspirate demonstrated granulomata.13 years later, investigations after a protracted pneumonia revealed panhypogammaglobulinemia. Standard immunoglobulin replacement therapy at a dose of 400mg/kg/month was started in both cases after the diagnosis of CVID.
An audit of our cohort of 148 patients with diagnosed sarcoidosis found that 47% had not had serum immunoglobulins checked during diagnostic work-up.
Conclusion: Chest physicians often omit to check immunoglobulins when assessing patients with suspected sarcoidosis.This may not be surprising given the lack

of advice on measurement of immunoglobulins in current Interstitial Lung Disease guidelines. While CVID is uncommon, awareness, early diagnosis and effective treatment can reduce morbidity, mortality and complications and improve quality of life.

P3675

Electrocardiographic characteristics in patients with sarcoidosis

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Background: Several studies have emphasized on the importance of early identification of cardiac sarcoidosis. Aim of our study is the evaluation of electrocardiographic (ECG) characteristics in a cohort of sarcoidosis patients indicating myocardial involvement.
Methods: Consecutive patients with biopsy proven sarcoidosis (n=315) were examined from October 2002 through October 2011. Exclusion criteria were presence of pacemaker and/or implantable cardioverter defribrillator. Heart rate (HR), PQ, QRS, QT and QT corrected intervals, P,QRS and T wave axis were collected. Also, complete and incomplete right (RBBB) and left (LBBB) bundle branch block, right (RVH) and left (LVH) ventricular hypertrophy, repolarization and intraventricular abnormalities were noted.
Results: Only 59 out of 315 patients had a normal ECG. Mean HR was 75±13.5 beats/min, QT=390±33ms, QTc=417.58±21.2ms while axis of P, QRS and T wave was: 42.65±19.86°, 20.79±34.06° and 34.74±25.92°, respectively. Six patients were found at atrial fibrillation while the rest were at sinus rhythm. PQ interval was 156.89±24.91 ms and the QRS interval was 97.34±17.56 msec. RBBB was detected in 55 (11 complete and 44 incomplete) and LBBB in 9 patients (8 complete and 1 incomplete). Sixty patients were found with ventricular hypertrophy (56 LVH/4 RVH). At least at one lead repolarisation abnormality was found in 177 patients including inferior lead abnormalities at 28, anterior leads abnormalities at 23 and lateral leads abnormalities at 23 patients.
Conclusion: Although ECG is a widely available tool used in the diagnosis of cardiac sarcoidosis various abnormalities were described implying necessity of extensive investigation in order to detect cardiac involvement.

P3676

Survival predictors in a cohort of patients with idiopathic pulmonary fibrosis biopsy-proven

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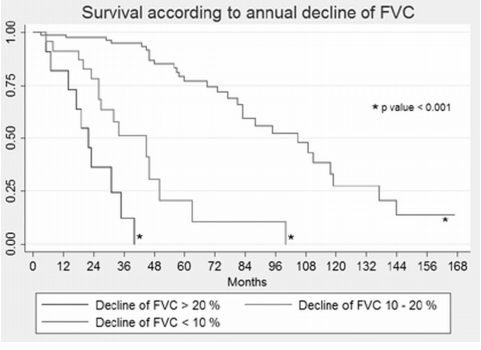
Idiopathic Pulmonary Fibrosis (IPF) is a bad prognosis disease with heterogeneous progression. Only few studies, including relative small sample size, have searched for bad prognosis factors. The aim of this study was to analyze survival predictors in a retrospective cohort.
The study was conducted at the National Thorax Institute in Santiago, Chile. Registers of patients in the period between 1991 and 2008 with clinical, radiological and surgical biopsy concordant with IPF were analyzed. We performed survival analysis with mixed models and proportional Weibull hazard models.
A total of 142 patients were analyzed. The average age was 58 years and 41.5% were males.
The mean survival was 80 months. In univariate analysis were predictors of mortality: diffusing capacity of the lung for carbon monoxide (DLCO) less of forty percent and desaturation during six minute walk test (6MWT) at baseline. The rate of decline of forced vital capacity (FVC) was mortality predictor.
The rate of decline of FVC is a strong mortality predictor in this study and allows distinguishing bad prognosis groups.

Table 1. Results of pulmonary function tests at baseline

	Mean (SD)
Forced vital capacity (ml)	2400 (770)
Forced vital capacity (%)	73 (20)
DLCO (ml/min/mm Hg)	14.0 (4.8)
DLCO (%)	57.8 (16.3)
6MWT (m)	477 (83)
6WMT (%)	95.3 (17.4)

SD: Standard deviation. DLCO: Diffusing capacity of the lungs for carbon monoxide. 6MWT: Six minute walk test.



P3677

Pathological findings in histiocytosis X with pulmonary hypertension

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Objective: To evaluate the hemodynamic characteristics, pulmonary function and pathological findings in patients with Langerhans cell histiocytosis (LCH) and Pulmonary Hypertension (PH) not explained otherwise.
Methods: A retrospective study was conducted in patients with Langerhans cell histiocytosis. Echocardiogram, lung biopsies, lung function tests and hemodynamic registries were reviewed.
Results: Twenty patients were studied, with a mean age of 41±10 years. 8 patients (40%) had severe PH.The median delay between the diagnosis of LCH and PH was 2.1 years. Six minute walk distance was 409±101m. Systolic PAP: 62±9.9 mmHg. FVC was 62±15% of predicted, FEV1 45±21% and DLco 41±13. All patients were on long-term oxygen therapy. After a median follow-up of 9.1 years,1 patient is clinically stable, 1 patient had died of cardiac arrest while waiting for lung transplant, and 6 patients had undergone lung transplantation with 83% survival at 1 and 3 years. Histopathological lesions studied in explanted lungs suggested a veno-occlusive origin for this kind of complication, with capillary haemangiomatosis-like changes and fibrosis of septa, something that has been rarely described in LCH.
Otherwise, it is interesting to remark the presence of three cases of malignant neoplasias in the global serie. This association has been described as isolated cases in literature review. Two patients suffered from malignant lymphoma and one female patient had an uterine cervix carcinoma.
Conclusions: Pulmonary Hypertension could have a veno-occlusive origin in LCH. A relationship between malignant neoplasias and LCH may be possible.

P3678

A combinational approach to optimize biomarkers efficacy in identifying patients with sarcoidosis and monitoring respiratory functional worsening

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Background: Sarcoidosis is a multisystemic granulomatous disease of unknown aetiology which affects lungs and lymphatic system.Its diagnosis is established by histologic evidence of non-caseating granuloma and the clinical course is unpredictable.
Aims: We aimed to investigate whether a panel of biomarkers combined together may help identify sarcoidosis and predict its functional worsening.
Methods: We analyzed 30 subjects with sarcoidosis and 34 with IPF. Participants underwent PFTs, radiologic investigations, and fiberoptic bronchoscopy. We examined BALF cellular profiles and BALF and serum concentrations of ECP, MPO, tryptase, procollagenIII, sIL-2R, IL-6, and TNFα.
Results: The linear predictor score,based on the combination of BALF lymphocytes, CD4, CD8,and ECP, correctly allocated 29 patients with sarcoidosis (97% of correct classification; 95% CI, 84.4%-99.8%) and 28 with IPF (82% correct classification; 95% CI, 68.8%-92.2%). The AUC was 0.93.
We also analyzed PFTs of participants with sarcoidosis during a 2-years follow-up period. At revaluation 76% of participants had stable disease, and 24% experienced a worsening of the respiratory function. The combination of BALF neutrophil percentage, ECP, and tryptase, yielded a 100% correct classification of patients (95% CI, 90.6%-100%); the AUC was 1. None of the markers analyzed as a single variable reached a similar allocation rate and a dissatisfying discrimination was obtained using markers from peripheral blood.
Conclusion: This combinational method could be a valuable approach to optimize biomarkers performance in the effort to identify sarcoidosis and to predict its clinical course.

P3679

Characteristic of gender distribution in sarcoidosis

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Introduction: Sarcoidosis is granulomatous disorder of unknown aetiology,predominatly manifesting in female patients. Is it the same or similar to mentioned, in patients from the Clinic for lung diseases and tuberculosis CC Serbia in Belgrade.
Method: Retroscetive analysis were obtaine on 857 patients incoming to the Clinic (F 587-68.5% - 44,7; M 270- 31.5% - 47,8 years) with previously obtained diagnosis of sarcoidosis.
Results: Acute onset of sarcoidosis is predominatly in younger (less than 35 years) with similar gender distribution, 153 F/132 M. The onset of sarcoidosis in oldier patients (over than 35 years) is less acute notify in more male patients, 381, than 191 female accompanying with prolonged duration of sarcoidosis (5.3/3.1 yrs M/F) and frequently more than one organ involved with sarcoidosis. Lung involvement were the only manifestation of sarcoidosis in 423 female/197 male patients. Only nonpulmonary involvement is in less numbered – 117 pts (eyes - 35, skin - 37, cerebri - 7, spleen - 5, bonnes - 3, liver - 9, per.lgl -57: 47F/8M, gl.parotis - 11, heart - 7) with male predominated: 51 pts/30pts F. Lung and nonpulmonary sarcoidosis were notified in 134 Female and/22 Male patients.
Conclusion: Due to analysis, the numbered patients with obtained diagnosis of acute onset of sarcoidosis are female. Male patients with nonpulmonary sarcoidosis predominated over the female. Duration of sarcoidosis course is much longer in male patients.

P3680

Prevalence of pulmonary involvement in rheumatoid arthritis patients in Indian population

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Rheumatoid arthritis (RA) is the most common chronic connective tissue disorder that significantly affects the lungs.
The aim was to evaluate the pulmonary involvement in RA patients and its correlation with duration of RA.
A total of 100 diagnosed cases of RA, divided into two groups of 50 patients each on the basis of duration of RA i.e. <5 years and > 5years were evaluated. All the patients were assessed for clinical characteristics, High resolution computed tomography (HRCT) thorax and Spirometry findings. Disease severity was assessed by DAS28 score.
Respiratory symptoms were present in 41% patients. Pulmonary involvement (either abnormal HRCT thorax/Spirometry or both) was found in 67% patients with abnormal Spirometry in 51% and abnormal HRCT in 59.30% patients. Chest radiographs were abnormal in 22% patients. Most common radiological finding on HRCT thorax were interstitial lung disease suggestive findings (31%) and bronchiectasis (29.41%). On Spirometry, restrictive defect was found in 33%, obstructive defects in 12% and mixed defect in 6%. FEF25-75% was abnormal in 18% patients. Risk factors for the presence of pulmonary involvement were increasing age and presence of rheumatoid factor. No association was found with gender, duration of disease, severity of disease.
A high prevalence of pulmonary involvement was found in RA independent of duration of illness. HRCT appeared to be more sensitive tool.

P3681

Is T-SPOT.TB performance in bronchoalveolar lavage usuful in differential diagnosis between sarcoidosis and tuberculosis? – Pilot study

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Introduction: Both sarcoidosis and tuberculosis are similar in their radiological and histological pictures. Sometimes it is difficult to distinguish between these two diseases. The only reliable diagnostic tool for M. tuberculosis (MTB) are cultures. Unfortunately we have to wait for several weeks for culture results to make final diagnosis.
Object and rationale: IGRAs in peripheral blood detect MTB infection but do not discriminate latent from active TB. The aim of this study was to evaluate utility of T-SPOT.TB test in BAL and its advantages over T-SPOT.TB test in peripheral blood in differential diagnosis between sarcoidosis and tuberculosis.
Material and method: 11 subjects (4 female, 7 male; mean aged 45,8±12) suspected for sarcoidosis were included in this study. 1 was withdrew because of bronchial obstruction which made the BAL impossible. T-SPOT.TB tests in peripheral blood and in BAL were performed in 10 subjects.
Results: All 10 patients were AFB and MTB DNA negative in BAL. T-SPOT.TB test was positive in peripheral blood in 2/10 and in BAL in 1/10. The culture of BAL was positive for MTB only in the case who had positive T-SPOT.TB test both in BAL and in peripheral blood.
Conclusion: Positive T-SPOT.TB performed in BAL could be helpful in differential diagnosis between sarcoidosis and tuberculosis. Further studies are needed.

P3683

Sarcoidosis in Sao Paulo, Brazil: Clinical, tomographic and lung functions data from 72 patients

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As part of major study on prevalence of pulmonary hypertention in outpatients with sarcoidosis, a sample of patients underwent prospective clinical, tomographic and lung function evaluation.
Objective: To describe clinical, imaging and lung function data of 72 consecutive patients with sarcoidosis.
Methods: Between September 2008 and September 2010, 72 consecutive patients underwent evaluation in a prospective fashion. All patients underwent clinical interview, chest radiography, high resolution computerized tomography and lung function tests (spirometry, lung volumes by pletysmography and carbon monoxide diffusion DLCO).
Results: Clinical characterization: 69.4% female, age 54.5±12.6. Smoking status: 63% non-smokers. Disease duration was 9.2±6.1 years. Pulmonary involvement was the most prevalent (91.7%), followed by lymph nodes and cutaneous envolvement. Number of extra pulmonary organ involvement was 1.6±1.1 organ per patient. Near 62% of patients had interrupted working activities for more than two weeks due to sarcoidosis morbidity. Up to 26% of patients had used imunossupressive drugs for sarcoidosis, and 81.6% had taken corticosteroids. Three patients (4.1%) used oxygen therapy. Scadding stage: 28.2% stage 0; 16.9% stage 1; 23.9% stage 3; 15.5% stage 3 and 15.5% stage 4. Lung function data: FVC 85.9±16.5%, VEF1 82.7±15.1%, VEF/CVF 96.8±8.8%; TLC 89.7±14.9%, RV 103.1±26.1%; DLCO 76.7±17,7%. Tomographic findings: parenchymal involvement in 64.5% of patients. Large (>1.5 cm) lymph nodes in 33.9%.
Conclusion: Our sample of patients prospectively evaluated is quite similar to other series of outpatiets described.

P3684

Coexistance of idiopathic pulmonary hemosiderosis and celiac disease: Complete remission with gluten free diet

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Idiopathic pulmonary hemosiderosis is a rare disease of unknown etiology usually characterized by recurrent episodes of alveolar hemorrhage, hemoptysis and iron deficiency anemia. It occurs most frequently in children but rarely in adults. The combination of idiopathic pulmonary hemosiderosis and celiac disease is also extremely rare. A 24-year-old man with history of recurrent hemoptysis and anemia was diagnosed with the combination of idiopathic pulmonary hemosiderosis and celiac disease. The patient was started on a gluten-free diet and has had no recurrences of hemoptysis over 2 months' follow-up. Hemoglobin at 2 months' follow up was normal and graund glass opasities in HRCT scan completely disappeared.

P3685

M2 chemokines during acute exacerbations of IPF

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Background: Alternative activation of macrophages is a well-recognized phenomenon in patients with IPF and is associated with poor prognosis. The most common cause of death in IPF is Acute Exacerbations (AEs).
Objectives: Evaluation of the alternative activation state of macrophages during acute exacerbations in patients with IPF.
Methods: 61 patients with IPF and 14 healthy volunteers underwent bronchoscopy with bronchoalveolar lavage, one million BAL cells were cultured for 24 hours without further stimulation and the conditioned medium was harvested. Spontaneous M2 chemokine production (CCL2, CCL17, CCL18, CCL22 and IL-1Ra) was measured by ELISA. AEs were defined according to the criteria of Collard et al. (Collard, HD et al. AJRCCM 2007; 176:636-643).
Results: BAL cells of patients with IPF produced significantly more CCL2, CCL17, CCL18, CCL22 and IL-1Ra as compared to cells of healthy volunteers. Seventeen patients suffered from an AE at the time point of bronchoscopy. The spontaneous production of CCL2, CCL18, CCL22 and IL-1Ra were significantly increased of BAL cells from patients with AE in comparison to patients without AE (all $p<0.05$). Furthermore, 5 patients underwent bronchoscopy before and during an AE and showed a significant increase in CCL18 ($p=0.04$). Of note,

M2 chemokine production was elevated despite a decrease in the percentage of alveolar macrophages during AE.
Conclusion: We could show a further increase of M2 chemokines during AEs in patients with IPF. High state of alternative activation of macrophages is associated with an increased risk for AEs and might therefore be a therapeutic target for AE prophylaxis.

P3686
Effects of aerobic and strength training on symptoms and exercise capacity of IPF patients
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Patients with idiopathic pulmonary fibrosis (IPF) have limited exercise capacity due to dyspnea, abnormal lung mechanics, pulmonary hypertension and other mechanisms. We tested the hypothesis that 24 sessions of exercise in the form of a rehabilitation program would improve six-minute walk test (6-MWT) distance, peak exercise oxygen uptake (VO2 peak) and dyspnea (Borg dyspnea index) after exertion in patients with typical IPF. We investigated possible underlying mechanisms including hypoxemia, oxidant stress and pulmonary hypertension. Subjects with IPF defined by clinical criteria were randomly assigned to a 3-month pulmonary rehabilitation program or to a control group that did not participate in rehabilitation. Before and after the 3-month rehabilitation or observation, subjects underwent 6-MWT and exercise gas exchange studies (cycle ergometry). Blood samples were obtained for 15-F2t-isoprostanes, lactate and NT-proBNP measurements immediately before and after cycle ergometry. Rehabilitation did not cause a significant increase in 6-MWT distance or a decrease in dyspnea. Subjects who completed pulmonary rehabilitation maintained VO2 peak at baseline over three months. The control group had a significant decrease in VO2 peak over the same 3 months. Plasma lactate increased significantly after ~50-watt cycle ergometry exercise testing at 0- and 3-month evaluations in both groups; this was associated with significant decreases in arterial oxygen saturation. Pulmonary rehabilitation maintained peak oxygen uptake, but did not improve exercise capacity of patients with moderately severe IPF. Low-level exercise was associated with significant hypoxemia and systemic oxidant stress.