467. Cystic fibrosis: new basic, clinical and bacteriological knowledge

P4550
Ciliary beat frequency in nasal and bronchial epithelial cells in patients with cystic fibrosis
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Background: The extent to which altered ciliary function plays a role in the decrease in mucociliary clearance in cystic fibrosis (CF) patients is unclear.
Objective: To study ciliary beat frequency (CBF) in nasal and bronchial epithelial cells of children with CF.
Methods: Nasal and bronchial brushings were performed on 11 CF children (mean age: 8.86±4.54) undergoing bronchoscopy. In 15 healthy controls (mean age: 11.47±4.7) undergoing endoscopic procedures, nasal brushings were performed. The biopsies were performed using an Olympus BC-202D-2010 disposable brush. The samples were transported in a Medium 199 HEPES buffer and immediately analyzed. Slides were put into a climate chamber preheated to 37°C and viewed through an inverted phase contrast video microscope (Olympus IX-51). Short videos of ciliated cell groups were filmed with a high-speed video camera (Olympus i-Speed 2) at 300 frames/sec. The videos were then played back and the ciliary beat frequencies of on average 5 to 10 cell conglomerates per patient were determined. Mean values were used for further analysis.
Results: Nasal CBF in CF patients was higher when compared to that of healthy controls (mean/SD: 15.4±3.03 vs. 12.92±2.37, $p<0.05$). Furthermore, nasal CBF in CF patients was found to be higher than bronchial CBF (mean/SD: 13.23±2.38, $p<0.01$), and the values were found to correlate ($r=0.7$, $p<0.01$).
Conclusion: Our results indicate that CF patients indeed have altered nasal ciliary function. Whether these findings could have therapeutic implications requires further study.

P4551
Molecular structure, packing and release of MUC2 with relevance to cystic fibrosis
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In Cystic Fibrosis extremely viscous fluid is built up likely connected to impaired release and expansion of mucins. MUC2 is mainly expressed in small and large intestine, but also in inflamed airways, and it is stored as a multimer in secretory granules of goblet cells at high [Ca^{2+}] and low pH. The extracellular milieu have to trigger the unpacking of MUC2 controled by its N-terminus, a not yet fully understood process. The aim is to elucidate organization and structure of MUC2 when it is packed and secreted.
The N-terminal part of MUC2 was expressed in CHO cells. The secreted trimerized recombinant mucin was purified from culture medium by anion exchange chromatography. Crosslinked samples were purified by density ultracentrifugation. Analysis was performed by transmission electron microscopy (TEM). The pH in the buffers was varied in the range from 5.2 to 8 to mimic conditions of secretory pathway and extracellular environment by adding HAc (pH 5.2), MES (pH 6.2) or Tris (pH 7.4 and pH 8) with or without calcium. Samples were adsorbed onto carbon coated EM grids and negative stained. Processing of micrographs was performed using EMAN1 software.
When pH was low and or calcium present, rings with an outer and inner diameter of 25-30 and 20-25 nm respectively were observed. Without calcium rings were assembled at pH 5.2 and 6.2, but vanished with increasing pH. 2D refinements of the projections showed rotational 5- or 6- folded symmetry. Assemblies of laterally concatenated rings were obtained in the high density fraction of MUC2 N-terminus. The formations of these rings are probably vital for proper packing and release of full length MUC2.
Harriet N. and Daniel A. have contributed equally

P4552
TGFβ1 genotype in correlation to TGFβ1 induced sputum (IS) and serum in cystic fibrosis (CF)
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Background: Previous studies have shown that high-producer TGFβ1 genotypes are associated with severe lung disease in CF, but data on TGFβ1 levels and its impact on CF lung disease are scarce. Our aim was to assess the relationship between TGFβ1 genotypes, TGFβ1 (in induced sputum and serum) and lung disease.
Methods: 23 patients delta F 508 homozygous (median age 24 y, m/f 13/10, BMI 20,96 kg/m^2, Shwachman score 75, FEV1 (%) 84) were examined. TGFβ1 was assessed in serum and IS by ELISA. Genotyping was performed for the TGFβ1 C-509T and T+869C genotype.
Results: TGFβ1 mutants (C-509T mutant/wildtype n=9/14; T+869C mutant/wildtype (7/16) had no influence on levels of TGFβ1 in IS (C-509T mutant/wildtype median 80.2/71.8 pg/ml, n.s; T+869C mutant/wildtype median 80.2/71.75 pg/ml, n.s) and serum (C-509T mutant/wildtype median 35.8/34.9 pg/ml, n.s; T+869C mutant/wildtype median 35.8/34.9 pg/ml, n.s) nor on leukocytes in IS (C-509T mutant/wildtype median 651/495/µl, n.s; T+869C mutant/wildtype median 651.25/495/µl, n.s) and in EDTA blood (C-509T mutant/wildtype median 6325/6990 pg/ml, n.s; T+869C mutant/wildtype median 6325/6990/µl, n.s), lung function resp FEV1 (%) (C-509T mutant/wildtype median 68.6/86.7%, n.s; T+869C mutant/wildtype median 60.3/86.66%, n.s) or BMI (C-509T mutant/wildtype median 21.9/19.2 pg/ml, n.s; T+869C mutant/wildtype median 22.41/19.52, n.s).
Conclusion: Genotype had no difference on TGFβ1 in IS and serum as well as for lung function or BMI. An explanation is that TGF β is activated by different pathways e.g. αvβ6-mediated activation appears to be absolutely dependent on direct cell-cell contact and does not release any diffusible free TGF β (Munger et al 1999).

P4553
Prevalence, risk factors and prognosis of pulmonary hypertension in cystic fibrosis
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Objectives: To determine the prevalence, determinants and prognostic value of

pulmonary acceleration time (PAT) to assess pulmonary hypertension (PHT) in cystic fibrosis (CF).
Methods: Prospective multicenter longitudinal study of CF patients with forced expiratory volume in one second (FEV1) ≤60% predicted evaluated during their yearly check up with echocardiography, spirometry, and nocturnal oximetry.
Results: Sixty-seven consecutive patients were included (mean age 17±10 years and mean FEV1 42±12% predicted). Eight patients received a lung transplant during a mean follow-up of 19±6 months. Systolic pulmonary artery pressure (sPap) was measurable using TR peak velocity in 50 (75%) patients, with 10 having values above 35 mmHg. PAT determined in all patients correlated negatively with sPAP (r=0.36, p=0.01). Patients in the lowest PAT tertile (<101 ms) had lower FEV1 and greater nocturnal oxygen desaturation and left ventricular diastolic dysfunction and were more often on the lung transplant waiting list than patients in the two other tertiles. Kaplan-Meier curves showed a significantly shorter lung transplant-free time in the lowest PAT tertile (p<0.001) but not in the group with sPAP>35 mmHg. By multivariate analysis, FEV_1 and the nocturnal desaturation index were the main determinants of low PAT.
Conclusion: PAT less than 101 ms is a useful prognostic indicator in patients with CF whatever the age and is determined by FEV1 and nocturnal oxygen desaturation.

P4554
Non invasive ventilation for advanced cystic fibrosis lung disease in children
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Background: Although non-invasive ventilation (NIV) is frequently used for respiratory failure in adult Cystic Fibrosis (CF) patients, the experience in children is limited.
Aim: To review the experience of using NIV for advanced CF lung disease in children at a large tertiary centre.
Methods: Retrospective review of medical records. Setting: Royal Manchester Children's Hospital, Manchester, U.K.
Results: The CF service at the Royal Manchester Children's Hospital (Manchester, UK) looks after approximately 350 children with CF. Over a period of two years (Feb 2009-Feb 2011), 7 children (Median [range] age: 15 [11-18] years, 6 females) with advanced CF lung disease were commenced on NIV. The median [IQR] FEV_1 (% predicted) was 27 [23-31]. In all children, NIV was commenced during an acute respiratory exacerbation and subsequently continued in all except one child who did not tolerate NIV. The indications for initiating NIV included one or more of the following: nocturnal and/or diurnal hypoxia, hypercapnoea, morning headaches, to aid airway clearance and as a bridge to lung transplantation. All children received nocturnal bi-level NIV using the pressure support mode with face/nasal mask interface. Two children died whilst on transplant waiting list. Median (range) usage was 8 (2-8) hours/night. Median (range) duration of use was 6 (1-21) months. None experienced any complication related to NIV. All children on NIV achieved improved gas exchange.
Conclusion: Although there is growing experience of using NIV in advanced CF lung disease in children, a number of unanswered questions remain. Long term prospective multicentre studies would help develop guidelines for use of NIV in this group of patients.

P4555
Glucose tolerance during pulmonary exacerbations in children with cystic fibrosis
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Introduction: Patients with cystic fibrosis (CF) and normal glucose tolerance (NGT) may exhibit diabetic glucose tolerance during pulmonary exacerbations [1].
Aims: We examined glucose tolerance during exacerbations in children with CF and compared continuous glucose monitoring (CGM) with the gold standard oral glucose tolerance test (OGTT).
Methods: Children with CF aged at least 10 years hospitalised with an exacerbation were recruited. Those with diabetes and those on corticosteroids were excluded. On admission, patients had an OGTT and were fitted with a CGM for 3 days. Six weeks post discharge both tests were repeated.
Results: Ten patients (3 males), mean age 13.9 years, have completed the study. Two patients had CGM alone, 4 patients had OGTT alone and 4 patients had both tests. By OGTT criteria, 3 were diabetic, 3 had NGT and 2 had impaired glucose tolerance (IGT) during exacerbations. Glucose tolerance status did not change between exacerbation and follow-up although mean 2-hour glucose fell from 9.7 mmol/l to 8.6 mmol/l on repeat testing (p=0.012). For CGM (n=6), mean time spent with glucose > 7.8mmol/l fell from 7% during exacerbation to 4.3% when well (p=0.24). All 3 patients with NGT and 1 with IGT on OGTT had transient hyperglycaemia ≥11.1 mmol/l on CGM during exacerbations.
Conclusions: In contrast to previous published research, we found that glucose tolerance status, as determined by OGTT, remains unchanged during exacerbations. Patients with NGT and IGT had transient hyperglycemia on CGM.
Reference:
[1] Sc NN, Shoseyov D, Kerem E, Zangen DH. Patients with cystic fibrosis and normoglycemia exhibit diabetic glucose tolerance during pulmonary exacerbation. J Cyst Fibros May;9(3):199-204.

P4556
Pre-procedure antibiotics and effect on microbiological yield from broncho-alveolar lavage fluid in children with cystic fibrosis
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Bronchoscopy and broncho-alveolar lavage (BAL) is widely used in children with cystic fibrosis (CF) to obtain reliable lower airway specimens for microbiological analysis.This is done under general anaesthetic (GA) or sedation.GA could lead to a significant decline in pulmonary function tests.It is recommended that preparation for surgery should involve physiotherapy and judicious use of antibiotics to treat any evidence of infection.However if antibiotics are given pre-procedure,the microbiological yield from BAL could potentially be lower.
Methods: We reviewed the records of children with CF undergoing bronchoscopy and BAL at our centre to see if there was a difference in rates of microbiological isolation if children with CF had antibiotics pre-procedure.BAL was collected in line with ERS task force 2000 recommendations.
Results: 36 of the 86 bronchoscopies done between 2005 and 2010 were in children with CF. BAL results from 2 children were not available.BAL showed bacterial growth in 21 (62%) of cases and atypical mycobacteria in 1 child.Children who did not have pre-procedure antibiotics were more likely to have bacterial isolates from BAL fluid as compared to children who had antibiotics pre-procedure (p=0.017) as shown in the table.

	Microbiology positive	Microbiology Negative
No Preprocedure Antibiotics (15)	13 (87%)	2 (13%)
Preprocedure Antibiotics (19)	9 (47%)	10 (53%)

Conclusions: Athough there may be a bias because of its retrospective nature, this study indicates that pre-procedure antibiotics in children with CF undergoing bronchoscopy for getting a gold standard microbiological sample leads to a significantly lower microbiological yield.

P4557
Inspiratory and expiratory reactance at 5Hz in adult cystic fibrosis
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Introduction: Progressive airways obstruction is a key feature of cystic fibrosis (CF) which has it origins in the small airways. Reactance at 5Hz (X_5), measured by impulse oscillometry (IOS), determines the capacitive properties of the peripheral lung. In COPD patients the respiratory phase difference in X_5 (inspiratory-minus-expiratory, ΔX_5) identifies individuals with expiratory flow limitation. Studies in CF, so far, have analysed whole breath impulse oscillometry.
Aim: To determine the relationship between inspiratory and expiratory phase X_5 with spirometry and body plethysmography.
Methods: Within-breath analysis of IOS (Jaeger) was performed on 25 patients with CF (FEV_1 range 26-119% of predicted). Results were correlated with spirometric and plethysmographic indices (Jaeger MasterLab).
Results: Both inspiratory and expiratory X_5 correlated with FEV_1 (r= 0.842, p<0.0001; r=0.892, p<0.0001), respectively. The parameters showed greater sensitivity at lower FEV_1 values. They also demonstrated an inverse linear relationship with RV/TLC% ratio (r=-0.747, p<0.0001: r=-0.817, p<0.0001). Respiratory phase difference (ΔX_5) correlated with FEV_1 and RV/TLC% (r=0.662, p<0.0001: r=0.659, p< 0.004). There was a greater unit change in ΔX_5 in CF patients with lower FEV_1 values (greater disease severity).
Conclusion: Measurement of inspiratory and expiratory X_5 are useful indices of airway obstruction and gas trapping in CF. IOS is quick, easy and portable to use at the patient bedside or outpatient clinic in contrast to body plethysmography. Calculating respiratory phase difference in X_5 (ΔX_5) may be a useful marker for identifying CF patients who have expiratory flow limitation.

P4558
Lung clearance index (LCI) at age 1-4 years vs lung function and chest X-ray (CXR) scores at age 7 years in children with CF
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Background: LCI from SF6 multiple breath washout (MBW) is more sensitive than spirometry to detect early CF lung disease and correlates closely to CT lung changes in older CF subjects [1].
Aim: To see if increased LCI during the preschool period correlates to elevated

LCI, CXR abnormalities (Northern score) and reduced FEV1.0 at age seven.
Methods: All CF patients born between 1995 and 2002, attending our center, and who had done at least one MBW at an annual review between age 0.6 to 4.0 years and retested at age seven with MBW, spirometry and CXR evaluated with Northern score [2] were included.
Results: Out of 24 children included (17M, median age at dx 0.4, range 0.0-2.6 yrs) four had one, six had two and 14 three MBW done, before age seven. For mean age and LCI at each age period see table 1. Median (range) FEV1 at age 7 was 94% pred, (73;116).

Table 1

Age group (N)	0.6–2.0 yrs (15)	2.0–3.0 yrs (21)	3.0–4.0 yrs (17)	7 yrs (24)
Mean age (SD)	1.33 (0.33)	2.42 (0.17)	3.47 (0.13)	7.37 (0.3)
LCI median (range)	7.31 (6.44; 11.80)	7.45 (5.96; 13.3)	7.61 (6.4; 11.1)	7.63 (6.43; 12.3)

Mean LCI at age 1-3 yrs did not correlate to LCI (rs=0.26, p=0.228) or FEV1 (rs=0.09, p=0.702) at age 7 but correlated to Northern score (rs=0.52, p=0.010).
Conclusion: Increased LCI in the preschool years correlates with the degree of structural lung changes at age 7.
References:
[1] Gustafsson et al. Thorax. 2008;63:129-34.
[2] Conway et al. Thorax. 1994;49:860-2

P4559
Combination of inhaled corticosteroids and long acting beta two agonists improve lung clearance index (LCI) in preschoolers with cystic fibrosis
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Background: Lung function testing is a means of monitoring progression of lung disease in cystic fibrosis (CF). Studies investigating Multiple Breath Washout (MBW) measurements in children older than 2 years with CF have shown lung clearance index (LCI) to be significantly greater in CF than in a reference population. Bronchodilators are used in CF to facilitate airway clearance and provide protection against potential bronchoconstrictors, ie DNase, hypertonic saline and inhaled antibiotics.
Aim: 1). To compare LCI values among CF preschoolers, and healthy controls, 2). To compare LCI with atopy and 3). To assess the effect of the combination of inhaled steroids with long-acting beta two agonists (LABA), among CF preschoolers, by changes in LCI values.
Method: Twenty-eight children with CF, and recurrent cough and wheeze, aged 2 to 5 years and 27 healthy controls performed MBW measurements. Children with CF received prophylaxis with inhaled corticosteroids + LABA for six months. History of atopy was recorded and total serum IgE was measured. The primary endpoint was change of LCI values.
Results: Children with CF had significantly higher LCI compared to controls (mean difference [95% CI] 2.6 [1.8, 3.7], p<0.001). LCI values were not correlated with history of atopy (p=0.128), or total IgE (p= 0.318, R=0.247). Six months after treatment with combination of inhaled steroids + LABA, LCI was reduced significantly (mean difference [95% CI]: -1.19 [-3.6, -1.01], p: 0.038).
Conclusions: Combination of inhaled steroids + LABA seem to improve lung function among preschooler with CF, as measured by LCI.

P4560
Respiratory muscle strength (RMS) in cystic fibrosis adult patients
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Cystic fibrosis (CF) is a genetic disease caused by CFTR gene mutation. RMS has been evaluated in CF and conflicting results were obtained. There are many reasons why these patients may have decreased RMS: malnutrition, physical deconditioning, CFTR gene mutation (also present in skeletal muscle where it plays a role in calcium regulation) and increased work of breathing due to hyperinflation. Our aim was to evaluate RMS in cystic fibrosis adult patients and compare it with a control group. We performed a prospective study with 12 CF adult patients (5 males) to evaluate spirometry, maximal static inspiratory and expiratory pressure through mouth (MIP and MEP), nasal sniff pressure (NSP) and arterial blood gases. Results were compared with 24 normal adult individuals (10 males) with similar sex, age and body mass index (BMI).
Our study group showed: age 27,33±7,45; BMI=20,03±2,74; FVC (%pred)=68,08±20,32; FEV1 (%pred)=51,42±22,59; FEV1/FVC=62,67±14,28; RV/TLC=51,83±17,64; MEP (%pred)=70,83±22,51; MIP (%pred)=79,50±27,02; NSP (%pred)=79,75±33,71; PaO2=75,73±12,19mmHg. Our control group presented: age 24,08±4,12; BMI=21,63±1,76; FVC=99,79±11,42; FEV1=101,04±10,93; FEV1/FVC=87,37±6,03; RV/TLC=112,25±18,26; MEP (%pred)=92,33±20,86; MIP (%pred)=79,57±21,11; NSP (%pred)=110,88±26,07; PaO2=100,12±5,79mmHg.
We conducted a statistical analysis using Student's t-test in SPSSv17 which demonstrated a statistical significant lower FEV1/FVC, SNP, MEP and PaO2 in our study group. There was no difference concerning MIP values. Although SNP and MEP values are lower in our population, we cannot evaluate diaphragmatic strength using these parameters in CF patients. More studies are needed to improve the assessment of RMS in CF patients.

P4561

P4562
Frequent detection of rhinovirus in bronchoalveolar lavage samples from children with cystic fibrosis
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Background: Rhinovirus (RV)-induced chest exacerbations are common in cystic fibrosis (CF) and have been associated with impaired virus clearance by the CF airway epithelium.
Hypothesis: As a consequence RV can be frequently detected in lower airways of CF children.
Patients and methods: Bronchoalveolar lavage (BAL) samples were collected from children with CF (n=93), non-CF bronchiectasis (n=26), asthma (n=19) and control children without lower respiratory tract disease (n=21) at a median (IQR) age of 6.7 (2.5-10.8) years. RV load was assessed by RT-PCR. Prevalence of RV infection and RV load were compared between groups and related to demographic and clinical parameters.
Results: RV was detected in 58 samples (36% of total) and more often in younger children <5years of age (29 vs. 18%). RV prevalence was highest in CF (41%) compared to non-CF bronchiectasis (23%), asthmatic (32%) and healthy children (29%). In RV-positive subjects RV load (median [IQR] copies/ml) was highest in CF (300 [15–3400] $\times 10^3$) compared to asthmatic (2.3 [2.1-4.8] $\times 10^3$) (p=0.02), non-CF bronchiectasis (11 [3.5-193] $\times 10^3$) (p=0.03) and healthy children (0.8 [0.4-6.5] $\times 10^3$) (p=0.001). RV prevalence was similar in CF patients in whom BAL was performed during chest exacerbation (n=20) and phases of clinical stability (n=17). However, RV load was higher during exacerbation (859 [20-3380] $\times 10^3$ vs. 25 [5.8-277] $\times 10^3$), p=0.01) and inversely related to FEV1 (%predicted) (r=-0.52, p=0.004).
Conclusions: RV is frequently detected in the lower airways of CF children. High RV loads during chest exacerbations and in children with advanced lung disease suggest a possible role for RV in CF lung disease progression.

P4563

Whooping cough in cystic fibrosis (CF)

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In the 1990s, there has been a slow steady resurgence of pertussis with an increased proportion of cases reported among adolescents and adults in absence of vaccine or natural boosters. CF is the commonest genetically inherited disease, leading to bronchiectasis. Cough is a non specific symptom in CF patients and whooping could cause lung function worsening,

We report a retrospective, monocentric study, on whopping in adult CF patients.

64 sera samples from patients (median age 26 years old) were analysed by ELISA (Enzyme-Linked Immunosorbent Assay) to detect anti-pertussis toxin (PT) antibodies. In all patients with a positive detection of anti-PT IgG, clinical and functional data were collected all around the date of the serum sample.

Among the 64 sera analysed, 57 had no IgG. Seven were positive with a titre of anti-PT IgG ranging from 35UI to 198UI/ml. None of them has a history of vaccination the years preceding the sample. Among the 7 patients, 4 had a severe lung disease which was progressing since several months. Two of them described a change in their cough. Patients with low levels IgG received daily azithromycin as anti-inflammatory treatment. Among the 3 patients with moderate disease, only one returned to baseline after 6 months. One patient wasn't known as a CF patient but as an asthmatic. Persistent new cough induced a new advice and the diagnosis of CF.

These results underline several aspects that clinicians should be aware: the difficulty to make the diagnosis of whopping when patients chronically cough, the potential impact of whopping cough on severe respiratory disease, the need to optimize vaccination coverage in adults at risk, the potential role of chronic azithromycin to reduce the duration and severity of illness.

P4564

Effect of recurrent growth of aspergillus on lung function in paediatric population with cystic fibrosis (CF)

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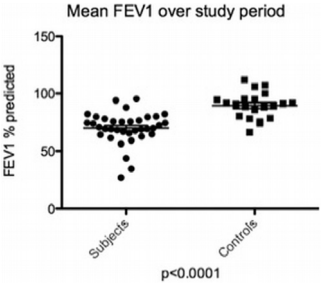
Background: Allergic bronchopulmonary aspergillosis (ABPA) is well described in CF. Many CF patients grow Aspergillus fumigatus (AF) on sputum and cough swabs but do not have ABPA. There is evidence that this is clinically important [Chest 2006;130:222, Ped Pulm 2007;42:785]

Hypothesis: Isolation of AF from sputum or cough swab is associated with a worse clinical state in CF children.

Methods: A retrospective cohort study of all children with CF who had sputum samples or cough swabs positive for AF on >1 occasion at least one month apart between 2008 and 2010. Lung function results and nutritional status were recorded.

Results: 35 children (15 male) were identified who fit the criteria, mean age 11.2 years (SD2.1) mean BMI 17.5. Data were collected on 21 controls (7 male) with CF who had not grown AF during the study period and had never had a diagnosis of ABPA, mean age 11.12 years (SD2.21) mean BMI 17.2. Children with AF had a lower mean FEV_1($p<0.0001$) over the follow-up period (69.8, SD13.8 vs 89.4, SD11.5), despite a greater number of days of intravenous antibiotics (45 days vs. 2.6 days in the 2 year period ($p<0.0001$))



Conclusions: Recurrent growths of AF are associated with a worse clinical state, manifest by lower lung function, despite the use of significantly more intravenous antibiotics.

P4565

Prevalence and impact on FEV_1 decline of methicillin-resistant Staphylococcus aureus infection in patients with cystic fibrosis

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Rationale: Risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA) in Cystic Fibrosis (CF) and the impact on CF disease progression are still under debate.

Objectives: To study clinical variables associated with MRSA infection and examine impact on FEV_1 evolution in CF patients.

Methods: A retrospective case-control study from 2002 to 2010, comparing clinical variables and decline of FEV_1 of MRSA positive patients with age-and sex matched controls.

Results: Thirty of the 165 CF patients (18.2%) had cultures positive for MRSA. Excluding patients under 4 years, the prevalence became 15.2% (23/151). Chronic infection was found in 19/151 (12.6%).

Most apparent differences between the groups were: a higher proportion of patients with genotype F508del, less pancreas sufficient patients, more bronchiectasis and more frequent hospitalization in the MRSA group.

The FEV_1 recorded one year prior to, and at the moment of MRSA infection, was not significantly different from that obtained in controls. However, FEV_1 decline over 2 and 6 year periods, were significantly greater in the MRSA group than in the controls. In fact, over a 6 year period FEV_1 decline amounted to -2.6% versus -1.3%predicted per year in the MRSA group and controls respectively (p=0.031).

Conclusion: Prevalence of MRSA in CF patients averaged 15%, and MRSA infection was shown to be associated with a particular genotype, presence of bronchiectasis and hospitalization. Our spirometric data also clearly show that a MRSA episode entails an FEV_1 decline that is almost double that predicted for CF patients who can remain unaffected by MRSA.

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Prevalence and reservoirs of *A. xylosoxidans* and *S. maltophilia* in cystic fibrosis center

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A. xylosoxidans (AX) and *S. maltophilia (SM)* becomes more and more important pathogens of lung disease in CF patients. Little is known about the routes of transmission of these pathogens from environmental or hospital sources to the patients. We hypothesised that strains of *AX* and *SM* are nosocomially acquired by CF patients.

Methods: 259 sputum samples, cough swabs were taken from 38 patients attending the Regional CF Center in 2010. Bacterial isolates were obtained from the hospital environment (sinks, toilets, physiotherapy equipments, nebulizers), personnel hands.

Results: Four (10,5%) of patients were colonised by *AX*. According to the European consensus criteria two of them were chronicaly infected and had an accelerating loss of lung function. In six patients (15,8%) *SM* was detected. Their clinical condition was stable. Two patients (siblings) were chronically colonized with *SM*. In 8 cases (80%) bacterial pathogens were detected after i.v. anti-pseudomonal therapy and hospitalisation. *AX* and *SM* were isolated from the sinks of a mixed infectious disease ward (32,0% and 66,7% respectively. 40% of toilets were contaminated with *AX* and *SM* strains. All inhalation systems and personnel hand cultures were *AX* and *SM* negative. One *SM* strain was isolated from the vest for high frequency chest wall oscillation and one *SM* strain from the physiotherapist hands at the end of the working day. Similar antibiotics sensitivity suggested a possible trasmission route from the hospital environment and personnel hands to the patients.

Conclusion: The role of these microorganisms can be underestimated. Improved hygienic measures in CF centers are required to prevent risk of bacterial transmission.

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Quality of life of paediatric patients with cystic fibrosis and their caregivers

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Introduction: Cystic fibrosis (CF) is the most common fatal genetic disease which has a significant impact on patient's and their caregiver's daily life.

Objective: The aim of the study was to determine the quality of life (QoL) of children with CF and their parents and to compare the impact of CF on daily life to that of asthma.

Methods: *The Cystic Fibrosis Questionnaire* (CFQ) was used to measure the QoL of children with CF and their caregivers. *PedsQL™ 4.0 Generic Core Scale* was

Quality of life of patients with CF

Domain	CFQ-R Child mean score ± SD	CFQ-R Teen mean score ± SD	CFQ-R Parent mean score ± SD
Physical activity	71.21±23.93	63.02±20.47	59.84±15.15
Emotion	76.89±10.76	73.33±8.73	76.36±16.96
Treatment	82.82±17.47	38.89±29.10	–
Respiratory	66.67±11.12	59.52±21.75	–
Digestive	76.67±22.50	90.28±12.51	–

used to compare QoL of paediatric CF patients and their caregivers to the QoL of asthmatic children and their parents.

Results: 54 (n_{CF}=22, n_{asthma}=32) children's data were collected (mean age: 13.05±3.13 years). Total score of PedsQL was 71.53±13.26 by CF patients, while total score of PedsQL was 77.35±16.61 in asthmatic patients (p=0.2). CF caregivers' score was 71.17±15.26 while total score of asthmatic patients' caregivers was 71.07±14.93 (p=0.98). CFQ results are shown in the table.

Conclusion: QoL scores were not significantly lower in children with CF than in asthmatic patients.