42 Comparison of 2 nasal potential difference measurement (NPD) methods (needle–abrasia): Is one more patient-friendly than the other?

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NPD is a valuable diagnostic tool in case of questionable CF. Currently, 2 methods, that are considered equivalent, are used: (A) the Calomel/agar method using a needle as subcutaneous reference electrode (RE) and (B) the AgCl/ECG cream method using AgCl electrodes and ECG cream on abraded skin as RE. NPD is measured with a Marquat® catheter under the inferior turbinate (IT).
Aim: To compare the subjects' acceptance for the 2 methods.
Methods: CF patients and healthy volunteers (HV) had method A and B in 2 nostrils on separate days. After each test they completed the questionnaire (Q): Did you experience pain at the RE site, at the IT site, during perfusion? Was the procedure annoying? Would you be prepared to repeat NPD? Which method do you prefer?
Results: 50 Qs were completed by 12 CF patients (mean age 26.6 y) and 14 HV (mean age 24.7 y). 16/50 (10A/6B, 3CF/13HV) reported pain at RE site, 7/50 (4A/3B, 3CF/4HV) at IT site, and 1/50 (A, HV) during nasal perfusion. 12/50 (9A/3B, 8CF/4HV) found the procedure annoying. 37/50 would agree to repeat NPD, 13/50 probably would. 9/24 subjects (3CF/6HV) preferred method A, 5/24 (2CF/3HV) method B and 10/24 (5CF/5HV) had no preference. 2nd testing (B) was refused twice (2CF) for reasons not related to the test. CF patients reported less pain at RE site compared to HV ($p = 0.017$). No other statistical difference was found between both tests or between subject groups.
Discussion: Overall, NPD was well tolerated. CF patients reported less pain at RE site compared to HV. Both methods were equally accepted by the study subjects. Further analyses of the quality of the tracings is needed to decide which method is most accurate.

43 Lung-MRI for monitoring cystic fibrosis (CF) patients with pulmonary exacerbation

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Objectives: CF is the most common lethal hereditary disease in the caucasian population. Currently, no sensitive, radiation-free methods are available to localize and quantify lung inflammation. PET-TC has been proposed for the localization and quantification of active inflammation in CF lung, but its use is limited by high exposure to ionizing radiation and high costs. Developments in MRI have made possible the clinical application of lung-MRI to obtain not only morphological but also functional information. Our propose is giving an overview of these new MR tecniques and their potential application in CF population.
Methods: In this study will be enrolled, during 12 months, 30 patients (age >8), 15 cases and 15 controls. Each patients will be undergo to two RM examinations: pre and post antibiotic for the case group; before and after 2 weeks for the control group. The MR examination were performed on a 1.5 T MR scanner (Avanto Siemens) with different sequences: TRUFI with spirometer, Propeller, DWI, Fourier decomposition. In post-processing were calculated and showed the diffusion and perfusion maps with ICE program (Siemens) and the DWI features with Matlab2010.
Conclusion: Our preliminary results show the DWI seems to be sensitive to lung inflammation and with the morphological sequences we can see the bronchiectasis, mucous plugging, consolidation and air tapping without undergoing the patient to ionizing radiation. Lung-MRI has the potential to supply new relevant functional information in thoracic imaging. Its impact in CF follow-up has still to be defined, but it might open new therapeutic scenarios in CF and in other lung disease.

44 Nitrogen washout using an ultrasonic device for routine measurement of the LCI in patients with CF

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Objectives: Inert gas multiple breath washout (MBW) for calculating the Lung Clearance Index (LCI) has become popular for assessing ventilation inhomogeneity (VI) as an early indicator of Cystic Fibrosis (CF) lung disease. However, routine use has been difficult as inert tracer gases certified for medical purposes are not universally available. Using nitrogen washout (MBW_{N2}) with 100% oxygen overcomes this problem but has rarely been used in patients with CF since commercial equipment is available.
The aim of this study was to assess whether LCI_{N2} discriminates between patients and controls and detects CF lung disease more often than spirometry.
Methods: 37 patients with CF (3.9–40.8 years) and 40 controls (6.9–84.4 years) performed 2–3 single MBW_{N2} using the EasyOne Pro LAB™ (ndd Switzerland). 30/37 patients performed a comparative spirometry.
Mean (SD) LCI_{N2} was 9.2 (2.50) in patients and 6.5 (0.72) in controls. Mean difference between the groups (95% CI, p-value) was −2.627 (−3.496; −1.768, <0.001). Mean FEV_1% predicted (SD) in patients was 82% (26.8). In 15/30 LCI_{N2} and FEV_1 were abnormal, in 3/30 LCI_{N2} and FEV_1 were normal and in 12/30 LCI_{N2} was abnormal while FEV_1 remained normal.
Conclusion: LCI_{N2} discriminated significantly between patients and controls. 80% of the patients with a normal FEV_1 had abnormal LCIs indicating manifestation of CF lung disease within the lung periphery that was not detectable using spirometry alone. Results were comparable to published data obtained with different equipment and with using inert tracer gases.
We conclude that MBW_{N2} reflects VI similar to inert gas MBW and can thus be used for routine monitoring of patients with CF.

45 Exhaled nitric oxide is associated with *Pseudomonas aeruginosa* infection and peripheral airway obstruction in cystic fibrosis

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Objectives: Exhaled nitric oxide (FeNO) is decreased in obstructive patients, but NO also reduces the epithelial adhesion and uptake of *P. aeruginosa*. Thus, the lower levels of NO will potentiate Pseudomonas colonization of patients with CF. The aim of this study was to investigate whether airway NO level are associated with *Pseudomonas aeruginosa* infection and peripheral airway obstruction in cystic fibrosis.
Methods: Exhaled NO was determined with a chemiluminescence analyzer (Niox Mino, Aerocrine, Solna, Sweden). Single breath FENO measurements at 50 mL/sec were performed in 18 stable CF patients (age (mean±SD), 14.7±6.6 years) and 15 non-smoking controls (age 17.2±7.0 years). All subjects underwent comprehensive pulmonary function assessment (MasterScreen Diffusion, E. Jaeger, Germany). CF patients revealed significantly lower FEV1 compared to controls (81.6±18.5 vs. 105.9±11.0 L; $p < 0.001$) but FeNO values did not differ between the two groups (14.1±6.9 vs 13.0±4.6 ppb; $p = 0.619$). Patient population was further divided whether there was (PI+; $n = 10$) or not (PI–; $n = 8$) Pseudomonas infection. In the PI (+) FeNO was significantly lower compared to PI (–) group (8.0±3.3 vs 20.2±2.7 ppb; $p < 0.001$). The PI (+) patients also had lower spirometric indices – $MEF_{50\%}$ = 54.7±27.9 vs 82.7±13.2 %pred; $p = 0.032$ and $MEF_{25\%}$ = 33.6±9.6 vs 57.7±13.5% %pred; $p < 0.001$.
Conclusion: Patients with CF who are PI (+) have lower levels of exhaled NO. They also reveal significant peripheral airway obstruction compared to PI (–). No difference was found in FeNO between CF patients and controls.