WS20.5 **A high colony count of anaerobic bacteria is related to lung clearance index in cystic fibrosis**

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Introduction: Although anaerobic bacteria have been detected in abundance in the CF airways, the impact their presence and abundance has on lung function and inflammation is unclear.

Objectives: To investigate the relationship between aerobic and anaerobic bacterial colony counts (CC), lung clearance index (LCI), FEV_1 and systemic inflammation in clinically stable CF child and adult patients.

Methods: Sputum was collected from CF patients and community composition and bacterial abundance was analysed using extended aerobic and anaerobic culture. All subjects completed spirometry and multiple breath washout using 0.2% SF_6 and a modified Innocor™ device to obtain LCI. Blood C-reactive protein, (CRP) was measured by turbidimetric immunoassay. Spearman's rank correlation coefficient was used to assess relationships.

Results: Aerobic and anaerobic bacteria were detected in sputum samples from all 29 CF patients studied. A significant negative correlation between total anaerobic CC and LCI ($r = -0.54$; $p = 0.002$) was observed. The relationship between total anaerobic CC and FEV_1% predicted ($r = 0.29$; $p = 0.13$) was not significant. Similarly, the relationship between total aerobic CC, LCI ($r = -0.32$; $p = 0.09$) and FEV_1% predicted ($r = 0.27$; $p = 0.16$) was not significant. In a subgroup of patients (15/29; 52%), a significant negative correlation was observed between total anaerobic CC and CRP levels ($r = -0.56$, $p = 0.03$).

Conclusions: A higher CC of anaerobic bacteria resulted in a better LCI and lower CRP, indicating that a lower load of anaerobic bacteria may reflect microbiota disruption and disease progression in the CF lung.

WS20.6 **The use of LCI as an effective tool for monitoring clinical response to ivacaftor therapy in CF patients with at least one G551D-allele**

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Objectives: To assess the use of Lung Clearance Index (LCI) as a tool for monitoring pulmonary response to ivacaftor therapy.

Methods: Ivacaftor therapy became standard in NI in 2013 for CF patients with one G551D-CFTR allele, positive sweat chloride and/or evidence of sino-pulmonary disease. Data were collected retrospectively on all adults and children on ivacaftor in NI. LCI measurements had been recorded pre-treatment, at 1 and 6 months on treatment, along with FEV1.

Results: 22 patients were eligible for inclusion, 15 adults and 8 children. Data were complete on 7 children and 7 adults at baseline and at 1 month. Due to lack of sufficient data, analysis was not carried out in the adults at 6 months. Mean baseline LCI: adults 11.15 (range 8–15.8); children 9.07 (range 6.54–10.8). Mean LCI after 1 month of treatment: adults 10.93 (range 8–13.77); children 7.68 (range 6.57–8.76). Mean LCI after 6 months of treatment: children 7.8 (range 6.12–10.73). Drop in LCI correlated with increase in FEV1. Many of the children had normal or near normal % predicted FEV1 with a mean FEV1 of 84.1% (71–105%) at baseline, 101.5 (72–150%) at 1 month and 96.3% (66–126%) at 6 months.

Conclusion: Mean LCI improved in adults and children after 1 month of ivacaftor therapy and was sustained in children at 6 months. LCI may be a useful tool for monitoring the effectiveness of ivacaftor therapy especially in those with normal FEV1.