343* Effect of impaired glucose tolerance on clinical status in adult CF patients

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Introduction: It has been suggested that impaired glucose tolerance (IGT) may be associated with a decline in clinical status, as a precursor to frank diabetes mellitus (CFRD). To look at this, we prospectively correlated glycaemic status with clinical parameters in 60 consecutive adult CF patients not known to have CFRD.
Method: Using a standard oral glucose tolerance test (OGTT), we classified patients as normal glucose tolerance (NGT), IGT, or CFRD, according to the 2-hour glycaemic values (WHO criteria) and compared the results with clinical status, including the need for IV therapy.
Results: Forty two (70%) had NGT, 10 (17%) IGT and 8 (13%) CFRD. There were no significant differences in age, sex, CFTR mutation, mean fasting plasma glucose or microbial type/duration of infection between the 3 groups, correlation between pancreatic enzyme supplementation and glycaemic status, and none had fasting hyperglycaemia. Mean 2-hour OGTT glucose values were raised in patients with IGT (mean±sem): 8.9±1.9 and CFRD 11.7±0.6, compared to NGT 5.3±1.4; both $p < 0.0001$. BMI was similar between all groups (NGT 22.4±3.6, IGT 20.0±3.1, DM 20.6±2.4; $p = 0.15$), but there was a trend towards poorer lung function in the CFRD group (FEV1% predicted: NGT 65±24.3, IGT 64±17.9, DM 54±12.7; $p = 0.43$). Similarly, CFRD patients had more hospital admissions in the preceding year (3 v 1 per patient per year; $p < 0.05$).
Conclusions: This study shows that IGT was not associated with a decline in nutritional status or pulmonary function, or predispose to pulmonary exacerbations requiring hospital admission. From these data, it is difficult to justify commencing insulin therapy in these asymptomatic individuals, with the ensuing treatment burden and impact on their quality of life.

344* Is presence of cystic fibrosis-related diabetes really associated with a faster decline in pulmonary functions?

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Background: Cystic fibrosis-related diabetes (CFRD) is believed to be associated with faster decline in pulmonary functions and with higher morbidity and mortality in cystic fibrosis (CF) patients. However, accurate matched patient control studies are missing. We investigated retrospectively the decline in pulmonary functions and BMI in patients with CFRD in comparison with matched CF patients without diabetes.
Methods: 27 patients with insulin dependent CFRD and good diabetic management (median HbA1c = 6.6) were matched with 27 CF patients without diabetes according to gender, age, BMI, class of mutation, FEV1% predicted and infection status. Over a period of 5 years the following parameters were studied: FEV1% predicted, FVC% predicted, BMI and in-hospital days.
Results: At the start of this study, no differences between both patient groups were seen. Over a period of 5 years, both groups showed a remarkable decline in pulmonary functions. The rate of decline for FEV1% predicted was significantly higher in CFRD patients (2.2% decline/year vs. 1.4% decline/year, $p = 0.049$), though this difference was not significant for FVC% predicted. CFRD patients tended to spend more days in hospital. BMI remained unchanged in both groups.
Conclusion: After 5 years, differences were found between CFRD patients and CF patients without diabetes for FEV1 and in-hospital days, however not for FVC and BMI. Unlike other studies, patients were properly matched and had good diabetic control. This study shows that the clinical impact of CFRD is certainly present, but probably smaller than originally presumed.

345 Evaluation of glucose intolerance in adolescent CF patients

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Background: The association between Cystic Fibrosis Related Diabetes (CFRD), deteriorating nutritional status, pulmonary health and worsening prognosis has been demonstrated in numerous studies, mainly in adult patients. Quoted rates for impaired glucose tolerance are 38% and 26% for CFRD in adolescents.
Methods: We performed an annual formal oral glucose tolerance test according to the guidelines of the American Diabetes Association in 40 adolescent patients (1.75g/kg of glucose, max. 75g). Patient age ranged from 9 to 16 years, the mean age was 12.7 years, none of our patients was known to suffer from diabetes.
Results: We found the rates for impaired glucose tolerance and CFRD significantly lower than usually reported. 4 out of 40 patients (10%) had impaired glucose tolerance, 1 out of 40 patients (2.5%) had CFRD. We found no significant correlation between 2 hour glucose levels and BMI, Shwachman scores, fitness as assessed by shuttle run distance or FEV1. Follow up data also showed no significant correlation for glucose levels and changes in BMI and FEV1.
Conclusion: In our group of adolescent patients we found the rates for glucose intolerance lower than reported previously. Currently annual oral glucose tolerance testing is the only valid screening tool for the detection of CFRD but it needs to be repeated regularly as glucose intolerance does not correlate with other clinical data. Further studies are necessary to establish the causative link between the aetiology of CFRD and its clinical implications in CF patients.

346* Loss of lean tissue mass in adults with CF: an independent predictor of loss of bone mineral density (BMD)

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Low BMD is common in CF, yet there are few longitudinal studies of the determinants of loss of bone mineral in adults with CF. This study aimed to measure changes in BMD in CF adults over 3 years; and to identify clinical correlates of loss of BMD.
Methods: Data were analysed from 47 adults with CF (55% male, mean age at baseline 29.9±6.9 years) who had not received bisphosphonate or hormone replacement therapy. Lumbar spine (LS) and femoral neck (FN) BMD and body composition (lean tissue mass, LTM) were assessed using DXA scanning at baseline and follow-up (mean 3.3±0.6 years later). Changes (ΔLSBMD, ΔFNBMD and ΔLTM) were expressed as annual %change from baseline (ann%Δ). Clinical predictors (including age, ann%ΔLTM, FEV_1%predicted, corticosteroid use, calcium and vitamin D supplements and serum 25-OH vitamin D levels) of ann%Δ in LS and FN BMD were analysed using univariate analysis and multiple linear regression.
Results: 34% of patients lost >2% BMD per year at one or both sites. Baseline BMD T-scores did not correlate with ΔBMD. Ann%ΔLTM was the only clinical variable which correlated with ann%ΔLS BMD. This association was retained in multivariate analysis ($R^2 = 0.21$, $p = 0.001$). No variables correlated with ann%ΔFN BMD. There were no atraumatic fractures during follow-up.
Conclusion: Loss of LTM was independently associated with loss of LS BMD, suggesting that declining nutritional status is a risk factor for developing osteoporosis. This highlights the importance of identifying and treating loss of LTM in CF.

	LS BMD (g/cm^2)	LS T-score	FN BMD (g/cm^2)	FN T-score	LTM (kg)	FEV_1pred.
Baseline	1.147±0.125	−0.57±1.00	1.014±0.131	−0.14±1.06	46.7±8.7	67.4±21.4
Annual %change	0.01±1.40	n/a	−1.50±1.45*	n/a	0.1±1.0	−1.0±2.6*

Data show mean±SD. *$p < 0.01$.