

241 Evidence for a cystic fibrosis enteropathy

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Objectives: Previous studies suggest a cystic fibrosis (CF) enteropathy. It can be hypothesized that this enteropathy contributes to the characterizing poor nutritional status, gradual decline in pulmonary function and subsequent mortality in these patients. This study aimed to investigate enterocyte damage and intestinal inflammation in CF, and its relation to pulmonary function.

Methods: Serum intestinal fatty acid binding protein (I-FABP), a circulating marker for enterocyte damage, was analysed in a cohort of 72 CF patients and 107 controls. Data regarding faecal calprotectin – a marker for intestinal inflammation, pulmonary function, and comorbidities were extracted from the medical charts.

Conclusion: I-FABP levels were significantly elevated in CF patients as compared to controls (502 pg/ml [281–774] and 288 pg/ml [147–349], $p < 0.001$). Serum I-FABP was negatively correlated with forced expiratory volume (FEV1) in children ($r_p -0.589$, $p < 0.05$, $n = 15$). Calprotectin levels were elevated in 93% of CF patients, and correlated positively with age ($r_s 0.350$, $p < 0.05$, $n = 20$) and negatively with FEV1 in adults ($r_s -0.440$, $p < 0.01$), even after correction for age. Patients with CF-related diabetes (CFRD), exocrine pancreatic insufficiency (EPI) and patients using protonpompinhibitors (PPIs), showed elevated calprotectin levels.

In this study, for the first time, enterocyte damage in CF is demonstrated using I-FABP as a marker. Presence of intestinal inflammation in CF patients was confirmed and now shown to be worse in EPI, CFRD and PPI use. Moreover, the data of this study suggest a relation between intestinal damage and inflammation and pulmonary function.

243 Transient elastography and abdominal ultra-sound investigation of adult CF patients monitored at the Copenhagen CF centre

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Objectives: To determine the prevalence of fibrosis/cirrhosis among adult Danish CF patients and to compare the performance of transient elastography (TE) to ultrasound of abdomen.

Methods: Cross-sectional study. All patient attending the Adult CF Centre at Copenhagen University Hospital, Rigshospitalet were invited to participate. In conjunction with a planned (non-acute) outpatient visit the patients had TE & ultrasound of upper abdomen performed. At the same visit blood samples were drawn for hemoglobin, leucocyte, thrombocyte levels, liver enzymes, tests for auto-immune hepatitis as well as samples for markers of fibrosis.

Results: By January 2013 49 patients have been included. A fifth (9/44) of the patients had elevated alanine amino-transferase (>45 U/l). TE could not be done in 3 (6%). Liver stiffness measurement were normal, with signs of fibrosis or cirrhosis (<7.7 , $>7.7 < 13.8$ & >13.8 kPa) for 83%, 13% and 4%, respectively. Two patients with high fibroelastase values (11.3 & 20.6 kPa) also had sonographical sign of fibrosis/cirrhosis. In both cases the patients and treating clinicians were unaware of signs of substantial liver affection. The highest liver stiffness value (35.8 kPa) was found in a patient previously diagnosed with cirrhosis.

Conclusion: At a routine visit to the adult CF clinic 20% of the patients displayed elevated liver enzymes. Seventeen percent of the patients had increased liver stiffness values, with 4% of the population having liver stiffness values (as well as ultrasound examination) indicative of cirrhosis. TE seems to be valuable in the evaluation of CF-related liver disease.

242 Evaluation of the size and contraction of the gallbladder by ultrasound in cystic fibrosis patients with and without pancreatic insufficiency

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Objectives: Evaluate the size and the contractility of the gallbladder (GB) in cystic fibrosis (CF) patients with and without pancreatic insufficiency.

Methods: There were included 76 individuals with age ranged from 1–18 years of age, 38 with CF (CF-Group) and 38 controls (control-group) matched for sex and age. All individuals were submitted to hepatic ultrasonography. The method of Van de Kamer was used to assess pancreatic function. The CF-Group was rated for presence (CF1) or absence (CF2) from steatorrhea. The evaluation of the gallbladder (GB) was obtained by:

1. greater longitudinal dimension,
2. larger anteroposterior size, and
3. GB area.

These measurements were obtained on fasting, 30 and 60 minutes after ingestion of food. From the results we calculated the GB contractility index (GBCI). To compare the measurements of the GB in CF patients versus controls was employed student t test for paired samples. To compare CF1 and CF2 groups was used the U Mann-Whitney test. In our study, the mean values of the measures 1, 2 and 3 for the CF and controls groups were: (12:45±51.53 mm, 15.25 mm ±4.98, 292.94±676 mm²) and (11:43±57.28 mm, 17.70 mm ±5.20, 344.17±896.65 mm²) respectively ($p < 0.05$). The GBCI on 30 and 60 minutes was also lower in CF-Group compared with the control group and no significant difference between subgroups in CF1 and CF2 was found.

Conclusion: CF patients have minor GB dimension and contractility than the control group. The GBCI was not associated with the presence or absence of steatorrhea in CF patients.

244 The effect of lubiprostone on human duodenal biopsy samples

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Objectives: To study the effect of lubiprostone (Lp) on human duodenal biopsy tissue. Previous work suggests that Lp activates CLC-2 in the gut, but not CFTR. Lp could therefore provide an alternative treatment to alleviate obstructive intestinal disease observed in cystic fibrosis patients.

Methods: Tissue samples from 9 female and 4 male patients, age 8 to 15 years (mean 12 years) were mounted in an Ussing chamber with standard Krebs both sides. Mean tissue resistance was 33 ± 5 ohms.cm² ($n = 13$). Control measurements were taken for 5 minutes and then glucose added apically to confirm tissue viability. 10 μ A of current was injected to calculate the equivalent short circuit current (I_{SC}). 1 μ M Lp was added apically. Statistical significance was tested using Student's t-test and assumed at the 5% level.

Conclusion: Addition of Lp shifted V_{te} from 0.56 ± 0.16 mV to 0.73 ± 0.19 mV, a mean shift of 0.17 ± 0.05 mV. This was associated with a significant increase in I_{SC} from 25.2 ± 9.70 μ A/cm² to 29.9 ± 9.90 μ A/cm², a mean increase of 4.72 ± 2.10 μ A/cm². These data suggest that Lp increases ion movement across human duodenal biopsy samples. The role of CFTR and CLC-2 in this ion movement is currently being investigated by examining the effect of the inhibitors CFTR_{inh172} (to block CFTR) and cadmium (to block CLC-2).