Longitudinal associations between FEV1 and HbA1c in a UK cohort of young people with cystic fibrosis

R.M. Williams1,2, T. Roots3, K.K. Ong1, D. McShane4, L. Shelby1, Tennon-diabetic CF patients (5F/5M) and nine healthy controls underwent an oral glucose tolerance test (OGTT) in the period 2003–2013 were collected. Glucose, insulin and C-peptide concentrations were determined every 30 minutes for 3 hours. The area under the curve (AUC) for glucose, insulin and C-peptide was calculated. Blood samples were also taken for measurement of C-peptide, insulin and C-peptide concentrations. Glucose, insulin and C-peptide concentrations were determined using enzymatic colorimetric assays. Glucose, insulin and C-peptide concentrations were determined using an automated analyser (Roche Cobas 6000). Glucose, insulin and C-peptide concentrations were determined using an automated analyser (Roche Cobas 6000). Glucose, insulin and C-peptide concentrations were determined using an automated analyser (Roche Cobas 6000).

Table 1. Univariate longitudinal models incorporated

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Slope (per % higher HbA1c)</th>
<th>P value</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>%FEV1</td>
<td>-2.9</td>
<td>0.016</td>
<td>-5.1 to -0.5</td>
</tr>
<tr>
<td>%FVC</td>
<td>-2.1</td>
<td>0.08</td>
<td>-4.4 to 0.3</td>
</tr>
</tbody>
</table>

Conclusion: In this large UK data set, longitudinal increases in HbA1c within the PD range were associated with declining lung function. Our findings support the rationale for trials to investigate if interventions to manage hyperglycaemia in young CF patients with PD. Acknowledgement: We are grateful to the CF trust for sharing the UK national data set. https://www.cysticfibrosis.org.uk/

Glucose tolerance in pediatric patients with cystic fibrosis

L. Zazzeron1, S. Gambazza1, C. Colombo1. Fondazione IRCSS Ca’ Granda Ospedale Maggiore Policlinico, Cystic Fibrosis, Milan, Italy

Background: Cystic fibrosis (CF)-related diabetes (CFRD) is a leading complication of CF and is associated with pulmonary and nutritional deterioration. Pathogenetic mechanism include insulin deficiency and insulin resistance. Objectives: To evaluate glucose tolerance in pediatrics patients with CF and to define a possible role of puberty in changing the status of glucose tolerance. Methods: Data of CF patients who performed an oral glucose tolerance test (OGTT) in the period 2003–2013 were collected. Glucose, insulin and C-peptide concentrations were determined every 30 minutes for 3 hours. The area under the glucose and insulin curve (AUC), the index of insulin resistance (HOMA-IR) and the insulinogenic index (IG) were also calculated.

Results: We analyzed OGTT of 175 CF patients (91 females; median age (IQR) 13.2 years (2.4); 91 pre-pubertal (8–12 years) and 82 pubertal (13–17 years). 12% of patients had glucose intolerance, 5% had diabetes without fasting hyperglycaemia, 1% had diabetes with fasting hyperglycaemia and 6% had indeterminate glucose tolerance. There was no significant differences in HOMA-IR, IG, FEV1%pred. and BMI percentile among different tolerance categories. In contrast pubertal patients had higher HOMA-IR and IG than pre-pubertal (P=0.001 and P=0.006, respectively) and a trend towards higher AUC (r=0.120).

Conclusion: The data suggest that glucose tolerance status in our CF pediatric population is not related to pulmonary function and nutritional status. The degree of insulin resistance seems to increase around pre-puberty.

A placebo-controlled trial of insulin therapy with or without adjuvant metformin in patients with cystic fibrosis-related diabetes (CFRD)

J.M.W. de Lind van Wijngaarden-vanden Berg1, R. van der Meer1, J.H.G. Heijerman1. Haga Teaching Hospital, Pulmonology, Adult Cystic Fibrosis Center, The Hague, Netherlands

Objectives: Diabetes is a major co-morbidity in patients with Cystic Fibrosis (CF) with a prevalence of 31% in our adult CF population and is associated with clinical deterioration. CFRD consists of both insulin deficiency and fluctuating insulin resistance. We hypothesized that adding metformin to insulin therapy results in a better management of CFRD. Aim of this study was to investigate the effect of adjuvant metformin therapy on insulin need and glycaemic control in CFRD. Methods: In this prospective randomized triple-blind crossover placebo-controlled study, 17 patients received insulin therapy and were randomized for either receiving adjuvant metformin or placebo during the first 3-month therapy period. After a four week wash-out, patients were interchanged to the other therapy regimen for a second 3-month therapy period. Study parameters were insulin need and blood HbA1c and glucose levels.

Results: 14 patients completed the study. The median number of units insulin administered per day was significantly lower during the metformin study period in comparison to the placebo period (respectively 19 IE/day and 26 IE/day, p=0.015). The lowering was more outspoken in patients with high insulin needs. HbA1c remained unchanged between both treatment periods (51.5 versus 55 mmol/mol, p=0.237). Glucose profiles measured by continuous glucose monitoring were more stable during the metformin treatment.

Conclusion: In patients with CFRD, insulin need lowered and glucose levels were more stable after adding metformin to their standard therapy.