329 Reactive hypoglycemia in non-diabetic cystic fibrosis patients

J.M. van den Berg[1], H.G. Heijerman[1]. [1]Pulmonology Department, Haga Teaching Hospital, The Hague, Netherlands

Background: CF patients may develop hypoglycemia during oral glucose tolerance testing (OGTT). We investigated the clinical importance of this by prolonged OGTT and continuous glucose monitoring system (CGMS).

Methods: Patients with reactive hypoglycemia on yearly OGTT (glucose <3.3 mmol/l) received a prolonged OGTT for 4 hours with regular determination of plasma glucose, insulin, glucagon, and C-peptide levels. Next, they received a subcutaneous CGMS for 3 days that measures interstitial glucose levels.

Results: 5 out of 75 CF patients (6.7%) had reactive hypoglycemia on yearly OGTT. On prolonged OGTT, the 2 male and 3 female patients had a mean fasting glucose of 5.3 mmol/l (SD 0.5). During the test mean glucose levels were 6.4 mmol/l (SD 2.9). Peak glucose levels (9.8–12.0 mmol/l) were measured after 30–60 minutes. The lowest glucose levels (2.0–3.1 mmol/l) were measured in 4 patients after 150 minutes and in 1 patients after 240 minutes. Glucose levels returned to normal afterwards. In all patients insulin levels (31.0–56.0 mU/l) peaked at least 30 minutes after the glucose level peak. Insulin and C-peptide levels had parallel trends. Glucagon levels were within the normal range and increased on low glucose levels. In all patients CGMS results were within the normal range, with all glucose levels between 3.9 and 11.1 mmol/l.

Conclusion: In all patients blood insulin peaks were later than peaks in glucose levels on prolonged OGTT, which indicates delayed insulin release. Glucose levels found during OGTT were borderline to diabetes, although the CGMS revealed no clinical implication in daily life. Patients with reactive hypoglycemia have direct postprandial hyperglycemia due to a late insulin reaction. Therefore, reactive hypoglycemia may be an indicator for patients who are at risk for developing CFRD.

330* Proof of principle. Treatment of cystic fibrosis-related diabetes: a possible role for complementary metformin?

J.M. van den Berg[1], H.G. Heijerman[1]. [1]Pulmonology Department, Haga Teaching Hospital, The Hague, Netherlands

Background: Insulin therapy is standard medical treatment in cystic fibrosis-related diabetes (CFRD). However, peripheral insulin resistance due to inflammation and drugs often complicates CFRD. Addition of an oral glucose-lowering agent with the aim to lower peripheral insulin resistance may therefore reduce the need for insulin and may improve glycemic control.

Methods: Metformin is a biguanide that acts on hepatic glucose production, glucose intestinal resorption and glucose muscle uptake. Possible side effects are gastrointestinal symptoms and a very small risk of lactic acidosis.

Two adult female cystic fibrosis (CF) patients with long term CFRD and treated with insulin pump therapy, had a disturbed glycemic control due to multiple pulmonary exacerbations and in one case oral corticosteroid use. Metformin was given in increasing dosages up to three times daily 500 mg during meals.

Results: In both patients insulin need decreased dramatically. After 3 months basal insulin need was decreased from 47 units per day (U/day) and 34 U/day to 35 U/day (−26%) and 24 U/day (−29%) respectively. Bolus insulin need also decreased from a mean of 38 U/day to 27 U/day (−29%) and from a mean of 18 U/day to 5 U/day (−72%). There was no nausea observed and blood lactate levels remained normal during metformin use.

Conclusion: In both patients insulin need decreased dramatically after starting metformin. This pilot is promising for the treatment of CFRD in the future. Currently a study is conducted to evaluate the effect of additional metformin on insulin need and glycemic control in a large CFRD patient population.

331 Efficacy of slow release insulin in patients with Cystic Fibrosis and Glucide Intolerance

L. Minicucci[1], R. Casciaro[1], A. De Alessandri[1], M. Haupt[1], M. Caso[1], V. Lucidi[2], F. Bagnasco[3]. [1]CF Center, G. Gaslini, Genova, Italy; [2]CF Center, Bambino Gesù, Roma, Italy.; [3]Epidemiology Unit, G. Gaslini, Genova, Italy.

In this multicentric, randomized, controlled study, tolerability and efficacy of insulin glargine to improve nutritional and glicometabolic condition and respiratory function was evaluated in CF patients with Glucide Intolerance (GI). Patients were divided into two groups (Group A and Group B) and patients in Group A received insulin (0.2 U/K/die). Up to now 45 patients (23 in Group A and 22 in Group B) entered in the study for a mean period of 14 months (range 3–18 months). After the enrollment 11 patients interrupted the study: 6 patients didn't accept the randomization result, 1 patient developed overt diabetes after 9 months, 1 patient voluntarily interrupted the drug after 15 months, 1 patient started enteral nutrition after 15 months, 1 underwent lung transplantation after 6 months, 1 died after 6 months. The collected data have been considered for all the parameters at time +9 months. Friedman's test was performed. BMI, Weight and FEV1% showed a mean improvement in group A patients (+0.3, +1 kg, +6% respectively), and a mean worsening in Group B (−0.1, −0.3 kg, −2.5% respectively). No difference reached statistical significance. Patients in both Groups improved their glicometabolic condition, but improvement in patients of group A was higher, even if not significantly (−0.2% and −0.1% respectively). No adverse effects were reported.

In conclusion insuline glargine has shown an apparently good impact on glicometabolic and clinical condition of underlying disease in CF patients with GI. Glargine, at the studied dosage, showed to be safe and well-accepted.

332 Carbohydrate counting and insulin adjustment in Cystic Fibrosis related Diabetes

L. Robb[1], M. Richardson[1], S. Johnston[1], J.A. Innes[1]. [1]Scottish Adult Cystic Fibrosis Service, Western General Hospital, Edinburgh, United Kingdom

Introduction: Carbohydrate (CHO) counting & insulin adjustment programmes teach participants to match insulin doses to food choices, whilst keeping blood glucose levels within the individuals target range.

CHO counting resources used locally were considered inappropriate for patients with Cystic Fibrosis (CF) due to their group format, "healthy eating" focus & lack of evaluation in the treatment of CF related diabetes (CFRD).

Aim: Develop & evaluate a CHO counting & insulin adjustment education programme for CFRD patients.

Methods: CHO counting/insulin adjustment skills were acquired via training courses & shadowing. A CHO counting programme specifically for patients with CFRD was developed and literature for those on conventional treatment was updated. *Inclusion*: patients on short acting daily insulin injections for ⩾ 3 months. *Controls*: patients wishing to remain on conventional treatment.

Both groups are seen at baseline, 3/12, 6/12, 9/12, 12/12. The study group (SG) are educated using the programme. The control group (CG) are re-educated using the updated literature. Outcome measures: body mass index (BMI), HBA1c, hypoglycaemic episodes (HE) & evaluation tool results. We intend to compare the two groups once data collection is complete.

Discussion: We hope to recruit ⩾ 15 patients into each group prior to data analysis. Results look promising so far, with an improvement in BMI (mean ↑0.3 SG, ↑0.2 CG) & HBA1c (mean ↓0.5% SG, no change CG) & a reduction in HE (mean ↓2.5 HE per month SG, ↑1 CG). Food knowledge is enhanced and patients appear to have better insight into diabetes treatment, targets and importance of good control. Some find the demands of the programme excessive, although the majority find the programme worthwhile.