Evaluation of continuous-glucose monitoring for the diagnosis of Cystic Fibrosis Related Diabetes (CFRD): A prospective and longitudinal study

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INTRODUCTION
Continuous-glucose monitoring (CGM) is becoming a useful tool to evaluate glucose profiles in real-life conditions and to detect glucose abnormalities undetected by OGTT in CF patients.

AIMS
- Evaluation of OGTT and CGM results longitudinally.
- Evaluation of BMI z-score and %FEV1 changes in relation to OGTT and CGM results.
- Analysis of 6 proposed criteria to classify glucose abnormalities by CGM results.

RESULTS
Cross-sectional study: 26% homozygous and 50% heterozygous for F508del mutation. 80% pancreatic insufficiency.
- OGTT: 28 patients (56%) NGT, 19 (38%) AGT and 3 (6%) CFRD.
- CGM: One patient (2%) with NGT and 11 (22%) with AGT on OGTT had glucose peaks >200mg/dL.

Chosen criteria to classify glucose abnormalities by CGM
(Specificity: 71.43%, Sensitivity: 86.36%)

<table>
<thead>
<tr>
<th>Fasting glucose</th>
<th>Post-prandial glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal glucose tolerance (AGT)</td>
<td>&lt;126 mg/dL</td>
</tr>
<tr>
<td>Cystic Fibrosis Related Diabetes (CFRD)</td>
<td>&gt;126 mg/dL</td>
</tr>
</tbody>
</table>

CONCLUSIONS
- CGM is a useful method to evaluate glucose abnormalities in CF patients.
- Criteria to diagnose glucose abnormalities using CGM are proposed.
- CGM is more sensitive than OGTT in detecting glucose abnormalities that are related with lung function variations and predicting future nutritional changes (decreased BMI).

PATIENTS & METHOD
Prospective longitudinal and cross-sectional study. Patients with genetically-confirmed CF >10 years old, visited between November 2012 and November 2019. Fifty patients (28 female), age: 13.79 ± 2.43 years. Patients receiving insulin, lung transplant; or treatment with corticosteroids, GH and/or immunosuppressants or having disease exacerbation in the previous four weeks were excluded.

OGTT and CGM performed yearly. BMI and %FEV1 assessed at the time of testing (±2 months) and at the previous year (±2 months).

OGTT classifies patients into normal glucose tolerance (NGT), abnormal glucose tolerance (AGT) or CFRD. After OGTT, CGM (IproTM2) was carried out for 6 days with regular exercise and diet. Comparison, by ROC curve, of sensitivity and specificity of the proposed criteria to classify glucose abnormalities by CGM results.

Propective study: in 21 patients at least 2 pairs of tests (CGM and OGTT) were performed (second test age: 15.33 ± 2.38 years) and in 12 of them (third test age: 16.01 ± 1.71 years) 3 pairs of tests.

BMI and %FEV1 according to CGM results.

<table>
<thead>
<tr>
<th>2nd CGM</th>
<th>Difference in BMI z-score* in 3rd test (median)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTG</td>
<td>0.13</td>
<td>0.024</td>
</tr>
<tr>
<td>AGT / CFRD</td>
<td>-0.30</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3rd CGM</th>
<th>%FEV1 in 3rd test (median)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTG</td>
<td>106</td>
<td>0.024</td>
</tr>
<tr>
<td>AGT / CFRD</td>
<td>94</td>
<td></td>
</tr>
</tbody>
</table>

NCT n=8; AGT/CFRD n=4.
*Difference of BMI z-score compared to the previous year.

REFERENCES

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