Does obesity influence ventricular repolarization in children?


Department of Pediatric Cardiology 1, Department of Pediatric Endocrinology 2, Department of Bioistatistics 3, Ankara University Faculty Of Medicine, Turkey

Introduction and purpose

- Ventricular repolarization changes lead to sudden cardiac death in obese individuals.
- Our aim is to investigate the relationship between ventricular repolarization changes, echocardiographic parameters with anthropometric measures and metabolic syndrome laboratory parameters in obese children.

Conclusion

- QT/QTc interval prolongation and increase in QT/QTc dispersions on ECG may be found at early ages.
- Subclinical left ventricular systolic dysfunction may also be detected on echocardiography in obese children.
- Further investigations are necessary for evaluation of probable rhythm disturbances.

Methods:

Patients

- 163 subjects (81 obese/82 control)
- Obese patients subdivided into groups; metabolic syndrome (MS, n:25) and non metabolic syndrome obese (NMSO, n:56) groups
- Anthropometric measures, plasma fasting glucose, fasting insulin, lipid profile, QT/QTc interval, QT/QTc dispersions left ventricular systolic measurements performed

Measurement technique

- Philips iE33 xMATRIX echocardiography device, 2.5 and 3.5 MHz transducers. M-Mode, 2-D ve pulsed-continuous and colored Doppler imagings
- M-mode echocardiography with Teichholz method left ventricular systolic functions (intraventricular septum diameter and left ventricular end systolic and diastolic diameters, friction and ejection fractions)
- Cardiocure Model EKG 2000, 12 lead ECG measured
- Bazett’s formula for QTc measurement

Statistics

- SPSS (Statistical Package for Social Sciences) for Windows 20.0 packet programme
- Results expressed as mean ±SD
- T-test for comparison of % between groups
- T test and Mann-Whitney U tests for comparing means

Results:

- Follow up time: approximately 4 years
- QT ve QTc dispersions were significantly higher in obese group regarding to healthy controls.
- Difference between QT ve QTc dispersions in MS group compared with NMSO and control group and in NMSO group compared with control group was statistically significant. (Table 1)
- QT and QTc dispersion was higher in obese group regarding to control group. (Figure 1,2)
- Left ventricular myocardial index (LVMI) was significantly high and EF was low in obese group regarding control group. (Figure 3,4)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>NMSO</th>
<th>MS</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>QT dispersion</td>
<td>36.6±18.5</td>
<td>46.4±17.5</td>
<td>64.0±23.8</td>
<td>0.001</td>
</tr>
<tr>
<td>QTc dispersion</td>
<td>35.8±25.2</td>
<td>55.6±32.5</td>
<td>78.2±33.2</td>
<td>0.001</td>
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<tr>
<td>Max Q70c (ms/m)</td>
<td>397.5±35.5</td>
<td>413.2±27.3</td>
<td>425.2±45.5</td>
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<tr>
<td>Min Q7c (ms/m)</td>
<td>350.6±20.1</td>
<td>356.6±25.5</td>
<td>347.3±33.3</td>
<td>0.376</td>
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<tr>
<td>Max QT (ms/m)</td>
<td>338.5±24.2</td>
<td>349.6±24.2</td>
<td>354.4±21.2</td>
<td>1.000</td>
</tr>
<tr>
<td>Min QT (ms/m)</td>
<td>301.5±26.1</td>
<td>303.2±22.5</td>
<td>298.4±17.4</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 1: ECG measurements
(C: Control MSO: Metabolic Syndrome Obese NMSO: Metabolic Syndrome Obese)

Figure 1: QTc Dispersion Change
Figure 2: QT Dispersion Change
Figure 3: LVMI Change
Figure 4: EF Change