QTc and QTd Changes after Pediatric Cardiopulmonary Bypass Surgery

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**Background**

- Systemic inflammation and altered myocardial repolarization are common consequences of cardiopulmonary bypass surgery.
- This study assessed the impact of cardiopulmonary bypass surgery on corrected QT (QTc) and QT dispersion (QTd) intervals.
- The possible role of inflammation on these variables was investigated.

**Results**

- QTc increased after surgery in 24 (67%) patients (mean ± SD = 31 ± 25 ms, range = 7 to 125) and decreased in 8 (22%) patients (28 ± 28 ms, range = 1 to 77).
- After surgery, QTc was abnormally prolonged in 8 (22%) patients (461 ± 18 ms, range = 445 to 487). Only one of these 8 patients had abnormally prolonged QTc before surgery, Fig. 1.
- Abnormally prolonged QTc returned to normal in 3 of the 4 patients with prolonged QTc.
- The changes in QTc and QTd did not correlate with CRP, WBC count, bypass time or aortic cross-clamp time, Fig. 2.

**Table 1.** QTc, QTd, CRP and WBC count one day before and five days after cardiopulmonary bypass surgery (n = 36).

<table>
<thead>
<tr>
<th>ECG parameters</th>
<th>Upper Limit Normal (97th Percentile) *</th>
<th>Pre-op (Day 1)</th>
<th>Post-op (Day 5)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTc, ms</td>
<td>440 (&lt;7 years of age)</td>
<td>404 (35)</td>
<td>422 (29)</td>
<td>0.037</td>
</tr>
<tr>
<td>QTd, ms</td>
<td>50</td>
<td>36 (13)</td>
<td>42 (10)</td>
<td>0.038</td>
</tr>
<tr>
<td>CRP, mg/dL</td>
<td>1.2</td>
<td>0.8 (0.2)</td>
<td>19.0 (11)</td>
<td>0.000</td>
</tr>
<tr>
<td>WBC count (x10³/µL)</td>
<td>15.5</td>
<td>7.8 (1.4)</td>
<td>10.7 (1.9)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Discussion**

- Impaired myocardial repolarization (abnormally prolonged QTc) appeared after surgery in 22% of pediatric patients.
- Since prolongation of QTc may predispose patients to post-operative arrhythmias, the clinical significance of these alternations deserve further studies.

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