

# 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  $\pm$  SD =  $31 \pm 25$  ms, range = 7 to 125) and decreased in 8 (22%) patients ( $28 \pm 28$  ms, range = 1 to 77).
- ♥ After surgery, QTc was abnormally prolonged in 8 (22%) patients ( $461 \pm 18$  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).

ECG parameters	Upper Limit Normal (97 <sup>th</sup> Percentile) *	Pre-op (Day 1)	Post-op (Day 5)	p
QTc, ms	440 (<7 years of age)	404 (35) (range = 275-479)	422 (29) (range = 371-487)	0.037
QTd, ms	50	36 (13) (range = 10-60)	42 (10) (range = 20-60)	0.038
CRP, mg/dL	1.2	0.8 (0.2) (range = 0.8-1.6)	19.0 (11) (range = 7-46)	0.000
WBC count ( $\times 10^3/\mu\text{L}$ )	15.5	7.8 (1.4) (range = 5-10)	10.7 (1.9) (range = 7-15)	0.000

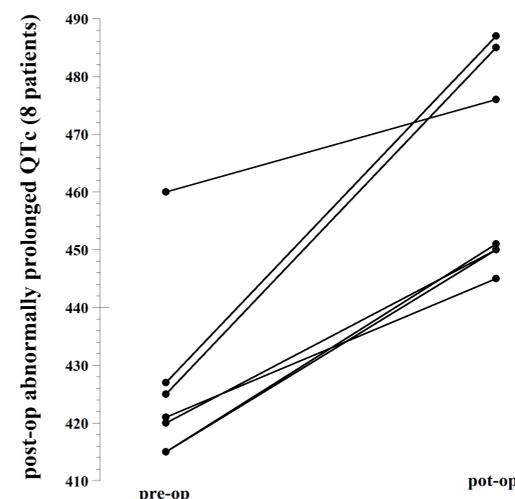
## References

- \* Makarov LM, Kisileva II, et al. Kardiologia 2006;45.  
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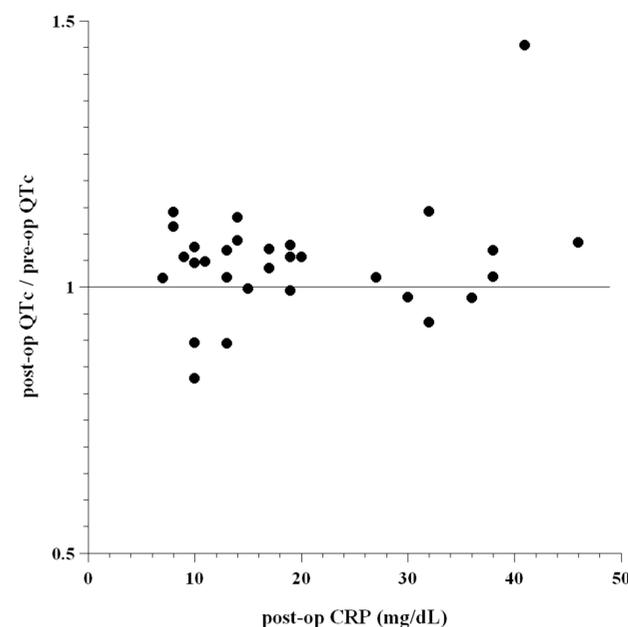
## Patients and methods

- ♥ ECGs were registered and C-reactive protein (CRP) and white blood cell (WBC) count were measured in 36 children with ventricular septal defect (VSD) or atrial septal defect (ASD).
- ♥ The parameters were measured one day before and 5 days after surgery.
- ♥ QTc and QTd were calculated as per standard procedures.
- ♥ The nonparametric (2 variables) Mann-Whitney test was used to compare samples.  $P < .05$  was considered significant.

**Fig. 1.** Eight patients with post-op abnormally prolonged QTc > 440 ms



**Fig. 2.** QTc changes as a function of post-op CRP values (n=36)



## 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.