

Postoperative Troponin: Beware Persistent Elevation!



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Dr Su et al from the Children's Hospital of Los Angeles have looked at the outcome of infants undergoing cardiac surgery and related this to serial assessment of their postoperative troponin levels.¹ Their study indicates that children who have persistent troponin elevation beyond 8 hours after surgery have a substantially higher incidence of both morbidity and mortality. Complications experienced in these patients with persistent troponin elevation included necrotizing enterocolitis, neurologic insult, renal failure, and pancreatitis. Persistent elevation of troponin beyond 8 hours was associated with a 30% mortality! There have been many previous attempts to look at troponin measurements and assess clinical correlation. These authors have demonstrated a relatively tight connection between a persistently elevated troponin and adverse clinical outcomes. This information will be useful to clinicians caring for infants after cardiac surgery.

Like all new modalities, the study also raises some new questions. Should we be assessing postoperative troponins in all infants following cardiac surgery? These results appear to support measuring troponin trends particularly in patients who are having an unusual postoperative recovery course. In my practice, I have typically followed postoperative troponin levels only in patients having a coronary procedure (arterial switch operation, Ross procedure, coronary unroofing, etc.). Given the results of this study, it may well be that for infants having cardiopulmonary bypass that troponin levels 6–8 hours postoperative ×24 hours should be a standard part of the postoperative order set much like arterial blood gasses. Persistent elevation beyond 8 hours should alert the clinician to move to a heightened index of suspicion for expectant complication management.

An interesting finding was that the use of deep hypothermic circulatory arrest was actually associated with lower troponin levels. One would have predicted that these patients would have been the most complex patients and hence, would have the highest troponin levels. This is an interesting conundrum. The authors speculate that deep hypothermic circulatory arrest may be protective to the myocardium. Also interesting was the



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Central Message

Elevated serial postoperative troponin levels identify infants at risk of postoperative hypoperfusion injuries and mortality after pediatric cardiac surgery.

fact that there was no correlation between the need for ECMO and persistent troponin elevation beyond 8 hours.

Given the results of the current study, it appears that we should be strongly considering assessing troponin levels in infants who are having postoperative outcomes different than expected (if not all infants) and having a heightened alertness and concern for potential complications if the troponin levels are elevated at that critical time period of 8 hours after surgery. We still have work to do, however, to establish the mechanism between cardiac enzyme persistent elevation and the occurrence of hypoperfusion injuries. How does one connect the dots between persistent troponin elevation and necrotizing enterocolitis or pancreatitis? The next step may be to simply acknowledge these findings and develop an algorithm that would incorporate troponin levels into other markers such as lactate, mixed venous saturation, and clinical data such as central venous pressure, arterial blood pressure, and urine output to establish a model that would be even more predicative of outcomes and offer chances to intervene at the appropriate time.

REFERENCE

1. Su J, Kumar S, Mahmoud H, et al: Postoperative serum troponin trends in infants undergoing cardiac surgery. *Semin Thorac Cardiovasc Surg*, in press. <https://doi.org/10.1053/j.semtcvs.2018.08.010>

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