Commentary: Timing of neonatal heart surgery: One less target in the quest for perfection

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The manuscript by Smith and colleagues1 uses the Pediatric Cardiac Critical Care Consortium (PC4) database to explore the relationship between outcomes of 4 neonatal heart operations (arterial switch operation [ASO]; arterial switch operation with ventricular septal defect closure, [ASO + VSD]; stage 1 Norwood palliation; and truncus arteriosus [TA]) and timing of surgery within days 2 to 7 of life. This has been a vexing topic in congenital heart surgery, with various single-institution studies producing conflicting results. Yet, because day of surgery is a modifiable risk factor, it has remained a topic of considerable debate and handwringing, with different centers exercising different superstitions. The current study appears to be the most authoritative on the topic, based on the robust multicenter database and careful exclusion of patients where timing of surgery may not have been modifiable and was likely dictated by other clinical factors. The results were clear and refreshing and consistent with common sense—in otherwise-stable patients, there is no difference between surgery on day of life 2, 3, 4, 5, 6, or 7.

The main caveat is that a significant proportion of patients in the study did not undergo surgery in the first week of life. Specifically, the rates of operation after day of life 7 were 22% for ASO, 32% for ASO + VSD, 31% for TA, and 15% for stage 1 Norwood palliation (Table E5 in the article by Smith and colleagues1). Examination of these numbers suggests 2 conclusions. First, a significant proportion of patients may have important clinical factors that lead to a delay in surgery. Second, there is probably less perceived urgency for repair of ASO + VSD and TA than for the other 2 lesions. Patients with ASO + VSD may have stable saturations and less risk of left ventricular deconditioning, and urgent surgery may not be considered mandatory. Repair of TA was historically not performed until as late as 1 to 2 months of age, and some programs may still prefer to allow a short period of feeding and growth before repair. It is therefore important to recognize that although there was no difference in outcomes identified for patients who underwent surgery between day of life 2 to 7, this does not necessarily mean that operation between day of life 2 to 7 should be the goal for every patient.

The quest for perfection in neonatal heart surgery has successfully marched forward, and progress has been made in most areas. Notably, in the recent update to the STAT (The Society of Thoracic Surgeons–European Association for Cardio-Thoracic Surgery) mortality categories that was implemented earlier this year, 2 of the 4 neonatal operations studied by Smith and colleagues were downgraded. ASO is now STAT 2 (2.3% estimated mortality, downgraded from STAT 3), and ASO + VSD is now STAT 3 (5.1% estimated mortality, downgraded from STAT 4).2

In relation to the aforementioned, the results of the study by Smith and colleagues are both satisfying and

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disappointing. While they show that there is no need to detonate the operating room schedule to accommodate surgery on a neonate on a specific day of life, it also reaffirms the sobering reality that there is less we can “modify” than we think. The major determinants of outcomes remain out of our control and include prematurity, birth weight, chromosomal/syndromic abnormalities, and fundamental cardiac anatomy. In the absence of other low-lying fruit, the pursuit of perfection in neonatal surgery returns to the fundamentals—judicious preoperative care and decision-making; technical execution with operating room factors optimized to reduce errors; skilled, attentive team-based postoperative care; and obsessive attention to detail at every step. With these principles at the forefront, concerns over precise timing of surgery in stable patients should fade into the background.

References