Letters to the Editor

Effect of surgical case volume on outcome after the Norwood procedure

To the Editor:

Checchia and colleagues¹ analyzed outcome data for the Norwood procedure performed in a cohort of 29 institutions stratified by case volume using the Pediatric Health Information System. They conclude that survival is associated with institutional Norwood procedure volume and that regional referral centers should be established for care of children with hypoplastic left heart syndrome.

Table 1 from the article reveals that the most favorable outcome of the entire group occurred in an institution in the "low-volume" cohort and that 4 of the 5 institutions with the most favorable outcomes were in the low- and medium-volume cohorts. Although variability in survival outcome is greater in low-volume institutions viewed as a group (low volume, 25%-100% survival; higher volume, 55%-92% survival), it is evident that individual institutions can achieve excellent outcomes regardless of volume.

Mavroudis and Jacobs² have stated that many lower-volume surgeons and centers have excellent results. Chang and Klitzner³ have published a theoretic analysis that regionalization of pediatric cardiac surgery is associated with reduction in surgical mortality. In the article by Checchia and colleagues,¹ institutional identity is blinded, but in the Pediatric Health Information System database individual institutions are informed of their outcomes. Institution 7 is a low-volume, freestanding children's hospital in which cardiac surgery is performed as part of a regional program. The outcomes achieved at that institution (as well as the outcomes at institution 6) demonstrate that excellent outcomes can be achieved at low-volume institutions. Evaluation of an institution cannot validly be based simply on procedure volume.

Our regional program includes 2 lower-volume institutions, as defined by the criteria used by Checchia and colleagues.¹

Analysis of our outcome data for patients with hypoplastic left heart syndrome who underwent stage 1 palliation (using the right ventricle-to-pulmonary artery conduit modification of the Norwood procedure) performed between 2002 and 2005 demonstrated survival to discharge of 21 of 23 patients (91% survival) at one institution and 8 of 8 patients (100% survival) at the other. We believe these outcome data further support the premise that excellent outcomes can be achieved in smaller-volume institutions, particularly when the institution is part of a regional program.

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Reply to the Editor:

My associates and I appreciate the comments made by Dr MacDonald and colleagues regarding our article examining the effect of surgical case volume on outcome after the Norwood procedure.¹ They raise interesting points.

We agree that individual institutions can achieve outstanding outcomes regard-

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