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Editorial Comment

Bidirectional cavopulmonary anastomosis

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SLAVIK AND HIS COLLEAGUES[1] OFFER A THOUGHTful discussion of the subject of the bidirectional cavopulmonary anastomosis, and offer a useful review of the primary papers. The authors make the important point that these patients are not a homogeneous cohort. The argument about where to measure the pulmonary arteries is a bit academic, and the strengths and weaknesses of various methods have been covered thoroughly in the papers that they reference. Especially in the work of Reddy and associates,[2] a very good case is made for measuring the branches of the pulmonary arteries in addition to central vessels. Slavik et al suggest that a measurement error is introduced because pulmonary arteries do not necessarily have a circular shape in their cross section. While this may be true, their suggestion to solve the problem using the diameter is subject to the same error, although only at a linear rather than geometric level.

As they point out, none of the investigators examining pulmonary arterial growth after the bidirectional shunt found pulmonary arterial size to be a risk factor for non-survival of subsequent Fontan type surgery. This conclusion would be valid only if every patient who had a bidirectional cavopulmonary shunt was subjected to a Fontan operation, which has certainly not been the case. In every series, there have been some patients who had high superior caval venous pressures, poor ventricular function, and so on, that excluded them from consideration for a Fontan operation. So one can only say that, amongst patients with a bidirectional shunt who were felt to need further surgery, and who were felt to be suitable for it, the size of the pulmonary arteries was not an issue. This is the real beauty of the bidirectional cavopulmonary shunt. It allows us to have a preview of post-Fontan haemodynamics without subjecting the patient to the operation. Those who are already in a haemodynamic situation which is less than ideal after the cavopulmonary shunt have nothing to gain from the Fontan operation. Pulmonary recirculation has already been eliminated, except in the presence of a second source of pulmonary blood flow, and therefore no further reduction in volume could be expected. All that one would achieve would be, perhaps, better oxygenation, but at the cost of the many complications associated with an elevated venous pressure in the lower body and, in many cases, a reduced cardiac output.

We should not dismiss the Nakata index[3] and its modifications as reliable methods for assessment of pulmonary arterial development after a bidirectional shunt. On the contrary, these remain very good methods as long as one avoids the mistake is not made of using them as the sole criteria for decision making about suitability or need for further Fontan surgery. Finally, as the authors mention, there is not much evidence to support the claim that a restrictive additional source of pulmonary blood flow is well tolerated, and that it may overcome concerns about the safety in the medium term of bidirectional cavopulmonary shunting in pulmonary arterial development. All we can say now is that the results of bidirectional shunting without a second source of pulmonary blood flow have led many groups to use, or maintain, a second source in the hopes that the pulmonary arteries will appear better developed at follow-up, with maintenance of suitability for conversion to the Fontan circulation should this become necessary on physiologic grounds.[4]

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