Commentary

Aortic arch reconstruction in Norwood procedure—size differences after hybrid or Norwood palliation

Julie Cleuziou

Department of Cardiovascular Surgery, German Heart Center, Munich, Germany

Correspondence to: Julie Cleuziou. Department of Cardiovascular Surgery, German Heart Center, Munich, Germany. Email: cleuziou@dhm.mhn.de.

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Aortic arch reconstruction in patients with hypoplastic left heart syndrome (HLHS) presents a surgical challenge and is associated with a re-intervention rate of 18% (1). Different surgical techniques have been advocated to improve results, but these are dependent on the initial geometry and size of the native aorta and probably also on the flow dynamics. Haller and colleagues sought to investigate the differences in aortic arch growth between patients treated with a Norwood procedure (NP) and patients undergoing an initial palliative procedure with bilateral pulmonary banding and ductal stenting (2). Diameters of the aorta were measured at different times after aortic arch repair and at different locations.

Diameters and z-scores were greater in HP than in NP before stage II or comprehensive stage II for the aortic isthmus and the descending aorta. The authors explain this finding with the natural growth of the aorta distal from the duct, due to preferential bloodstream patterns in HP. Before stage III, diameters of the descending aorta were comparable, though the actual diameters in HP remained larger than in NP. Probably, the reason for this finding is the preferential blood stream towards the descending aorta in HP, but I am missing a discussion about this crucial area of the aortic arch, in which recoarctation is most probable to develop. Several patients have in this area a coarctation with ductal tissue within the descending aorta. A posterior shelf is also quite common, which is not being resolved by the implantation of the ductal stent. Are these anatomical variants, which are seen during the NP, eliminated by the blood flow to the descending aorta? Or are these just overstented? Probably, more information about the surgical finding at time of aortic arch repair in HP can answer these questions.

Interestingly, the retrograde blood flow through the ductal stent doesn't seem to have an influence on the growth of the ascending aorta, although it is enough to keep up coronary perfusion. Of major importance are the findings after stent retention. One would expect that the remaining of ductal tissue is a disadvantage for growth of the aortic arch and would lead to a narrowing. The fact that no patch material was used in these patients shows again, that recoarctation is not necessarily due to patch material (3).

Overall, it is difficult to compare both procedures, since the timing of aortic arch repair is different. From a surgeon's point of view, the tissue of a new-born with intravenous prostaglandin scheduled for NP is more fragile than the tissue of a 4-month old patient scheduled for comprehensive stage II. Still the texture of the tissue is of relevance and a stronger tissue at time of aortic arch repair could reduce scarring, leading to a lowered recoarctation rate. Furthermore, the growth of the aorta might be dependent on the initial size of the aorta and thus the native tissue which is thought to be the only one to have growth properties. Unfortunately, the preoperative sizes of the aorta are not mentioned in this paper.

This paper shows nicely, that recoarctation in patients with HLHS is still an unresolved problem. Both presented

groups, although operated upon with a completely different surgical method, had similar recoarctation rates. Thus the cause for a recoarctation should be searched elsewhere.

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Footnote

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