Editorial

Ascending aortic slide for interrupted aortic arch repair: a new approach to maintain native tissue continuity

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Interrupted aortic arch (IAA) is characterized by the absence of luminal continuity between segments of the aortic arch and the proximal descending aorta (1,2). It is a rare congenital malformation that is often associated with a ventricular septal defect (VSD), and may coexist with severe intracardiac congenital anomalies such as common arterial trunk (CAT), transposition of the great arteries (TGA), aortopulmonary window (APW) or hearts with single ventricle connection (1-3).

The natural history of IAA results almost in death within the first year of life (1,2). Survival of children with IAA is dependent on a patent ductus arteriosus (PDA), which provides lower body perfusion through the right-to-left shunt. With regard to the surgical approach of repair for IAA, a staged repair or a single stage repair can be done. In either approach, or depending on the type of interruption, the aortic arch repair can be done by different techniques, such as subclavian flap technique (4), interposition of a graft (5), direct anastomosis (6), or sliding arch aortoplasty (7). Although the treatment of choice seems to appreciate a single stage repair with direct anastomosis (2,5,6), some controversy still exists on the preferable approach (1,4).

Possible complications from the direct anastomosis are restenosis of the aortic arch and left bronchial compression. Tension on the anastomosis even after full mobilization of the aortic arch and the descending aorta or incomplete resection of the ductal tissue for fear of tension might contribute to the outcome. In addition, excessive tension between the two aortic ends in the newly reconstructed taut aortic arch could result in left main bronchial obstruction (8). If this is a strong concern, i.e., the gap between the proximal and the distal portions of the arch is too far apart and a direct native tissue anastomosis is not possible, a prosthetic graft interposition may be necessary. In this case, future reoperation will be mandatory because of inability of graft to grow. So native tissue-to-tissue reconstruction is always preferred when it is possible. Jacobs and his associates (9) used Norwood arch reconstruction technique into hypoplastic left heart syndrome variants where aortic arch branches are anastomosed in side-to-side fashion and then arch reconstruction is completed by augmentation with gusset of cryopreserved pulmonary artery homograft. This technique may bring relatively tension-free anastomosis, so it may contribute to less bronchial compression or restenosis.

New technique for aortic arch repair introduced by Urencio and his associates is a modification of Norwood arch reconstruction (10). The medial ascending aorta is split into half longitudinally from the sinotubular junction up to the arch origin. The resultant flap of ascending aorta is rotated leftward and posteriorly toward the distal aortic portion and used as a posterior bridge of native tissue to connect the proximal and distal parts of the interruption, thereby becoming a neotransverse arch. This is wise use of native tissue to make a native-to-native tissue continuity,

although some idea comes up on how small ascending aorta can be used for this technique and how much tissue can be safely used from relatively small ascending aorta. The authors applied this technique in neonates with ascending aorta as small as 3.8 mm. Splitting an already small ascending aorta may lead to future supravalvular aortic stenosis. Other potential drawback is related to long suture line, which will be always a risk of bleeding and/or longer cross clamp time as well as future restenosis.

Patch material may be concerned to avoid future stenosis or reoperation. Many materials have been used for arch augmentation in other techniques, such as PA homograft (9), own pericardium (11), and autologous pulmonary artery patch (12,13). Extracellular matrix patch (14) might be a potential alternative. So far there is no superiority in one material over the other.

Limitations of Urencio's study include the small number of patients, short follow-up time period, the retrospective nature of analysis and no comparison of any other conventional techniques, however this technique can potentially be a good alternative in some conditions, where more conventional techniques are judged suboptimal or will not allow for a tension-free repair in patients with IAA.

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Footnote

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