

JSPCCS-AEPC Joint session

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Mon. Nov 23, 2020 4:00 PM - 5:30 PM Track2

[II-AEPCJS-4]Optimal indication and surgical technique for AS/AR: the role of aortic valve replacement in the very young patient

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Aortic valve replacement may be required at a very early age (neonates, infants and very young children) for severe aortic stenosis and/or regurgitation, either as a primary or a secondary choice, the latter in the cases of failed balloon or surgical aortic valvuloplasty. Surgical options for this patient population are particularly limited because of patient size and lack of suitable prosthetic valves (mechanical or biological). Therefore, in the past decade, the use of pulmonary autograft has been increasingly recognized as the best solution. In fact, it almost entirely satisfies all the criteria of the ideal prosthesis in aortic position, being: 1) Available, i.e. collected from the same patient, provided the absence of pulmonary regurgitation. 2) Efficient, in a similar way to a normal aortic valve, with early normalization of left ventricular function. 3) Durable, based on a dual mechanism of growth and dilatation, though variable from patient to patient. 4) Thromboresistant and fully biocompatible, without need for anticoagulation. 5) Implantable, although usually at the expense of aortic annulus enlargement by means of a challenging surgical procedure, the Ross/Konno operation. Neonates and infants undergoing this operation are a high-risk group, with an average hospital mortality in the neonatal group of up to 20-30% in multi-institutional studies, i.e. comparable with some of the highest risk procedures. Several risk factors have been identified in this age cohort, e.g.: critical aortic stenosis with preoperative ventricular dysfunction, need for postoperative mechanical circulatory support, aortic arch hypoplasia and mitral disease. Procedure-related long-term survival is generally reported as very satisfactory with excellent left ventricular functional parameters. Conversely, freedom from reoperation on either the left or the right ventricular outflow tract (or both, "two-valve disease") declines progressively with time, although variably from institution to institution. Interestingly, it has been noted that the reintervention rate on the aortic outflow tends to be lowest in infants compared with older patients, whereas age is inversely related to need for reintervention on the pulmonary outflow tract. In fact, the planned need for right ventricle-to-pulmonary artery conduit is generally considered the true Achilles' heel of the Ross (\pm Konno) operation.

Among alternative options for aortic valve replacement at a very young age (including infants), it is worth mentioning the initial experience with the Ozaki procedure, recently reported by the Boston group. Encouraging short-term results were achieved also in young patients with small aortic annulus, adding a procedure for surgical annular enlargement.