Arterial switch operation: is the glass half full or half empty?

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Dr Lim et al. [1] report their experience with the arterial switch operation (ASO). Between 1987 and 2011, 258 patients underwent ASO; the late results were evaluated in 220 operative survivors after a mean follow-up of 8.5 years.

The results can be looked at in two different ways.

On the one hand, the outcome is satisfactory. Late mortality was low, achieving a 97% probability of survival at 20 years (excluding operative mortality). Freedom from reoperation was 82% at 20 years; the main indications for reoperation were pulmonary stenosis (10 patients), aortic regurgitation (four patients) and coronary artery lesions (three patients). At the last follow-up, 96% of patients were free of symptoms.

On the other hand, several concerns arise. The early mortality rate was not negligible (14.7%); the actual late survival was, therefore, far from optimal. Coronary lesions were detected in five patients, but only 95 (43%) patients actually underwent coronary evaluation. At 20 years, the freedom from more than moderate aortic regurgitation was 71% and the freedom from significant pulmonary stenosis was 35%. The incidence of both aortic regurgitation and pulmonary stenosis increased linearly with the length of the follow-up.

These results raise two further comments:

1. The results of the present study should be taken with caution.

The study group is relatively small for a common surgical procedure (258 patients during a 23-year study period). This represents a mean of 11 operations/year and <4 patients/year for each attending surgeon. ASO is a procedure in which both experience and volume of practice play a major role [2]. This factor alone may account for the relatively high early mortality.
rate (14.7%), as well as the potential implication of several technical factors in the occurrence of late complications.

The study group includes three different groups of patients: simple transposition of the great arteries (51%), transposition with ventricular septal defect (41%) and Taussig–Bing anomaly (8%). There are, between these subgroups, major differences (coronary anatomy, spatial relationship between the great arteries, size discrepancy between the aortic and pulmonary roots, associated lesions) which may influence greatly the development of late residual lesions.

The small number of patients in each anatomical subgroup, the limited length of the follow-up (the mean follow-up is only 8.5 years and <50 patients have reached 15 years) and the small number of adverse events make the statistical interpretation of the results hazardous.

2. Despite these limitations, the study provides further confirmation of the risk of late events following ASO.

Coronary lesions may be present in patients without evidence of coronary ischaemia and may be progressive. Routine and repeated coronary evaluation is mandatory. Reoperations should be performed in most patients in order to preserve ventricular function [3].

Moderate dilatation of the neo-aortic root is common. To date, the incidence of severe aortic regurgitation and the need for aortic valve repair or replacement remain fortunately low [4], although the dilatation of the aortic root and the severity of aortic regurgitation worsen with time. Technical factors may play a role, such as the preservation of a normal sinotubular junction and the avoidance of valvar distortion during coronary reimplantation. However, the ability of the neo-aortic root to sustain systemic pressure on the very long-term remains a matter of concern.

To conclude, (1) ASO is a typical procedure where the early and late outcomes are highly dependent upon surgical factors. Even if this is a matter of long discussion, this may justify the concentration of the patients in units with a sufficient level of experience and volume of practice. (2) A careful long-term follow-up is mandatory and the need for reoperation can be anticipated in a good number of cases.

**REFERENCES**