Repair Of Neo-aortic Valve Insufficiency Following The Ross Procedure With Geometric Ring Annuloplasty

Objective: Late reoperation for autograft dilatation and neo-aortic valve insufficiency following the Ross procedure usually includes aortic root replacement (Bentall or valve sparing). While autograft dilatation contributes to insufficiency, leaflet pathology is not uncommon. We present neo-aortic valve repair of an intermediate-type bicuspid valve with the use of tri-leaflet aortic ring annuloplasty, along with replacement of the non-coronary sinus and supra-coronary autograft with a Dacron graft.

Case Video Summary: A 9 year-old male had a Ross procedure 4 years earlier for bicuspid aortic valve disease. Lately, he developed heart failure, worsening severe neo-aortic Insufficiency, thickened leaflets, a 3.1 cm annulus, and neo-aortic root dilatation. At surgery, the aorta was transected and suspended at the commissures. The neo-aortic valve seemed to have two partially fused leaflets, making it an intermediate-type bicuspid valve. Leaflet sizing revealed a 21 mm non-fused leaflet and 19 mm for each fused leaflet. A 19 mm tri-leaflet aortic annuloplasty ring was selected, and 3 Cabrol-like stitches buried the ring posts into the sub-commissural triangles. Then, 3 looping sutures anchored each ring sinus segment to the annulus. All sutures were tied and laterally fixed. The leaflets then were assessed and had different effective heights. The ultrasonic aspirator helped soften the thickened cleft tissue in the fused leaflet, and all leaflets were plicated to raise and equalize effective heights until good verticality and coaptation were achieved. The noncoronary sinus and supra-coronary autograft wall were replaced with a 26 mm Dacron graft. Echocardiogram showed trivial to mild neo-aortic valve regurgitation and a mean systolic gradient of 16 mm Hg. Recovery was noneventful.

Conclusions: The approach of aortic ring annuloplasty and leaflet reconstruction facilitates repair of the dysfunctional neo-aortic valve, stabilizes the annulus, and simplifies the resection of the dilated neo-aortic root.

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