Piezoelectric-assisted Aortic Valve Repair

Objective: Several techniques of aortic valve (AV) repair have, to date, shown safety and efficacy. One of the main contraindications to AV repair is still the presence of cusps calcification and this reduces the rate of patients eligible for this procedure. Piezoelectric surgery (PS) is based on the high frequency vibration of a metallic tip used to selectively cut calcium while sparing surrounding soft tissues. This technology can be considered a useful tool in addressing towards conservative techniques also complex valves with calcified cusps. CASE VIDEO Summary: This is a case of a 55-year-old woman with diagnosis of severe AV regurgitation and dilated ascending aorta who was suitable for aortic valve repair. The trans-esophageal echocardiography (TEE) showed a tricuspid AV with severe regurgitation and a partial fusion of right and non-coronary cusps with mild calcification of the raphe, which could compromise a successful repair. A full sternotomy is performed, and cardiopulmonary bypass established. The ascending aorta is opened, and the aortic valve exposed. AV cusps appear pliable except for the calcified raphe. The raphe is therefore opened with a sharp dissection and then calcium removed with a piezoelectric scalpel, until a pliable surface is obtained. Repair feasibility is then verified by measuring the effective height of all the three cusps with a dedicated calliper. HAART ring is sized with the dedicated spherical sizer and a 21 millimeters ring is selected. The post sutures are placed in the sub-commisural triangle with Cabrol-like configuration and the ring is lowered into the sub-valvular position. The sinus sections of the device are secured to the annulus with two interrupted looping sutures for each sinus. Ascending aorta is then replaced with a 30 mm Dacron graft. Post-procedural TEE shows a trivial residual AV regurgitation with a mean gradient of 10 mmHg.

Conclusions: Nowadays, in high experienced centers, AV repair should be considered as first option in all comers with aortic regurgitation. Piezoelectric surgery helps surgeons to face also complex cases with cusps calcifications in patients otherwise considered not suitable for a conservative technique.

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