Robotic mitral repair after two previous sternotomies (Rastelli operation and replacement of the aortic valve and RV-PA conduit)

Objective
Mitral surgery is one of common procedures in adults after initial repair for congenital cardiac disease and redo cardiac operations can be challenging. We have utilized robotic techniques to repair mitral regurgitation to promote better visualization, effective operative manipulation, and less invasiveness by avoiding redo sternotomy.

Case Video Summary
A 37-year-old gentleman developed symptomatic progressive severe mitral regurgitation after an initial Rastelli operation (left ventricular baffling to the aorta through the ventricular septal defect (VSD) and reconstruction of right ventricular outlet using right ventricle-pulmonary artery (RV-PA) conduit) for D-transposition of the great arteries with VSD and subpulmonic stenosis at 4 years old and subsequent bioprosthetic aortic valve replacement (25mm) and RV-PA conduit replacement (23mm bioprosthesis and 24mm dacron tube) for infective endocarditis at 27 years old. Preoperative echocardiography showed severe mitral regurgitation with flail P2 leaflet. Preoperative computed tomography showed persistent left superior vena cava (PLSVC), the aorta adjacent to the sternal bone, and the mitral valve located just behind the pulmonary artery stump. We employed a robotic approach to avoid a third sternotomy. We cannulated the bilateral internal jugular veins, left femoral vein, and right femoral artery to establish cardiopulmonary bypass and the left femoral artery to deliver the endoballoon to the ascending aorta. We carefully dissected adhesions around the left atrium. After ischemic arrest, we opened the left atrium and exposed the mitral valve. The dilated mitral annulus with P2 prolapse was identified. We resected the P2 segment and closed the cleft between P1 and P2. We placed a 34mm SimuPlus annuloplasty band (Medtronic, Minneapolis, MN) to the dilated annulus. As the coaptation depth was still shallow, we applied a P1-A1 edge-to-edge stitch. Postoperative echocardiography showed trivial residual mitral regurgitation with mean pressure gradient of 1mmHg. Blood loss was minimal and there was no red blood cell transfusion. The patient was extubated the following day and postoperative course was uneventful.

Conclusions
We report a successful robotic approach to repair degenerative mitral regurgitation after two previous sternotomies for congenital heart disease. This robotic approach provided a safe and effective alternative to traditional redo-redo sternotomy or right thoracotomy.

Makoto Hibino (1), Michael Halkos (1), (1) Emory University, Atlanta, GA