Robotic Artificial Chord Implantation for Repair of Extensive Non-contiguous Posterior Mitral Leaflet Prolapse

Objective: To demonstrate our robotic approach to repair extensive mitral prolapse involving non-contiguous regions of the posterior leaflet.

Case Video Summary: We present a 58 year-old gentleman who underwent robot-assisted mitral valve repair for asymptomatic severe mitral regurgitation (MR). The patient was found to have a cardiac murmur and investigation revealed severe MR due to extensive posterior leaflet prolapse. Pre-operative workup demonstrated good left ventricular function, excluded coronary or aortic atherosclerosis and confirmed suitability for a robotic approach.

Our repair strategy depends on the nature of posterior leaflet pathology. In this case, the patient had severe MR due to prolapse of two non-contiguous regions of the posterior leaflet. Therefore, we opted to use two sets of artificial chordae to each prolapsing region respectively. The robotic approach enables optimal visualization of the mitral valve, including the subvalvular apparatus, thus facilitating ideal placement of chords. Our robot-assisted technique involves passage of one pre-knotted limb of an artificial chordal suture from the atrial surface of the leaflet through the papillary muscle as a felt pledget-reinforced U-stitch. The leading end of the suture is then passed back from the ventricular to atrial surface of the leaflet, making one or more passes through the leaflet edge to finish adjacent to the first limb of the suture. Leaflet height is adjusted and the chord tied with ten to fifteen throws. When using two sets of chords, as in this case, the first is tied securely while the second is tied with a surgeon's knot to allow for any necessary adjustment of leaflet height after static testing of the valve prior to completely tying. The repair is then completed by implanting a flexible annuloplasty band from trigone to trigone using a braided suture with a continuous running technique. Intraoperative transesophageal echocardiography off cardiopulmonary bypass confirms a successful repair with no MR, no systolic anterior motion and good left ventricular function.

Conclusions: We present a case video that demonstrates our technique of robot-assisted artificial chord implantation for successful repair of extensive prolapse involving non-contiguous regions of the posterior mitral leaflet. In particular, the robotic approach facilitates our technique through excellent visualization of the mitral valve and dexterity of instrumentation.

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