

Chordal preservation mitral valve replacement for delayed MitraClip failure

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Abstract

Mitral valve replacement may be indicated for delayed MitraClip failure. Although it would be best to preserve the chordal apparatus during mitral valve replacement, this has not been reported for delayed MitraClip failure. The reason is probably because there is almost always impressive inflammation around the MitraClip which has likely precluded previous attempts at chordal preservation. We report successful chordal preservation mitral valve replacement for delayed MitraClip failure.

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Running title: Valve replacement after MitraClip

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Abstract:

Mitral valve replacement may be indicated for delayed MitraClip failure. Although it would be best to preserve the chordal apparatus during mitral valve replacement, this has not been reported for delayed MitraClip failure. The reason is probably because there is almost always impressive inflammation around the MitraClip which has likely precluded previous attempts at chordal preservation. We report successful chordal preservation mitral valve replacement for delayed MitraClip failure.

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Introduction:

MitraClip failure can require mitral valve replacement. Although chordal preservation is the preferred option for valve replacement, it has not been described for MitraClip failure. The present case report addresses this line of reasoning.

Case report/description:

The Mayo Clinic Rochester Institutional Review Board waves IRB approval for a case report. The patient signed a waiver of informed consent at the time of treatment.

We were asked to evaluate a 60 y/o man with class III dyspnea and mixed mitral valve disease related to MitraClip failure. The patient had chronic atrial fibrillation, cirrhosis (MELD score 9), and history of ascites with gastrointestinal bleeding.

At an outside Institution approximately 17 months prior to our evaluation, he received placement of a single MitraClip (Abbott, Chicago, Illinois, USA) for severe valve regurgitation. Two months later he received placement of 2 additional MitraClips to treat persistent severe mitral valve regurgitation. Neither procedure resolved the valve regurgitation. He was subsequently denied mitral valve operation at the outside facility because of the cirrhosis.

Transthoracic echocardiography at our Institution demonstrated an ejection fraction of 57% with no regional wall motion abnormality. Pulmonary hypertension was present with an estimated right ventricular systolic blood pressure of 76 mm Hg (systemic systolic blood pressure 125 mm Hg). There was also significant mixed mitral valve disease with a mean diastolic mitral transvalvular gradient of 10 mm Hg (heart rate 74 beats/min) and severe mitral valve regurgitation (multiple eccentric jets).

There were no transcatheter treatment options available. We elected to move ahead with mitral valve operation. Intraoperative transesophageal echocardiography provided a good image of the problem (Video clip 1). The mitral valve was exposed through a superior transeptal approach. Examination demonstrated myxomatous changes of the mitral valve leaflets. There was also significant inflammation around the previously placed MitraClips. The valve was not repairable.

The anterior leaflet of the mitral valve was incised radially approximately 5 mm from the annulus and the incision continued down through both commissures. The entire MitraClip/mitral valve leaflet complex (i.e., free anterior leaflet, MitraClips, and posterior leaflet) was dropped posterior. Valve replacement sutures went through the free anterior mitral valve leaflet edge and then the posterior leaflet in a chordal preservation technique. The suture pledgets were positioned on the ventricular side. A 33 mm porcine prosthesis was easily sutured into position. The left atrial appendage was amputated.

The patient separated from cardiopulmonary bypass without difficulty. Completion transesophageal echocardiography demonstrated an ejection fraction of 45% with ventricular pacing induced apical hypokinesis. There was normal function of the mitral valve prosthesis with trivial prosthetic and no paravalvular prosthetic regurgitation. The mean diastolic mitral transvalvular gradient was 4 mm Hg (heart rate 100 beats/min).

The patient was discharged to home 11 days after operation. Discharge transthoracic echocardiography demonstrated an ejection fraction of 44% with no regional wall motion abnormality. There was normal function of the mitral valve prosthesis: trivial central prosthetic regurgitation, no paravalvular regurgitation, and a mean diastolic mitral transvalvular gradient of 6 mm Hg (heart rate 84 beats/min and hemoglobin 8.8 gm/dL). The MitraClip/mitral valve leaflet complex appeared to be effectively constrained in the area behind the prosthesis posterior valve strut (Video clip 2).

Through 7 months of follow-up, the patient has experienced no cirrhosis-related complications. He maintains New York Heart Association class I function. Transthoracic echocardiography demonstrates an ejection fraction of 40% with no regional wall motion abnormality. There is continued normal function of the mitral valve prosthesis.

Comment

Mitral valve replacement may be indicated for delayed MitraClip failure (1-4). Surgical dogma dictates chordal preservation is ideal during valve replacement (5). We did a PUBMED (PubMed.gov, July 16, 2020) review of the literature and identified no report of chordal preservation mitral valve replacement for delayed MitraClip failure.

The present case demonstrates feasibility of chordal preservation mitral valve replacement for delayed MitraClip failure. Our patient had the expected MitraClip related phlegmon, but the myxomatous changes of the mitral valve leaflets likely facilitated procedure success. The perceived benefits of chordal preservation mitral valve replacement should not be denied to patients with delayed MitraClip failure.

Author contributions:

Kevin L. Greason: Concept/design, drafting article, critical revision of article, approval of article, data collection.

Peter C. Spittell: Concept/design, drafting article, critical revision of article, approval of article, data collection.

R. Scott Wright: Concept/design, drafting article, critical revision of article, approval of article, data collection.

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Video clip 1 legend: Preoperative transesophageal echocardiography 3-D video image left atrial view of mitral valve demonstrating the 3 MitraClips.

Video clip 2 legend: Postoperative transthoracic echocardiography image of apical 4 chamber view of mitral valve demonstrating the MitraClip/mitral valve leaflet complex being constrained behind the prosthesis posterior valve strut.