



Peer-Reviewed Case Report

Successful Left Ventricular Assist Device Support in Patient with Bjork-Shiley Mitral Valve Replacement

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Abstract

There is limited clinical experience with left ventricular assist device therapy in patients with prosthetic mitral valves. We present a case of successful left ventricular assist device support in a patient with previous mechanical mitral valve replacement.

Keywords

Ventricular assist device; Heart failure; Prosthetic valve; Mitral valve

The approach to the patient with a mechanical mitral valve replacement (MVR) who requires left ventricular assist device (LVAD) therapy can be problematic. There is limited anecdotal experience in the literature on LVAD support in patients with mechanical MVR. This case report details successful continuous-flow LVAD placement in a patient with a Bjork-Shiley MVR.

A 54 year old male patient with nonischemic cardiomyopathy who was actively listed for heart transplantation presented for consideration of left ventricular assist device (LVAD) therapy due to worsening heart failure. His history was significant for severe mitral regurgitation which required mechanical Bjork-Shiley mitral valve replacement (MVR) at 19 years of age. The patient did well after MVR but subsequently developed systolic heart failure years later which was idiopathic in nature. The patient had been on intravenous milrinone for 12 months and listed for transplant as a status 1B. Due to worsening heart failure, he was admitted to the hospital and his status changed to 1A. However, the patient continued to worsen and no donor organ was available. We made the decision to proceed with implantation of HeartMate II LVAD (Thoratec Corporation, Pleasanton, CA). Perioperative course was uneventful other than bleeding which

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was expected. Low-dose intravenous heparin and warfarin were started on post-operative day #1. The patient was discharged on post-operative day #21. Hospitalization was extended by the presence of right ventricular dysfunction which subsequently resolved. Subsequent follow-up has demonstrated normal functioning MVR and normal flows through LVAD which is set at 9200 RPM (Figure 1). Laboratory testing reveals slight elevation of total bilirubin (1.4 – 1.8 mg/dL) and LDH (300-600 U/L) likely indicating low level of hemolysis from MVR. We have maintained target INR 2.5-3.5 and the patient has not had any major bleeding complications. The patient has done well through 1295 days of follow-up.

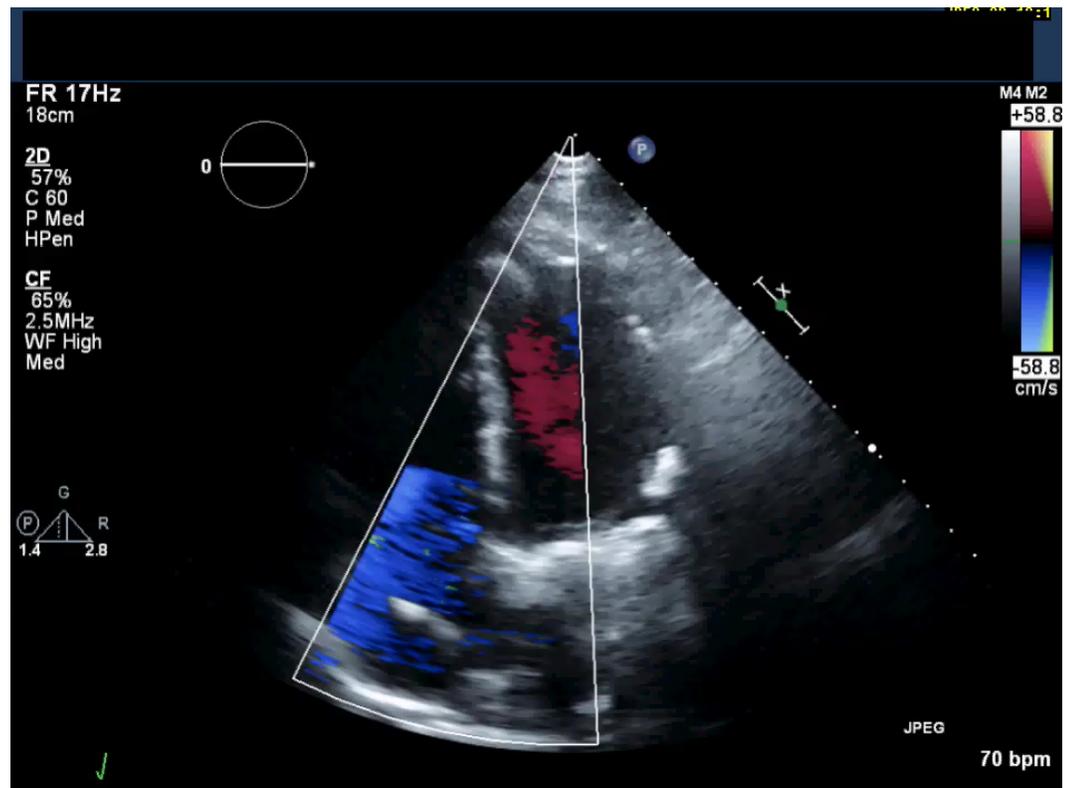
This case demonstrates that prior mechanical MVR is not a contraindication to LVAD placement and that such patients can do well with long-term continuous-flow LVAD support. Ideally heart transplantation would be the best option if a patient with a prosthetic MVR and severe heart failure is a candidate for transplantation. However, given longer wait times for transplantation and scarcity of donor organs, LVAD will need to be considered for such patients. Concerns with the presence of a mechanical MVR in LVAD patients include perioperative anticoagulation, the potential increased risk for thromboembolism, and higher target INR which may increase the risk of gastrointestinal bleeding. The Bjork-Shiley MVR is believed to have a higher rate of thrombosis than other prosthetic MVR which was a particular concern for our patient (1). Fortunately our patient has done well with long-term support.

Goda et. al. (2) published the largest series describing 9 patients with mechanical MVR undergoing LVAD implantation. The majority of these patients were supported with HeartMate XVE device – 3 had HeartMate II LVAD. The patients did well with LVAD support with the majority undergoing heart transplantation. The longest duration of support reported in these 9 patients was 507 days. Swartz et. al. (3) reported on VAD support on 2 patients with Bjork-Shiley MVR, but they were supported with temporary pumps and the duration of support was quite short (3 and 12 days). Other case series in the literature report on very few patients with mechanical MVR with the majority of patients having prosthetic valves in the aortic position (4, 5). Our case report represents the longest reported duration of LVAD support on a mechanical MVR.

Given improving outcomes with LVAD technology and the limitations of organ transplantation, it is possible that LVAD candidates with mechanical valves may become more common in the future. While a great deal of interest has focused on valves in the aortic position, there is little data or guidance for the approach to LVAD in patients with prosthetic mitral valves (6). This case report demonstrates that LVAD patients with mechanical MVR, particularly one as potentially thrombogenic as the Bjork-Shiley valve, can have successful outcomes. The presence of a mechanical MVR is not an absolute contraindication for long-term LVAD support.



Four-chamber video clip of color Doppler flow through MVR towards LVAD cannula in left ventricular apex (<https://vimeo.com/120809245>).



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