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A case series of left Impella-device as bridge from acute mitral regurgitation to MitraClip-procedure: a novel implementation of percutaneous mechanical circulatory support

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Topic(s):
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Citation:
Background: Acute mitral regurgitation (MR) is a medical and mostly surgical emergency. Severe acute MR presenting with hemodynamic collapse is usually related to an exceedingly rare mechanical complication such as papillary muscle rupture after AMI or chordae tendinae rupture, resulting in flail mitral leaflets. Preoperative stabilization is complex due to concomitant hemodynamic collapse and hypoxic respiratory failure. Finding the right balance between both preload and inotropic support is very challenging. Nowadays, when patients are too sick for immediate surgical intervention, mechanical circulatory support should be considered because of its decreasing effect on afterload and cardiac work while increasing coronary perfusion and cardiac output. Nevertheless, even after initial stabilization, the surgical risk remains high in critically ill acute severe MR patients and other technical modalities reducing the MR – such as MitraClip - should be explored.

Methods: Between August 2017 and September 2019, five patients on 2 tertiary ICUs presenting with acute, moderate-to-severe or severe MR and considered too ill for immediate surgical intervention (EURO-II score > 11.2%, pulmonary edema necessitating mechanical ventilation and/or hemodynamic instability), were selected for Impella-assisted ventricular unloading as bridge to MitraClip.

Results: The mean age was 72 years. The cause of MR was ischemic in 20% and all patients presented in cardiogenic shock state, necessitating mechanical ventilation. Only one patient was in multiple organ failure (late referral) at presentation. The overall cardiac operative risk assessment (Euro-II) score represented a 35% chance of in-hospital mortality after surgery. Cardiac output was severely impaired (mean LVOT VTI 8.2 cm). All patients were on inotropic support and supported by an Impella-CP pVAD (mean flow 2.5 Liter per minute; mean 6.3 days of support). In all cases, we managed reducing the LVEDP below 15 mmHg using medical therapy (afterload reduction, inotropes), mechanical ventilation and pVAD-therapy. The MR could be successfully reduced by a MitraClip-procedure in each patient. The overall survival at discharge was 80%. One patient with late referral and multiple organ failure at presentation deceased due to refractory cardiogenic shock. All four patients survived 6 months after discharge.

Conclusions: A combined strategy of Impella and MitraClip appears to be a novel, feasible alternative for patients presenting with acute, severe MR unable to proceed to a corrective procedure at presentation due to cardiogenic shock requiring mechanical circulatory support. In these cases, the initiation of pVAD-support early is essential to reduce the risk of development of irreversible end organs damage and dysfunction. Given the limitations of this small, non-randomised case series, further exploration in a larger, randomised population is warranted to investigate this strategy further.
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