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Complicated Bi-Pella Support: Acute Mitral Regurgitation and Bailout MitraClip Repair

Igor Belluschi , Paolo Denti , Nicola Buzzatti , Giulio Melisurgo , Silvia Ajello , Marco Ancona , Luca Bertoglio , Stefano Stella , Eustachio Agricola , Ottavio Alfieri , Alessandro Castiglioni , Michele De Bonis & Anna Mara Scandroglio

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Complicated Bi-Pella Support: Acute Mitral Regurgitation and Bailout MitraClip Repair

Running Title: Report of a Cardiogenic Shock

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During the last decades, the use of mechanical circulatory support devices (MCS) has increased exponentially. In this scenario, a fully percutaneous approach to biventricular cardiogenic shock has been previously described using 2 axial flow pumps (1). Unfortunately, acute iatrogenic mitral regurgitation (MR), developed during Impella placement procedure or caused by mechanical lesions attributable to both pump tip trauma or suction of the inlet area, could even complicate a *per se* challenging case of cardiogenic shock. Despite great debate originated from recent RCTs, the transcatheter treatment of both severe primary and functional mitral regurgitation (MR) using MitraClip device (Abbott Inc., Chicago, IL, US) has spread worldwide with more than 100.000 implants. Here, we describe a case illustrating the use of MitraClip as a bailout option to treat severe MR occurred after placement of a Bi-Pella support.

A 60 years-old man with history of deep vein thrombosis, systemic lupus erythematosus and chronic anemia, presented with congestive heart failure rapidly evolving in cardiogenic shock (Figure 1A). Severe biventricular dysfunction remained despite intra-aortic balloon pump (IABP) and inotropic support (Online Video 1). Coronary angiography showed left anterior descendant (LAD-) and right coronary artery (RCA-) chronic total occlusions (CTOs).

Persistence of a refractory shock suggested need for a biventricular mechanical circulatory support (“Bi-Pella”) (Figure 1B, Online Video 2). A 5.0 Impella (Abiomed Inc., Danvers, MA, US) was placed through the right axillary artery for left ventricular support and an RP Impella for the right. Four-days later the patient developed acute pulmonary edema (Figure 1C) and a new-onset of Impella-mediated severe mitral regurgitation (MR) due to A3-P3 flail (Figure 1D, Online Video 3). Considering profound thrombocytopenia, unclear neurological status and acute liver failure, the

surgical risk was prohibitive (STS mortality score: 61.561%; EuroSCORE 2: 36.81%). So, Heart Team decided for a MitraClip procedure despite extreme technical difficulties. After temporary retraction (<2 cm) of the left Impella, sitting on A3, two XTR clips were implanted (Figure 1E) with significant reduction of regurgitation to moderate MR as well as of the left atrial pressure from 41 to 15 mmHg and normalization of bilateral pulmonary veins flow (Figure 1F, Online Video 4-5). Unfortunately, the patient has finally died of multi-organ failure after 22 days. A previous report described feasibility and safety of percutaneous edge-to-edge in presence of hemodynamic support devices (2). To our knowledge, this is the first reported case of a feasible and effective MitraClip procedure to treat acute severe iatrogenic MR after positioning of a Bi-Pella in a patient affected by cardiogenic shock.

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Figure Legend

Figure 1.

MitraClip bailout after Bi-Pella.

Pre-procedural TEE showing LVEF 20% and trivial MR (A). Positioning of Impella 5.0 (§) and RP Impella (*) (B). Post-Bi-Pella pulmonary edema (C). Left vein access and right Impella resulted in a complex transeptal puncture; while small atrium, tachycardia and proximity of Impella (red arrow) to A3-P3 flail led to a demanding procedure (D). MitraClip implantation (red arrow) (E). Final moderate residual MR (F).

ACCEPTED MANUSCRIPT

