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Impella-Clip: a secure and effective strategy in cardiogenic shock due to acute severe mitral regurgitation. Case resolution

Impella-Clip: una estrategia segura y eficaz en el shock *secundario a insuficiencia mitral aguda. Resolución*

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CASE RESOLUTION

Given the impossibility to remove the Impella 5.0 device (figure 1) and due to the high surgical risk involved (EuroSCORE II, 48,9%; Society of Thoracic Surgeons score (STS), 16%), percutaneous mitral valve repair was attempted with a MitraClip device (Abbott Laboratories, United States).

With support from an Impella 5.0 device at a rate of 2 L/min and under transesophageal echocardiography guidance the MitraClip NTW device was implanted at A3-P3 level (greater effective regurgitant orifice area), which resulted in a reduced regurgitant jet (videos 1 and 2 of the supplementary data), improved blood flow into the pulmonary veins, and a transmitral gradient of 4 mmHg. Result was reassessed by reducing hemodynamic support temporarily at 1 L/min. A grade III-IV central regurgitant jet was seen. A second MitraClip NT was implanted at A2-P2 level (videos 3 and 4 of the supplementary data). Difficulties during its positioning due to interference with the Impella 5.0 device were reported, which is why reversal maneuvers towards the atrium were performed. Finally, capture or grasping turned out effective, and the lack of residual mitral regurgitation was confirmed. However, although transmitral gradient increased up to 7 mmHg,

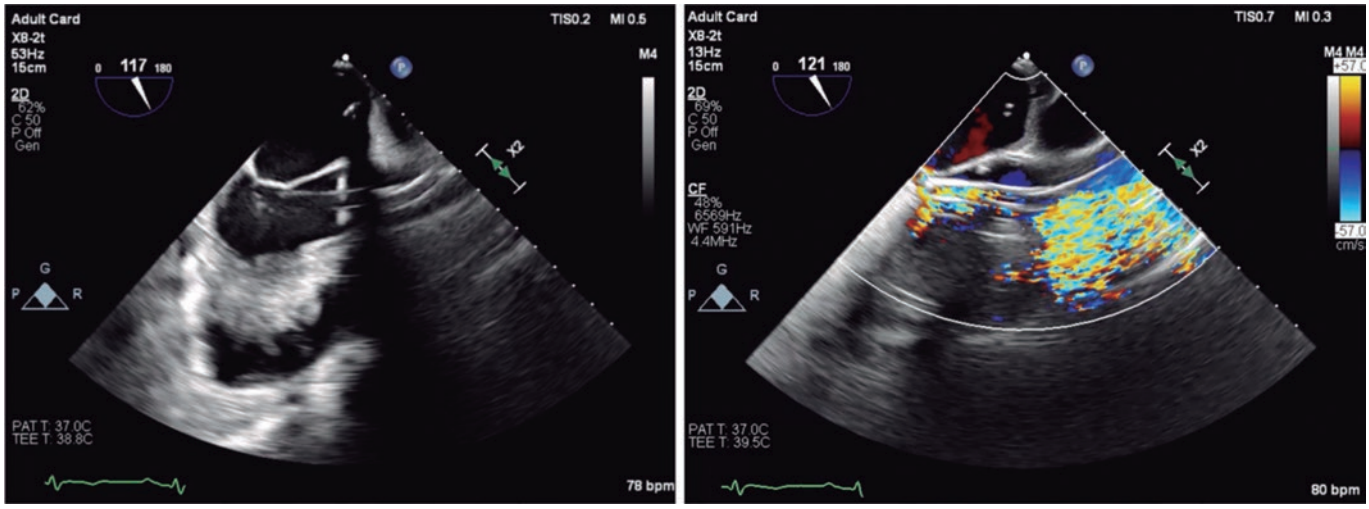

Figure 1. Normal position of the Impella device as seen on the transesophageal echocardiography.

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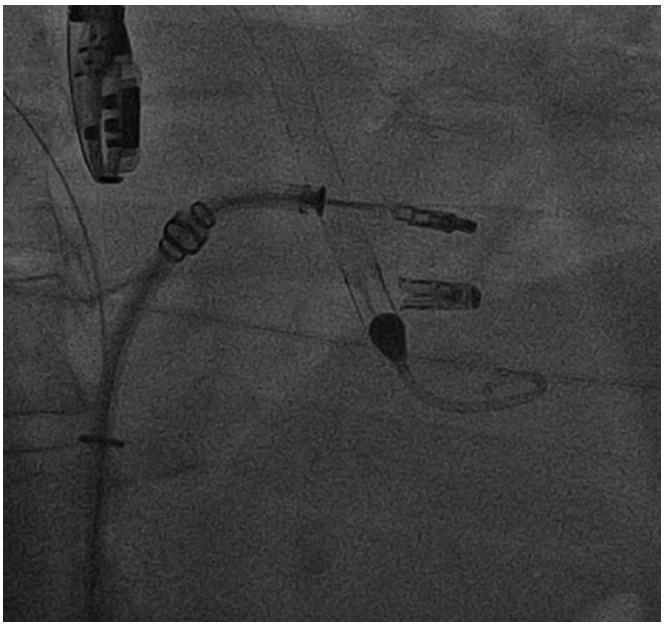

Figure 2. Final procedural outcomes.

after reducing hemodynamic support down to 0.5 L/min, the gradient dropped down to 5 mmHg. Since the presence of hemoglobin levels of 8.6 g/dL and heart rate of 90 bpm could make the gradient could go up slightly—overestimating the measurements—the second device was released with such gradient (figure 2). The patient was extubated and the Impella 5.0 device was removed 72 hours later with satisfactory disease progression.

Acute mitral regurgitation is one mechanical complication of infarction that leads to higher mortality rates (35% to 50%)[1] because it is associated with cardiogenic shock (CS) with increased retrograde pressure and volume. Circulatory support and vasoactive drugs necessary here. The Impella device actively unloads the left ventricle, increases cardiac output,[1] and is indicated in the acute phase.[2]

Traditional treatment has consisted of emergency heart valve replacement that is associated with significant perioperative mortality. Over the last few years, percutaneous mitral valve repair has proven beneficial in asymptomatic secondary mitral regurgitation despite optimal medical therapy.[2] However, data are scarce on acute mitral regurgitation with secondary cardiogenic shock,[1,3] which could be particularly beneficial in this setting.

This case describes how a combined strategy of Impella and MitraClip is both safe and effective. However, several technical considerations should be made at this point: *a)* the MitraClip device should be positioned carefully due to interference with the Impella device; *b)* hemodynamic support should be reduced to assess results since this support can overestimate the reduction of mitral regurgitation; and *c)* anemia and tachycardia are not rare, factors that could overestimate the residual gradient.

Long-term follow-up and more evidence are necessary to support this strategy. However, in the ischemic severe acute mitral regurgitation setting complicated with cardiogenic shock, complete percutaneous resolution (coronary revascularization, Impella and percutaneous mitral valve repair) could be the treatment of choice.

The case was published after obtaining the patient's verbal consent.

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AUTHORS' CONTRIBUTIONS

All the authors contributed drafting or reviewing the case.

CONFLICTS OF INTEREST

R. Moreno is associate editor of *REC: Interventional Cardiology*; the journal's editorial procedure to ensure the impartial handling of the manuscript has been followed. A. Jurado-Román is a member of the editorial team. The remaining authors declared no conflicts of interest whatsoever.

SUPPLEMENTARY DATA

Supplementary data associated with this article can be found in the online version available at https://doi.org/10.24875/RECICE.M22000317.

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Massive hemoptysis. Selective embolization of bronchial artery-left pulmonary artery fistula

Hemoptisis masiva. Embolización selectiva de fístula de arteria bronquial a arteria pulmonar izquierda

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CASE PRESENTATION

Hemoptysis is the subglottal expectoration of blood from the tracheobronchial tree. Most cases of massive hemoptysis originate at the bronchial arteries (90%) and often become complicated due to systemic arterial blood pressure. The mechanism of action is the rupture of hypervascularized reticulum and vascular dilatation as a response to the substances released in the inflammatory process. This clinical entity has elevated morbidity and mortality rates. Early diagnosis and the timely administration of therapy are of paramount importance.

This is the case of a 73-year-old woman with a past medical history of breast cancer with ED presentation of early onset massive hemoptysis. She was admitted to the intensive care unit with a heart rate of 122 bpm, arterial blood pressure of 78/45 mmHg, and oxygen saturation of 82% with high-flow oxygen mask. Emergency orotracheal intubation and mechanical ventilation were decided. Given the patient's hemodynamic instability, vasopressor drug infusion was started at increasing doses until a mean arterial blood pressure of 60 mmHg was reached with noradrenalin at 0.3 µg/kg/min. Lab test results showed hemoglobin levels of 7.5 g/dL, hematocrit of 21%, PaO_2 of 62%, and hyperlactacidemia. A total of 2 bags of packed red blood cells were transfused, and the patient was transferred to the computed tomography scan room. The CT scan revealed the presence of a fistula from the left bronchial artery towards the upper branch of the left pulmonary artery with images consistent with alveolar hemorrhage compromising all lobes from both pulmonary fields (figure 1).

It also revealed the occupation of the left main bronchus and the lower and upper lobe branches with dense material suggestive of blood clots due to its high spontaneous density (figure 2). Given this clinical presentation and the features revealed by the CT scan, right bronchial selective intubation was decided. Afterwards, the patient was immediately transferred to the cath lab for endovascular embolization.

The patient gave her informed consent for publication purposes.

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