Case report - Assisted circulation

Acute ventricular septal defect treated with an Impella recovery as a ‘bridge therapy’ to heart transplantation

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Received 21 May 2007; received in revised form 1 July 2007; accepted 3 July 2007

Abstract

We present the case of a 59-year-old male, admitted to hospital for cardiogenic shock due to massive infero-lateral myocardial infarction. Angiography showed occlusion of the right coronary artery and widespread critical lesions of both the anterior descending and circumflex artery. Echocardiography showed inferior akinesia with a large posterior ventricular septal defect (VSD). The haemodynamic instability induced us to use a left ventricular assist device (L-VAD) like Impella for easiness of its percutaneous implantation and for its duration. We obtained the stabilisation of the patient and the improvement of the clinical conditions. The location of the ventricular septal defect (VSD), from one side, and the serious and widespread coronaropathy (not suitable for any kind of revascularisation), from the other side, led us to choose heart transplantation for this patient. Heart transplantation was performed on the 12th day after myocardial infarction without complication and the patient was discharged on the 35th postoperative day. In our opinion, when the position of the VSD is unseemly and there coexists a widespread coronaropathy not eligible for revascularisation, heart transplantation may represent an efficacious alternative. Moreover, the use of L-VAD, reducing interventricular shunt and ensuring an adequate cardiac output, allows to obtain clinical stabilisation before heart transplantation.

Keywords: Ventricular septal defect; Left ventricular assist device; Heart transplantation

1. Patient characteristics

We describe the case of a 59-year-old male admitted to hospital for cardiogenic shock due to massive infero-lateral myocardial infarction. Angiography showed occlusion of the right coronary artery and widespread critical lesions of both the anterior descending and circumflex artery. Echocardiography showed inferior akinesia with a large posterior ventricular septal defect (VSD). The haemodynamic instability induced us to use a left ventricular assist device (L-VAD) like Impella for easiness of its percutaneous implantation and for its duration. We obtained the stabilisation of the patient and the improvement of the clinical conditions. The location of the ventricular septal defect (VSD), from one side, and the serious and widespread coronaropathy (not suitable for any kind of revascularisation), from the other side, led us to choose heart transplantation for this patient. Heart transplantation was performed on the 12th day after myocardial infarction without complication and the patient was discharged on the 35th postoperative day. In our opinion, when the position of the VSD is unseemly and there coexists a widespread coronaropathy not eligible for revascularisation, heart transplantation may represent an efficacious alternative. Moreover, the use of L-VAD, reducing interventricular shunt and ensuring an adequate cardiac output, allows to obtain clinical stabilisation before heart transplantation.

2. Surgery procedure and pathological characteristics

During angiography, we positioned an Impella Recovery (P7; flow 4 l/min) through the right femoral artery. During heart transplantation, after cardieotomy, we observed the large VSD (3 cm x 4 cm) located just behind the posterolateral papillary muscle in connection with the mitral annulus (Fig. 1); the risk of mitral regurgitation was too high and the surrounding tissue was still too delicate to allow an adequate suture.

3. Discussion

The main determinant factor of early outcome following VSD is the appearance of acute heart failure, depending on the degree of interventricular shunt and the extension of ischaemic tissue [1, 2]. A quick VSD recognition allows to avoid clinical deterioration of the patient and choose the best strategy [3, 4]. The objectives of the use of Impella in case of VSD are: (Fig. 2)

- Reduction of left ventricular systolic pressure (LVSP);
- Reduction of inter-ventricular shunt;
- Reduction of inter-ventricular shunt;
Fig. 1. Macroscopic examination shows a large ventricular septal defect just behind the postero-lateral papillary muscle and in connection with the mitral annulus.

- Improvement of cardiac output (CO);
- Improvement of right ventricular function.

We observed a reduction of pulmonary artery pressure (PAP) and SVO, with an improvement of CO, which showed a reduction of interventricular shunt. Echocardiography was not useful in measuring the entity of interventricular shunt because of the interferences of Impella with the echocardiographic feeler.

In our case, VSD is not suitable for standard surgical approach for these reasons:

- Location of VSD, very close to postero-lateral papillary muscle, posterior leaflets of the mitral valve and in connection with the mitral annulus, without enough tissue to suture the patch preserving mitral valve function (Fig. 1).
- Coronaric anatomy: the widespread coronaropathy, the shortage of the run-off and the unfavourable anatomy of the vessels like ‘rosary crown’, determined the uselessness of surgical revascularisation;
- The age of the patient.

In conclusion, our experience confirms that the use of Impella is useful in the stabilisation of these patients; moreover, in patients with VSD not suitable to the surgical repair, cardiac transplant represents a valid alternative.

References


