

Temporary Circulatory Support as Bridge to Retransplantation

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SUMMARY

Despite the significant advances in the criteria of selection of heart transplantation recipients, the best organ preservation, the new immunosuppressive therapeutics and the advances in post-transplantation care, those patients who received a heart transplantation still have a high rate of early and late graft failure. For these cases, multiple therapeutic interventions have been proposed; however, ventricular support devices and heart transplantation are the definitive treatments for this subgroup of patients. In this presentation we describe a case of refractory cardiogenic shock post acute myocardial infarction in a patient with previous heart transplantation, who was consecutively treated with intra-aortic balloon pump, myocardial revascularization surgery and, finally, as still in refractory cardiogenic shock with multiorgan failure, received circulatory support with Levitronix® CentriMag® as bridge to retransplantation. After 21 days in ventricular support and improvement of the multiorgan failure, the orthotopic transplantation was performed.

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Key words > Heart transplantation – Circulatory support – Shock

CLINICAL CASE

A male patient aged 29 was admitted to our center in cardiogenic shock, referred from other center where he entered due to chest pain and heart failure 72 hours before. He had the antecedent of orthotopic heart transplantation, due to post-miocarditis heart failure 12 years before. At the moment of admission, he was in ventilatory support and laboratory test showed levels of creatin kinase of 923 UI/L and troponin T > 2ng/ml. The electrocardiogram showed sinus tachycardia with 135 beats/min, elevation of the segment in leads V1-V3, with QS in V1-V2. The echocardiogram was consistent with severe left ventricular dysfunction, with anterior and septal hypokinesia, apical akinesia, with suggestive apical thrombus image. A coronary angiography which showed occlusion of the anterior descending artery, associated with diffuse and severe circumflex and right coronary arteries disease was performed. The decision was to perform an implantation of an intra-aortic balloon pump and an emergency myocardial revascularization surgery, with venous bridges to the posterior descending artery of the right coronary and the circumflex obtuse marginal artery.

The patient remained with refractory hypotension with evidence of cardiogenic, renal, hepatic and haematological failure, thus the implantation of left ventricular support (Levitronix® CentriMag®) was decided. As within six hours after the procedure, the cardiogenic shock with clinical and echocardiographic evidence of right ventricle failure continued, right ventricular support was indicated and the patient was included in the emergency list for cardiac transplantation. The intra-aortic balloon pump was removed. Both ventricular supports at 2.500-3.000 bpm in order to obtain a flow of 4 to 6 litres/min were programmed.

During the follow-up he showed several complications: 1) multi-organ failure: hepatic, splanchnic, respiratory, haematological and renal failure with haemodialysis; 2) left leg compartment syndrome with supracondylar amputation.

After 21 days in ventricular support with Levitronix® and clear signs of improvement of the multiorgan failure, the orthotopic transplantation was performed.

Once the patient left the center, was referred to a physical rehabilitation center. Since then, he

returned to his work and witnessed the birth of his first daughter.

DISCUSSION

Despite the significant advances in the criteria of selection of heart transplantation recipients, the best organ preservation, the new immunosuppressive therapeutics and the advances in post-transplantation care, those patients who received a heart transplantation still have a high rate of early and late graft failure.

In the last records, an improvement in the short term evolution is observed; however, toxicity associated with immunosuppressive drugs, as well as the presence of graft vascular disease, continue affecting survival at long term of these patients. (1)

Multiple therapeutic interventions for patients with graft failure, as aggressive immunosuppressive therapies, percutaneous coronary angioplasties (2) and myocardial revascularization surgery have been proposed; (3) however, ventricular support devices and heart retransplantation are still the definite treatment for this subgroup of patients. Nowadays, retransplantation represents 2% of all the procedures of heart transplantation in adult population and 7% in paediatric population. (1)

In patients undergoing a transplantation that entered with coronary syndrome, its management and the therapeutic options still should be defined. A record of a recent transplantation suggests that elective angioplasty in patients with graft vascular disease has a high rate of primary success, with low rate of complications, and with levels of restenosis equivalent to procedures performed in native arteries, but only in the short term. (3) Myocardial revascularization surgery after heart transplantation may be another therapeutic option; however, mortality in these patients is of 33% to 43%. (4)

However, many patients with graft vascular disease may show diffuse disease or cardiogenic shock. In the latter case, left ventricular support is an option as bridge to retransplantation. (5)

Cardiogenic shock complicates 5-10% of acute myocardial infarction cases, with mortality near to 80% in the first year. (6) Even with an adequate blood flow by a percutaneous procedure or revascularization surgery, cardiogenic shock complicating acute myocardial infarction is associated with a high rate of mortality in the short term, near to 35-50%. (6) Ventricular support devices may have an important role in cardiogenic shock complicating acute myocardial infarction, even in those patients with multiorgan failure. (6-8) In a study done by Dang et al. (6) it has been suggested that the primary treatment of Killip and Kimbal D infarction with ventricular support before revascularization shows better results than the posterior implantation.

Ventricular support with devices as Levitronix® CentriMag® is nowadays an option for cardiogenic shock and, as it was observed in this clinical case,

even as bridge to retransplantation in patients with cardiogenic shock. (8)

RESUMEN

Asistencia circulatoria temporaria como puente al trasplante

A pesar de las mejoras significativas en los criterios de selección de los receptores de trasplante cardíaco, la mejor preservación de los órganos, las nuevas terapéuticas inmunosupresoras y los avances en el cuidado postrasplante, los pacientes que recibieron un trasplante cardíaco continúan con una tasa alta de falla temprana y tardía del injerto. Se han propuesto múltiples intervenciones terapéuticas para estos casos; sin embargo, los dispositivos de asistencia ventricular y el trasplante cardíaco permanecen como el tratamiento definitivo para este subgrupo de pacientes. En esta presentación se describe un caso de shock cardiogénico refractario posinfarto agudo de miocardio en un paciente con trasplante cardíaco previo, que fue tratado en forma consecutiva con balón de contrapulsación intraaórtico, cirugía de revascularización miocárdica y, finalmente, por continuar en shock cardiogénico refractario con falla multiorgánica, recibió asistencia circulatoria con Levitronix® CentriMag® como puente al trasplante. Luego de 21 días en asistencia ventricular y mejoría franca de la falla multiorgánica, se realizó el trasplante ortotópico.

Palabras clave > Trasplante cardíaco - Asistencia circulatoria - Shock

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