The Student Section

Heart Transplant for a Jehovah's Witness Patient : Case Report 4/6/17

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Set Up

Following is the system used for the procedure: LivaNova Sorin Group S5 heart lung machine, Capiox Terumo FX25 hard shell reservoir with an integrated arterial filter hollow fiber membrane oxygenator, Sorin Revolution centrifugal blood pump, and Sorin custom tubing pack which specifically for this case, included a 3/8" x 3/8" venous arterial loop with bridge for reducing priming volume. The cardioplegia system used was the Sorin Vanguard which was set to deliver 1:4 Del Nido Cardioplegia. Inline blood gas monitoring system using the Terumo CDI 500 inline was also employed.

The circuit was CO2 flushed and then subsequently primed with plasma -lyte and 50 meq of Sodium Bicarbonate.

The Fresenius C.A.T.S continuous auto transfusion system was set up for skin-to-skin blood savaging. In consideration of the Jehovah's Witness Clinical Guidelines for reinfusion of autologous blood, it was imperative to set up continuous lines from the cell saver to both the perfusion system and the anesthesia central line, to ensure closed circuits with the patient's circulatory system.

In consideration of the Guidelines, no donor blood transfusion can be given, extra 250cc bottles of 5% albumin were accounted in the event of inadequate volume.

History

The patient is a 34 y/o male Jehovah Witness (JW) with a past medical history (PMHx) of end stage heart failure, atrial fibrillation, cardiomyopathy, congestive heart failure, left ventricular thrombus, arrhythmia, polycythemia and previous procedure of pericardial window, was admitted for heart transplantation. The patient had minimal previous intervention as a JW and had declined the support of an LVAD as bridge to transplant. As a result the patient was listed as class A1 on the heart transplant recipient list.

Pre-operative laboratory data showed the patient has a hematocrit of 48, platelet count of 208,000, K+ 4.4, Glucose 101, BUN 21, Creatinine 1.00, total albumin of 1.1, PT of 11.2, INR 1.0, PTT 44.4, Hemoglobin A1C of 6.3 and a blood type of B positive.

Events

Patient was heparinized with 300u/k heparin (30,000 units) and initiation ACT was 507 seconds. Arterial cannulation was performed with a Medtronic EOPA 20 Fr arterial cannula in the ascending aorta. Venous cannulation was completed bicaval with a 24 fr Medtronic DLP single stage venous cannula right angle metal in the SVC and a 28 fr Medtronic DLP single stage venous cannula right angle metal in the IVC. Pre bypass fluid balance were infusion of 500 ml and 350ml urine output. Just before retrograde autologous priming (RAP) 5,000 units of heparin were added to the pump. RAP was employed draining both the arterial and venous side of the circuit and a total of 500 ccs was replaced by patient's plasma. Arterial line pressure was then tested and proved to be appropriate. CPB was initiated and venous drainage was augmented by vacuum assisted venous drain (VAVD). Venous return was adequate and calculated flow was achieved. Once on bypass, 37.5 gm of Albumin and 37.5 gm of Mannitol were titrated. The pa-

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tient was cooled to 34 degree C. Isoforane was used for the duration of CPB at 1.0 % or higher.

DelNido cardioplegia was used. High potassium levels were encountered during CPB and zero balance filtration (Z-BUF) was used successfully. Z-BUF technique used for this case was performed through use of the hemoconcentrator and adding a solution of plasma lyte, 25 meq of sodium bicarbonate and 200mg of calcium chloride to the reservoir. A total of 5 liters of Z-BUF were used throughout the case. Before the donor heart is implanted DelNido solution was infused directly into the donor heart coronaries to ensure further myocardial protection. The native heart was removed and the donor heart was anastomosed. The donor heart came from a patient in the mid 20's who died of an asthma attack and was not a JW. The heart was preserved using bridge to life solution.

Hematocrit remained above 35 for the entire case and negative base deficits of bicarbonate resulting in metabolic acidosis were treated with adding appropriately calculated amounts of sodium bicarbonate to the pump. Glucose levels remained within normal ranges during CPB and lactate levels reached a high of 1.9. Cerebral oximetry was used to ensure proper cerebral perfusion. Cerebral saturations maintained at or above baseline. Venous saturations, measured through CDI monitoring and with blood gases, never dropped below 75% indicating adequate tissue perfusion.

Once the donor heart was implanted the patient was rewarmed to 37degree C and "hot" shots of warm blood were given to the donor heart. At this time 2g of Magnesium and 100mg of lidocaine were given via the perfusion system. The cross clamp was then removed and the heart was checked for air via TEE.

The total ischemia time for the donor heart was 3.5 hours and through protocol recirculation on bypass was completed for 25 minutes, 10% of the ischemic time. Once circulation was completed the patient was given 1000mg of calcium chloride and weaned from CPB.

Total urine on bypass was 550cc and was further complemented with a total of 9600 cc of CPB ultrafiltration. The patient left the OR on drips of Epi/ Mil/ Dob and was hemodynamically stable. However, on post op day 1 an intra-aortic balloon pump (IABP) was inserted because of hemo-instability presenting with an EF of 35%. Once hemo-stability was regained the IABP was removed and on post op day 14 the patient was discharged from the hospital.

Notes

This case is somewhat unusual and controversial given the Guidelines that a JW will not accept any blood transfusions, blood products, support devices such as an LVAD and not even accept autologous blood if there is no continuous loop with their circulatory system, as shown with the cell saver. As a result, illustrated in this case, the patient is automatically elevated to class A1 recipients on the transplant list. Willing to accept donor organ and not willing to accept donor blood appeared to be in conflict with the Guidelines. The policy of JW recipients jumping ahead to the front of the waiting line should also be examined. The technique of volume control using oncotic agents prove to be very effective in this case and ,perhaps, should impact the routine cases for review and modification of protocol. In terms of blood management, perhaps, every case should be treated like a JW to reduce donor blood usage.

Citations

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