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Pump Thrombosis following HeartMate II Left Ventricular Assist Device Implantation in a Patient with Aspirin and Plavix Resistance

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INTRODUCTION

Despite advances in pump technology, thromboembolic events and pump thrombosis are potentially life-threatening complications in patients with continuous flow ventricular assist devices. Here we describe a patient with pump thrombosis following LVAD HeartMate II implantation presenting with Aspirin and Plavix resistance and signs of acute hemolysis as manifested by high LDH, changing pump power, pulse index and reduced pump flows.

CASE REPORT

We report a 66-year-old male with history of ischemic cardiomyopathy, who underwent a HeartMate II LVAD implantation at our center. His past medical history included pulmonary hypertension, arterial hypertension, DM type II, atrial fibrillation, chronic kidney disease, s/p AICD implantation, s/p PCI, and multiple stent implantation. His preoperative EF was 15% and right heart catheterization showed an increased PCWP (40 mmHg) with pulmonary hypertension (80/50, mean: 60 mmHg). He underwent a HeartMate II implantation at our center without complications and was discharged home after the first postoperative week. In the early postoperative period, he developed hemolysis with acute anemia, increased LDH and plasma Hgb, and was treated with intravenous heparin with a PTT goal between 40-60 seconds. He was found to be Aspirin as well as Plavix resistant. Hemolysis resolved with heparinization and he was discharged home. He was readmitted 5 weeks after operation with heart failure symptoms and deteriorating renal function. He had no clinical evidence of hemolysis (LH: 1912, plasma Hgb: 10), but his circulation was pulsatile and the left ventricle was not decompressed as assessed by TTE and right heart catheterization with LVAD flows >3 liters and LVAD pump flows >10000 rpm. The pump exchange was done at our center without any complication. An incision was made in the right groin and a dissection of the common femoral artery and vein was performed for cannulation. Extracorporal circulation was established. A left subcostal incision was made. Further, the outflow graft was clamped and the pump unscrewed at both ends, removing the pump from the chest after cutting the driveline. The interior of the pump showed a thrombus within the pump rotor. The new pump was reconnected and after de-airing the outflow clamp was removed and the pump started at 6000 rpm. The patient was successfully weaned off the heart lung machine and tolerated the procedure well. He was discharged home without any complications. He was maintained on iv heparin and changed to oral coumadin for a goal INR 2.5-3.5, oral Ticagrelor 90 mg bid, and Aspirin 80 mg/day. He has not shown any further episodes of thrombosis to date.

DISCUSSION

CF-LVADs have been increasingly used in the last years as a bridge to recovery, final destination, and transplantation. Thromboembolic events/pump thrombosis scenarios are one of the most feared complications in CF-LVAD patients. In our experience, the use of clopidogrel on top of Aspirin and coumadin in optimising anticoagulation seems to be effective and safe in the majority of patients. Some studies have shown that the efficacy of antiplatelet therapy using clopidogrel was not sufficient in more than 50% of cases [Birschmann 2014]. In a recent multicenter analysis it was demonstrated that hemolysis causes long-term negative effects in a long-term course of LVAD support [Katz 2015]. Hasin and colleagues reported that 7% of patients with HeartMate II showed signs of hemolysis presenting with high LDHs (more than six times the normal levels). In their report, intensifying the anticoagulation helped to decrease the levels to baseline within 2 weeks [Hasin 2014], with recurrent hemolysis up to 75% in 1–7 months. A recent analysis of the INTERMACS Registry of 4850 patients showed a mean time to event of 7.4 months and an incidence of 9% in 2 years [Katz 2015]. Here we report a case of early pump thrombosis in our patient, who was diagnosed with acquired Aspirin and Plavix resistance. The challenge in this case was the resistance to antithrombotic therapy, which could be successfully managed by changing the patient to oral Ticagrelor and Aspirin therapy. The important question of anticoagulation management in patients on LVAD support is clearly a challenging but important one. Gastrointestinal bleeding and pump thrombosis as expected complications require a careful approach as far as

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the dosing of the anticoagulation is concerned. In an era of centrifugal and axial flow pumps, the question of adequate anticoagulation needs to be addressed in each individual case after consideration of a patient's past medical and surgical history as well as previous episodes of GI bleeding and/or pump thrombosis. Further studies will give more insight into the best alternate source for patients with pump thrombosis and resistance to the standard antithrombotic regimen.

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