CASE REPORT

Coronary revascularization in a patient with cirrhosis and ESRD

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ABSTRACT

Surgery in a patient with hepatic cirrhosis entails risk of complications and of death. Association of End Stage Renal Disease (ESRD) with cirrhosis further increases perioperative risk of morbidity and mortality. There are no documented reports of patients with concomitant liver cirrhosis and ESRD undergoing cardiac surgery. We present a case report of a successfully operated case of ESRD with compensated hepatic cirrhosis posted for coronary artery bypass grafting.

Key Words: *Hepatic Cirrhosis, End-stage Renal Disease, Cardiac Surgery, Coronary*

INTRODUCTION

Hepatic cirrhosis increases the risk of perioperative mortality due to the pathological changes in multiple organ systems. As liver is the major site for metabolism, clotting factor synthesis and has a role in platelet formation, deranged liver functioning can affect recovery. ESRD leads to water and electrolyte imbalance, anaemia and increases mortality risk. Patients with combined hepatic cirrhosis and ESRD posted for a major cardiac surgery pose significant challenges for a successful outcome.

CASE REPORT

A 62 year male reported to the emergency department with complaints of exertional dyspnea and sweating since the last few days. He was a known diabetic, hypertensive, chronic kidney disease on medical management and had hepatic cirrhosis with portal hypertension and splenomegaly. Evaluation showed presence of triple vessel coronary artery disease and preserved cardiac function. He had undergone esophageal banding previously for esophageal varices. His liver function tests were within normal limits and had serial platelet counts between 60,000/µL-70,000/µL. He had a functioning left radio-cephalic fistula. A multidisciplinary team involving a nephrologist, gastroenterologist, cardiologist, cardiac surgeon and cardiac anesthesiologist was constituted to look at treatment options and the associated risks. An informed decision to treat the patient with elective coronary artery bypass grafting (CABG) was taken after counselling the patient and the attenders about the condition, treatment options and associated risks. Elective dialysis was commenced. Esophagoscopy revealed esophageal varices and banding done for the second time. The patient was discharged home for 2 weeks of elective dialysis, with dual antiplatelet therapy along with other cardiac medications. His euroscore II was 3.2%, had a Child-Turcotte-Pugh (CTP) class A and MELD score of 20.

Cardiac surgery was expedited in view of patient getting re-admitted to the EMD with chest pain after 10 days of discharge. He was managed conservatively with injection NTG and heparin temporarily.

Patient underwent dialysis the previous day of surgery. On the morning of surgery, after arterial and central venous cannulation under local anaesthesia in the operation theatre, smooth induction was achieved with etomidate and muscle relaxation with atracurium followed by intubation. Fentanyl at 5 µg/kg for intraoperative analgesia and amnesia with midazolam were given. An infusion of fentanyl at 2 µg/kg/hr and dexmeditomidine 0.5 µg/kg/hr were maintained perioperatively, as per departmental protocol till patient got extubated. Blood products were kept ready. No potassium containing fluids were transfused perioperatively. Left internal mammary artery was not harvested in view of a working left-sided AV fistula. After complete heparinisation and ACT>480 seconds, venous grafting to LAD, ramus, OM and distal RCA was done on cardiopulmonary bypass. Intraoperative filtration was not done in view of poor volume status and previous day dialysis. Patient was weaned from cardiopulmonary bypass at first attempt successfully with moderate doses of cardiac supports. Intraoperative blood loss was replaced only with packed red blood cell transfusion. In view of low preoperative platelet counts, 4 units of platelets were transfused immediately post CPB. After adequate protamine reversal and confirming hemostasis, patient was shifted to ICU.

Immediate postoperative management included hemodynamics, ABG monitoring and tight blood glucose management. Patient was given colloid transfusion in the form of fresh frozen plasma along with potassium-free fluids for maintenance. Blood was transfused in view of low hemoglobin concomitantly with renal replacement therapy in the form of Sustained Low Efficient Daily Dialysis (SLEDD) after about 10 hrs of shifting to ICU. SLEDD was again done on day 1 post-surgery following which patient was weaned and extubated.

The total drains till extubation was 750ml. Cardiac supports were tapered by day 2. His platelets continued to be in the range of 60000/ µL throughout the postoperative period. Patient received a total of 4 packed red cell, 4 plasma and 6 platelet transfusions during the perioperative period. Patient was continued on regular dialysis from day 3 and was discharged on 6th postoperative day without any complications.

DISCUSSION

Liver cirrhosis is associated with multiple organ dysfunction that lead to hepatosplenomegaly, esophageal varices, ascites, anemia, thrombocytopenia, impaired coagulation, renal dysfunction, pulmonary dysfunction and endocrine disorders among others. During cardiac surgery, thrombocytopenia and altered coagulation status are significant due to the already increased risk of bleeding and heparinisation. Moreover, these patients are likely to decompensate due to surgical stress and anaesthesia related factors. Presence of liver cirrhosis and ESRD in patients undergoing cardiac surgery increases postoperative morbidity and mortality.

EuroSCORE II criteria estimates hospital mortality in patients undergoing cardiac surgery. Mortality after CABG varies from 1%-3.2% depending on age, sex, comorbidities, emergency surgery, LV function, renal function and other operation related factors, etc. It does not consider liver function in its scoring system, though studies do show an increase in morbidity and mortality in patients with hepatic dysfunction [1].

The mortality of patients with liver cirrhosis undergoing open-heart surgery progressively increases with the severity of liver dysfunction [2]. Studies have shown that mortality is higher in CTP class B and C. The preoperative total bilirubin and cholinesterase concentrations as well as the EuroSCORE along with the CPB time are significant predictors of mortality

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after open-heart surgery in patients with cirrhosis [3-5]. MELD score, INR and bilirubin levels also increase the mortality post cardiac surgery [6].

Platelet count <96000/μL, age and operation time increase the incidence of postoperative morbidity [7]. Our patient had platelet counts of 60000/cu.mm-70000/cu.mm during the preoperative period and we transfused platelets electively to reduce the risk of postoperative bleeding.

Patients with end stage renal failure are anemic with fluid and electrolyte imbalance. ESRD patients undergoing CABG tend to need more vasopressor support, have longer duration of ventilator support and ICU and hospital stay as compared to normal renal function patients [8]. Intraoperatively, emphasis should be on maintaining dialysis access sites patent, prevent hyperkalemia, acidosis, fluid overloading along with good perfusion pressures. Our patient underwent early SLEDD along with blood product transfusions for maintaining hemodynamics and preventing hyperkalemia and acidosis.

Our patient had both compensated liver cirrhosis and end stage renal disease on medical management. In view of the risk of perioperative renal failure, dialysis was started preoperatively. Preoperative initiation of dialysis reduces morbidity and mortality in patients undergoing cardiac surgery [9].

The concerns in our patient perioperatively included fluid and electrolyte management, bleeding risk in view of thrombocytopenia and altered liver function, esophageal varices precluding the possibility of utilising transesophageal echocardiography, need for multiple blood product transfusions and the influence of altered drug pharmacokinetics and pharmacodynamics in view of hepatic and renal failure. There was also a risk of decompensation of liver cirrhosis due to anaesthesia and surgical risk factors.

Even though platelet counts less than 1lakh/μL increases the risk of perioperative bleeding significantly, there have been reports of CABG being done with platelet counts as low as 19000/cu.mm in cases of ITP [10]. Our patient had stable platelet counts between 60000/cu.mm-70000/cu.mm in the preoperative period. Elective platelet transfusion immediate post bypass may have contributed to better hemostasis. It would have been ideal to monitor using thromboelastogram and treat as necessary.

His post-operative platelet counts were 76000/cu.mm on day 1 and subsequently continued to be around 50000/cu.mm-60000/cu.mm throughout the postoperative period. We did not transfuse platelets further after day 2. Patient received only aspirin post-surgery.

We managed the patient by starting dialysis early after the coronary angiogram. In view of portal hypertension and cirrhosis, patient underwent banding of the esophageal varices. Grafting was done electively on bypass in a controlled environment and platelet transfusions were given immediately off bypass to reduce the risk of bleeding due to thrombocytopenia. Blood loss was managed by transfusing only blood products. Early dialysis post-surgery using SLEDD was done to reduce risk of hemodynamic instability, hyperkalemia and acidosis.

CONCLUSION

Patients with combined end stage hepatic and liver disease posted for major cardiac surgery need a multidisciplinary team approach for successful outcome of the patient.

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