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Coronary revascularization in a patient with cirrhosis and renal failure. Coronary artery bypass grafting in a patient with hepatic cirrhosis and end stage renal disease

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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) along with cirrhosis further increases perioperative risk of morbidity and mortality. There are no reports in the literature of patients with liver cirrhosis and ESRD having undergone cardiac surgery. We present a report of a successfully operated case of ESRD with compensated hepatic cirrhosis posted for coronary artery bypass grafting.*

Key words: *hepatic cirrhosis, coronary artery, bypass grafting*

Comment: We would like to publish a case report of a patient with end stage renal disease and liver cirrhosis having successfully undergone coronary artery bypass grafting at our institution.

Introduction

Surgery in a patient with hepatic cirrhosis entails risk of complications and of death. Association of end stage renal disease (ESRD) along with cirrhosis further increases perioperative risk of morbidity and mortality. There are no reports in the literature of patients with liver cirrhosis and ESRD having undergone cardiac surgery. We present a report of a successfully operated case of ESRD with compensated hepatic cirrhosis posted for coronary artery bypass grafting.

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 hepatic cirrhosis with portal hypertension and splenomegaly. He had undergone oesophageal banding one month back for esophageal varices. His liver function tests were within normal limits and the last few platelet counts were between 60,000–70,000/ μL . He had a functioning left radio-cephalic fistula. Further evaluation showed presence of coronary artery disease with calcified coronaries and preserved cardiac function. In view of his multiple comorbidities, a multidisciplinary team including nephrologist, gastroenterologist, cardiologist, cardiac surgeon and cardiac anaesthesiologist was constituted to look at treatment options and the associated risk. The patient and the attenders were counselled about the condition, treatment options and associated risks. Elective dialysis was started. Esophagoscopy revealed esophageal varices and banding was done for the second time. After further counselling, an informed decision was taken to go with coronary artery

bypass grafting (CABG) after two weeks of regular hemodialysis (HD). The patient was discharged on dual antiplatelet therapy along with other cardiac medications and was advised regular dialysis. His euroscore II was 3.2%, had a child-turcotte-pugh (CTP) class A and MELD score of 20.

The patient got readmitted to the EMD with chest pain after 10 days of discharge. He got stabilized with injection NTG and heparin. In view of the worsening cardiac symptoms, a decision for early CABG was considered.

Patient underwent dialysis the previous day of surgery. On the morning of surgery, patient was shifted to the OR, arterial and central venous access were achieved under local anaesthesia. Smooth induction was achieved with etomidate and muscle relaxation with atracurium followed by intubation. Intraoperative analgesia was maintained with fentanyl and amnesia with midazolam. As per departmental protocol, an infusion of fentanyl at 2 $\mu\text{g}/\text{kg}/\text{hr}$ and dexmedetomidine 0.5 $\mu\text{g}/\text{kg}/\text{hr}$ were maintained perioperatively till patient got extubated. Adequate blood products were kept ready for the surgery. No potassium containing fluids were given perioperatively. LIMA was not harvested in view of a working left-sided AV fistula. After complete heparinisation and ACT > 480 seconds, venous grafts to LAD, ramus, OM and distal RCA was done under cardiopulmonary bypass. Intraoperative filtration was not done in view of poor volume status and previous day dialysis. Weaning from cardiopulmonary bypass was achieved successfully with moderate doses of cardiac supports. Intraoperative blood loss was replaced with packed red blood cell transfusion. In view of low preoperative platelet counts, 4 packs of platelets were transfused immediately post CPB. After adequate protamine reversal and confirming hemostasis patient was shifted to ICU.

Continuous monitoring for hemodynamic stability and bleeding along with regular monitoring of ABGs was done. He was managed according to our ICU protocol. Blood sugars were maintained within 200 mg% throughout with the help of insulin infusion. Patient received plasma transfusions in the postoperative period as maintenance along with potassium free crystalloids on the day of surgery. He underwent dialysis in the form of slow low efficient daily dialysis (SLEDD) on the POD '0' (after about 10 hours of shifting to ICU) along with transfusion of PRBC during dialysis in view of low hemoglobin of 7 gm%. Though we try to avoid dialysis on the day of surgery, we dialysed our patient as there was a concern about expected hemodynamic disturbances due to low hemoglobin. After 2 sessions of SLEDD on day 0 and day 1, regular dialysis was restarted post cessation of all cardiac supports.

After reversing neuromuscular blockade and weaning from ventilator, patient was extubated. The total drains till extubation was around 750 ml. Cardiac supports were tapered by day 2. His platelets continued to be in the range of 60,000/ 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 discharged on 6th postoperative day without any complications.

Discussion

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

Cirrhosis is characterized by fibrosis and nodule formation of the liver secondary to chronic injury, leading to altered normal lobular organization of the liver. The mortality of patients with liver cirrhosis undergoing open-heart surgery progressively increases with the severity of liver dysfunction [1]. Studies have shown that mortality is higher in CTP class B and C. The preoperative total plasma bilirubin and cholinesterase concentrations as well as the EuroSCORE along with the CPB time are significant predictors of mortality after open-heart surgery in patients with cirrhosis [2, 3, 4]. Even MELD score, INR and bilirubin levels all increase the mortality post cardiac surgery [5].

Platelet count < 96000/ μL , age and operation time have been shown to increase the incidence of postoperative morbidity [6]. Our patient had a platelet count of 60,000–70,000 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 and an increased risk of atherosclerosis. 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 [7]. Intraoperatively, emphasis should be on maintaining dialysis access sites patent, prevent hyperkalemia, acidosis, fluid overloading along with good perfusion pressures.

Presence of liver cirrhosis and ESRD in patients undergoing cardiac surgery increases postoperative morbidity and mortality. Liver cirrhosis is associated with multiple organ dysfunction that lead to hepatosplenomegaly, esophageal varices, ascites, anemia, thrombocytopenia, impaired coagulation, renal dysfunction, pulmonary dysfunction, 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.

Our patient had both compensated liver cirrhosis and end stage renal disease on medical management. In view of the risk of perioperative renal failure, patient was started on dialysis preoperatively. Preoperative initiation of dialysis has been shown to reduce morbidity and mortality in patients undergoing cardiac surgery [8].

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.

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.

Even though platelet counts less than 1 lakh/ 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 [9]. Our patient had stable platelet counts between 60,000–70,000/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 76 000/cu.mm on day 1 and subsequently continued to be around 50,000–60,000/cu.mm throughout the postoperative period. We did not transfuse platelets further after day 2. Patient received only aspirin post-surgery.

Managing a patient with combined hepatic and renal failure needs a multidisciplinary approach with planning especially when posted for a major cardiac surgery.

Коронарна реваскуляризація у пацієнта з цирозом печінки та нирковою недостатністю. Шунтування коронарної артерії у пацієнта з цирозом печінки та термінальною стадією захворювання нирок

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Анотація. Операція у пацієнта з цирозом печінки тягне за собою ризик ускладнень та смерті. Зв'язок термінальної ниркової недостатності (ТНН) з цирозом печінки ще більше підвищує періопераційний ризик захворюваності та смертності. У літературі немає повідомлень про пацієнтів з цирозом печінки і ТНН, які перенесли операцію на серці. Ми представляємо звіт про успішно прооперований випадок ТНН з компенсованим цирозом печінки, направлений на аортокоронарне шунтування.

Ключові слова: цироз печінки, коронарна артерія, шунтування.

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Коронарная реваскуляризація у пацієнта с циррозом и почечной недостаточностью. Аортокоронарное шунтирование у пацієнта с циррозом печени и терминальной стадией почечной недостаточности

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Резюме. Операція у пацієнта с циррозом печени влечет за собой риск осложнений и смерти. Связь терминальной стадии почечной недостаточности (ТПН) с циррозом дополнительно увеличивает періопераційный риск заболеваемости и смертности. В литературе нет сообщений о пациентах с циррозом печени и ТПН, перенесших кардиохирургические вмешательства. Мы представляем отчет об успешно прооперированном случае ТПН с компенсированным циррозом печени, отправленном на аортокоронарное шунтирование.

Ключевые слова: цирроз печени, коронарная артерія, шунтирование.