Letters to Editor

Liver transplantation for acute liver failure due to hepatitis E in a pregnant patient

Sir,

A 28-year-old female at 28 weeks of gestation was referred from a peripheral centre with history of tiredness, jaundice of 6 days' duration and altered sensorium for a day. On investigation, she was diagnosed to be hepatitis-E-positive. The patient was admitted in the intensive care unit (ICU) for further management. Blood investigations revealed coagulopathy (international normalised ratio 6.76), serum arterial ammonia of 82 μmol/L, haemoglobin 10.5 g/dL, serum creatinine 0.9 mg/dL, and bilirubin 13 mg/dL. The calculated Model for End stage Liver Disease score was 36.

Foetal ultrasound revealed an appropriate for gestational age foetus with good cardiac activity. She was initiated on fulminant hepatic failure management. An infusion of N-acetyl cysteine was started at a rate of 6.25 mg/kg/h. Intravenous (i.v.) infusion of midazolam was initiated. About 3% sodium chloride was started as an infusion at a rate of 10 mL/h with the aim of keeping serum sodium above 145 meq. Serum sodium was monitored 4th hourly and modification was made accordingly. On subsequent day, her coagulopathy worsened and had per-vaginal bleeding. Encephalopathy worsened to grade 2 over 3 h from grade 1. Arterial ammonia level increased to 130 μmol/L. Her pupils were reacting equally. She met the Kings College Criteria for transplantation and was reviewed by the transplant team. A multidisciplinary team decided to proceed for living donor liver transplantation, with lower segment caesarean section prior to transplant.

The patient was shifted to the operating room, i.v. access was done with wide bore cannula and multiparameter monitoring was started. The right radial artery was cannulated for invasive blood pressure monitoring. Adequate pre-oxygenation was done and proceeded with rapid sequence intubation.

Lower segment cesarean section (LSCS) was done and a live female baby was delivered. The baby was handed over to the neonatal intensive unit, where the baby was intubated and ventilated. APGAR score at 1 min was 6 and at 5 min was 8. Coagulopathy in the mother was corrected by use of fresh frozen plasma according to rotational thromboelastometry (ROTEM). The dose of noradrenaline was increased from 0.05 to 0.08 μg/kg/min in view of hypotension after caesarean section.

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Once the LSCS was completed, the transplant team proceeded for surgery. Advanced venous access 9 F was done in the right internal jugular vein (IJV) under ultrasound guidance. Triple lumen central venous catheter, 7 F, was also secured to the right IJV, 1 inch below the advanced venous access (AVA) insertion site. All lines were secured using sutures. Left-sided radial artery was cannulated for sample collection and intraoperative coagulation monitoring.

ROTEM was used for coagulation assessment. FloTrac™ EV 1000 (Edwards Life sciences Corporation, CA, USA) was used for intraoperative haemodynamic monitoring. Central venous pressure (CVP monitoring was initiated during the entire surgery and the postoperative period. The dissection phase was accompanied by severe coagulopathy, requiring two units of fresh frozen plasma transfusion and two units of cryoprecipiate. The correction was guided by the ROTEM values. Noradrenaline infusion of 0.1 μg/kg/min, phenylephrine infusion (0.5 μg/kg/min) and vasopressin infusion (1.2 U/h) were started off early during the dissection phase due to hemodynamic instability. Anhepatic phase blood gases showed acidosis which was corrected by sodium bicarbonate infusions (100 meq over an hour). Correction of hypocalcaemia (0.8 mmol/L) was done during the anhepatic phase using 10% calcium, gluconate 10 mL as bolus, followed by an infusion of 0.5 mg/kg/h. The implantation of the graft liver was done using inferior venacava IVC cross clamp. The total cold ischaemia was 2 h 11 min. The reperfusion phase was marked

by severe post reperfusion syndrome which was tackled by increasing the dose of noradrenaline to 1 μg/kg/min, vasopressin 2.4 units/h, infusion of sodium bicarbonate (100 meq over 1 h), calcium chloride 10% as 10 mL bolus and a single bolus dose of adrenaline (1:100,000). The immediate reperfusion phase showed a rise in central venous pressure and worsening acidosis which settled within half an hour after reperfusion. Clearing of acidosis in the arterial blood gas was noted 1 h after reperfusion. The warm ischaemia time was 56 min. The total duration of the surgery was 11 h. The patient was shifted to the transplant ICU for elective postoperative ventilation. She was put on pressure support ventilation and sedation was done by propofol 0.5 mg/kg/h and fentanyl 1 μg/kg/h infusions. Sedation hold was done 6 h after surgery. Tapering of ionotropes was done gradually. She was extubated 12 h after surgery. Her higher mental functions were intact and ionotropes were tapered off 14 h after transplant.

The baby was mechanically ventilated for 48 h. Magnetic resonance imaging of the brain was done to rule out hypoxic brain injury as the baby had seizures on the following days. ECHO revealed patent ductus arteriosus (PDA), which was managed medically. Liver function tests of the recepient started declining to normal levels 24 h after liver transplant; 72 h after transplant, immunosuppresion was started and was titrated according to the enzyme values. The patient was discharged 20 days after surgery with no complication. The patient and the baby are on regular follow-up for the past 1 year with no postop surgical or medical issues.

Hepatitis E is an important cause of enterically transmitted hepatitis in the developing countries. It can lead to acute liver failure especially in pregnant patients and in patients with preexisting liver diseases.[1] The mortality rates increased in the third trimester of pregnancy and with increasing grades of hepatic encephalopathy. The frequency of infection and mortality rate increases with the gestational age. The severe course in pregnant women is because of the reduction in the expression of progesterone receptor, which led to predominant T-helper type 1 lymphocytes. This immunologic shift results in an exuberant cytotoxic T-cell reaction resulting in foetal and maternal injury.[2] Orthotopic liver transplantation is a treatment option for patients presenting with acute liver failure. The mortality rates were higher as found in other studies when the transplant was done at a later stage of encephalopathy. Hence we decided upon terminating the pregnancy with the hope of saving a viable foetus and following up with a living donor liver transplantation to rescue the mother. A case where LSCS was done to terminate the pregnancy and later proceeding with transplant option with a succesful outcome was available in the literature.[3] The timing of LSCS and liver transplantation is always a debatable topic. Various case reports are available in literature where LSCS was followed up with liver transplantation few days later. Centres have done induction of labour, and then depending on the clinical condition, transplantation was done at a later stage.[4] Delaying the delivery of foetus will interfere with the immunosuppresion regimen as many of the immunosuppressive agents are not pregnancy safe.[5] In our case, we decided upon LSCS and liver transpant with the idea that a viable foetus could be saved and better hemodynamic control could be acheived in a contolled way and transplant offered in the same session could have a better prognosis for both the mother and the baby. The main challenges we faced were to maintain adequate hemodynamic parameter so as to have a good placental perfusion during the initial phases of anesthesia and induction.

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Conflicts of interest

There are no conflicts of interest.

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