Role of Splenic Artery Partial Embolization in a Patient With Portal Hypertension and Pancytopenia Undergoing Hysterectomy Under Anesthesia

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Management of a patient with portal hypertension and hypersplenism who is scheduled for elective surgery is a challenge for anesthesia providers. We report a case that was scheduled for elective surgery in which preoperative splenic artery embolization improved the hematologic parameters. A 32-year-old woman was scheduled for total abdominal hysterectomy for multiple fibroids and menorrhagia with pancytopenia. She also had diagnoses of chronic liver disease with cirrhotic changes, portal hypertension, and grade IV esophageal varices with hepatosplenomegaly. In view of pancytopenia, splenic artery partial embolization was done preoperatively. Her hematologic parameters improved, and she underwent surgery under general anesthesia with intrathecal morphine analgesia, uneventfully. The condition of patients with portal hypertension with associated hypersplenism and pancytopenia who are scheduled for elective surgery can be optimized with preoperative partial splenic artery embolization.

Keywords: Elective surgery, pancytopenia, portal hypertension, splenic artery partial embolization.

Management of a patient with portal hypertension and hypersplenism who is scheduled for elective surgery is a challenge for anesthesia providers. Splenectomy has been the most frequently used procedure for hypersplenism, but it is associated with a 30-day mortality rate of 20%. In patients with idiopathic portal hypertension, partial splenic embolization can be effective in preventing variceal bleeding, reducing splenic volume, and substantially increasing the platelet count. We report such a case that was scheduled for elective surgery in which preoperative splenic artery embolization improved the hematologic parameters and, thus, helped provide an uneventful perioperative period.

Case Report

A 32-year-old woman weighing 51 kg was scheduled for total abdominal hysterectomy for multiple fibroids and menorrhagia with pancytopenia. The patient had a history of jaundice and menorrhagia 8 years earlier. She was diagnosed as having uterine fibroid. Her jaundice was managed conservatively, and, subsequently, myomectomy was done uneventfully under general anesthesia. She remained asymptomatic until 2 years earlier when she had multiple episodes of hematemesis. Further evaluation revealed chronic liver disease with cirrhotic changes, portal hypertension, and grade IV esophageal varices with hepatosplenomegaly. Her antinuclear antibody, anti–smooth-muscle actin, liver-kidney microsomal antibody, serum copper, serum ceruloplasmin, serum iron, and lipid profile results were normal. Fundus examination for Kayser-Fleischer rings was normal. She underwent endoscopic banding for esophageal varices.

In the present case, she sought care because of menorrhagia. Examination revealed pallor and a pulse rate of 98/min and a blood pressure of 118/76 mm Hg. Respiratory and cardiovascular examinations revealed no abnormality except a systolic murmur. The abdominal examination revealed a uterine size of approximately 24 weeks’ gestation with an irregular globular surface. The spleen was palpable at a size of 3 fingers below the subcostal margin.

Laboratory testing revealed a hemoglobin level of 8.2 g/dL, a total leukocyte count of 2,120/μL, a platelet count of 48 × 10^3/μL, and a prothrombin time of 16 seconds (control, 11 seconds). The results of liver and kidney function tests, chest radiographs, and an electrocardiogram were normal. Viral markers (hepatitis B surface antigen, human immunodeficiency virus, and hepatitis C virus) were negative. Contrast-enhanced computed
tomographic scanning revealed a cirrhotic liver, hepato-splenomegaly, moderate ascites, portal hypertension, multiple dilated collateral blood vessels (along the lower esophagus, in the perisplenic region), and fibromyoma of the uterus. Upper gastrointestinal endoscopy revealed grade I varices.

In view of the presence of splenomegaly with pancytopenia, the opinion of a gastrointestinal surgeon was sought about splenectomy along with total abdominal hysterectomy, but splenectomy was not advisable. In view of the pancytopenia, splenic artery partial embolization was planned. Under aseptic technique, the splenic artery was selectively cannulated via the transfemoral route, and partial embolization was achieved using gel foam pledgets, resulting in a decrease in 50% of parenchymal staining. At 24 hours after the procedure, a repeated hemogram revealed a hemoglobin level of 9.9 g/dL, a total leukocyte count of 9,300/µL, a platelet count of 211 × 10³/µL, and a prothrombin time of 12 seconds (control, 11.9 seconds).

The patient was scheduled for total abdominal hysterectomy 4 days later. She was prescribed oral diazepam (5 mg) and pantoprazole (40 mg) the night before and on the morning of surgery.

In the operating room, routine monitors (5-lead electrocardiogram, pulse oximeter, and noninvasive automated blood pressure) were applied. Intravenous access with a 16-gauge catheter was secured. Under aseptic conditions, intrathecal morphine (300 µg) was administered using a 27-gauge spinal needle with the patient in the left lateral position. Anesthesia was induced with intravenous lantylent (100 µg) and propofol (100 mg), and the lungs were ventilated with isoflurane (1.2%) in oxygen and air (50:50). After achieving neuromuscular blockade with vecuronium (5 mg), the trachea was intubated with a cuffed endotracheal tube (7 mm internal diameter). Anesthesia was maintained with isoflurane in oxygen and air (50:50), maintaining a minimum alveolar concentration of 1 to 1.2. Supplementary doses of fentanyl and vecuronium were administered when required. The surgical procedure lasted for 90 minutes. Blood loss was 600 mL, and 1 U of packed red blood cells was given. Hemodynamic parameters remained stable. There was no excessive oozing from the surgical sites.

After completion of the surgical procedure, residual neuromuscular blockade was reversed and the trachea extubated. The patient was moved to the high-dependency unit for observation. For postoperative pain, intravenous tramadol (50 mg) every 8 hours was prescribed for the next 3 days. A repeated hemogram revealed a hemoglobin level of 10.9 g/dL, a total leukocyte count of 11,400/µL, and a platelet count of 188 × 10³/µL. On the fourth postoperative day, the counts increased further, as follows: hemoglobin level, 10.8 g/dL; total leukocyte count, 10,800/µL; and platelet count, 266 × 10³/µL.

All other studies showed normal results, with negative results for the viral markers as well.

The patient was discharged on the eighth postoperative day with advice to follow up in the gastroenterology and gynecology clinics.

**Discussion**

Portal hypertension is commonly associated with splenomegaly and, at times, with functional hypersplenism and its attendant peripheral blood cytopenias. Patients with such conditions may undergo elective surgery and present a challenge for anesthesia providers in the perioperative period. Not only the deranged liver function but also the presence of pancytopenia remain major concerns.

When medical therapy fails, physicians often insert a transjugular intrahepatic portosystemic shunt to treat the complications of portal hypertension. Total splenectomy may be an effective treatment for hypersplenism, but it impairs the ability of the body to produce antibodies against encapsulated microorganisms and predisposes patients to sepsis. Also, splenectomy is associated with perioperative complications. Many authors have advocated incomplete or partial splenic arterial embolization, in which a portion of the splenic parenchyma is left viable to preserve the immunologic function. The procedure helps occlude the arterial supply of the spleen more peripherally, which results in ischemic necrosis of much of the functional spleen followed by a decrease in splenic size and hypersplenism. Also, it is a simple, rapid procedure that can be performed easily under local anesthesia and incurs less morbidity, and there is no need for blood transfusion.

When clinically appropriate, this procedure may provide an alternative to open surgery. The procedure may help to salvage splenic function in patients with posttraumatic injuries or hypersplenism and to improve hematologic parameters (ie, to treat pancytopenia, thrombocytopenia, leukopenia, or anemia). Splenic artery embolization may also be considered an alternative option for patients with rare blood groups by decreasing the requirement for blood products. The procedure requires selective and superselective catheterization of the splenic artery and its branches. This can eliminate the need for an emergency portosystemic shunt and defer it to an elective procedure with a lower mortality.

The concerns in our case were the presence of pancytopenia and, thus, the risk of increased bleeding. The cause of hepatosplenomegaly with portal hypertension could not be identified in our case. Splenectomy was deferred in our case in view of only moderate splenomegaly and regression of esophageal varices after banding. Splenic artery embolization was successful, and all cell
counts increased within 24 hours after embolization. The patient did not require transfusion of platelet concentrates or other blood products. Pain management is also a concern. We administered “single-shot” intrathecal morphine to provide long-lasting analgesia. Nonsteroidal anti-inflammatory agents were avoided because the platelet counts were already low.

In the presence of portal hypertension with associated hypersplenism and pancytopenia, preoperative partial splenic artery embolization can help avoid the need for blood transfusion and its associated complications in patients scheduled for elective surgery.

REFERENCES

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