

C A S E R E P O R T

Intraperitoneal hemorrhage following primary cytoreductive surgery for ovarian cancer: successful treatment with superior epigastric artery embolization

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Abstract: Hemoperitoneum often occurs due to abdominal trauma, abdominal tumors, gastro-intestinal perforation and more rarely it's spontaneous due to coagulopathies. Superior epigastric artery (SEA) iatrogenic damage is rarer than the Inferior epigastric artery injury, it may occur during laparotomy and, in most cases, it causes a rectus muscle hematoma. We present the case of a caucasian 44 years-old-woman with hemoperitoneum after cytoreductive surgery for ovarian cancer. Active bleeding from the distal branch of the SEA was diagnosed at computed tomography and coil embolization followed by surgical laparotomic drainage of the hemoperitoneum was performed. After initial resolution, active bleeding from the same vessel was observed. Further embolization of the same vessel was necessary to stop bleeding. Ultrasound follow-up showed a complete resolution of the hemoperitoneum. (www.actabiomedica.it)

Key words: Hemoperitoneum, Superior epigastric artery bleeding, Embolization, Laparotomic complication.

Introduction

Hemoperitoneum often occurs due to abdominal trauma, abdominal surgeries, gastrointestinal perforation, and more rarely it's spontaneous due to anticoagulant therapy or coagulopathies(1). Its clinical manifestations can be non-specific such as severe anemia, abdominal pain, abdominal compartment syndrome, or acute heart failure(2) A clinically relevant hemoperitoneum could be due to iatrogenic or spontaneous rupture of major vessels with high flow rates(3). Hemoperitoneum due to the rupture of small blood vessels generally follows minor procedures such as paracentesis and it resolves spontaneously in most cases(4).

The Superior and Inferior epigastric arteries vascularize the anterior abdominal wall, and their injury is unusual and rarely requiring re-operations or lifesaving procedures(5). The inferior epigastric artery is the most injured abdominal vessel during laparoscopic surgery, it often causes a consequence-less self-resolving hematoma(6). Superior epigastric artery (SEA) iatrogenic injury is more rare, it often occurs after midline laparotomy and in most cases causes a rectus muscle hematoma(7).

SEA bleeding rarely causes hemoperitoneum and in most cases no treatment is needed(8). Here we present a rare case of hemoperitoneum due to SEA bleeding after cytoreductive surgery for advanced ovarian cancer that required embolization, reoperation, and repeat embolization.

Case report

A 44-years-old-woman referred to our Department of Gynecology and Obstetrics, in October 2019. After the diagnosis of high grade serous ovarian cancer with a Fagotti's score(9)of 8 and the drainage of 7 liters of ascites obtained by diagnostic laparoscopy, the patient underwent primary debulking surgery. Primary surgery included total hysterectomy, bilateral salpingo-oophorectomy, radical omentectomy, splenectomy, rectosigmoid colon resection with colorectal anastomosis, resection of pelvic enlarged lymph nodes, and diaphragmatic right upper quadrant peritonectomy.

Six days after surgery, the serum hemoglobin dropped from 9.3 to 6.8 g/dL (normal range 12-16 g/dL), and computed tomography revealed hemoperitoneum. A blood transfusion was performed and hemoperitoneum on the anterior liver surface was revealed at the computer tomography (Fig. 1a,b).

Using a transfemoral approach, selective catheterization of the left internal mammary artery was performed and the left SEA active bleeding was found (Fig. 2). Therefore, super-selective coil embolization of the left SEA was carried out using 2 mm multiple coil placement, and complete hemostasis was obtained placing the coils across the site of the focal bleed (Fig. 3).

Two days after selective embolization, laparoscopic drainage of the perihepatic hemoperitoneum was performed to reduce the infectious disease risk and 1200 ml of blood was drained.



Figure 1a: Hemoperitoneum on the anterior liver surface at the computed tomography (transverse plane).

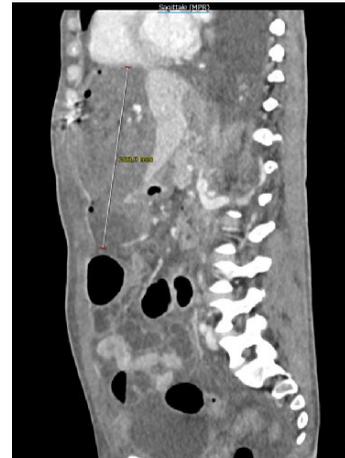


Figure 1b: Hemoperitoneum on the anterior liver surface at the computed tomography (sagittal plane).



Figure 2: Left SEA active bleeding at the computed tomography angiography.



Figure 3: Selective coil embolization of the left superior Epi-gastric artery using 2 mm multiple coil placement.

Following the evacuation of hemoperitoneum, there was evidence of SEA active rebleeding by blood test analysis and confirmed by computed tomography angiography (CTA). The CTA confirmed the rebleeding of the same terminal branch of the SEA, also the bleeding site was not supplied by the inferior epigastric artery. The left SEA re-embolization procedure was carried out with gelatin sponge particles (Spongostan, Johnson & Johnson) and with two 1 mm coils placement. After the procedure, the patient was transferred to the post-operative intensive care unit to monitor her clinical conditions. Clinical parameters of the patient improved and she was discharged 21 days after the main surgery.

Ultrasound follow-up showed gradual and complete reabsorption of hemoperitoneum within 3 months. The patient started chemotherapy 45 days after the main surgery, and no other complications were diagnosed. Five months after surgery, the patient performs regular follow-up and no recurrence has been reported.

The patient has consented to the submission of the case report for submission to the journal.

Discussion and Conclusion

Hemoperitoneum due to SEA bleeding is an extremely rare event and standardized treatment remains to be identified(6).

The SEA is a small size blood vessel (mean size: 2–3 mm) with an average blood flow of 60 mL/min, which under different conditions can increase until 150 mL/min, resulting in a potentially 1-L blood loss in a few minutes if injured(10)

Literature review of iatrogenic SEA injury reveals that most cases resolve spontaneously, with a much smaller percentage of cases resulting in hemoperitoneum and requiring intervention or embolization(7).

In this case, a coil embolization, a reintervention, and a further embolization of the same vessel were needed to stop the left SEA bleeding. The reason why the first embolization coil was not sufficient is uncertain. A possible explanation could be linked to vasoconstriction during embolization. During embolization vasospasm through intravascular manipulations of catheters can occur(11). This

temporary vasospasm can cause a temporary stop of the bleeding that could resume once the vasospasm has ended. Furthermore, temporary vasoconstriction via the local injection of diluted epinephrine has been reported in some cases(12). Surely, patients who have recently undergone multiple transfusions of blood products show an altered coagulation profile. Besides, the massive ascites present at the time of diagnosis may have congested the Vena Cava and Aorta circulation, resulting in a portal-like hypertensive disease. As in cases of portal hypertension, portosystemic congestion may have developed vascular anastomoses of the superficial anterior abdominal wall between the lower and upper Epigastric arteries and veins. In this way, hemoperitoneum could be supplied not only by the SEA but also by the IEA. Finally, the portosystemic vascular congestion could have enlarged the SEA making first transcatheter coil embolization ineffective. However, these remain only hypotheses, and a specific cause of the rebleeding remained idiopathic.

When the bleeding recurred, after multidisciplinary analysis, the interventional radiologists decided to perform a further embolization, using gelatin sponge particles to control distal bleeding and two transcatheter coil embolizations to occlude the dilated SEA. The choice to perform a further embolization, together with not performing further surgical gestures, led to a complete resolution of the vascular complication.

This case reported an extremely rare surgical complication reported after primary debulking surgery for ovarian cancer. Attention should be paid in case of superior epigastric artery injuries during laparotomy.

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