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Intraoperative splenic injury as a complication of the laparoscopic excision of uterine myoma

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ABSTRACT

The incidence of iatrogenic splenic injury during gynecological laparoscopic surgery is rare or probably underreported. The spleen is situated principally in the left hypochondrium, connected to the colon, the omentum majus and the lateral abdominal wall. The estimated prevalence of iatrogenic trauma after the more common operative procedures is considered relatively low, however, immediate identification and management either by splenic repair or splenectomy should result in avoiding any potential complications. We presented a case of uterine myoma enucleation of the anterior wall of the uterus with an accidental injury of the spleen that implicated splenectomy. Constant awareness of the prevalence of this operative complication and the mechanisms by which it may arise should enable its early identification and prevention of any potential sequelae.

1. Introduction

Leiomyomas of the uterus are the most common benign solid pelvic tumor of the female with an incidence of 20%–50%[1]. The operative treatment of myomas requires a qualified surgeon and a cautious indication. Laparoscopic surgery is a well-established treatment modality for myoma enucleation in gynecological surgery.

Minimally invasive procedures have their own technique and related complications. The estimated prevalence of iatrogenic trauma after the operative procedures is as follows: nephrectomy (4%), hiatus hernioplasty (3%), left or total colectomy (2%), gastric operations (2%) and aortic

aneurysmectomy (1%)[2]. Bleeding complications have been reported as occurring in 0.25% to 1.77% of cases[3,4]. They usually arise from injuries to vessels of the abdominal wall and different intra-abdominal organs, however, desired hemostasis may be achieved laparoscopically or by laparotomy.

The spleen is normally covered by omentum, bounded by the diaphragm superiorly, the left kidney posteriorly, and the gastric fundus and the splenic flexure of the colon anteriorly. Following a splenic injury, the blood usually accumulates in the left pericolic gutter and a bluish protruding omentum or blood clots can be seen. In some instances, laparoscopy reveals only minimal hemoperitoneum without significant bulging or bluish discoloration of the omentum. We presented a case of unrecognized accidental splenic injury during myoma enucleation of the anterior uterine wall. Late intra-operative hemorrhage of unknown origin finally led to splenectomy.

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2. Case report

A 40-year-old woman, nulliparous, presented to the outpatient clinic complaining of difficulty during defecation and urination. She had a 6-month history of several attacks of urinary retention and emergency catheterization but no previous surgical or medical history of antecedent infectious disease. Gynecological examination revealed a smooth, heavy and immobile mass that could not be elevated during the Douglas pouch palpation, suggesting the presence of a myoma. Ultrasound imaging confirmed the presence of a large fundus myoma (10 cm×8 cm) in a retroflexed-positioned uterus. The patient was admitted for laparoscopic myoma enucleation.

Pneumoperitoneum was achieved following the Semm safe entry technique entering through the umbilicus. A diagnostic assessment was performed using an optic trocar, introduced through the umbilicus. Inspection of the lower abdomen showed a large posterior wall myoma extending into the cervix. No other anatomical or functional abnormalities were seen. After successful enucleation of the myoma, the uterine wall was reconstructed in a single layer with reversed and inverted single stitches (Figure 1). This was followed by morcellation of the myoma using the left working trocar for morcellation. At the alleged end of the operation, hemostasis was confirmed and the trocars were removed under direct vision. During the subcuticular closure of the umbilicus suture, an oozing of fresh blood was noticed and the abdomen was reentered. Fresh blood collections were seen in the abdomen, and the uterus suture line and trocar entry sites were rechecked. The bleeding source was not related to the operative site. Blood accumulation in the left hypochondric region led to the visible diagnosis of a splenic bleeding (Figures 2 and 3). The splenic capsule showed a superficial tear, ranging from 1–2 cm. With the assistance of a general surgeon, several attempts were performed to stop the bleeding. Attempts to achieve hemostasis using compresses, tamponades and bipolar current were insufficient and finally a splenectomy was performed.

The post-operative recovery was unremarkable and the patient was discharged 5 d after surgery.



Figure 1. The uterus wall after reconstruction using polydioxanone suture.

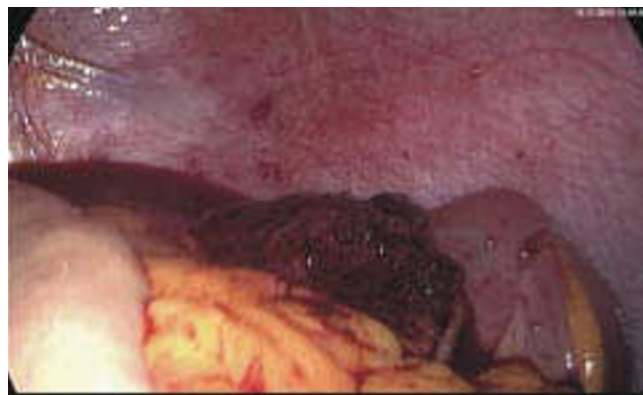


Figure 2. Blood collections in the left hypochondrium region after injury.

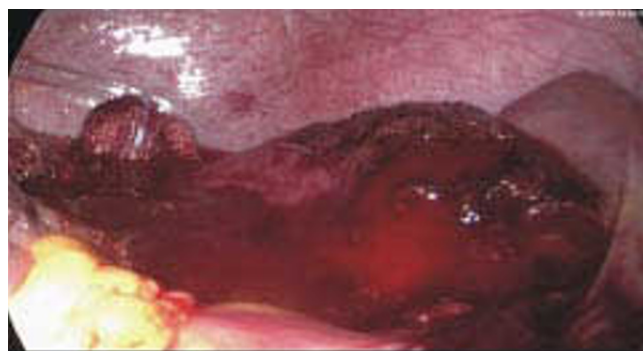


Figure 3. After inspection of the pelvis and trocar sites, the bleeding site can be seen on the spleen surface.

3. Discussion

Over the past 20 years, laparoscopy has developed into a major tool in gynecological surgery allowing gynecologists to perform operations, previously performed as laparotomies, by laparoscopy. A retrospective analysis of 32 205 laparoscopies in Finland revealed a total complication rate of 0.40%: 0.06% for diagnostic laparoscopies, 0.05% for tubal sterilization and 1.26% for operative surgery (treatment of endometriosis, ectopic pregnancy, ovarian cysts, myomectomy and hysteroscopy)[5]. Schäfer *et al.* showed a complication rate of 0.464%: 0.184% for diagnostic surgery, 0.084% for minor surgery, 0.43% for major surgery and 1.745% for advanced surgery in a total of 29 666 laparoscopies[6]. The percentage of conversions to laparotomies reported in a retrospective study varied from 0% to 41%[7].

The laparoscopic procedure may be divided into two main steps: (i) “Blind” step includes induction of pneumoperitoneum and installation of the first trocar. (ii) “Visual” step includes installation of the operating trocar and the surgical procedure. Complications associated with the first step are extremely dangerous and require a certain surgical experience to avoid their occurrence.

These complications include subcutaneous emphysema, carbon dioxide embolism, major and minor vascular injuries (risks of hemorrhage) and gastrointestinal injury, including stomach and bowel injury. Complications associated with the second step may occur during insertion of the secondary trocars or the surgical procedure. As trocars can cause injury to the vascular, urinary or intestinal structures, a cautious introduction is needed, especially if entering the abdomen via the Palmer's point. In a review of 408 trocar-related major vascular injuries reported to the FDA (Food and Drug Administration) by the medical device industry, 26 deaths were noted, representing a mortality rate of 6.37% for vascular laparoscopic injuries^[8].

A review of the literature revealed that splenic lesions during laparoscopy are rare and were reported in only 4 of 17 collective studies on complications of laparoscopy^[9]. These lesions were reported in 17 patients and varied from a small capsular laceration with bleeding to splenic rupture. In 12 patients, 4 injuries were related to splenomegaly and occurred during insertion of the cannula and laparoscope^[10]. In one patient, splenic bleeding occurred after an attempt to remove parts of the omentum adherent to the spleen^[11]. Common mechanisms of splenic injury during surgery include traction on the stomach toward the right side of the abdomen, which is more likely to tear the short gastric vessels or the splenic capsule. Similarly, downward traction on the splenic flexure of the colon puts tension on the lienocolic ligament and frequently produces a capsular laceration^[12]. In the remaining seven cases, bleeding occurred immediately after insertion of the laparoscope; improper needle positioning during establishment of pneumoperitoneum may have been responsible. Many laparoscopic complications are iatrogenic and this one might have occurred while establishing the pneumoperitoneum. Distortion and stretching of small vascular adhesions between the spleen and the abdominal wall may also have played a role^[13]. Difficulties in recognizing the injury intraoperatively are caused by the intraperitoneal pressure on the bleeding vessels and the decreased venous return due to the Trendelenburg position.

Bleeding complications are in fact common during laparoscopic surgery. Meticulous dissection techniques, careful suction and irrigation techniques, immediate recognition and suggestions of rapping the injured spleen with powerful tissue sealants, *e.g.*, oxidized regenerated methylcellulose or haemostatic gelatine matrix, *i.e.* Surgicel^[14] or Floseal^[15], are still to be considered the adequate surgical management techniques^[6].

Of greater importance is the constant acknowledgment of the associated bleeding risk from the abdominal organs after inspection of the trocar entry sites and the operative field and the awareness of the different maneuvers to avoid traction upon the spleen and its attachments.

Conflict of interest statement

We declare that we have no conflict of interest.

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