

Intra-abdominal and abdominal wall haematoma from 5 mm port insertion site in laparoscopic cholecystectomy

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Abstract

Trocar insertion is an essential and initial part in any laparoscopic procedure. Inadvertent abdominal wall vascular injury, leading to intra-abdominal bleeding or abdominal wall haematoma due to trocar insertion, may occur at this first step. We report here a case of uneventful laparoscopic cholecystectomy in a 44-year-old woman, which was followed later by large abdominal wall haematoma through the 5 mm trocar insertion site. Emergency laparotomy was needed to control the bleeding. Delayed abdominal wall haematoma can occur even with most lateral, 5 mm trocar insertions. Learning abdominal wall vascular anatomy, transilluminating the abdominal wall before trocar insertion and entering the abdominal cavity at a right angle may decrease the possibility of this complication.

Key words: haematoma, laparoscopy, port, abdominal wall, complication.

Introduction

Laparoscopic cholecystectomy is an established and relatively safe procedure. As for any surgical procedure complications may arise. Large life-threatening intra-abdominal and intramuscular abdominal wall haematoma is a rare presentation of trocar insertion-related injury. Massive bleeding from trocar insertion sites can occur with any laparoscopic procedure. Delayed intra-abdominal bleeding and lateral abdominal wall haematoma from the 5 mm trocar insertion site after laparoscopic cholecystectomy has not been reported previously. Here, we report such a case.

Case report

A 44-year-old, G3P3L3, woman was scheduled for laparoscopic cholecystectomy for symptomatic chronic gall stone cholecystitis. In pre-operative sonography she had multiple gall stones with normal calibre, 5 mm

common bile duct. Pre-operative Hb was 13.5 mg/dl with 40.5 for haematocrit. Laparoscopic cholecystectomy had an uneventful course. On the 1st postoperative day she become pale and developed orthostatic dizziness and tachycardia. Her haemoglobin dropped to 7.5 mg/dl (Hct = 22.9) with serial measurement during the next 18 h. After infusion of 4 units of packed RBC, haemoglobin level rose to 8.6 mg/dl, but symptoms, as well as tachycardia, continued. Coagulation profile (platelet count, PT, PTT, INR) was normal. There was not any ecchymosis on abdominal skin. Emergency laparotomy with the impression of intra-abdominal bleeding from the liver bed or cystic artery was done. In laparotomy more than 700 ml of clotted blood in the right gutter was evacuated. A small amount but continuous bleeding from the most lateral 5 mm trocar insertion was found as the source of bleeding. A thick bite suture was made to control the bleeding. Regarding vital signs and general wellbeing, she had an uneventful post-operative course, except

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for large right flank and back ecchymosis, which developed on the 1st day after laparotomy (Figure 1). She was discharged on the 5th postoperative day. In the outpatient visit, 2 weeks later, she was asymptomatic except for little right flank pain.

Discussion

Trocar insertion is an essential and initial part in any laparoscopic procedure. Just at this initial point complications may occur [1]. Inadvertent vascular or gastrointestinal injury, unrecognized at initial laparoscopy, causes a significant rise in mortality or morbidity rates. Although it may be underreported, the complication rate directly related to trocar insertion is low, ranging from 0.03% to 0.2% [2]. Retroperitoneal vascular injuries (the aorta and inferior vena cava and the common internal and external iliac arteries and veins [3, 4]) are largely avoidable by safe techniques such as use of safety shields and direct-view trocar, but even these sophisticated instruments cannot totally prevent serious injuries [5]. Even with the safest open (Hasson) technique for first trocar insertion with its blunt tip, perforating injuries are reported [2].

Minor bleeding, which stops spontaneously before the end of the procedure, occurs frequently with trocar insertion. Major bleeding, which could be life threatening, is not so frequent and arouses high suspicion of major vascular injuries. Infrequently small abdominal wall vessels may be injured and cause major bleeding.

Giant parietal wall haematoma after laparoscopic appendectomy [6] or right hemicolectomy [7] or pelvic pseudocyst removal [8], with probable inferior epigastric artery injury, has been reported previously. In these circumstances epigastric vessels are those most commonly injured [9]. Deep and superficial epigastric vessels arise from the external iliac and femoral artery, respectively. Topography of the deep circumflex iliac artery is also important to avoid abdominal wall haematoma induced by trocar insertion [10]. Abdominal wall transillumination increases superficial abdominal wall vessels' visibility even in coloured skin normal weight women [11] but can be problematic in patients with a high body mass index [12]. Although it cannot be effectively located by transillumination, port insertion under direct vision, by laparoscope, decreases the chance of damage to deep abdominal wall vessels. The inferior epigastric artery could be identified in some patients by direct

vision, after laparoscope insertion through a midline trocar, and finding of a raised fold of peritoneum overlying it, named the lateral umbilical fold [11]. Use of hand-held Doppler ultrasound for abdominal wall vascular localization is also described [11]. Entering the port at a right angle to the abdominal wall and use of the smallest trocars possible may decrease the possibility of this complication [9].

Vascular anatomy of the abdominal wall was studied in many human cadavers but with wide variation in results [13]. A zone of approximately 4-8 cm away from the midline is named the dangerous zone for abdominal wall vascular injuries [12, 13] but Saber *et al.* [14] in a study on abdominal and pelvic CT



Figure 1. Right flank and back haematoma, around and lateral to the 5 mm trocar insertion site after laparoscopic cholecystectomy

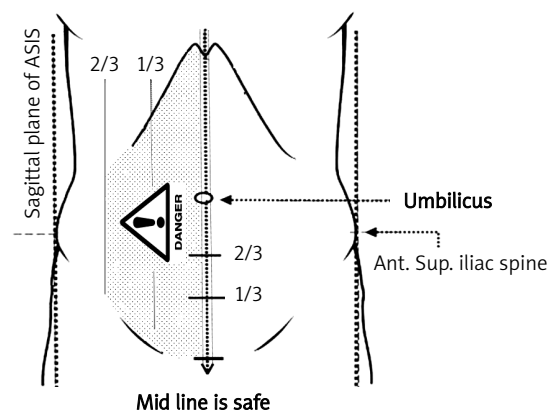


Figure 2. Schematic representation of rule of 2/3: medial two-third (dotted) of anterior abdominal wall (umbilicus to sagittal plane through anterior superior iliac spine) is not safe for trocar insertion, except for avascular midline

images of 100 patients found that “The average distance of the epigastric vessels from the midline for both left and right sides is consistently higher for older patients and those with body mass index more than or equal to 26.3 in all sections”. Thus it is better to insert trocars lateral to more than 0.65 of the distance from the midline to the sagittal plane through the anterior superior iliac spine [11]. As a rule of thumb, we use this rule as the rule of two-thirds (Figure 2). However, Balzer in a study on 21 human cadavers found that approximately half of 36 trocar sites recommended for five standard laparoscopic procedures (cholecystectomy, appendectomy, inguinal herniorrhaphy, fundoplication and sigmoid-rectal procedures) are within the range of the inferior epigastric or circumflex iliac arteries’ tributaries [10].

Control of bleeding by direct pressure by port or Foley catheter balloon or full-thickness abdominal wall suture ligation may be beneficial when bleeding is detected during laparoscopy. Delayed bleeding in a stable patient may respond to conservative management [9]. Treatment with selective arterial transcatheter embolization is also reported [7]. An unstable patient needs emergent wound exploration or formal laparotomy [6]. In our case, failure to achieve full thickness abdominal wall and skin suture led to redirecting the small bleeding vessel to bleed subcutaneously, which presented as very large ecchymosis of the abdominal wall later.

Conclusions

Trocar insertion may cause abdominal wall vascular injuries. It is a potentially preventable complication. By learning the anatomy of the abdominal wall vasculature, transilluminating the abdominal wall in non-obese patients before port insertion, entering the port at a right angle to the abdominal wall and use of the smallest trocars possible, we may decrease the possibility of this complication.

Once it has occurred, conservative management in stable and emergency surgical intervention in haemodynamically unstable patients is mandatory. The case we report confirms that abdominal wall haematoma can occur with a most lateral 5 mm trocar, with late presentation.

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