

Rare haemorrhagic complications of laparoscopic cholecystectomy

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Abstract

Laparoscopic cholecystectomy (LC) has become a “gold standard” for cholelithiasis treatment and is considered to be a safe method of treatment for acute cholecystitis. Among complications of this procedure, gallbladder and bile duct injuries as well as haemorrhage caused by vascular, hepatic or abdominal wall vessel injuries are most frequent. Rarer complications include duodenum, colon and other visceral perforations or vascular injuries. Four thousand five hundred and ninety-five laparoscopic cholecystectomies were performed in a single department of surgery from 1994 to 2008. Since 2001, ten serious complications have been noted. Herein we present our experience with rare complications after LC: splenic lesion and abdominal aorta rupture. Surgeons should always be aware of even unlikely complications of frequently performed procedures. In the case of intra-abdominal haemorrhage after LC and no apparent bleeding site in the operated region, injury to distal organs should always be considered. Whenever suspicion of intraperitoneal haemorrhage after LC is raised, revision by laparoscopy should be considered, and as shock symptoms develop, urgent laparotomy is required.

Key words: laparoscopic cholecystectomy, complications, splenic rupture, aortic rupture.

Introduction

Laparoscopic cholecystectomy (LC) is a gold standard in the treatment of gallstone-related cholecystitis and is considered a safe method of management of acute cholecystitis. Injury to the gallbladder wall and biliary tract, and bleeding from the cystic artery, liver parenchyma or abdominal wall vessels are the most common complications [1-6]. Perforation of the duodenum or colon and lesions of other organs are infrequent [7, 8]. Haemorrhage as a complication of laparoscopic cholecystectomy is usually caused by inadequate ligation of the cystic artery, lack of haemostasis in the gallbladder fossa or damage to abdominal wall vessels on trocar introduction [1, 9, 10]. Herein, our experience with

severe, rare hemorrhagic complications of laparoscopic cholecystectomy is presented.

Case report

From 1994 to 2008 in our department 4595 laparoscopic cholecystectomies were performed, i.e. from 151 to 392 procedures a year. Mean age of patients subjected to cholecystectomy was 58 years (range: 18-89); 59% were women. Since 2001, cholecystectomy has also been performed for acute cholecystitis, and the percentage of laparoscopic procedures for this indication increased over the period from 20% in the first two years up to 80% in the last two. In the mentioned time period 30% of patients originally assigned to laparoscopic

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cholecystectomy for acute indications had conversion to the classic procedure due to technical difficulties. This rate decreased somewhat with accumulating experience in the following years, yet it was 25% in the last year. The conversion rate in planned laparoscopic cholecystectomies was 1.1% during the last 2 years (5 cases of conversion in 428 scheduled cholecystectomies). Until 1998, intraoperative cholangiography and biliary tree revision after conversion to open procedure were performed when common bile duct gallstones were suspected. Since 1999 choledocholithiasis has been treated with ERCP. Until 2003, laparoscopic cholecystectomy was performed solely in an 'American' setting (surgeon at the right side of the patient), and since 2004 also in the 'French' position (surgeon between the patient's legs). Pneumoperitoneum was created with a Veress needle – in the American position placed below the umbilicus and in the right hypochondriac area in the French position. In selected patients pneumoperitoneum was controlled visually with Visiport or performed with minilaparotomy. Three or four trocars were introduced. Cystic duct and artery were closed with placement of clips.

Since 2001, ten cases of severe complications of laparoscopic cholecystectomies performed in the department have been seen. Eight of them were biliary tree injuries, treated endoscopically (prosthesis placement) in six cases and with laparotomy (choledocho-enterostomy, Kehr's drainage) in the remaining two. Two other complications involved massive bleeding into the peritoneal cavity – from the spleen and aortic injury site, respectively. In this article we analyze both cases of hemorrhagic complications of laparoscopic cholecystectomy.

Spleen lesion after laparoscopic cholecystectomy

A forty-five year old man was admitted to the department for symptoms of biliary colic lasting 15 h and fever of 38°C. These symptoms did not resolve after administration of analgesics and antispasmodic agents. Chelmonski's sign was found on physical examination. The patient's leukocytosis was high (16 thousand) and gallbladder containing multiple stones with the wall thickened up to 4 mm was detected on ultrasound. The patient was qualified for urgent laparoscopic cholecystectomy. The procedure was conducted in the French position. Insufflation

was done with a Veress needle placed in the left hypochondriac area. Four trocars (video port below the umbilicus, working ports in the left and right hypochondriac regions and retractor port below the xiphoid process to the left of the falciform ligament of the liver) was inserted. Intraoperatively, distended gallbladder with thickened wall, inflammatory infiltrate and adhesions to the large bowel were found. The adhesions were released, and the artery and duct were identified, cross-clipped and cut. Finally, the gallbladder was removed. Insignificant bleeding from the gallbladder site was dealt with by coagulation. The peritoneum was not drained. Prior to suturing trocar-site wounds, the peritoneal cavity was inspected. The procedure lasted 45 min. The patient was in a good condition after the surgery. Heart rate, blood pressure, diuresis and other measured life parameters were within normal range. Ten hours after surgery symptoms of hypovolaemia and then shock developed, with increase of heart rate up to 120 beats/min and reduction of systolic blood pressure to 80 mm Hg. Urgent laparotomy was performed for fast-developing shock symptoms. The abdominal cavity was opened with an upper paramedian incision and approximately 800 ml of blood were found. No bleeding from the gallbladder fossa, Calot's triangle, damaged diaphragmatic site of the liver or haemorrhage from any of the trocar sites was found. Thorough control of the abdominal cavity revealed a lesion of the upper pole of the spleen. An adhesion between the spleen capsule in its upper pole and the diaphragm was found. The spleen lesion was 4 cm long and was located in the proximity of the adhesion. Splenectomy was performed for intensive haemorrhage from this site. Lower, 5 cm wide additional spleen was found and spared. A drain was left in the peritoneal cavity at the site of the removed spleen. The patient required transfusion of 3 units of packed red blood cells. Post-operative course was uneventful. The patient was discharged from the hospital on the 7th postoperative day in good condition.

Injury of the aorta as a complication of laparoscopic cholecystectomy

A fifty-three year old woman was admitted to the department with symptoms of chronic cholecystitis for scheduled laparoscopic cholecystectomy. The patient had no history of abdominal surgery

and was on medication for arterial hypertension only. On physical examination she was asthenic type with BMI of 18 kg/m². She was operated on in the French position. Pneumoperitoneum was attained in a manner typical for this position, i.e. a Veress needle was placed in the left hypochondriac region, 4 cm below the subcostal arch in the midclavicular line, directing the needle perpendicular to the abdominal wall. After 15 mm Hg pressure was reached, a trocar was introduced below the umbilicus. The surgeon felt strong resistance while introducing the trocar. When the camera was inserted, quick growth of extraperitoneal space volume was observed. Immediate conversion was performed. A fast-growing extraperitoneal haematoma was found on laparotomy. The extraperitoneal space was accessed at umbilicus level, the aorta was reached and a 5 mm long injury of its anterior side below the renal arteries was found with concomitant point injury of the posterior wall. The aorta was temporarily clamped and repaired with Prolene 5-0 suture. Haemodynamic parameters stabilized and a pulse was detectable on both femoral arteries. Cholecystectomy was accomplished. During and immediately after the procedure, 8 units of packed red cells and 4 units of plasma were transfused. The procedure lasted 185 min. The postoperative period was uneventful. Control D-ultrasound of the aorta showed no abnormalities. The patient was discharged home on the 8th postoperative day for further surveillance in the vascular surgery clinic.

Discussion

Spleen injury in the first case was most likely caused by traction of the adhesion between the spleen and diaphragm during insufflation, which caused a tear of the splenic capsule, lesion of the parenchyma and massive haemorrhage. Creation of pneumoperitoneum in the left hypochondriac region after emptying the stomach through the tube is a standard procedure in our department while performing cholecystectomy in the French position. This way of insufflation was abandoned only when splenomegaly had been found on ultrasound. In the discussed patient, a Veress needle was placed 3 cm below the left subcostal arch, perpendicular to the abdominal wall, which eliminates the possibility of a lesion of the superior pole of the spleen during insufflation.

Splenic injury is an extremely rare complication of laparoscopic procedures. It occurs more often in anti-reflux and bariatric procedures [11, 12]. In the Medline database there is only one case of injury of the spleen during laparoscopic cholecystectomy. In this case, 3 weeks after LC the patient presented with symptoms of hypovolaemic shock with abdominal symptoms limited to the left hypochondriac region. After rupture of the spleen was found on abdominal CT, splenectomy was performed. The authors of this report believe that adhesions of the spleen with the peritoneum, which tore the capsule during gas insufflation, were the cause of the spleen injury [13].

In another one of the cases discussed here, insufflation of the peritoneum was conducted without complications (no blood in Veress needle, free flow of saline into the peritoneum before connection of insufflation tube, normal air flow rate and adequate final pressure). Injury of the aorta occurred on introduction of the first trocar into the peritoneal cavity. Flabbiness of abdominal wall layers and asthenic constitution most likely contributed to the accident. Fatigue of the surgeon (a specialist with many years of experience in laparoscopic surgery), who was conducting the fourth procedure on the same day, had had two 24-h shifts during the preceding week and had spent 28 h in the OR within the previous 4 days must have contributed to the event.

Aortic and large vessel injuries as a complication of laparoscopic cholecystectomy have been described a few times in the literature [1, 2, 14-16]. Repaired quickly, these lesions usually did not cause serious consequences, yet one publication reviewing over 100 thousand laparoscopic procedures describes 7 fatal cases of haemorrhage from Veress needle or trocar induced injury of large vessels including the aorta [2]. Polish literature also reports some cases of large vessel injuries during laparoscopic cholecystectomy (including fatal ones) [14, 17].

Hemorrhagic complications occur rarely after laparoscopic cholecystectomy. The surgeon should always be aware of even unusual complications of often performed procedures. In abdominal haemorrhage following laparoscopic cholecystectomy and no visible bleeding from the surgical site, injury of distal organs ought to be considered. When intraperitoneal haemorrhage after laparoscopic cholecystectomy is suspected, laparoscopic revision should be considered, and urgent laparotomy should be done when shock symptoms progress rapidly.

Minimization of the chance of haemorrhagic complications is feasible with strict following of accepted algorithms of pneumoperitoneum formation and laparoscopic procedures (elevation of the tegument while introducing the first trocar, placement of other trocars under visual control, or minilaparotomy in selected cases). Immediate diagnosis of severe bleeding during laparoscopic cholecystectomy is important for prognosis whenever such complications occur.

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