

Figure 1. Rectus sheath hematoma of the first patient

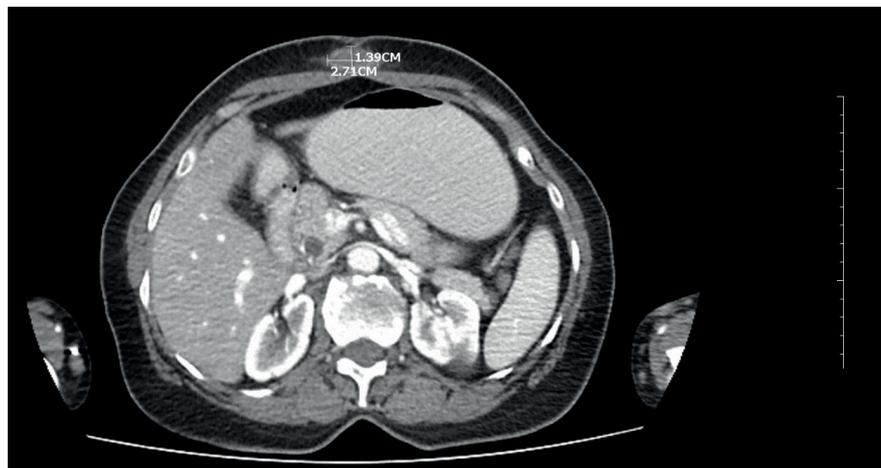


Figure 2. Rectus sheath hematoma of the second patient

excessive anticoagulation use, comorbidities like atherosclerosis, and decreased muscle mass, which explains the aforementioned ratio. The most affected age group of patients as per publications is the 49-69 years [1]. Both of the present patients were female and their ages were in the above-stated range; both had a single dose of preoperative venous thromboembolism prophylaxis. Over the years, many risk factors have been published for developing RSH. Spreading awareness of such risk factors might help in more accurate and faster RSH diagnosis. These factors are trauma, iatrogenic/surgery, anticoagulation, coughing/intense contractions of the rectus muscles, other medical conditions, and pregnancy. RSH might develop after laparoscopic or open abdominal surgery, which is mostly due to the lack of hemostasis, or after intra-abdominal injection paracentesis and peritoneal catheter insertion [1]. We also believe that the causes of the RSH in the present cases might be insufficient hemostasis and anticoagulation. Abdominal wall hematoma complication is common post-LC, which occurred in 6.25% patients, according to

Bhattacharya et al.'s series [3]. It usually occurs between the second and sixth postoperative day, and causes delay in hospital discharge or readmission after discharge [3]. RSH occurred in only (2/500) 0.4% of the patients who underwent LCs in the last 5 years, in the author's hospital. This rate was lower than that in other reported case series. Bruising is an important complication. Except the visible ecchymoses, RSH should be suspected in all patients who suffer from postoperative pain which is unusually high, and in asymptomatic patients who presents an unexplained and sudden drop in hematocrit post-surgery. Abdominal wall ecchymosis was found in 17% of the cases and revealed extraperitoneal hematoma extension or intraperitoneal rupture [3]. This finding was in line with the present cases. Abnormal liver function test and mild icterus might occur due to gradual breakdown of clots [3]. The primary investigation is the imaging through ultrasonography of the abdomen, but it is limited to detecting intra-abdominal wall blood, only if that is what is looked for particularly [3]. Both ultrasonography and CAT scan

have reduced surgeries that were unnecessary for RSH; however, now the CAT scan is the diagnostic imaging of choice. In two recent series of RSH, CAT scan established 100% diagnosis in the cases; it can also exclude other diseases of the abdomen, if the initial diagnosis is unclear [4]. RSH can categorize its findings into one of the three groups, by its cross-sectional CT scan appearance: type I, intramuscular unilateral hematoma does not dissect along the fascial planes; minor hematoma, results in diffused muscle enlargement with minimal hemodynamic compromise and does not require hospitalization. Type II: unilateral or bilateral intramuscular hematoma with fluid-fluid level requires hospitalization. Type III: hematoma with presence of blood between transversalis fascia and muscle. It might be associated with hematocrit drop and moderate clinical condition deterioration with moderate hematoma, which requires hospitalization [5,6]. A fluid-fluid level implies the presence of blood which is not clotted, which indicates either active hemorrhage or coagulopathy, requiring hospitalization and requirement of blood transfusion [7]. The diagnosis of the present case patients was made with an abdominal ultrasonography and then abdominal CT scan. CT scan of their abdomens showed RSHs, which was classified as type II. The author had the two patients with an intramural hematoma and there was no sign of bleeding within the abdomen, which suggests a damaged vessel of the abdominal wall, while setting an access port. Hematoma formation due to abdominal wall vessel damage might be reduced by siting of the 5 mm access ports carefully in the right upper quadrant. Reports have suggested prevention of medium-sized vessel damage by transilluminating the abdominal wall before inserting trocars and by observing the entry points through laparoscope, which allows early detection of blood [3]. RSHs in the present patients occurred in the 10-mm subxiphoid trocar site; the trocar entry sites of both patients were routinely sutured. A report from England mentioned that two patients had abdominal wall hematoma and bruising in conjunction with blood collection in the subphrenic space of the right side. A possible explanation can be a reactionary hemorrhage from the gall bladder bed. The second patient of the present study also had a small reactionary hemorrhage in her gall bladder bed (the image of it is not shown here) [3]. Both patients of one study were given subcutaneous LMWH as antithrombotic prophylaxis [3]. Both patients of the present study were also given LMWH. It might have resulted in RSHs in the patients, but the hemostatic parameter of the patients was in normal value. One US study reported 1983 cases, in which five patients had perioperative gall bladder bed bleeding; they were observed and treated with transfusion. There was one episode of epigastric artery bleeding after insertion of trocar, which was then sutured [3]. The present cases were already routinely sutured at the trocar

insertions in all LCs. A significant decrease in hematocrit is usually treated by blood transfusion and oral iron supplement, if required [3]. RSH is usually self-limiting; hence, conservative treatment is the most common management. It consists of analgesics, bed rest, application of ice packs, cessation of anticoagulants, compression, correction of coagulopathy, volume replacement, and antibiotics, if there is an infection. This treatment strategy was followed in the present cases as well. RSH has been reported to be formed during LC because of trocar insertion [3,8]. However, this might be under-reported. RSH has a mortality rate of 1.6%. Early diagnosis is the key to treat even large hematomas conservatively, but if conservative treatment is insufficient, endovascular embolization, bleeding vessel ligation, and surgery should be considered [4]. For those receiving anticoagulation therapy, the mortality rate has been reported to be as high as 25%. The decision to opt for surgery in RSH management is difficult, as surgery has been reported to be carried out for incorrect diagnoses in many patients and because doctors confuse RSH with other intra-abdominal problems [9]. Infection and other complications, such as hypovolemic shock or death, can be prevented by early diagnosis and quick treatment. This is also important for patients with comorbidities. However, the mortality rate is high for elderly patients who have undergone surgery [10].

Conclusion

RSH might develop post-LC; hence, surgeons should assess the patient's complaints, labs, and physical examination to find RSH. Awareness of RSH is important in the differential diagnosis of acute abdominal pain, especially if occurred in the postoperative period.

What is new?

According to the existing literature: (1) RSH is rare. (2) The occurrence after LC could be seen, but almost always it was not reported as we have seen in clinical setting. (3) We need to be aware of this situation as presented in our cases, otherwise it could be risky.

List of abbreviations

LC	Laparoscopic cholecystectomy
RSH	Rectus sheath hematoma

Consent for publication

Written consent was obtained from all the patients.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Summary of the case

1	Patient (gender, age)	Two 47 and 52 years old females
2	Final diagnosis	Rectus sheath hematomas
3	Symptoms	Anemia tachycardia, sharp intense pain bruising on the skin
4	Medications	Two patients were treated conservatively with iv liquid,ab,packed red cell suspension transfusion,analgesics,bed rest,hematoma compression,ice packs,cessation of low molecular weight heparin
5	Clinical procedure	The patients were treated conservatively
6	Specialty	General surgery