

Rectus sheath haematoma.

Report of two cases



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Rectus sheath haematoma is a well-documented clinical entity. The accumulation of blood within the rectus sheath produces a painful swelling that can mimic an intraperitoneal mass, with features of an acute abdomen. Accurate diagnosis is essential, in order to avoid an unnecessary laparotomy. Two cases of this entity are reported. The correct diagnosis was established by appropriate assessment of the clinical, laboratory and imaging findings.

KEY WORDS: Anticoagulant therapy, Rectus sheath haematoma.

Case reports

CASE 1

A 73-year-old male patient was admitted to our hospital for a mild cerebrovascular accident, of thromboembolic origin, due to a new-onset atrial fibrillation. Among others, the patient was placed on enoxaparin 70 mg, subcutaneously, every 12 hours.

Three days later, the patient complained of a sudden onset of abdominal pain and developed a depression of consciousness, along with haemodynamic instability. Physical examination revealed the presence of a palpable, firm, tender, nonmobile right lower quadrant mass, approximately 7 cm by 9 cm in size, with dullness on percussion. The evaluation of Carnett's sign was unreliable, because of the decreased level of consciousness. A significant drop in his haemoglobin was also noted, from 12.3 g/dl on admission to 4.1g/dl. Further imaging was not possible, due to the patient's haemodynamic instability. He was taken to the ICU. A needle aspiration of the mass was performed and produced frank blood. A Diagnostic Peritoneal Lavage was also performed and was negative for intraperitoneal haemorrhage.

After the successful outcome of resuscitation, the patient underwent a Computed Tomography of the abdomen, which confirmed the presence of a large rectus sheath haematoma (Fig.1). Heparin was discontinued and the efforts of resuscitation in the ICU continued, with the administration of intravenous crystalloids, packed red

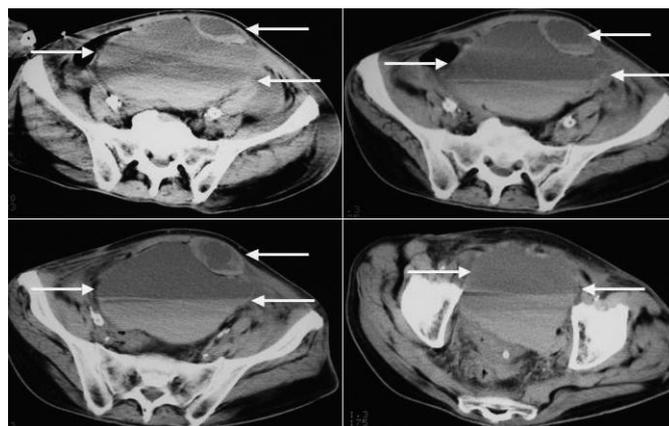


Fig. 1: Large haematoma of the left rectus sheath in hemodynamically unstable patient.

blood cells and fresh frozen plasma. The evolution of the haematoma was followed by serial ultrasound scans. The patient's clinical course was complicated by sepsis and multi-organ failure and he died 16 days later.

CASE 2

A 73-year-old woman presented to the emergency department with a history of abrupt onset of left lower-quadrant pain. There were no associated symptoms. She did not report any precipitating events, such as a bout of cough, prior to the onset of the abdominal pain. Her past medical history revealed that she suffered from congestive heart failure, due to coronary artery disease. She had been maintained on warfarin therapy due to chronic atrial fibrillation. She was in moderate distress. Fever and haemodynamic instability were absent.

Physical examination revealed the presence of a large, tender, well demarcated, left lower quadrant mass. Peritoneal signs were absent.

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The left lower quadrant tenderness increased when the patient tensed her abdominal wall by lifting her head and shoulders off the examining table (positive Carnett's sign). The rest of the physical examination was unremarkable. The admission haemoglobin was 7.3 g/dl and the INR was 3.74. An abdominal and pelvic Computed Tomography (CT) Scan, with oral and intravenous contrast revealed the presence of a left rectus sheath haematoma (Fig. 2).

The patient was treated with bed rest, intravenous crystalloids, fresh frozen plasma, packed red cells and analgesia. Two days later, an abdominal ultrasound scan was performed and showed the presence of multiple masses in the left rectus sheath. The largest had a diameter of 6 cm. The patient's clinical status and haemoglobin level improved gradually. She recovered fully and was discharged thirteen days later, after careful reinstatement of therapeutic levels of oral anticoagulation (Figs. 3 and 4).

Discussion

Rectus sheath haematoma (RSH) is a well-documented clinical entity and was known to the ancient Greek

physicians Galen and Hippocrates. More than 500 cases have been reported in the world literature and this entity has had many names: Rupture of the rectus muscle, spontaneous rupture of the epigastric artery, spontaneous haematoma of the abdominal wall, spontaneous haematoma of the rectus sheath¹.

The cause of the haematoma is usually a sudden disruption of the inferior epigastric artery, rather than a rupture of the fibers of the rectus muscle². The anatomy of the rectus sheath has been described in detail by Cullen et al⁶. The rectus sheath and muscle originates in the inferior border of costal cartilages 5 through 7 and the xiphoid and its insertion is into the superior pubic ramus. The length of the muscle is divided into 4 or 5 segments by tendinous bands. A strong sheath, formed by the tendons of the external oblique, the internal oblique and transversus abdominis muscle, covers its anterior surface. Posteriorly, this sheath ends at the linea semicircularis (Line of Douglas), 5 cm below the umbilicus. Caudally to this line, only the transversalis fascia and the peritoneum separate the muscle from the intra-abdominal viscera³. Superior to the linea semicircularis, the sheath is limited laterally by the linea semilunaris and medially by the linea alba.

Below the line semicircularis the two sheaths intercommunicate posteriorly. It is here that the retrorectal space is in communication with the perivesical space of Retzius. The haematoma is usually located below the umbilicus, where the aponeurotic sheath does not protect the epigastric vessels posteriorly. The epigastric vessels are relatively fixed in this region and thus can shear along with their length or at mobile branches extending into the rectus muscles⁴. Furthermore, the lower part of the rectus muscle is the most powerful and its changes in length with contraction and stretching are extensive⁵. The risk of rupture is extremely high when vascular mobility is impaired, as in arteriosclerosis or by scar tissue. One may notice, however, that in one series only 26% of the patients with scars had a haematoma on the same side as

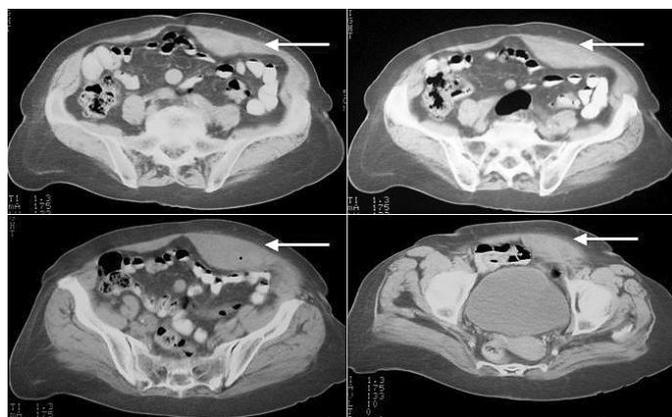


Fig. 2: Haematoma of the left rectus sheath.

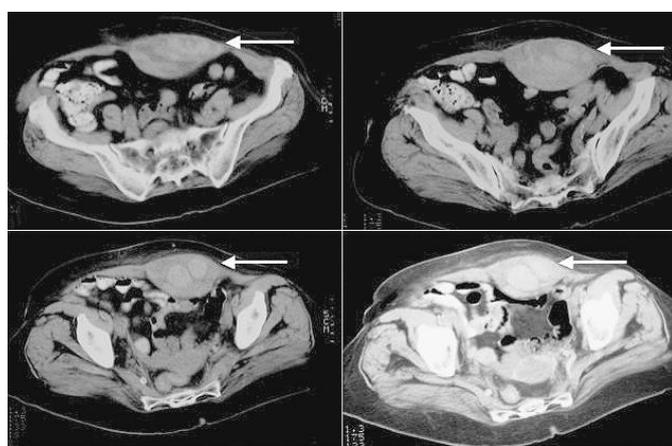


Fig. 3: Left rectus sheath haematoma after 13 days.

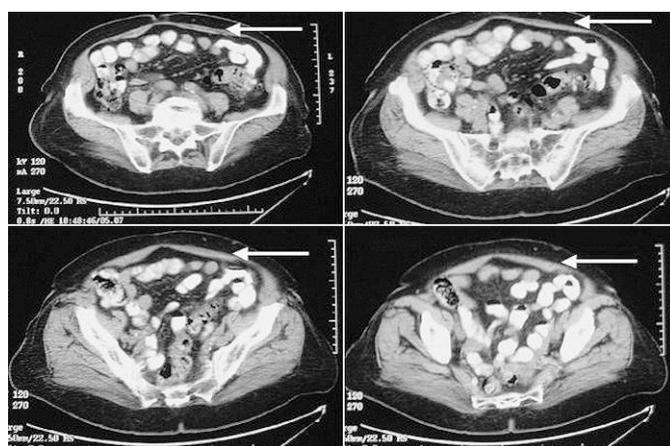


Fig. 4: Abdominal CT after 4 months without haematoma.

the scar⁶. Haemorrhage within the rectus sheath can be caused by a variety of conditions, such as trauma or surgical procedures, pregnancy and labor, cardiovascular diseases, including arteriosclerosis, cardiac failure and hypertension, blood dyscrasias, degenerative muscle disease (associated with infections, like typhoid, influenza and pneumonia or cancer), excessive stretching of the muscle (as caused by ascites, abdominal tumor, aortic aneurysms and obesity) and finally, anticoagulants³.

This last category (e.g. patients on anticoagulant therapy) is of rising significance, due to the high number of patients receiving anticoagulants nowadays. In this group of patients there have been reports of RSH developing without the recognition of a precipitating event (such as a bout of cough, etc)⁷, hence the term "Spontaneous Rectus Sheath Haematoma".

In Cullen's classic early review on this topic in 1937⁸, a variety of precipitating events have been recognized as causes of the rupture. These activities include coughing; sudden changes of body position, lifting, straining at stool, gymnastics⁸. The most important precipitating event according to a series was a bout of cough (in 60% of patients)⁶.

There appears to be a female predominance in the development of RSH (in a series of 100 patients, 75 were women)⁹. The incidence is higher in the elderly (with a mean age of 59 in a series of 50 patients)¹⁰. A carefully taken history will elicit the cause and precipitating factors and one must actively seek for the causes previously mentioned. The patients usually present with the classic triad: Abdominal pain of sudden onset, abdominal mass and drop of haemoglobin¹¹.

One must highlight, though, the importance of a high index of suspicion of this entity in the differential diagnosis of patients on anticoagulant therapy, who develop sudden abdominal pain or mass, in order to avoid an unnecessary laparotomy. The clinical presentation is influenced by the location and the size of the haematoma, as well as by the degree of coexisting peritoneal irritation. The haematoma develops suddenly, with sharp, severe and well-localized abdominal pain. Fever, nausea and vomiting may occur. If the blood loss has been excessive, signs of shock may be present³. It is also possible for the haematoma to compress the bladder (leading to acute urinary retention), to mimic an acute splenic enlargement¹⁰ or to cause abdominal compartment syndrome¹³. Physical examination often discloses absence of bowel sounds and a nonpulsative tender mass that persists in both supine and upright position. Discoloration of the skin over the affected area may develop, but this is a late finding, which arises three to four days later⁶.

In 1926, Carnett described a test to differentiate pain originating from the abdominal wall versus pain arising from intra-abdominal pathology. The test involves placing the patient supine and asking him to tense his abdominal wall by lifting head and shoulders off the examining table. Tenderness originating from inside the abdominal cavity

usually decreases, while in contrast pain originating from the abdominal is unchanged or increased by this maneuver (positive Carnett's sign)¹⁴. WE Fothergill described a similar sign in 1926¹. If a haematoma is very large, it can be also palpated rectally or vaginally³.

Routine laboratory studies may reveal a drop in haematocrit and leucocytosis. Coagulation parameters may be within the therapeutic limits or excessive anticoagulation may be observed¹¹. The role of imaging studies is very important. Ultrasound scan is a good non-invasive initial diagnostic procedure. It usually reveals the presence of a fusiform longitudinal mass, which is sonolucid initially, but becomes increasingly sonodense with organization of the haematoma. Ultrasonography can prove very useful if it is aimed at a site of suspected pathology⁴. Computed Tomography is the diagnostic modality of choice in cases of RSH¹¹ because it permits a precise determination of the location, size and extension of the haematomas. Berna et al, in 1996, classified RSH into three types, based on the CT scan findings in 13 cases². This classification seems to be of prognostic value and also helps in taking management decisions for these patients.

RSH constitutes a real enigma of differential diagnosis¹. Common disease processes that are often confused with rectus sheath haematoma include acute appendicitis, ovarian cyst rupture, ovarian torsion, ovarian abscess, ruptured ectopic pregnancy, ventral hernia, peptic ulcer perforation, intestinal obstruction, intra-abdominal abscess and abruptio placenta¹⁵. Vigilance should be maintained in all cases presenting with acute abdominal pain accompanied by an abdominal mass and signs of blood loss.

Once the diagnosis is made, the usual mode of therapy is conservative management¹¹. Therapy generally consists of bed rest, analgesia, antibiotics and correction of coagulopathy and haemodynamic support. Immediate reversal of anticoagulation may be necessary, with the administration of vitamin K and factor replacement with Fresh Frozen Plasma. The coagulation parameters must be monitored every 6-8 hours, during the first 24 hours. The optimal is to restore the INR to normal values within 6 to 24 hours of treatment¹¹. Some cases require blood transfusions. Usually 2 to 6 units of blood are enough to restore the normal values of haemoglobin.

In the majority of cases, clinical evolution is favorable and reintroduction of anticoagulation is possible. This usually starts with intravenous unfractionated heparin and then continues with subcutaneous low-molecular-weight heparin. Oral anticoagulation can be restarted 7 to 9 days later.

Due to the preference for conservative treatment, surgical intervention is indicated principally in cases where haemodynamic stability is not achieved, in cases of abscess formation and uncertainty of diagnosis⁴. Catheter embolization of the inferior epigastric artery could be an alternative⁶. Needle aspiration has been used in the past

for clinical diagnosis only and it can be useful if modern imaging modalities are not readily available. However, it does not have a therapeutic role, because of the risk of infection and also because it is not useful for a haematoma that is organizing⁴.

The prognosis of RSH varies. Usually it constitutes a benign self-limiting condition, but it may be fatal. Reported mortality ranges from 4% overall to 25% in patients under anticoagulation⁶. In terms of outcome, the single most important factor is correct and prompt diagnosis. Titone et al noted that a correct diagnosis was made in only 40% cases¹⁰.

Conclusions

Rectus Sheath Haematoma is a rare but very important clinical entity, especially for patients undergoing anticoagulant therapy. A high index of suspicion is mandatory, in order to avoid unnecessary surgical intervention. It must always be considered in the differential diagnosis of a patient on anticoagulant therapy, who develops sudden abdominal pain or mass.

Riassunto

L'ematoma della teca del muscolo retto dell'addome è un'entità clinica ben documentata. L'accumulo di sangue entro la teca del muscolo retto produce una fluttuazione dolente che in alcune occasioni - raggiunto un certo volume - può anche mimare una massa intraperitoneale e presentarsi con un quadro clinico di addome acuto. L'accurata diagnosi risulta essenziale al fine di evitare una laparotomia non necessaria. In questo lavoro viene presentato il caso relativo a due pazienti. La corretta diagnosi fu stabilita in seguito ad un'appropriate valutazione ed interpretazione dei reperti clinici e dei risultati degli esami di laboratorio e della diagnostica per immagini.

References

- 1) Gocke JE, MacCarthy RL, Foulk WT: *Rectus sheath haematoma: Diagnosis by computed tomographic scanning*. Mayo Clin Proc, 1981; 56:757-61.
- 2) Berna JD, Garcia-Medina V, Guiaro J, et al: *Rectus sheath haematoma: diagnostic classification by CT*. Abdom Imaging, 1996; 21:62-64
- 3) Wyatt GM, Spitz HB: *Rectus sheath haematoma: Ultrasonographic diagnosis*. AJR, 1977; 128(2):283-85.
- 4) Moreno-Gallego A, Aguayo JL, Flores B, et al: *Ultrasonography and computed tomography reduce unnecessary surgery in abdominal rectus sheath haematoma*. Br J Surg, 1997; 84:1295-297.
- 5) Jones TW, Merendino KA: *The deep epigastric artery: Rectus muscle syndrome*. Am J Surg, 1962; 103:159-69.
- 6) Verhagen HJ, Tolenaar PL, Sybrandy R: *Haematoma of the rectus abdominis muscle*. Eur J Surg, 1993; 159(6-7):335-38.
- 7) Adeonigbade O, Khademi A, Karowe M, et al: *Spontaneous rectus sheath haematoma and an anterior pelvis haematoma as a complication of anticoagulation*. Am J Gastroenterol, 2000; 95:314.
- 8) Cullen TS: *Hemorrhage into or beneath the rectus muscle simulating an acute abdominal condition*. Bull Johns Hopkins Hosp, 1937; 61: 317-48.
- 9) Teske JM: *Haematoma of the rectus abdominis muscle, report of a case and analysis of 100 cases from the literature*, Am J Surg, 1946; 71: 689-695.
- 10) Berna JD, Zuazu I, Madrigal M, Garcia-Medina V, Fernandez C, Guirado F: *Conservative treatment of large rectus sheath haematoma in patients undergoing anticoagulant therapy*. Abdomin Imaging, 2000; 25(3):230-34.
- 11) Buckingham R, Dwerryhouse S, Roe A: *Rectus sheath haematoma mimicking splenic enlargement*. J R Soc Med, 1995; 88:334-35.
- 13) O'Mara MS, Semins H, Hethaway D, Caushaj PF: *Abdominal compartment syndrome as a consequence of rectus sheath haematoma*. Am Surg, 2003; 69(11):975-77; Suleiman S, Johnston DE: *The abdominal wall: an overlooked source of pain*. Am Fam Physician, 2001; 64(3):431-38.
- 14) Ramirez MM, Burkhead JM, Turrentine MA: *Spontaneous rectus sheath haematoma during pregnancy mimicking abruptio placenta*. Am J Perinatol, 1997; 14:321-23.