

Learning from errors

Abdominal compartment syndrome – a fatal complication from a rectus sheath haematoma

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Summary

Rectus sheath haematoma is increasingly being seen in patients with anticoagulation therapy. Abdominal compartment syndrome is a rare complication of rectus sheath haematoma with only two cases reported in literature. The authors report a case of a young male who developed abdominal compartment syndrome from a rectus sheath haematoma secondary to anticoagulation therapy. The case highlights the need for a surgical intervention in such exceptional cases.

BACKGROUND

Rectus sheath haematoma is a known complication of abdominal wall trauma, surgery and excessive strain of abdominal wall. With the use of anticoagulation, there is an increase in rectus sheath haematoma although the exact incidence is unknown. The condition has a wide-spectrum of severity depending on its size, aetiology and development of complications. Treatment is usually expectant and outcome is generally favourable. We report a case of a fatal complication from rectus sheath haematoma secondary to anticoagulation therapy.

CASE PRESENTATION

A middle aged male was brought to accident and emergency department with a 12 h history of severe right upper quadrant pain. He had an aortic valve replaced 2 weeks prior to this presentation and was on long-term warfarin. His co-morbidities included hypertension, diabetes mellitus, hypothyroidism and morbid obesity.

On examination he was pale, tachycardia at 105 beats/min and his blood pressure (BP) was 89/32 mm Hg. He was tender in his right upper abdomen and there was bruising over his lower abdomen which was presumed to be secondary to low molecular weight heparin injections. Blood gases showed metabolic acidosis with a pH of 7.19, bicarbonate of 13 mmol/l, base deficit of 14 mmol/l, lactate of 11.4 mmol/l. His haemoglobin (Hb) was 7.4 g/dl, white blood cell was $24.2 \times 10^9/l$ with neutrophilia. His platelet count, liver function tests and serum amylase were within normal limits. His urea was 10.9 mmol/l, creatinine was 263 micromol/l and international normalised ratio (INR) was 3.9. His liver function tests and serum amylase levels were within normal limits. He was transfused three units of packed cells which improved his BP to 100 systolic. An emergency CT scan of his chest and abdomen was performed which showed a large right-sided rectus sheath haematoma (figure 1).

His INR was reversed with beriplex. As there was no obvious bleeding point, a radiological intervention was not felt necessary. Following transfusion, his Hb was still 7.7

g/dl although his acidosis had improved with a pH of 7.34 and lactate of 3 mmol/l and he remained haemodynamically stable. His anticoagulation was challenging but on balance he was started on heparin. On day 3, his urine output started dropping with a rise in intra-abdominal pressure to 21 mm Hg. At that point, a surgical opinion was sought and it was felt that any surgical intervention will release the tamponade effect and will cause further bleeding. His inotropic requirement continued to increase with worsening metabolic acidosis which did not respond to continuous veno-venous haemofiltration and he died after 40 h of hospital admission. A postmortem was carried out which showed a rectus sheath haematoma measuring $400 \times 200 \times 100$ mm with more than 2 litres of blood in the retro-peritoneal space.

DISCUSSION

Rectus sheath haematoma is an uncommon and frequently misdiagnosed cause of abdominal pain.¹ It denotes a collection of blood in the rectus sheath secondary to disruption of blood vessels coursing through it or injury to the muscle itself. It is seen more commonly in males and is usually in right lower abdomen. The average age was reported to be 47 years² but with the increased use of anticoagulation, it may be higher. The overall mortality has been reported as 4% but in anticoagulated patients, it increases upto 25% mainly due to older age and co-morbid conditions.³

Rectus sheath haematomas above the arcuate line are generally caused by damage to the superior epigastric artery. Large haematomas tend to occur below the arcuate line due to absence of posterior rectus sheath enabling haematomas to spread extraperitoneally or even intraperitoneally should the peritoneum be ruptured. The vessels that tend to bleed below the arcuate line are the inferior epigastric vessels as they are firmly attached to the muscle and are subject to shearing forces.

The symptoms can be quite variable but abdominal pain and mass are constant features of presentation. Carnetts test helps to determine whether the tenderness is intra-peritoneal or arising from the abdominal wall. Fotherhill's



Figure 1 Abdominal CT scan showing right-sided rectus sheath haematoma.

sign is useful in distinguishing between an intra-abdominal mass and a mass arising in the rectus sheath.⁴ Late signs include bruising of the abdomen which may be periumbilical (Cullen’s sign) or in the flanks (Grey–Turner’s sign), indicative of intraperitoneal rupture of extraperitoneal extension respectively.

Rarely, patients with rectus sheath haematoma may present with manifestations of acute abdomen and this may mimic acute abdominal disorders like appendicitis, acute cholecystitis and diverticulitis. Clinical examination is often misleading and radiological imaging is required to ascertain the diagnosis and avoid unnecessary laparotomy.⁵

Ultrasound scan is usually the first investigation of choice and has a sensitivity of only 80–90%.⁶ CT scan is the gold standard and is useful in grading these haematomas.⁷ Grade I is intramuscular and unilateral which does not dissect the fascia. Grade II can be bilateral and dissects along the fascia. Grade III haematomas dissect along the fascia with extraperitoneal extension or even intraperitoneal and prevesical blood which can result in abdominal compartment syndrome.

Treatment of rectus sheath haematoma is generally conservative which includes analgesia, fluid resuscitation, blood transfusion and treatment of the underlying condition. For continued bleeding, radiological embolisation is an option. Surgery is usually the last resource where the bleeding vessel is ligated either via an open technique or with an image guidance and percutaneous suturing of the offending vessel through the abdominal wall. Surgical evacuation of the haematoma is not generally indicated and may cause persisting bleeding by diminishing the tamponade effect. However, this may be required even if the haematoma is large and abdominal compartment syndrome is suspected.

Abdominal compartment syndrome from rectus sheath haematoma was first reported by O’Mara *et al* in 2003⁸ following which there has been one more case of abdominal compartment syndrome⁹ and two cases with suspected diagnosis who did not undergo surgery and died from it.^{10 11} Our patient did not undergo surgery as it was felt that this would release the tamponade effect and cause further bleeding.

Learning points

- ▶ Rectus sheath haematoma presenting as an acute abdomen is a rare clinical entity, but should always be considered particularly in patients who are on anticoagulation therapy.
- ▶ Treatment for rectus sheath haematoma is usually conservative.
- ▶ Patients with Grade III haematomas should be monitored for abdominal compartment syndrome and surgical evacuation is mandated in these patients.

Competing interests None.

Patient consent Not obtained.

REFERENCES

1. **Holmes SJ**, Yale SH, Mazza JJ. Rectus sheath hematoma as a cause of acute abdominal pain. *Am Fam Physician* 2001;**64**:1681–2.
2. **Teske JM**. Hematoma of the rectus abdominis muscle; report of a case and analysis of 100 cases from the literature. *Am J Surg* 1946;**71**:689–95.
3. **Hildreth DH**. Anticoagulant therapy and rectus sheath hematoma. *Am J Surg* 1972;**124**:80–6.
4. **Fotherhill WE**. Hematoma in the abdominal wall simulating pelvic new growth. *BMJ* 1926;**1**:941–2.

5. **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**:1295–7.
6. **Cervantes J**, Sanchez-Cortazar J, Ponte RJ, *et al*. Spontaneous rectus sheath hematomas: clinical and radiological features. *Am Surg* 1983;**49**:542–5.
7. **Berná JD**, Garcia-Medina V, Guirao J, *et al*. Rectus sheath hematoma: diagnostic classification by CT. *Abdom Imaging* 1996;**21**:62–4.
8. **O'Mara MS**, Semins H, Hathaway D, *et al*. Abdominal compartment syndrome as a consequence of rectus sheath hematoma. *Am Surg* 2003;**69**:975–7.
9. **Donaldson J**, Knowles CH, Clark SK, *et al*. Rectus sheath haematoma associated with low molecular weight heparin: a case series. *Ann R Coll Surg Engl* 2007;**89**:309–12.
10. **Luhmann A**, Williams EV. Rectus sheath hematoma: a series of unfortunate events. *World J Surg* 2006;**30**:2050–5.
11. **Kayrak M**, Bacaksiz A, Yazici M. Is enoxaparin injection from the abdominal wall safe in elderly people?: a fatal case of rectus sheath hematoma. *Can Fam Physician* 2008;**54**:1246–8.

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Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Jafferbhoy SF, Rustum Q, Shiwani MH. Abdominal compartment syndrome – a fatal complication from a rectus sheath haematoma. *BMJ Case Reports* 2012;10.1136/bcr.12.2011.5332, Published XXX

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