Received: 2005.10.17
Accepted: 2005.12.22
Published: 2006.01.30

Extensive rectus sheath haematoma secondary to needle injury to inferior epigastric vessels – anatomy remains important to clinical practice

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Summary

Background: Rectus Sheath Haematoma (RSH) is a well documented but an uncommon entity whose diagnosis could be elusive. It is produced when there is a direct or indirect injury to the rectus muscles and/or epigastric vessels within the rectus sheaths. Spontaneous RSH however has been reported especially in the elderly and infirmed.

Case Report: We report a case of extensive RSH in a 67 year old lady resulting from direct needle trauma to the inferior epigastric vessels following enoxaparin injection to the anterior abdominal. The significance of understanding of applied anatomy in clinical practice has been stressed.

Conclusions: The significance of this pathology is its ability to mimic other causes of intra-abdominal acute surgical abdomen presenting a diagnostic dilemma.

Key words: **rectus sheath • haematoma • epigastric vessels • enoxaparin • acute abdomen**

Full-text PDF: http://www.crcpr-online.com/pdf/vol_7/8340.pdf

Word count: 1358
Tables: -
Figures: 2
References: 7

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Background

Rectus Sheath Haematoma (RSH) is an uncommon clinical entity often misdiagnosed as an intra-abdominal cause of acute abdomen. It usually results from bleeding into the rectus sheath from trauma to the epigastric vessels and/or their branches or may result from a tear of rectus muscle itself.

We report a case of extensive RSH resulting from direct needle trauma to the inferior epigastric vessels following enoxaparin injection to the anterior abdominal wall resulting in significant morbidity. The anatomy of the rectus sheath and epigastric vessels is discussed and safe injection sites on the anterior abdominal wall highlighted.

Case Report

A 67 year old lady was admitted to Coronary Care Unit (CCU) with a confirmed diagnosis of anterior myocardial infarction. She was started on twice daily subcutaneous injections of Clexane® 70mg (into the anterior abdominal wall) and clopidogrel. She had not been thrombolysed on admission.

On the third day of admission she developed right lower abdominal pain associated with a spiking temperature, nausea, vomiting and loss of appetite. Her haemoglobin had fallen from 13.5 on admission to 8.8 g/dl necessitating transfusion with two units of blood. Her white cell count was 2.8 X 10^9/L, platelet count was 256 X 10^9/L and clotting profile was normal.

Examination showed an unwell lady with moderate pallor and a temperature of 38.5 degree. There was a tender mass in the right lower abdomen extending towards the midline with an overlying bruising and ecchymosis indicating the site of clexane injection. The mass felt to be within the anterior abdominal wall. The diagnosis of a possible rectus sheath haematoma was made; differential diagnoses included an appendix or caecal mass. Abdominal and pelvic CT scans confirmed an extensive right-sided rectus sheath haematoma extending down into the pelvis, involving the bladder and uterus (Fig 1).

Her anticoagulation was stopped and she was managed conservatively. Her symptoms improved (including resolution of her fever) and she was discharged home on day ten of her admission. Unfortunately she represented 5 days later with pain and swelling in her right calf and colour Doppler scans confirmed extensive right leg deep venous thrombosis extending up to the proximal popliteal vein. She was commenced on therapeutic dose Heparin and discharged on warfarin to be followed up in the anti-coagulant clinic. MRI follow-up scans at 6 weeks show the haematoma to be resolving satisfactorily.

Discussion

Direct trauma or rupture of epigastric vessels and/or its perforating branches usually cause rectus sheath haematoma. However, "spontaneous" rectus sheath haematoma is known presenting with acute abdominal pain [1, 2]. Initial misdiagnosis is common in up to

Right rectus sheath haematoma in the anterior abdominal wall.

Extensive right rectus sheath haematoma spreading to the pelvis pushing the urinary bladder and uterus to the left.

Figure 1. CT scan of abdomen and pelvis showing extensive RSH.

93% of reported cases [2]. The lower quadrants are the most commonly affected site [3]. The risk factors predisposing to RSH include anticoagulation therapy [4], cardiovascular disease, atherosclerosis and chronic cough [5], older age group [6]. Initial misdiagnosis is common as more common intra-abdominal emergencies are suspected.

The rectus sheath is the fibrous tissue codensation of the aponeurotic layers of the anterior abdominal wall muscles as they approach the midline. The sheath invests the rectus abdominis muscle consisting of two vertically aligned parallel muscles. It also envelopes the epigastric vessels originating superiorly from the internal thoracic and inferiorly from the iliac vessels. The sheath is incomplete posteriorly at a level inferior to arcuate line and superiorly above the costal margin. The anterior layer is formed jointly by the external oblique and superficial leaf of the internal oblique aponeuroses. The posterior layer is from the aponeurosis of the transverses abdominis muscle and the deeper leaf of the internal oblique aponeurosis. The two layers meet in the midline to form a relatively bloodless linear alba. The absence of a posterior rectus sheath below the linear semilunaris allows the haematoma to spread and cross the midline to invade the space of Retzius, irritating the bladder and the peritoneum.

Our patient presented with sudden onset of right lower abdominal pain, spiking fever, nausea/vomiting and diarrhoea, which have been reported previously [6]. Most of these symptoms are caused by peritoneal irritation. Ecchymosis of the abdominal wall is not uncommon as shown in this patient and we believe she developed RSH secondary to inadvertent anticoagulant injection into the rectus muscle and possibly trauma to the inferior epigastric vessels.

There are specific regulations and protocol for the subcutaneous injection of anticoagulants and certainly the knowledge of anatomy of the rectus sheaths/muscles and epigastric vessels as illustrated in figure 2 will be of great help in the daily care of patients. Enoxaparin (Clexane®) like any other anticoagulant should be administered with the patient lying down by deep subcutaneous/intrafat injection as follow [7]:

Select an area on the right or left of the abdomen at least 5cm away from the umbilicus, gently grasp a fold of skin between the thumb and forefinger, vertically insert the full length of the needle into the skin fold, inject the desired volume of clexane using the meniscus of the liquid as a guide. Remember to continue holding the skin fold as the drug is injected; withdraw the needle after injecting the desired dose while still holding the skin fold. To minimise bruising, do not rub the injection site after injection and take care not to inject into the muscle as this can cause haematoma, irritation and severe pain at the injection site.

The diagnosis of RSH is suspected from the clinical history and examination. Imaging such as ultrasound, CT or MRI scans are used to confirm the diagnosis. Treatment is conservative including blood transfusion, discontinuation of anticoagulation and correction of coagulation disorder may be required. The protocol for subcutaneous anticoagulant injections to the anterior abdominal wall should be strictly observed to reduce the risk of RSH from this care.

Conclusions

Rectus sheath haematoma is a rare entity and the significance of this pathology is its ability to mimic other causes of intra-abdominal acute surgical abdomen presenting a diagnostic dilemma. A high index of suspicion is therefore advised when attending elderly, infirmed patients or patients on anticoagulant therapy presenting with a mass in the anterior abdominal wall.

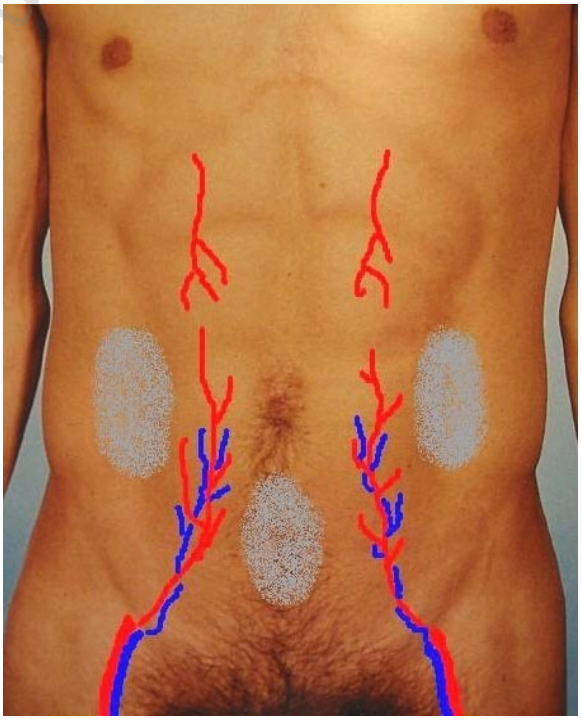

Figure 2. Surface anatomy of the rectus muscles and the epigastric vessels. Shaded areas are the recommended sites for subcutaneous injections of enoxoparin.

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