

Management of expanding lateral abdominal wall haematoma following blunt trauma

Dimitri Aristotle Raptis^a, Dimitrios Lytras^a, Amir Darakhshan^a, James Skipworth^a,
Julian Hague^b and Duncan Brennand^b

^a*Department of Surgery, University College Hospital, London, UK; and*

^b*Department of Interventional Radiology, University College Hospital, London, UK*

*Corresponding address: Dimitri Aristotle Raptis, MBBS, MSc,
120 Totenhall Road, N13 6DG, London, UK.
E-mail: draptis@btinternet.com*

Date accepted for publication 21 August 2009

Abstract

Lateral abdominal wall haematoma following blunt trauma can be a life-threatening condition and requires prompt diagnosis and treatment. We present the imaging findings and treatment modalities used for a young man presenting to the emergency department with abdominal pain and bruising.

Keywords

Abdominal trauma; trauma; lateral abdominal wall; bleeding; radiology; intervention.

Introduction

Blunt trauma to the lateral abdominal wall leading to a rapidly expanding haematoma is an uncommon but well-described phenomenon. The potential foci of bleeding include any vessels that supply the lateral abdominal wall, such as the deep circumflex iliac artery, the deep inferior epigastric artery, the deep superior epigastric artery, the lower two to four posterior intercostal arteries and the lumbar arteries^[1].

Most reports of abdominal wall haematoma involve patients with significant predisposing factors for bleeding, such as ongoing anticoagulation therapy or primary coagulopathy. Other causes include iatrogenic injuries and spontaneous haematomas. A rapidly expanding lateral abdominal wall haematoma represents a surgical emergency and is potentially life threatening if left untreated.

In this report, we present imaging findings and a description of the management techniques employed in a patient presenting to the emergency department with abdominal pain and bruising.

Case report

A 30-year old male presented to the accident and emergency department 6 h after a fall from his bicycle, at approximately 5 miles per hour, on a flat road surface. His main complaint was

right-sided abdominal pain and bruising of the right lateral abdominal wall. He was otherwise fit and well with an unremarkable previous medical history.

Physical examination revealed a large, palpable, right-sided abdominal wall haematoma (35 × 25 cm) (Fig. 1) that was exquisitely tender to touch, but no other obvious injuries. Vital signs were all within normal limits, with blood pressure 125/85 mmHg and pulse rate 70 beats/min. Admission arterial blood gases were entirely normal (pH 7.41, PaO₂ 13.1 kPa, PaCO₂ 5.3 kPa, basic excess +1.6 mmol/l, HCO₃, 19.5 mmol/l and SaO₂ 99%). Haemoglobin and haematocrit levels were 13.1 g/dl and 0.382 l/l, respectively. The patient's platelet count (197 × 10⁹/l) and coagulation screen (prothrombin time 11.3 s, internationalized normalized ratio (INR) 1.06, activated partial thrombin time (APTT) 29 s and thrombin time 13 s) were also normal.

Contrast-enhanced computed tomography (CT) revealed a large collection (6.5 × 8.0 × 5.5 cm) within the subcutaneous tissues of the right flank, superior to the right iliac crest, with a considerable amount of adjacent subcutaneous oedema. Arterial and venous phase imaging revealed two small intra-collection regions (one superior and one medial) of active contrast extravasation, a finding consistent with ongoing acute haemorrhage (Figs. 2 and 3). No acute bony or intra-peritoneal injury was found.

Repeated clinical examination revealed that the haematoma continued to visibly expand, confirming CT evidence of ongoing haemorrhage, and an emergency angiography was arranged for further assessment and management of the bleeding focus.

During angiography, the right common femoral artery was punctured, a 5-French sheath (Cordis, Miami Lakes, FL) was inserted and the right L-3 left lumbar artery was selectively cannulated. Injection of contrast medium demonstrated two bleeding points from two peripheral arteries (Figs. 4 and 5), the calibre of which was too small to allow passage of a 2.1 French micro-catheter (Cordis, Miami Lakes, FL). A super-selective embolisation was therefore successfully performed utilising Gelfoam absorbable sponge slurry (Pharmacia & Upjohn, Kalamazoo, MI) and follow-up angiography images revealed that all contrast extravasation had ceased. The patient's subsequent recovery was uneventful and he was discharged home 3 days post-embolisation on simple non-opioid analgesia.



Fig. 1. Lateral abdominal wall haematoma.



Fig. 2. CT showing a large haematoma within the subcutaneous tissue with marked oedema.



Fig. 3. CT showing a hyperdense stream within the subcutaneous tissue, suggesting active bleeding (arrow).

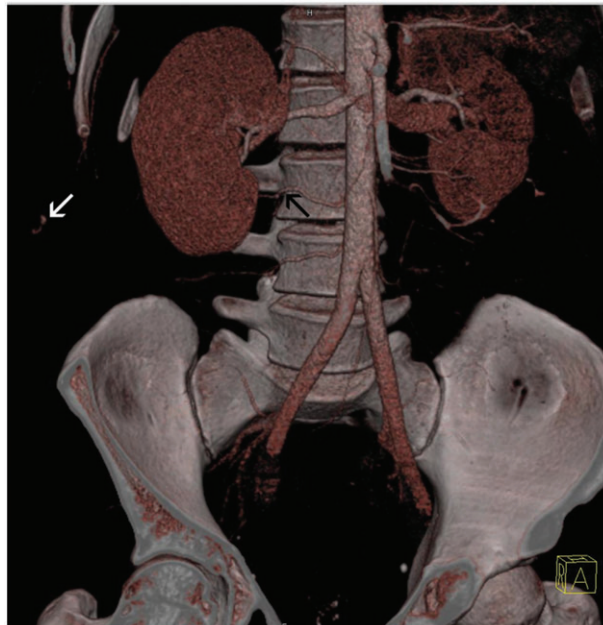


Fig. 4. 3D reconstruction showing the course of the right L-3 lumbar artery (black arrow) and a bleeding focus (white arrow).

Discussion

Rupture of a cutaneous branch of the lumbar artery leading to development of an expanding haematoma in the subcutaneous tissue of the lateral abdominal wall is rare^[2,3] and haematomas of the lumbar artery are usually located in the retroperitoneal space^[4,5]. Lateral abdominal wall vessels may bleed spontaneously or following trauma or iatrogenic injury, and potential foci of bleeding include any vessel supplying the lateral abdominal wall such as the deep circumflex iliac artery, the deep inferior epigastric artery, the deep superior epigastric artery, the lower two to four posterior intercostal arteries and the lumbar arteries^[1]. The most common haematomas are those of the rectus sheath, usually caused by the inferior or superior epigastric arteries and their branches^[10]; the most common vessel responsible for abdominal wall haematomas is the inferior

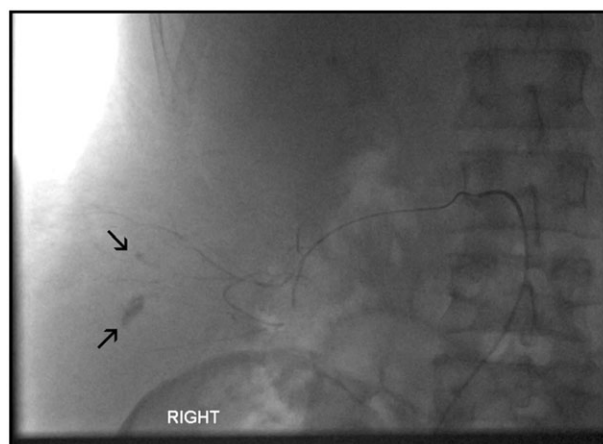


Fig. 5. Super-selective angiogram of the right L-3 left lumbar artery showing 2 separate active bleeding foci (arrows).

epigastric artery^[8]. Rare cases of haematomas located within the fascial compartments (internal oblique) have also been reported^[7].

The majority of patients (69–80%) presenting with abdominal wall haematomas are on anticoagulants^[6,8]; however, we describe a report in which the patient was not anticoagulated and had no obvious evidence of a primary coagulopathy. Also unusual is the fact that high-impact blunt traumas, which are severe enough to cause abdominal haematomas, are usually associated with concomitant injuries, such as extremity and spinal fractures^[9]; the traumatic injury in this report led to no other bony or soft tissue injuries.

This condition, although rare, can be fatal and in-hospital mortality range from 2 to 5%^[6,8]. Treatment options for abdominal wall haematomas depend upon the patient's progress and the facilities available but include conservative and supportive management for insignificant bleeds; blood transfusion and reversal of anti-coagulation as necessary; angiographic embolisation where possible; and surgery in refractory cases or cases where angiographic management is not possible^[6,8].

Improvements in haemodynamic stability and decreased transfusion requirements can be achieved safely without surgical intervention through the prompt use of coil or catheter embolisation^[11]. Angiographic embolisation therefore remains the management strategy of choice where possible and can be successful in up to 90% of cases with few or no associated complications^[6,8]. In cases of bleeding from small calibre vessels, as in this report, operative location of a bleeding focus can be extremely difficult, as well as being associated with extensive soft tissue dissection, potentially long and repeated general anaesthetic, and increased hospital stay, and should therefore be reserved as a last option.

Teaching points

Patients with expanding abdominal wall haematomas should be promptly assessed with an intravenous contrast-enhanced CT and referred for angiographic embolisation where appropriate. If facilities for urgent angiography are unavailable, patients should be promptly transferred to a tertiary centre with out-of-hours interventional radiology services.

References

1. Konerding MA, Gaumann A, Shumsky A, Schlenger NK, Hockel M. The vascular anatomy of the inner anterior abdominal wall with special reference to the transversus and rectus abdominis musculoperitoneal (TRAMP) composite flap for vaginal reconstruction. *Plast Reconstr Surg* 1997; 1: 705–10.
2. Nishiuchi T, Horikawa H, Hinami J, Yokota J. An unusual case of noncavitary hemorrhage revealed by intravenous contrast-enhanced computed tomography. *J Emerg Med* 2002; 22: 21–5. doi:10.1016/S0736-4679(01)00432-2. PMID:11809552.

3. Wall B, Keller FS, Spalding DM, Reif MC. Massive hemorrhage from a lumbar artery following percutaneous renal biopsy. *Am J Kidney Dis* 1986; 7: 250-3.
4. Fortina M, Carta S, Del Vecchio EO, Crainz E, Urgelli S, Ferrata P. Retroperitoneal hematoma due to spontaneous lumbar artery rupture during fondaparinux treatment. Case report and review of the literature. *Acta Biomed* 2007; 78: 46-50.
5. Barak M, Fischer D, Gat M, Katz Y. Retroperitoneal hematoma after spinal anesthesia with the paramedian approach. *Anesth Analg* 2004; 98: 851-3.
6. Cherry WB, Mueller PS. Rectus sheath hematoma: review of 126 cases at a single institution. *Medicine (Baltimore)* 2006; 85: 105-10.
7. Nakayama T, Ishibashi T, Eguchi D, *et al.* Spontaneous internal oblique hematoma successfully treated by transcatheter arterial embolization. *Radiat Med* 2008; 26: 446-9. doi:10.1007/s11604-008-0254-7. PMID:18770005.
8. Sobkin PR, Bloom AI, Wilson MW, *et al.* Massive abdominal wall hemorrhage from injury to the inferior epigastric artery: a retrospective review. *J Vasc Interv Radiol* 2008; 19: 327-32. doi:10.1016/j.jvir.2007.11.004. PMID:18295690.
9. Lefere P, Gryspeerdt S, Van Holsbeeck B, Baekelandt M. Diagnosis and treatment of expanding haematoma of the lateral abdominal wall after blunt abdominal trauma. *Eur Radiol* 1999; 9: 1553-5. doi:10.1007/s003300050883. PMID:10525864.
10. Werdehoff SG, Blomkains AL. Rectus sheath hematoma. Available at: <http://www.eMedicine.com>; updated January 19, 2005. Accessed 24 December 2008.
11. Surani S, Estement B, Manchandan S, Sudhakaran S, Varon J. Spontaneous extraperitoneal lumbar artery hemorrhage. *J Emerg Med* 2008; 00oi:10.1016/j.jemermed.2008.01.029.