CASE REPORT

Spontaneous intraperitoneal rupture of a postpartum rectus sheath haematoma

Adel Elmoghrabi, Mohamed Mohamed, Michael McCann, Gul Sachwani-Daswani

Department of Trauma
Services, Hurley Medical
Center, Flint, Michigan, USA

Correspondence to
Dr Mohamed Mohamed,
mmohame4@hurleymc.com

Accepted 23 February 2016

SUMMARY

A 35-year-old woman presented to the emergency department (ED) with acute severe abdominal pain at 4 days postpartum. CT of the abdomen revealed a type II rectus sheath haematoma for which she was initially treated conservatively and discharged. A few hours later, she returned to the ED with a picture suggestive of peritonitis. Exploratory laparoscopy was performed and revealed haemoperitoneum and a ruptured area on the posterior rectus sheath. Approximately 2 L of blood was aspirated. Haemostatic control was achieved and closed suction drains secured in position. The patient was discharged in stable condition on postadmission day 6. She continued to follow-up on an outpatient basis and was doing well 3 months postoperatively.

BACKGROUND

Rectus sheath haematoma (RSH) is a rare but well documented clinical entity.¹ Injury to the epigastric vessels and their branches, or a direct tear in the musculature of the rectus abdominus muscle, may result in RSH.¹ Being an infrequent clinical entity and a rare cause of abdominal pain during the postpartum period, diagnosis requires a high index of suspicion. Although usually self-limiting, it may carry a worse prognosis and result in hypovolemic shock, and, rarely, intraperitoneal rupture. We report a case of spontaneous rupture of a rectus sheath haematoma at 4 days postpartum in a 35-year-old woman.

CASE PRESENTATION

A 35-year-old woman, G4P3A1, presented to the emergency department (ED) 4 days after an uncomplicated full term vaginal delivery with acute, severe mid and right lower quadrant abdominal pain. There was no history of trauma, fever, nausea, vomiting or dysuria. There was no evidence of abnormal postpartum bleeding. Medical, surgical and drug history were unremarkable.

On examination, the patient was in painful distress. Vital signs revealed tachycardia at 104 bpm, and were otherwise normal. Abdominal examination revealed severe right lower quadrant tenderness with no rebound, no guarding and no evidence of a mass. A complete blood picture revealed an elevated white cell count of 11.5 k/ μ L, and was otherwise normal. Metabolic panel, serum lipase and urine analysis were normal. CT of the abdomen and pelvis with contrast revealed a 6.2 cm $\times$ 3.8 cm $\times$ 6.6 cm hyperdense mass in the right lower quadrant, contained in the retrorectus plane (figure 1). The patient was diagnosed with

type II rectus sheath haematoma and discharged for conservative management including analgesics and cold compresses. A few hours later, she returned to the ED with worsening abdominal pain and inability to void. She appeared anxious and diaphoretic. Vital signs revealed tachycardia at 140 bpm, but were otherwise normal. Re-examination of her abdomen revealed worsening tenderness that became more generalised with accompanying rigidity and no rebound tenderness. Ultrasonography of the bladder revealed 600 mL of urine and the patient subsequently underwent urinary catheterisation. At that point, suspicion was raised for urine retention caused by an expanding RSH. Repeat complete blood count revealed a rise in the leukocyte count at 19 000 k/ μ L. Metabolic panel and blood gases remained normal. After surgical consultation, the decision was made to admit the patient for observation. Serial abdominal examinations revealed intractable abdominal pain with the development of a peritonitic abdomen. Subsequently, she underwent an emergent diagnostic laparoscopy. Haemoperitoneum was immediately visualised. An omental segment was detected sealing off an area on the posterior rectus sheath, consistent with the site of the haematoma. Omental dissection revealed a ruptured area on the posterior rectus sheath, however, it resulted in bleeding. Haemostatic control of the oozing omentum was achieved, and inspection of the rectus sheath and muscle revealed no evidence of vascular or muscular injury, and no active bleeding. Approximately 2 L of mixed fresh and clotted blood was suctioned during the procedure.

The postoperative course was uneventful with no requirement for blood transfusion. The patient was discharged in stable condition on postadmission day 6. She continued to follow-up on an outpatient basis and was doing well 3 months postoperatively.

INVESTIGATIONS

CT of the abdomen and pelvis with contrast revealed a 6.2 cm $\times$ 3.8 cm $\times$ 6.6 cm hyperdense mass in the right lower quadrant, contained in the retrorectus plane (figure 1).

DIFFERENTIAL DIAGNOSIS

Although the patient's presenting symptom of abdominal pain encompasses a broad differential diagnosis including appendicitis, ovarian torsion, cystitis and bowel obstruction, among others, the addition of postpartum intrauterine complications further widens the range of possibilities and poses a greater diagnostic challenge.

CrossMark

To cite: Elmoghrabi A, Mohamed M, McCann M, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-214905

Figure 1 CT of the abdomen and pelvis with contrast, showing a 6.2 cm×3.8 cm×6.6 cm hyperdense mass (white arrows) in the right recto rectus plane.

TREATMENT

The patient underwent an emergent diagnostic laparoscopy. Haemoperitoneum was immediately visualised. An omental segment was detected sealing off an area on the posterior rectus sheath consistent with the site of the haematoma. Omental dissection revealed a ruptured area on the posterior rectus sheath, however, it resulted in bleeding. Haemostatic control of the oozing omentum was achieved, and inspection of the rectus sheath and muscle revealed no evidence of vascular or muscular injury, and no active bleeding. Approximately 2 L of mixed fresh and clotted blood was suctioned during the procedure.

OUTCOME AND FOLLOW-UP

The postoperative course was uneventful with no requirement for blood transfusion. The patient was discharged in stable condition on postadmission day 6. She continued to follow-up on an outpatient basis and was doing well 3 months postoperatively.

DISCUSSION

RSH results from accumulation of blood within the sheath of the rectus abdominus muscle. The anatomical course of the epigastric vessels, particularly the inferior epigastric artery, within the posterior rectus sheath, makes it prone to injury. Owing to its relatively loose trajectory and in combination with its strongly anchored perforating branches, forceful muscular contraction causes shortening of the rectus abdominus muscles and may result in shearing forces that are injurious to the branching points.^{1 2} Owing to the retrorectal location of the epigastric vessels and supportive deficit of the posterior rectus abdominus below the level of the arcuate line, RSH occurs more commonly posteriorly and infraumbilical.^{1 3}

Blunt abdominal trauma, pregnancy or vigorous contraction of the rectus abdominus muscle as a result of labour, vomiting, straining, acute cough, bronchitis, influenza or asthma, may result in injury to the arterial supply; the latter three are thought to be the cause in 56% of cases.⁴ Iatrogenic injury is also possible either from direct injury to the epigastric vessels during surgical intervention, or due to the increasing use of anticoagulation in modern day medicine. The main inciting event for the development of RSH in pregnancy has been reported to be cough in 73% and labour in 18% of cases.⁴

Owing to the diversity of causes that can result in RSH, patients may present to different medical specialties,

highlighting the importance of interdisciplinary attentiveness to the causes and presentation.

The main presenting symptom in RSH is abdominal pain, more commonly occurring in the right lower quadrant.⁴ This poses a bigger diagnostic challenge in patients presenting in the postpartum period due to the additional consideration given for intrauterine postpartum complications in the differential diagnosis.⁵ Patients may also present with an abdominal mass, mild fever and leukocytosis.⁶ Clinical examination is often misleading; however, certain signs may be elicited at bedside that can help differentiate RSH from other intra-abdominal pathologies.⁶ A positive Fothergill sign, suggestive of a RSH, is the presence of an abdominal mass that does not cross the midline and remains palpable on contraction of the rectus muscle. Disappearance of the mass renders the test as negative denoting an intra-abdominal pathology.⁷ Patients lying in supine position with abdominal pain that increases or remains unchanged on elevation of the head to a semisitting position, yields a positive Carnett sign, and represents a possible indicator of an abdominal wall pathology.⁷ Other signs that may present late include Culling's or Grey Turner's signs, and are associated with intra-peritoneal rupture and extraperitoneal extension, respectively.

In 1996, Berna *et al* classified RSH into three types according to severity and radiographic CT characteristics: type I is intramuscular, does not cross the midline or dissect across facial planes and results in mild to moderate abdominal pain; type II is also intramuscular but may extend between the rectus muscle and transversalis fascia, and is either unilateral or, more frequently, bilateral; type III is similar to type II but blood may trickle to the prevesical space and cause haemoperitoneum.

In 2001, Humphrey *et al* conducted an updated review of the literature spanning 100 years, on antepartum and postpartum cases of RSH. The review revealed only 68 cases, of which only two had ruptured intraperitoneally, with no distinction made whether the rupture was antepartum or postpartum.² This emphasises the rarity of RSH cases, especially those that rupture. A review of 78 patients by Villa *et al* revealed only four cases of RSH that occurred during pregnancy. However, none occurred during the postpartum period and none had ruptured. This was similar to the findings of other reviews including one of the largest series (126 patients), reported by Cherry *et al*.^{8–10} To the best of our knowledge, since Humphrey *et al*'s review, we encountered only a single case report of a RSH that had ruptured intraperitoneally as a result of vigorous uterine massage in a patient with atonic postpartum haemorrhage.¹¹

Ultrasound (US) has been reported to have a sensitivity of 85–96% and is useful in haemodynamically unstable patients, as well as pregnant patients, to avoid ionising radiation.¹² Sonographic findings may include a hypoechoic mass containing some anechoic areas and an increased anteroposterior diameter of the rectus abdominus muscle on the affected side. Haematomas tend to be ovoid in shape above the arcuate line, below which they tend to be spherical.² CT is superior to US and is considered to be the gold standard for achieving a diagnosis,^{3 6} especially in larger haematomas where the relationship between the abdominal wall and the haematoma cannot be determined.² Albeit CT may accordingly prevent unnecessary exploratory laparotomies, it may confuse RSH for an abdominal tumour.⁴ CT findings include a hyperdense mass posterior to the rectus muscle, which was evident in our patient, however, chronic haematomas may appear isodense or hypodense relative to the surrounding muscle.¹ MRI can be useful in assessing uncertain CT findings, however, it is rarely necessary.¹²

Treatment of RSH is usually conservative and seldom requires intervention.^{3–6} Management is based on the severity, degree of expansion and haemodynamic stability.⁶ Generally speaking, type I and II are benign and may be treated conservatively with expected resolution within 1, and 2–4 months, respectively. Conservative treatment entails clinical observation and discontinuation of any offending agents such as anticoagulation. Other measures include rest, analgesics, cold compresses and blood transfusion, if necessary.^{2–3} Type II may require short-term hospitalisation as a standard precaution.¹ Although in retrospect it seems inappropriate to have discharged our patient on conservative management after her initial presentation with a type II RSH, there is lack of consensus on mandating admission for this subtype especially for patients who are haemodynamically stable. However, from this experience, closely observing patients with type II RSH regardless of their haemodynamic status represents a sensible plan of care.

Patients with type III haematomas should be admitted, and are subjected to longer hospital stays and requirement of transfusion therapy. Only a few patients develop haemodynamic instability or intraperitoneal rupture that inevitably requires surgical intervention.^{1–2} Surgery constitutes control of bleeding and aspiration of haemoperitoneum and clotted blood, with ligation of the bleeding vessels and closed suction drainage.³ In more stable patients, successful transcatheter arterial embolisation of the culprit bleeding vessel has been reported to achieve haemostasis.^{9–10–13} Luhmann *et al*⁶ recommended routine use of urinary catheters in patients with type III haematomas to assess for evolving intra-abdominal compartment syndrome that may require urgent surgical decompression.

In the study by Villa *et al*, a univariate analysis of different variables including demographic characteristics, laboratory and imaging examinations, was conducted and failed to show any statistically significant prognostic factors of haemodynamic instability. This undermines the importance of closely observing clinical and laboratory data for signs of deterioration such as haemodynamic instability, intraperitoneal rupture, spread of the haematoma to the pelvis and coagulopathy.³

CONCLUSION

RSH is an unusual cause of abdominal pain, particularly during the postpartum period. Intraperitoneal rupture is a rare but

Learning points

- ▶ Rectus sheath haematoma is a rare but well documented cause of abdominal pain that may mimic acute abdomen.
- ▶ Rectus sheath haematoma may present during puerperium and result in intraperitoneal rupture.
- ▶ Rectus sheath haematoma has been classified into types I, II and III.
- ▶ Type II and III rectus sheath haematomas should be admitted to hospital for observation, conservative management and intervention, if necessary, due to the risk of intraperitoneal rupture and/or haemodynamic instability.

possible consequence. To date, no prognostic factors are available that predict which patients will develop such a grave complication. However, admission of patients presenting with grade II–III RSHs regardless of their haemodynamic status seems to be a sensible plan of care.

Contributors AE was responsible for writing the case report. MM made substantial edits to the drafted manuscript. MMCC and GS-D revised and edited the manuscript. GS-D supervised the overall process.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Chang WW, Blomkalns AL, Knight WA. Rectus Sheath Hematoma. Medscape Drugs & Diseases. Updated Nov 2, 2014. Available at: <http://reference.medscape.com/article/776871-overview>.
- 2 Humphrey R, Carlan SJ, Greenbaum L. Rectus sheath hematoma in pregnancy. *J Clin Ultrasound* 2001;29:306–11.
- 3 Villa M, Grande M, Rulli F, *et al*. Rectus sheath haematoma: are there prognostic risk factors of haemodynamic instability motivating an early operative treatment? *Eur J Trauma Emerg Surg* 2012;38:537–41.
- 4 Siddiqui SA. Rectus sheath hematoma: a diagnostic dilemma. *J Coll Physicians Surg Pak* 2010;20:828–9.
- 5 Sheppard R, Wilson C. Postpartum acute abdomen and its diagnostic challenges. *BMJ Case Rep* 2015;2015:bcr2015212052.
- 6 Luhmann A, Williams EV. Rectus sheath hematoma: a series of unfortunate events. *World J Surg* 2006;30:2050–5.
- 7 Senthilkumaran S, Balamurugan N, Menezes RG, *et al*. Rectus sheath hematoma: clinical examination is the key. *Am J Emerg Med* 2012;30:2069–70.
- 8 Cherry WB, Mueller PS. Rectus sheath hematoma: review of 126 cases at a single institution. *Medicine (Baltimore)* 2006;85:105–10.
- 9 Salemis NS, Gourgoutis S, Karalis G. Diagnostic evaluation and management of patients with rectus sheath hematoma. A retrospective study. *Int J Surg* 2010;8:290–3.
- 10 Anyfantakis D, Kastanakis M, Petrakis G, *et al*. Rectus sheath hematoma in a single secondary care institution: a retrospective study. *Hernia* 2015;19:509–12.
- 11 Bangal VB, Denita F, Chalasani S, *et al*. Rectus sheath hematoma and intra-peritoneal bleeding following per abdominal uterine massage to control atonic postpartum haemorrhage. *Int J Biomed Adv Res* 2014;5:573–5.
- 12 Tolcher MC, Nitsche JF, Arendt KW, *et al*. Spontaneous rectus sheath hematoma pregnancy: case report and review of the literature. *Obstet Gynecol Surv* 2010;65:517–22.
- 13 Hatjipetrou A, Anyfantakis D, Kastanakis M. Rectus sheath hematoma: a review of the literature. *Int J Surg* 2015;13:267–71.

Patient's perspective

"I was completely shocked at the complications after pregnancy. I had two normal natural births prior, so at first the feeling of a pulled muscle seemed quite normal. When the feeling suddenly became excruciating, I knew something was really wrong. Things were promptly taken care of at Hurley and diagnosed, which I was thankful for. I originally was sent home after the discovery of the haematoma but things just got progressively worse for me. When I could barely move, stand or walk, I went back in again. Surgery then followed."

Copyright 2016 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow