CASE REPORT

Delayed postpartum abdominal bleeding caused by a spontaneous ruptured branch of the internal iliac artery and successfully treated by arterial embolisation

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SUMMARY

A 34-year-old gravida 2 para 1 had an uneventful second pregnancy and successful vaginal birth after caesarean section. She was readmitted on the third day postpartum with severe abdominal pain coinciding with lactation. On admission, her vital signs were stable and was expectantly managed. After an unexpected drop in haemoglobin level, a CT scan was ordered, showing a haemoperitoneum. Laparoscopy was performed and 2.5 L of blood was evacuated from the peritoneal cavity, no source of the bleeding could be identified. At the intensive care unit the patient's vital signs deteriorated and her haemoglobin level dropped to 2.2 mmol/L. The patient was stabilised and instead of a laparotomy to locate the bleeding, an arterial CT and angiography were performed. This revealed the presence of a blush from a pseudoaneurysm rising from a branch of the internal iliac artery. The artery was successfully occluded by embolisation.

soft and tender with mild rebound tenderness in the whole lower segment. The uterus was well contracted and not painful on palpation. Vaginal examination did not reveal any masses. Bowel sounds were normal. An indwelling bladder catheter gave no symptom relief. Her vital signs showed a marked tachycardia with a pulse of 130 bpm, temperature of 36.8°C and blood pressure of 130/89 mm Hg. Her haemoglobin level was 5.9 mmol/L.

Transvaginal ultrasound demonstrated a mass, interpreted as organised haematoma, covering the uterus and left fallopian tube (figure 1).

At this stage we suspected the patient of having either urine retention, endometritis, perineal haematoma or ovarian vein thrombosis; however, no evidence for any of these conditions could be identified. The patient was haemodynamically stable and there were no signs of infection. Therefore expectant management with pain relief, close observation and monitoring of vital signs was chosen.

BACKGROUND

This case demonstrates a rare cause of abdominal bleeding 3 days post partum, with potentially life-threatening consequences. Ruptured arterial pseudoaneurysm is rarely found as the cause of the bleeding. Emergency pelvic arterial embolisation in this case has proven to be effective and prevented the patient from having to undergo major abdominal surgery.

CASE PRESENTATION

We present a case of a 34-year-old gravida 2 para 1 with an obstetric history of term pre-eclampsia resulting in caesarean section after a failed induction 2 years earlier. She had an uneventful second pregnancy. She was fit and well, with no medical conditions and no family history of any disorders. The prelabour haemoglobin level was 8.5 mmol/L. After spontaneous onset of labour and a normal dilation phase without augmentation, she had a ventouse delivery for failure to progress into the second stage with suspicion of fetal distress. Estimated total blood loss was 300 mL. She had an uneventful recovery and left the hospital the next day. During lactation 3 days post partum, she experienced acute abdominal pain in the right lower quadrant. The pain worsened over the next couple of hours. She presented with severe abdominal pain radiating to her shoulder. On examination, her abdomen was

INVESTIGATIONS

Laboratory investigations later that day showed a drop in haemoglobin levels from 5.9 mmol/L at early morning presentation to 4.5 mmol/L. The patient was suspected to have internal bleeding. The latter information was not communicated to the radiologist when a CT scan was ordered.

CT scan: Abdominal venous CT scan demonstrated significant haemoperitoneum without a clear identification of the source of bleeding. The pelvic organs were reported as normal (figure 2). Considering the history of caesarean section, intra-abdominal bleeding from a concealed uterine rupture was suspected. Laparoscopy was performed.

Diagnostic laparoscopy: At laparoscopy, 2.5 L of blood was evacuated from the peritoneal cavity. A normal uterus, normal adnexa, and a few adhesions between rectum and rectouterine cavity could be identified. No source of the bleeding was found, despite extensive exploration of all four quadrants of the abdomen assisted by the vascular surgeon. Assuming the bleeding had stopped spontaneously, the procedure was terminated.

Following laparoscopy, the patient's vital signs revealed tachycardia (pulse of 160 bpm) and hypotension (blood pressure of 70/50 mm Hg). The patient was aggressively given intravenous fluids and blood products to maintain normal circulation.

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Figure 1 Ultrasound demonstrating a haematoma covering the uterus.

CT scan and angiography: After a further drop in the haemoglobin level to 2.2 mmol/L, an arterial and venous CT scan was performed. In contrast to the first venous CT scan, an active bleeding pseudoaneurysm could be identified, which was suitable for embolisation ([figure 3](#)).

Angiography confirmed the presence of a pseudoaneurysm in a branch of the left internal iliac artery, from where the haemorrhage originated ([figure 4](#)).

DIFFERENTIAL DIAGNOSIS

The first venous CT scan revealed a haemoperitoneum and therefore, by considering the patient's history of a caesarean section, a concealed uterine rupture was suspected. Surgical management became inevitable. Despite extensive searching during a laparoscopy, in the presence of a vascular surgeon, no source of the bleeding was found and we assumed that the bleeding had stopped spontaneously. The bleeding could be from other origins—the broad ligament, a ruptured pseudoaneurysm, the uterine artery, a ruptured degenerated uterine fibroid, superficial rectal vessels or bleeding due to endometriosis—as described in the medical literature; however, there was no sign of any of these during laparoscopy.^{1 2}

Figure 2 Abdominal CT scan demonstrating massive intra-abdominal fluid with dense components, highly suggestive of haemoperitoneum.

TREATMENT

After identification of the origin of the bleeding, immediate transcatheter coiling of the artery was performed. The right internal iliac artery was selectively engaged with a catheter, through which a microcatheter was passed and manoeuvred into the anterior division of the left internal iliac artery. Two 2 mm, two 3 mm and one 6 mm VortX coils were injected through the microcatheter, which resulted in occlusion of the anterior division of the left internal iliac artery ([figure 5](#)). Given the emergency of the clinical situation, the severe haemodynamic shock, a proximal embolisation was performed. As the patient was subsequently haemodynamically stable, embolisation did not need to be bilateral. Note the unintentional placement of a coil loop in the posterior division, not resulting in occlusion of this artery.

OUTCOME AND FOLLOW-UP

Successful occlusion of an arterial pseudoaneurysm led to haemostasis of a spontaneous postpartum intra-abdominal bleed. This was demonstrated by angiography at the time of the procedure and confirmed at the second laparoscopy the following day, which was performed to remove the accumulated blood clots (5 L) to prevent the patient from having paralytic ileus and overly long recovery. The patient had an uneventful post-operative recovery and was doing well at the follow-up consultation, 8 weeks later.

DISCUSSION

Obstetricians are faced with abdominal pain post partum on a regular basis. Most likely causes include urine retention, endometritis, perineal haematoma or ovarian vein thrombosis. Intra-abdominal bleeding is a very rare cause of postpartum abdominal pain especially after a vaginal delivery. In case of a disproportionate drop in haemoglobin level and in the absence of the aforementioned diagnoses, one should be aware of intra-abdominal bleeding. Clear communication to the radiologist when ordering a CT scan is important and this was suboptimal in this case. This resulted in the performing of a venous CT scan—to find the cause for abdominal pain—instead of an arterial CT scan, which is mandatory in case of suspected intra-abdominal bleeding.

The presenting symptoms of a haemoperitoneum post partum might be atypical due to the changes in abdominal pressure post partum, allowing a greater volume of blood to accumulate before becoming symptomatic.³

Regarding the timing in our case, we hypothesise that the physiological cardiovascular changes may have contributed to an increase in arterial pressure leading to the rupture of the pseudoaneurysm of the branch of the internal iliac artery. The involution of the uterus as well as the lactation-related contractions and the possible adhesions as a result of the previous caesarean section might have played a role.

The first venous CT scan was performed in a non-acute setting of abdominal pain. This showed haemoperitoneum without a clear source of the bleeding. In retrospect, the pseudoaneurysm might have been present, but not visible on the venous CT scan. After extensive searching during laparoscopy, the aetiology could not be found. Most probably the initial clots had temporarily stopped the bleeding arising from the arterial rupture. After evacuating the abdominal blood, the high abdominal pressure during laparoscopy might have prevented us from finding the culprit.

Figure 3 The venous CT scan (before laparoscopy) where no contrast extravasation/active bleeding nor the source is demonstrated and the arterial CT scan (after laparoscopy) at the same level which demonstrates active bleeding/contrast extravasation.

In selected cases of haemodynamically stable patients with signs of intra-abdominal bleeding, careful observation may be permissible, but the risk of ileus and infection should be considered. With conservative approach in the absence of demonstrated active bleeding, the patient can be prevented from having several invasive interventions. In this case, surgical intervention was inevitable.

The further decline in haemoglobin level and the development of shock after the initial diagnostic laparoscopy necessitated subsequent interventions. The case was discussed by a multidisciplinary team, including a vascular surgeon, gynaecologist and intensive care specialist. The proclivity towards an exploratory laparotomy was resisted and it was opted to take an arterial CT scan to aid the diagnosis. At this moment it was obvious and clearly communicated to the radiologist that there was active bleeding. The origin of the active bleeding was found and the radiologist could offer direct endovascular intervention. Typically a bilateral uterine artery embolisation could be

performed with the use of a large lumen microcatheter and gelfoam or particles. However, in this case the specific origin of the bleeding was identified; therefore, the intervention was exclusively aimed at targeted embolisation on the side of the bleeding in this case, using regular-sized lumen microcatheter and coils. This case illustrates the importance of imaging techniques and these prevented major surgery.

As shown in [figure 3](#), the CT scan before laparoscopy could not clearly identify the cause of the bleeding. The additional benefit of angiography is that once the source is located, the radiologist can offer direct intervention. Although exploratory laparotomy is considered the standard method for treating intra-abdominal bleeding, endovascular treatment has been shown to be successful as well.⁴

There have been other case reports of successful arterial embolisation.^{5 6} However, most cases of postpartum arterial rupture presented with vaginal bleeding and were followed by caesarean section. Thus, our case presentation is unique as there

Figure 4 Angiography reveals a pseudoaneurysm in a branch of the left internal iliac artery, from where blood leaks into the pelvis.

Figure 5 Internal iliac artery angiography after embolisation shows occlusion of the anterior division.

are limited such cases reported in medical literature and will be of great educational value.^{7–9} The majority of spontaneous arterial ruptures during pregnancy and post partum had open surgery.^{10–11} Embolisation is widely used as treatment for post partum haemorrhage by interventional radiologists and obstetricians.¹² The prevalence of pseudoaneurysm might be increasing as a result of surgery.¹³ This case may raise awareness about the possibilities of interventional radiology in similar cases.

Learning points

- ▶ When a patient presents with severe abdominal pain after non-traumatic delivery in combination with a significant drop in haemoglobin level, one must consider intra-abdominal bleeding.
- ▶ Blood clots might stop the bleeding and high abdominal pressure during laparoscopy might prevent one from finding the source of the bleeding.
- ▶ Endovascular treatment has been shown to be successful and prevents the patient from having to undergo major abdominal surgery.
- ▶ Multidisciplinary approach is of paramount importance.

Contributors RME had the idea for the article, performed part of the literature search and drafted the paper. She is the guarantor. MNB had the idea for the article, performed part of the literature search, drafted and revised the paper. GFAJBVT selected the figures, and revised the figure captions and treatment. PJHMR revised the paper and is the guarantor. MNB, PJHMR and RME contributed to the case identification and all the authors contributed to the management of the case history.

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