CASE REPORT

An unexpected complication following uterine artery embolisation

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Accepted 23 July 2017

SUMMARY

A 35-year-old nulliparous woman underwent uterine artery embolisation (UAE) for heavy menstrual bleeding and anaemia due to fibroids, refractive to medical and surgical treatment.

Bilateral UAE was performed after cephazolin prophylaxis and analgesia. Postoperatively, pain and abdominal bloating were prominent. Symptoms were initially treated as postembolisation syndrome, and analgesia was escalated. By the third day, pain was worsening and the woman developed marked tachypnoea and tachycardia, with raised inflammatory markers and lactate. An abdominal X-ray and CT showed dilated colon. A colonoscopy demonstrated severe mucosal ulceration down to the muscular layer.

A subtotal colectomy and end ileostomy formation was performed with intraoperative findings of toxic megacolon with near perforation. The cause of the toxic megacolon, in the absence of previous bowel pathology, was attributed to pseudomembranous colitis as a consequence of single dose prophylactic antibiotic.

BACKGROUND

This case demonstrates the challenges in differentiating postembolisation syndrome (PES) from infection and ischaemia. It also highlights the multi-disciplinary management (gynaecological, surgical, radiological) of an unexpected complication.

The case shows that even a single dose of prophylactic antibiotic can cause pseudomembranous colitis and that colectomy is required in complicated cases to avoid high morbidity and mortality rates.

CASE PRESENTATION

A 35-year-old nulliparous woman presented to our Gynaecology outpatient service with heavy menstrual bleeding and was initially managed effectively with Mirena intrauterine system (IUS). Two years later, symptoms returned and ultrasound showed a 3 cm submucosal fibroid with 50% in the uterine cavity. She underwent incomplete hysteroscopic resection under general anaesthesia, and histology confirmed leiomyoma. Follow-up ultrasound demonstrated a persistent fibroid and at repeat hysteroscopy, myomectomy was unable to be performed.

She developed anaemia despite tranexamic acid, and a further Mirena IUS was expelled. Subsequently, uterine artery embolisation (UAE) was offered. Preprocedure magnetic resonance angiogram (MRA) did not show ovarian or other collateral supply to the uterus (see figure 1).

The patient was admitted electively for bilateral UAE and given paracetamol 1 g orally, omeprazole 20 mg orally, diclofenac 100 mg orally, oxycontin 10 mg orally, scopoderm patch 1.5 µg topically and 1 g cephazolin IV, 1 hour preprocedure.

The UAE technique was as follows: a 5 French Cobra catheter was placed in sequence into the left then right internal iliac arteries. A 3 French microcatheter was placed subselectively into the uterine artery and contrast digital subtraction angiography (DSA) studies performed to confirm anatomy. A type III uterine-to-ovarian artery collateral was demonstrated on the left and coil embolisation protection was performed (Hilal 1.5 cm coil) to avoid non-target embolisation of the left ovary. Bilateral selective UAE was performed with 500–700 µm Embospheres to near vascular stasis. Completion fluoroscopic cine acquisitions were performed to confirm adequate embolisation.

Postprocedure pain was treated with paracetamol, diclofenac, gabapentin and an oxycodone patient-controlled analgesia.

Day 1 postoperatively, her abdominal pain was significant and was attributed to PES. Analgesia was continued. The urinary catheter was reinserted due to urinary retention.

On day 2, the patient complained of worsening pain, abdominal bloating, nausea and difficulty breathing deeply. She had passed flatus but no bowel motion. Physiotherapy and laxatives were started. A second attempt at urinary catheter removal failed and the catheter was reinserted.

Figure 1 Preprocedure magnetic resonance angiogram.

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To cite: Peters S, Wise M, Buckley B. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2016-217238

Figure 2 Chest X-ray postprocedure.

By day 3, her symptoms persisted, the abdominal distension was worsening, she became tachypnoeic and wheezy and her oxygen saturation dropped to 80% on one occasion. Chest X-ray was normal, and treatment for asthma was started. Pain scores remained at 7/10 despite escalating analgesia.

By day 4, the patient had worsening abdominal pain and distension, more difficulty breathing and new diarrhoea. She had persistent tachycardia and tachypnoea.

INVESTIGATIONS

Inflammatory markers revealed a C reactive protein (CRP) of 200 mg/L (previously 125 mg/L) and white cell count was $3.7 \times 10^9/L$. Arterial blood gas showed a lactate of 2.3 mmol/L and base excess of -4 .

Figure 3 Abdominal X-ray postprocedure.

Figure 4 Pelvic CT postprocedure.

Investigations were performed to look for a source of infection. Chest X-ray and pelvic ultrasound were unremarkable. Urine and stool cultures were negative. CT pulmonary angiogram was done to exclude pulmonary embolism and was negative.

Abdominal and chest X-rays were done to differentiate between ileus and bowel obstruction and showed dilated colon of 6 cm (see [figures 2](#) and [3](#)). CT of the abdomen showed extensive inflammatory change involving the colon with no evidence of bowel obstruction (see [figures 4](#) and [5](#)).

Figure 5 Abdominal/pelvic CT postprocedure.

With a working diagnosis of pseudo-obstruction, a colonoscopy was performed to decompress the bowel and characterise the intestinal mucosa. Colonoscopy revealed severe ulceration almost to the muscular layer. The gastroenterologist commented on an ischaemic appearance.

DIFFERENTIAL DIAGNOSIS

Symptoms of PES can be similar to infection; however, making this differentiation is crucial as PES resolves spontaneously, while infection requires prompt treatment to avoid sepsis.

PES is a common complication but its severity cannot be predicted in individual patients.¹ Because of its features of pain, fever, nausea, leucocytosis and raised CRP, there is diagnostic overlap with other conditions such as early infection.² It may also involve non-specific malaise, arthralgia and loss of appetite which mimic 'influenza-like illness'.

The diagnostic keys to differentiating PES from infection and other diagnoses are the characteristic pain pattern and time frame. PES can continue for up to 14 days. Classically, acute pain starts within 2 hours due to global uterine ischaemia. This pain plateaus at 5–8 hours and rapidly reduces thereafter as blood flow returns to the uterus. Some 15%–20% of patients experience a pronounced PES response.

However, uncontrolled pain or a high fever are not typical of PES and should trigger investigations towards an alternate diagnosis. In this case, an unwavering pain score of 7/10 despite escalating analgesia over 3 days was the initial indicator to search for other diagnoses outside of PES. By day 4, the presence of high fevers, oxygen desaturation and ultimately direct imaging triggered a further interventional cascade.³

Pyomyoma, endometritis and uterine/ovarian infarct were considered, but ruled out with imaging. A generalised procoagulopathic state across the wider vasculature caused by the embolisation was felt to be unlikely.⁴ No identifiable mechanism for non-target organ embolisation was evident. The preprocedure MRA and procedural imaging did not demonstrate any aberrant arterial anatomy. While inferior mesenteric artery (IMA) collaterals directly supplying fibroids have been reported in up to 1.3% of patients, no direct uterine artery-to-IMA collaterals have been reported. Therefore, no vascular pathway in this case, or any cases we know of, have been shown that would allow particles to flow from the uterine artery to the mesenteric circulation.⁵

Pneumonia and pulmonary embolism as causes of her tachypnoea and shallow breathing were ruled out with imaging. In retrospect, the patient's respiratory symptoms were likely secondary to abdominal pain and distension.

TREATMENT

The patient underwent acute laparotomy, subtotal colectomy and end ileostomy formation. Intraoperative findings were of mega caecum with serosal tears to near perforation. There was no frank infarction.

The patient remained in hospital for the next 3 weeks, with a second septic event prompting further antibiotics, radiological drainage of an abdominal collection and treatment of an *Escherichia coli* urinary tract infection.

OUTCOME AND FOLLOW-UP

Histopathology of the resected colon was most in keeping with pseudomembranous colitis, but was not able to rule out ischaemia. On detailed assessment, no Embosphere embolisation particles were found. No particles were found in the vasculature of the

Patient's perspective

- Prior to fibroid embolisation, my menstrual bleeding stopped everything in my life. I was so tired I couldn't work, exercise, sleep or socialise. I tried all these other options but none of them worked. Why did I choose fibroid embolisation over hysterectomy? I had not had children yet, and at 34, still felt I was not too old to consider having children in the future. The doctors were great at helping me make that decision; I felt well informed about the risks and benefits of the procedure itself, and they explained about what to expect afterwards, and about postembolisation syndrome.
- The procedure itself went fine, but then I didn't recover as quickly as the doctors expected me to. By the time of my emergency bowel surgery, I was so unwell that I didn't care about what was going on around me, I just wanted to get better; the doctors said I needed to have the surgery so I did.
- How did the doctors communicate with me? I felt the clinical teams communicated well with me and with my family. By the time I finally left hospital, I felt that all our questions were answered to our satisfaction, and I mostly understood what had happened to me.
- My recovery was long and slow. Since leaving hospital, it took some time to readjust to the new stoma. At the beginning, I could not exercise or work. I avoided going out in public, instead preferring to visit my friends in their homes. However, I took comfort in knowing that the stoma was reversible.
- My menstrual bleeding is now much better—lighter without the large clots and feeling so exhausted all the time. I have now returned to full-time work, and feel more confident doing my usual things, like exercising and going out with friends.
- My advice to other women is that they should still consider having fibroid embolisation if that is an option for them, as I think it is generally thought to be a straightforward safe procedure that will help women who have heavy menstrual bleeding. I think what happened to me was rare, and this shouldn't put off other women from having fibroid embolisation.
- (as told to SP in May 2016)

removed colon. Swabs from the colon mucosa and a stool sample were negative for *Clostridium difficile*.

The patient had a stoma reversal performed at 6 months, and notes from follow-up appointments in the Gynaecology outpatient service for review suggest that her menstrual bleeding has significantly reduced and she is back to her usual activities.

DISCUSSION

UAE offers a safe and minimally invasive alternative to hysterectomy for heavy menstrual bleeding in appropriately selected patients. Compared with hysterectomy, patients undergoing UAE benefit from quicker recovery times and less severe post-operative pain. A Cochrane review comparing hysterectomy and UAE found no significant difference in major complication rates and both scored high satisfaction rates at 2 years.² The EMMY trial found that while UAE patients were readmitted more often following the procedure compared with hysterectomy patients, their hospital stays were shorter. Less than one in four UAE patients went on to have hysterectomy at 2 years of follow-up, and there were no significant differences in improvement of pain and bulk related complaints.⁶

Use of prophylactic antibiotics remains a consideration of risks versus benefits. Infection within 30 days of a UAE procedure occurs in less than 2% of the patients.⁷ O'Grady *et al* reported on a case series of over 1000 patients where 70% received at least one prophylactic antibiotic, most commonly a cephalosporin. Uterine infections were uncommon (2%), but the rate was higher for patients without prophylactic antibiotics (relative risk (RR) 2.38).⁸

However, this case demonstrates that prophylactic antibiotics are not benign, and that even a single dose can lead to pseudomembranous colitis. Carnigan *et al* showed that single dose prophylactic antibiotics caused an 8.4% risk of *C difficile* infection in a population of surgical patients, and that 1.5% were of a hypervirulent strain.⁹ *C difficile* infection leads to fulminant disease in 3%–5% of patients and can result in mortality in up to 80%.¹⁰ Because of this, early surgical intervention is important in fulminant colitis and toxic megacolon. The gold standard surgery is subtotal colectomy and end ileostomy formation.^{11 12}

While in this case, *C difficile* was not cultured on two retrospective samples, other bacteria can cause pseudomembranous colitis and the pseudomembranous appearance to the colon is pathognomonic.

In conclusion, prolonged pain and fever is a recognised complication following UAE. It is important to consider and exclude other, although rare, complications, before continuing to treat patients on the assumption of PES. While prophylactic antibiotics are important to prevent infection, it is necessary to be vigilant to the potential of colitis if signs and symptoms suggest.

Contributors Each author has made a substantial contribution to this study. SP conceived of and designed the study, acquired the data, performed a literature search, drafted the manuscript and interviewed the patient. MW interpreted the data and critically revised the manuscript. BB contributed relevant studies for the Discussion, interpreted the data, critically revised the manuscript and supplied the images. Each author has approved this final version of the manuscript.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Learning points

- Differentiating postembolisation syndrome (PES) from other postprocedure complications is critical given PES resolves with supportive treatment but infection and ischaemia require intervention.
- uterine artery embolisation is a straightforward procedure with comparable safety profile to hysterectomy, shorter length of stay in hospital and equivalent long-term clinical outcomes.
- A single dose of prophylactic antibiotics can cause pseudomembranous colitis.

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