CASE REPORT

Clostridium hathewayi bacteraemia and surgical site infection after uterine myomectomyAla S Dababneh,¹ Avish Nagpal,² Bharath Raj Varatharaj Palraj,¹ M Rizwan Sohail³¹Infectious Diseases, Mayo Clinic, Rochester, Minnesota, USA²Infectious Diseases, Sanford Health, Fargo, North Dakota, USA³Divisions of Infectious Diseases and Cardiovascular Diseases, Mayo Clinic, Rochester, Minnesota, USA**Correspondence to**Dr Rizwan Sohail,
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Accepted 6 February 2014

SUMMARY

A 42-year-old woman with uterine fibroids underwent myomectomy. She developed postoperative sepsis and bloodstream infection with *Clostridium hathewayi* secondary to an infected haematoma. The patient was readmitted after failure of oral antibiotic therapy and underwent intrauterine drainage followed by prolonged parenteral antibiotic therapy. The patient was followed for 1 year and did not have any relapse of infection.

BACKGROUND

Clostridium species are anaerobic, endospore-forming, rod-shaped bacteria that are widely distributed and frequently a part of normal gastrointestinal tract flora. Most of these are Gram-positive rods. However, *Clostridium hathewayi* is a newly described gut commensal that stains Gram-negative. It is a rare cause of human infection and we report the first case of surgical site infection and bacteraemia with this organism.

CASE PRESENTATION

A 42-year-old woman, with a medical history significant for sickle cell trait and uterine fibroids, underwent an extensive abdominal myomectomy and myolysis for management of infertility and iron-deficiency anaemia. The patient received cefazolin for perioperative prophylaxis. Her intraoperative course was complicated by blood loss for which she received two units of packed red blood cells. Her postoperative course was complicated by fever of 38.5°C on postoperative day (POD) 1 and 38.7°C on POD 2. A CT scan of the abdomen and pelvis was performed on POD 1, which revealed multiple small haematomas at the myomectomy site (figure 1A). The patient was initially started on empiric therapy with piperacillin/tazobactam intravenously. Her blood cultures that were obtained on second POD grew *C. hathewayi* in anaerobic culture bottles only. The organisms were resistant to penicillin on in vitro testing but susceptible to the rest of the panel that included piperacillin/tazobactam, ertapenem, clindamycin and metronidazole. The patient's fever curve improved while on piperacillin/tazobactam and she was discharged on POD 3 on oral levofloxacin. The patient continued to take levofloxacin but began to experience fevers as high as 38.5°C that were associated with back pain for which she was readmitted to the hospital on POD 8.

INVESTIGATIONS

The patient was haemodynamically stable with a temperature of 37.9°C on admission. Her

abdominal incision was clean with no erythema, purulence or drainage and she had no rebound or guarding on abdominal palpation. Abnormal laboratory findings included a leucocyte count of $17.7 \times 10^9/L$ (normal 3.5 to $10.5 \times 10^9/L$) with 89% neutrophils. Haemoglobin was 10.3 g/dL (normal 13.5 to 17.5 g/dL) and potassium 5.1 (normal 3.5 to 5.3 mmol/L).

A repeat CT scan of the abdomen and pelvis performed at the time of admission on POD 8 showed new gas formation throughout the previously seen haematoma (figure 1B,C). Blood cultures from the time of admission again grew *C. hathewayi* (anaerobic bottle only) in two sets obtained at different times. The susceptibility pattern of *C. hathewayi* (Minimum inhibitory concentration (MIC) followed by interpretation based on The Clinical and Laboratory Standards Institute (CLSI) standards) was reported as follows: penicillin 4 (resistant), piperacillin/tazobactam 16/4 (susceptible), ertapenem 8 (intermediate), clindamycin ≤ 0.5 (susceptible), metronidazole ≤ 0.5 (susceptible). The second blood culture set also grew prevotella bivia with a susceptibility pattern reported as follows: piperacillin/tazobactam $\leq 0.5/4$ (susceptible), ertapenem ≤ 0.5 (susceptible), clindamycin ≤ 0.5 (susceptible) and metronidazole 1 (susceptible).

TREATMENT

The patient was started on intravenous piperacillin/tazobactam on admission. Surgical options were discussed and offered to the patient, but she opted for conservative management to preserve future fertility options. On POD 11, an intrauterine 10 French locking loop drainage catheter was placed within the infected myometrial cavity. In the uterine fluid culture, only the anaerobic cultures grew an organism resembling *clostridium* as well as a Gram-positive and a Gram-negative bacillus. Repeat labs showed an improvement in leukocytosis and her fever defervesced prior to discharge on POD 16. The patient was continued on intravenous antibiotics for a total of 3 weeks and then received three additional weeks of oral antibiotic therapy until drain removal. A CT scan of the abdomen was repeated towards the end of therapy (figure 1D).

OUTCOME AND FOLLOW-UP

The patient responded well to intrauterine drainage procedure and antimicrobial therapy. She continued to do well during 12 months follow-up after completing therapy without relapse or recurrence of infection.

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To cite: Dababneh AS, Nagpal A, Palraj BRV, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-009322

Figure 1 Serial CT imaging: (A) postoperative day 1 (B and C) postoperative day 8 and (D) postoperative day 60.

DISCUSSION

Leiomyomas are the most common pelvic tumours in women.¹ Clinical presentation can range from an incidental finding on an imaging study to pelvic pain and menorrhagia. Rarely, it is encountered as a cause of infertility.² Myomectomy is the treatment of choice for leiomyomas in the setting of infertility, and fertility outcomes improved after myomectomy in patients with submucosal as well as intramural myomas with cavity distortion,³ as was the case in our patient. One should weigh the benefits of myomectomy with the risks of complications as with any other procedure.

Fever is a commonly encountered postoperative complication. After elective abdominal surgery, it can occur in up to 15% of the patients, but an infectious aetiology is identified in a minority of these cases.⁴ However, fevers after uterine myomectomy are reported in more than a third of the patients, but an underlying source for these fevers lasting more than 24 h is only identified in 14% of these patients.⁵ Besides fever, the other frequently encountered intraoperative complication during a uterine myomectomy procedure is major bleeding that may occur in up to one-third of the patients.⁶ Our case of *C. hathewayi* bloodstream infection secondary to an infected haematoma after uterine surgery is a unique presentation of a rare infection.

The majority of the intestinal tract flora consists of anaerobes that are classified as members of the *Bacteroides*, *Clostridium coccooides* and *Clostridium leptum* subgroup.⁷ The enteric commensals are an important part of our microbiome, and the identification of new species has only been made possible in recent years by the use of 16S rRNA. *C. hathewayi* is one of the newly described anaerobic intestinal tract commensals.⁷ *C. hathewayi* stains as a Gram-negative rod while the more commonly encountered members of the *Clostridium* species in clinical infections such as *Clostridium perfringens*, *Clostridium difficile* and *Clostridium botulinum* are Gram-positive bacilli. Infections due to *C. hathewayi* are rare with only three cases reported in the literature.^{8–10} Previously

reported cases include a case of bacteraemia with acute appendicitis,⁸ fatal septicemia⁹ and a case of cholecystitis and hepatic abscess.¹⁰ We report the first case of *C. hathewayi* as a postoperative surgical site infection. In our case, the most likely cause of the recurrent bacteraemia was the infected haematoma that was seen on an abdominal-pelvic CT scan in figure 1B,C. While our patient was haemodynamically stable at admission, aggressive surgical management was offered to the patient due to the concern that she could quickly deteriorate. However, the patient did well with appropriate intrauterine drainage and antibiotic therapy. In addition, *Prevotella bivia* was also identified from one out of four anaerobic blood culture bottles. *P. bivia* is an anaerobic Gram-negative rod which is also part of the enteric flora and has been associated with a wide variety of infections ranging from skin and soft tissues infections¹¹ to infective endocarditis.¹² The isolation of *P. bivia* from the second blood culture set suggests that the infection in this case was most likely polymicrobial with other organisms being present. However, given the heavy growth of *C. hathewayi* from all blood culture sets, this was most likely the major contributor.

Previously published reports^{8–10} and our case highlight the fact that the outcome in these cases is favourable with adequate source control and appropriate antimicrobial therapy that included anaerobic coverage.

Learning points

- ▶ *Clostridium hathewayi* is an anaerobic gut commensal that stains Gram-negative.
- ▶ We describe the first case of postoperative *C. hathewayi* sepsis and bloodstream infection.
- ▶ Empiric antibiotic therapy for infections after gynaecological surgery should include anaerobic coverage.

Contributors All the authors contributed to the conception, drafting and revision of the manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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