CASE REPORT

Paediatric splenic and rectovesical pouch abscesses caused by *Eggerthella lenta*Sonoko Kondo,¹ Hitoshi Okada,¹ Ryuichi Shimono,² Takashi Kusaka¹¹Department of Pediatrics, Kagawa University, Kagawa, Japan²Department of Pediatric Surgery, Kagawa University, Kagawa, Japan

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SUMMARY

Paediatric splenic abscesses are rare, but can be fatal. An 8-year-old boy developed recurrent fever and abdominal pain 5 months after undergoing an appendectomy. A CT scan showed splenic and rectovesical pouch abscesses. The patient was successfully treated with antibiotics, and laparoscopic drainage and debridement of pus from the rectovesical pouch abscess. *Eggerthella lenta* was cultured from the latter lesion. Early diagnosis and treatment resulted in the satisfactory resolution of the infection.

BACKGROUND

Splenic abscesses are rare in children. In fact, they are so uncommon that their paediatric incidence is difficult to estimate. Splenic abscesses usually occur because of metastatic infections; trauma; ischaemia-inducing embolic non-infectious events, or superinfections associated with red blood cell abnormalities, contiguous infections or immunodeficiency. The incidence of splenic abscesses has recently increased, and it is considered that immunodeficiency due to chronic corticosteroid use, aggressive chemotherapy treatment, or organ transplantation, has contributed to this rise. In addition, the development of CT and ultrasonography has led to more splenic abscesses being diagnosed. The mortality rate of splenic abscesses is almost 100% in untreated patients, but only 14% in patients who receive appropriate treatment.^{1–3}

Anaerobic bacteria can cause invasive infections. However, splenic infections caused by *Eggerthella lenta*, an anaerobic gram-positive bacillus found in the normal human gut flora, are rare. *E. lenta* is an anaerobic, gram-positive, non-motile, non-spore-forming bacillus that can grow as a single organism, in pairs, or in short chains. *E. lenta* was previously known as *Eubacterium lentum* and was reclassified into the genus *Eggerthella*, based on gene sequencing of 16S ribosomal RNA in 1999.

We treated a child who had splenic and rectovesical pouch abscesses caused by *E. lenta*. He did not have a history of immunodeficiency. Treatment with antibiotics, and laparoscopic drainage and debridement of the rectovesical pouch abscess was successful. The purpose of this report is to increase awareness about this rare infection.

scan, he was diagnosed with multiple splenic abscesses and was treated with antibiotics. His condition initially improved, but the fever recurred and persisted, his clinical condition deteriorated and his C reactive protein level was elevated. A second abdominal CT scan showed that the splenic abscesses had enlarged. The patient was referred to our hospital after being treated with antibiotics for 3 weeks. His medical history included an appendectomy, which had been performed at another hospital 5 months earlier, but he had never suffered any abdominal trauma. In addition, he was taking methylphenidate and paliperidone for a developmental disorder. He had not come into contact with any infected individuals or been travelling recently, but he had known exposed to cats.

INVESTIGATIONS

On admission, his temperature was 37.5°C, his heart rate was 106 bpm, his respiratory rate was 30 breaths/min and his blood pressure was 102/58 mm Hg. His abdomen was diffusely tender, although he generally felt quite well and had a good appetite. Laboratory tests showed an elevated C reactive protein level (3.92 mg/dL), a normal white cell count ($11\,770 \times 10^9/L$ and 76.4% neutrophils), and normal hepatic and renal parameters. In addition, a Mantoux test was negative. The patient's immunoglobulin titres were normal, and a test for immunodeficiency was negative. A contrast-enhanced abdominal CT scan showed mild splenomegaly, multiple splenic abscesses near the hilum of the spleen (5.0×2.2 , 2.9×2.9 and 1.0×1.2 cm) and a rectovesical pouch abscess (figure 1). No abscesses were observed in the liver or lungs, and a cranial CT scan was normal.

DIFFERENTIAL DIAGNOSIS

Anaerobic organisms and fungi are the organisms most commonly associated with splenic abscesses, but aerobic bacteria such as *Staphylococcus* and *Salmonella* spp can also cause them.^{2–4} In addition, *Mycobacterium tuberculosis*, *Klebsiella pneumoniae* and *Bartonella henselae* can cause splenic abscesses in rare cases.^{5–6} Aseptic splenic abscesses are much less common, with the majority of cases being reported in Europe.

TREATMENT

The patient was administered intravenous meropenem (115 mg/kg/day), vancomycin (40 mg/kg/day) and micafungin (3 mg/kg/day) in divided doses before his blood culture results were obtained. However, no microorganisms were detected during

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CASE PRESENTATION

An 8-year-old boy was transferred to our hospital with fever and abdominal pain. He had a 1-month history of recurrent fever and frequent abdominal pain. Based on the findings of an abdominal CT

Figure 1 An 8-year-old boy in whom multiple splenic abscesses and a rectovesical pouch abscess were detected on contrast-enhanced abdominal CT scans. The rectovesical pouch abscess is shown by black arrows. (A) On admission, multiple splenic abscesses were detected near the hilum of the spleen (size: 5.0×2.2, 2.9×2.9 and 1.0×1.2 cm) and a rectovesical pouch abscess was also observed. (B) Three days after the laparoscopic debridement and drainage of the rectovesical pouch abscess (and treatment with intravenous meropenem, vancomycin and micafungin), the splenic and rectovesical pouch abscesses were smaller. (C) At 10 days after the drainage procedure, further reductions in the sizes of the splenic and rectovesical pouch abscesses were observed.

the blood culture tests. On the day after admission, the patient underwent laparoscopic drainage and debridement of the thick pus in the rectovesical pouch abscess. A culture sample of the pus was submitted for analysis. After 2 days, we suspected that anaerobic bacteria were responsible for the patient's lesions and, 1 week later, *E. lenta* was isolated from the pus using brucella HK agar media (rabbit) in an anaerobic chamber. Phenotypic identification was performed using the RapID ANA II card. Antimicrobial susceptibility testing demonstrated that the causative *E. lenta* strain was susceptible to penicillin, piperacillin-tazobactam, cefmetazole, flomoxef, minocycline, imipenem/cilastatin, clindamycin, meropenem, levofloxacin and vancomycin, but resistant to cefotiam, ceftazidime and sulbactam/cefoperazone.

The patient's fever and C reactive protein level decreased after surgery. Abdominal ultrasonography and a contrast-enhanced CT scan showed that the cavities of the splenic and rectovesical pouch abscesses had reduced in size (figure 1).

The patient was treated with empirically, involving intravenous meropenem, vancomycin and micafungin for 7 days, which resulted in an improvement in his condition, followed by intravenous meropenem monotherapy for 7 days. Subsequently, he was administered oral amoxicillin-clavulanate and cefpodoxime proxetil, to which the *E. lenta* was sensitive, for another week. Weekly follow-up ultrasonography scans showed that the abscesses were healing. In addition, the patient's C reactive protein level returned to normal within a week and a contrast-enhanced abdominal CT scan performed on the 10th day after the drainage procedure showed that the splenic and rectovesical pouch abscesses had further reduced in size (figure 1). The patient received therapy at our hospital for 3 weeks, and was administered antibiotics for a total of 8 weeks.

OUTCOME AND FOLLOW-UP

After 8 weeks, the abscesses had markedly reduced in size, and the patient was asymptomatic. At 6 months after discharge, he remained well, and the abscesses had not relapsed.

DISCUSSION

Our patient developed rare splenic abscesses, even though he had previously been healthy and was not suffering from immunodeficiency. This case is unique because it highlights two important findings: (1) splenic abscesses can be caused by *E. lenta*, and (2) the abscesses responded to treatment with antibiotics, and laparoscopic drainage and debridement of the rectovesical pouch abscess.

Splenic abscesses are rare in children, but their frequency has been increasing because of a rise in immunodeficiency associated with chronic corticosteroid use, chemotherapy or organ transplantation. However, in the present case, detailed evaluations demonstrated that the patient was not suffering from immunodeficiency or other predisposing factors.

The symptoms of splenic abscess typically include fever, left upper quadrant or diffuse abdominal pain and shortness of breath. Our patient had a low-grade fever and diffuse abdominal pain, but he also had a good appetite, and was able to walk. In addition, as the patient had a developmental disorder, the precise details of his complaints were unclear, which made obtaining a definitive diagnosis difficult. A physical examination detected diffuse abdominal distention and tenderness, and a contrast-enhanced abdominal CT scan showed a rectovesical pouch abscess. Splenic abscesses should be afforded a high clinical index of suspicion in order to avoid a delayed diagnosis, despite their common non-specific symptoms of a fever of uncertain origin and abdominal pain, because untreated splenic abscesses are fatal.

In the present study, the splenic abscesses were probably caused by *E. lenta*, which was isolated from cultures collected from the rectovesical pouch abscess. *E. lenta* is a common gastrointestinal commensal organism and has been isolated from various clinical sources including abscesses, blood, genitourinary tract infections, obstetric infections, wound infections, liver abscesses, peritonitis, spondylodiscitis and intra-abdominal infections such as appendicitis. Furthermore, in a previous study, *E. lenta* was isolated from 18 of 41 paediatric cases (44%) of appendicitis.⁷ In our patient, a blood culture test did

not detect microbial growth, possibly because he was given antibiotic therapy before being referred to our hospital. Although the mortality rate associated with *E. lenta* is high (20–40%), our patient survived.

Our patient responded to treatment with antibiotic therapy, and laparoscopic drainage and debridement of the rectovesical pouch abscess. There are no specific treatment guidelines for paediatric splenic abscesses. In previous studies, the most common treatments for splenic abscesses included splenectomy and broad-spectrum antibiotics, and splenectomy is still favoured as a definitive treatment by some authors. Another study suggested that splenectomy should be used in cases involving multiple abscesses.⁸ In addition, splenectomy can prevent spontaneous rupturing of the abscess and peritonitis, which is often fatal.

Alternatively, splenic abscesses can be treated with aspiration, drainage and antibiotics. Splenic preservation is important in children, as it prevents severe postsplenectomy infection syndrome. A previous study described a paediatric case series in which 88% children with abscesses of >3 cm in diameter were treated with ultrasonography-guided or CT-guided percutaneous aspiration and intravenous antibiotics, and only 12% patients underwent splenectomy.⁹ In another study, it was recommended that antibiotic therapy and percutaneous aspiration or drainage should be the initial therapy for solitary and multiple paediatric splenic abscesses.¹⁰ In a series of adult patients, percutaneous aspiration was used to treat small abscesses (<5 cm), whereas percutaneous catheter drainage was employed for abscesses of >5 cm and bilocular abscesses. Interestingly, salvage splenectomy after unsuccessful percutaneous drainage resulted in a similar mortality rate (14.3%) to that seen when splenectomy was performed as an initial treatment (16.9%).⁴ In the present patient, percutaneous aspiration of the splenic abscesses was considered, but antibiotic therapy and laparoscopic drainage and debridement of the rectovesical pouch abscess were performed because we were worried about the risk of massive haemorrhaging because the splenic abscesses were not near the surface of the spleen.

Our patient had been administered meropenem at the previous hospital, so we continued to give it to him after his admission. We kept using meropenem as an empiric therapy after the laparoscopic drainage and debridement of the rectovesical pouch abscess because the causative bacterium was unknown. After 1 week, *E. lenta*, which is susceptible to antibiotics with much smaller spectra than meropenem,¹¹ was isolated from the cultures of the pus collected from the rectovesical pouch abscess. However, we kept administering meropenem because we did not know whether the splenic abscesses had been caused by *E. lenta* alone. As (1) anaerobic bacteria was cultivated from the patient's culture samples, (2) it was difficult to identify the specific bacteria that had caused the patient's abscesses, and (3) the patient had a history of appendicitis, we decided to treat him with wide-spectrum antibiotics.

The patient was subsequently given oral amoxicillin-clavulanate and cefpodoxime proxetil. We added cefpodoxime proxetil after a discussion with an infection specialist because the gram-negative bacilli found in our region, particularly *Escherichia coli*, are sometimes able to tolerate amoxicillin-clavulanate.

Our patient presented with splenic abscesses 5 months after being treated for appendicitis at a previous hospital, but his

appendix was not perforated and no pathological evaluation was performed. The initial source of the infection that caused the rectovesical pouch abscess is unknown, but it is possible that the appendectomy performed 5 months earlier had caused transient bacteraemia, leading to a splenic infection. The absence of abscesses at other locations such as the liver suggests that it is unlikely that the bacteria infected the spleen via lymphogenous spread from the rectovesical pouch abscess.

In conclusion, splenic abscesses can be caused by *E. lenta*. Our patient responded to treatment with antibiotic therapy, and laparoscopic drainage and debridement of the rectovesical pouch abscess.

Some splenic abscesses might remain undetected and, hence, more paediatric splenic abscesses may occur than currently thought. Treatment should be initiated promptly in paediatric cases of suspected splenic abscess, and the possibility of additional abscesses should be considered in children who do not recover after antibiotic therapy for splenic abscesses.

Learning points

- ▶ Splenic abscesses may be caused by *Eggerthella lenta*.
- ▶ Our patient responded to treatment with antibiotic therapy, and laparoscopic drainage and debridement of an associated rectovesical pouch abscess.
- ▶ Some splenic abscesses may not be detected, and more cases may occur in children.
- ▶ Additional abscesses may be suspected in children who do not recover after antibiotic therapy for splenic abscesses, and a high index of suspicion may lead to expeditious treatment.

Competing interests None declared.

Patient consent Obtained.

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