CASE REPORT

Bacteroides fragilis endocarditis in a patient with Crohn's diseaseShailendra Singh,¹ Vishal Goyal,¹ Parikshit Padhi,¹ Elie Aoun²¹Division of Internal Medicine, West Penn Allegheny Health System, Pittsburgh, Pennsylvania, USA²Division of Gastroenterology, West Penn Allegheny Health system, Pittsburgh, Pennsylvania, USA**Correspondence to**
Dr Shailendra Singh,
ssingh1@wpahs.org**SUMMARY**

Bacteroides fragilis is an uncommon cause of endocarditis and its occurrence in Crohn's disease has never been reported. We present a case of a *B fragilis* bacteraemia and endocarditis caused by seeding of left ventricular thrombus formed secondary to severe left ventricular dysfunction. A 44-years-old man with a history of persistent bloody diarrhoea for many years presented with 1-month duration of generalised weakness, malaise, fever and chills. The patient also developed right foot pain associated with cyanotic discoloration. On examination, he was cachectic and his right foot was pulseless, cold and blue in colour. Echocardiogram showed three intraventricular echo densities. Colonoscopy revealed multiple fistulous openings and blood cultures grew *B fragilis*. He was treated with intravenous metronidazole and underwent a proctocolectomy with ileostomy. Biopsy of the specimen confirmed Crohn's disease. This case emphasises the importance of identifying anaerobic bacteria as an uncommon but important cause of endocarditis and recognise likely source.

BACKGROUND

Anaerobic bacteria are an uncommon but important cause of infective endocarditis. Most cases of anaerobic endocarditis are caused by anaerobic cocci, *Propionibacterium acnes* and *Bacteroides fragilis* group. Gastrointestinal tract is the most common source for *B fragilis* endocarditis¹ but its occurrence in a patient with Crohn's disease has never been reported. *B fragilis* in our patient likely seeded the left ventricular thrombus formed secondary to severe left ventricular dysfunction. This is a rare finding and usually involvement of heart valves (native or prosthetic valves) has been reported.

CASE PRESENTATION

A 44-year-old man presented to an outside hospital with 1-month duration of generalised weakness, malaise, fever and chills with exacerbation of symptoms in last 3 days. At the outside hospital, patient developed right foot pain associated with cyanotic discoloration. Patient was transferred to our hospital after his foot became cyanotic. He had a history of persistent bloody diarrhoea for many years. He had not seen a doctor for last 5 years and was not on any medications. He was married, lived at home, was unemployed and smoked a pack of cigarettes for last 25 years.

Upon hospital admission his physical examination showed that he was afebrile, blood pressure of 97/54 mm Hg, pulse rate of 104/min. The patient was

extremely dry and cachectic on general examination. He had normal heart sounds with no murmurs. Mild tenderness to palpation of the lower abdomen was appreciated. The patient had bluish discoloration of dorsal and lateral aspect of the right foot that was extremely tender to touch. Both lower extremities were cold to touch, pulses were not palpable but present on Doppler examination.

INVESTIGATIONS

Laboratory studies showed white blood cell count of 20 300/μl with a differential of 81% neutrophils and 17% bands. His platelet count, aspartate and alanine aminotransferase were within normal limits. Blood urea nitrogen was 17 mg/dl and creatine was 1.67 mg/dl. His coagulation studies showed activated partial thrombin time of 41 s and prothrombin time of 19.6 s. Arterial blood gas showed pH 7.41, PaCO₂ 25, PaO₂ 108, HCO₃ 15.6.

Electrocardiogram (EKG) revealed atrial fibrillation with rapid ventricular rate. Transthoracic echocardiogram showed mild dilation of left ventricle and systolic dysfunction with an ejection fraction of 15%. There were three moderate sized echo densities in left ventricle, two of which were attached to interventricular septum and one was attached to distal lateral wall of apex. There were no valvular lesions (figure 1). CT scan of the abdomen and pelvis showed multiple bowel fistulae (figure 2). Colonoscopy was done which confirmed the presence of multiple fistulous openings (figure 3). Two sets of blood cultures grew *B fragilis*.

Figure 1 Transthoracic echocardiogram. Three moderate sized echodensities in left ventricle, two of which were attached to interventricular septum and one was attached to distal lateral wall of apex.

To cite: Singh S, Goyal V, Padhi P, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-009248

Figure 2 CT scan of the abdomen and pelvis showing multiple bowel fistulae.

DIFFERENTIAL DIAGNOSIS

Subacute bacterial endocarditis was the most important diagnosis to consider when this patient presented to our hospital. Identification of organism, which is causing these constellations of symptoms, was more important. It was crucial to consider the history of persistent bloody diarrhoea. At the outside hospital, he was started on intravenous vancomycin and ceftriaxone to cover common organisms such as *Staphylococcus aureus*, *Streptococcus* species (viridans group, *Streptococcus bovis* and others), *Enterococcus* species and HACEK (*Haemophilus* species (*Haemophilus parainfluenzae*, *Haemophilus aphrophilus*, *Haemophilus paraphrophilus*), *Actinobacillus actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, and *Kingella* species) organisms. After initial resuscitation, an emergent echocardiogram was performed, which showed three intraventricular vegetations with no valvular lesions. Since patient was cachectic and malnourished, we considered possibility of immunosuppression. Complaints pertaining to gastrointestinal tract prompted us to add coverage against Gram-negative and anaerobic organisms. Large vegetations with embolic phenomenon in patient with chronic diarrhoea and cachexia made us extend antibiotic coverage to include micafungin to cover *Candida* species and metronidazole to cover anaerobic bacteria.

TREATMENT

Once blood cultures started growing Gram-negative bacilli in anaerobic bottles, we de-escalated antibiotics to cover these

Figure 3 Colonoscopy showing multiple fistulous openings into the descending colon.

organisms. Now we had to investigate the source of these bacteria. Initially, a CT scan of abdomen and pelvis was done which showed multiple fistulae. Colonoscopy was performed. Gastroenterologist reported that as soon as they entered descending colon multiple fistulous openings were encountered. They could no longer identify true lumen of colon and had to withdraw the scope. Colorectal surgeons were consulted. Decision was made to perform proctocolectomy once he was medically stable. Blood cultures eventually grew *B fragilis* and it was susceptible to metronidazole. He was also placed on anticoagulation with intravenous heparin to prevent more embolic episodes. He underwent surgery in next few days without complications and was started on enteral nutrition. He also underwent debridement of the gangrene developed in his right foot secondary to embolisation of the intraventricular vegetation.

OUTCOME AND FOLLOW-UP

His symptoms of generalised weakness, malaise, fever and chills improved after treated with 4 weeks of intravenous metronidazole after negative blood cultures. He was discharged home in stable condition and advised to follow-up as outpatient.

DISCUSSION

B fragilis is an anaerobic Gram-negative rod and constitutes 1–2% of the normal colonic bacterial microflora in humans. However, these organisms can also be responsible for infections of endogenous origin including dental abscess, peritonitis, cholecystitis, appendicitis, aortoduodenal fistula, obstetric-gynaecologic, diabetic foot and skin structure infections. Because of their fastidious nature, they are difficult to isolate from infectious sites and are often overlooked. Anaerobic bacteria are an uncommon but important cause of infective endocarditis (IE). Most cases are caused by the anaerobic and microaerophilic streptococci *Propionibacterium acnes*, *B fragilis* and *Clostridium* species.

On reviewing of existing literature, we found that *B Fragilis* endocarditis is rare and its association with Crohn's disease has not been reported. Felner and Dowell² reported 11 cases of endocarditis caused by *B fragilis* and Rodrigues *et al*¹ published a review of eight cases. These studies suggest that the gastrointestinal tract is the major source of bacteraemia and the endocarditis in these patients. Mean age of these patients is usually more than 50 and the majority of them have pre-existing heart disease. Rodrigues *et al*¹ found lesser thromboembolic complications than Felner and Dowell² (33% vs 55%).² A literature review done by Brook *et al*³ showed an increased incidence of thromboembolic events in patients with endocarditis due to anaerobic bacteria. In particular, cases of endocarditis from *B fragilis* were associated with higher thromboembolic phenomena.^{3–4} The higher rate of embolisation could be secondary to heparinase production and the fact that anaerobic bacteria are notorious for causing larger vegetations.⁵ Other important complications secondary to *B fragilis* endocarditis are multiple mycotic aneurysms, valvular destruction, aortic-ring abscess, aortitis, cardiogenic shock, dysrhythmias and septic shock.⁶

Here, we describe a rare case of a patient who had long-standing Crohn's disease that led to *B fragilis* bacteraemia. *B fragilis* then seeded left ventricular thrombus formed secondary to severe left ventricular dysfunction. We think that *B fragilis* not only seeded these thrombi but facilitated development of thrombus secondary to production of heparinase. This enzyme can accelerate the intravascular clotting and may contribute with thrombus formation.⁵ Heparinase was also responsible for embolisation of these vegetations leading to gangrene of the right foot.

The treatment of IE mandates the use of bactericidal antimicrobials. A report of a patient with infective endocarditis due to *B fragilis* had an isolate resistant to metronidazole.⁷ It is important, therefore, to perform susceptibility testing to isolates recovered from patients with IE. Metronidazole, carbapenems, combinations of β -lactam with a β -lactamase inhibitor (clavulanate, sulbactam and tazobactam) and some quinolones (moxifloxacin) have a good activity against *B fragilis* and can be used in the treatment of endocarditis caused by these bacteria.

Learning points

- ▶ Identifying anaerobic bacteria as an uncommon but important cause of endocarditis and recognise likely source.
- ▶ Recognise management strategies, predisposing conditions and complications that evolve from *Bacteroides fragilis* infections particularly in endocarditis.
- ▶ Broaden antibiotic coverage to cover anaerobic bacteria in patients with endocarditis and gastrointestinal tract as a source of bacteraemia.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Rodrigues C, Siciliano RF, Ziegler R, *et al.* *Bacteroides fragilis* endocarditis: a case report and review of literature. *Braz J Infect Dis* 2012;16:100–4.
- 2 Felner JM, Dowell VR Jr. Anaerobic bacterial endocarditis. *N Engl J Med* 1970;283:1188–92.
- 3 Brook I. Endocarditis due to anaerobic bacteria. *Cardiology* 2002;98:1–5.
- 4 Brook I. Infective endocarditis caused by anaerobic bacteria. *Arch Cardiovasc Dis* 2008;101:665–76.
- 5 Gesner BM, Jenkin CR. Production of heparinase by bacteroides. *J Bacteriol* 1965;81:595–604.
- 6 Bacchion F, Cukon S, Rizzoli G, *et al.* Infective endocarditis in bicuspid aortic valve: atrioventricular block as sign of perivalvular abscess. *Cardiovasc Pathol* 2007;16:252–5.
- 7 Chow A, Patten V, Guze L. Susceptibility of anaerobic bacteria to metronidazole. *J Infect Dis* 1975;131:182–5.

Copyright 2013 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