



Case Report

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First Case of Splenic Abscess *Parvimonasmicra* and Bacteremia *Porphyromonagingivalis* Coinfection

Angela Ho^{1,2}, Bharati Duvapu^{1,2}, Ngoc Duong^{1,2}, Sandhyarani Samantara²

¹Touro College of Osteopathic Medicine, Middletown, NY, United States

²Putnam Hospital Center, Putnam, NY, United States

Abstract

Porphyromonagingivalis and *Parvimonasmicra* are anaerobic microorganisms that are usually found in the normal oral microbiome. Bacteremias are rarely caused by *P. gingivalis* and there have been no reports of splenic abscess caused by *P. micra*. Treatments for *P. micra* include vancomycin, ceftriaxone, and metronidazole, while treatments for *P. gingivalis* include tetracyclines, macrolides, beta-lactam penicillins, and clindamycin. We report a case of a 76-year-old caucasian male with bacteremia caused by *P. gingivalis* and splenic abscess caused by *P. micra*. This patient presented with nonspecific symptoms: fever, chills, body aches, and shortness of breath. He was treated with IV piperacillin-tazobactam that was later switched to ampicillin sodium/sulbactam sodium during his hospital course and underwent a splenectomy. He ultimately expired due to acute respiratory failure and cardiac arrest, secondary to post-surgical complications. To our knowledge, this is the first case of *P. micra* and *P. gingivalis* coinfection.

Keywords: *Porphyromonagingivalis*, *Parvimonasmicra*, Splenic abscess, Bacteremia

Introduction

Porphyromonagingivalis is a gram-negative anaerobe that accounts for 10-15% of the periodontal diseases in adults [1,2]. There has been one case of bacteremia due to *P. gingivalis* reported in the literature [3]. A patient with bacteremia will become symptomatic when immune response mechanisms fail or are overwhelmed which can lead to many clinical spectrum [4]. More specifically, bacteremic elderly patients typically present with symptoms including but not limited to fever, chills, increased erythrocyte sedimentation rate, recently altered mental status, and leukopenia [5]. *Staphylococcus aureus* is the most common gram-positive associated bacteremia, while *Escherichia coli* is the most common gram-negative organism [4]. Broad-spectrum antibiotics including cephalosporin or beta-lactamase inhibitors are used to treat bacteremia. In addition, vancomycin can be added to cover resistant gram-positive organisms [4].

Parvimonasmicra is a gram-positive anaerobic cocci that is typically found in the oral flora and is also often associated with

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***Corresponding author:** Ngoc Duong, Touro University, Department of Osteopathic Medicine, Middletown, NY, United States, E-mail: ngoocduong@gmail.com

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periodontal diseases [6]. Risk factors for *P. micra* infection include various dental procedures and systemic disease (diabetes mellitus, corticosteroids treatment) [6]. Coboet al. [7] identified 31 cases of *P. micra* infection with the first documented case in 1986. The spine has been the reported preferred location of infection; however *P. micra* has also been associated with heart valve infections and perirenal, hepatic, and intracranial abscesses [8-11]. The incidence of splenic abscesses is very low [12]. Symptoms of infection by *P. micra* are non-specific (fever, chills) and the choice of treatment has not yet been established [11].

We report a case of a 76-year-old man with splenic abscess caused by *Parvimonas micra* and bacteremia due to *P. gingivalis* treated successfully with splenectomy, vancomycin, piperacillin-tazobactam and ampicillin sodium/sulbactam sodium.

Case presentation A 76 year-old-man with a past medical history of tobacco abuse, hyperlipidemia, stage 3 chronic kidney disease and hypertension presented to the Emergency Department (ED) with shortness of breath, chills, fever, and body aches. The patient reported a Tmax of 102°F recorded at home. He also has a history of multiple dental cleanings, with a cleaning every three months, and the most recent cleaning a month ago. The patient was febrile (100.3°F), HR 85, RR 21, BP 128/70, O2 sat 96%. Dental evaluation did not identify any periodontal source of infection. The differential diagnosis at this time included Covid-19, bronchitis, febrile illness, viral infection. Covid-19 test was negative, his x-ray results showed no acute pulmonary process, and EKG showed normal sinus rhythm (NSR); so, the patient was discharged home.

He returned to the hospital later that night with an additional complaint of sharp, constant abdominal pain localized to the left upper quadrant. On the physical exam, he was guarded, but did not have any rebound tenderness. He also presented with the same chills and fever as he did in the morning. The patient denied any prior history of abdominal surgeries. Lab values were significant for elevated troponin at 121, with an NSR EKG reading, WBC 11.4, creatinine 2.07, BUN 114, and lactate 2.4. Code sepsis was called, and blood cultures were collected. The patient became hypoxic, and was put on 2L oxygen nasal cannula (NC). Throughout the stay, the patient's oxygen requirements stayed around 2-3 liters.

Upon admission to the hospital, the patient received IV fluid boluses and antibiotics, including vancomycin 1000mg, piperacillin-tazobactam 3.375gm, and ampicillin sodium/sulbactam sodium 1.5gm. The patient was stabilized. Patient was also receiving labetalol 200mg, nifedipine 30mg, and atorvastatin 40mg for hypertension. His CT showed a small amount of free fluid in the abdomen and an intrasplenic lesion. The patient's troponin and lactate levels were progressively

trending downwards. His abdominal pain began to improve. However, the patient's acute kidney injury still remained, possibly due to a multifactorial use including but not limited to the use of antibiotics including vancomycin, contrast imaging studies, sepsis, and fluid overload. Echocardiogram done did not show any major cause for the volume overload. Transthoracic echocardiogram was negative for endocarditis.

The splenic lesion was examined *via* a fluid collection and subsequently drained percutaneously. This aspiration showed bloody purulent fluid and blood cultures were positive for growth of *Porphyromonas gingivalis* and *Parvimonas micra* on hospital day 9 and 10, respectively. Once the patient was hemodynamically stable, he underwent a splenectomy. After his splenectomy, vancomycin was discontinued on hospital day 10 and treatment with piperacillin-tazobactam (Zosyn) was switched to ampicillin sodium/sulbactam sodium (Unasyn) on hospital day 15. On day 16, the patient developed emesis and subsequently acute respiratory distress syndrome (ARDS). He went into cardiac arrest, was successfully resuscitated and intubated. EKG showed NSR, chest x-ray was significant for bibasilar atelectasis, and his renal function was worsening. The patient later had another cardiac arrest in the afternoon, from which he did not survive.

Discussion

To our knowledge, this is the first case of splenic abscess formation by *P. micra*. It is well known that the oral cavity is composed of many microbiological organisms. According to Watanabe *et al.* [9], *P. micra* can be found in periodontal disease, infective endocarditis, and intra abdominal abscess. 75% of patients with *P. micra* infection presented with several risk factors including several dental procedures as seen in our case who received multiple dental cleanings [6]. Despite the fact that dental evaluation did not show periodontal disease, the most likely source of the infection remains translocation of microorganism from oral cavity to GI tract. Further, infections caused by *P. micra* are rare and even less likely to form splenic abscess. It may be difficult to initially diagnose due to its non-specific manifestations of symptoms. The diagnosis of splenic abscess caused by *P. micra* should be suspected in patients with frequent dental procedures as in this case.

Treatment of *P. micra* has not been established; however, drainage of abscess and treatment with vancomycin, ceftriaxone, and metronidazole have been effective in treating this microorganism [10]. A previous case study showed that most *P. micra* infections are susceptible to penicillin, clindamycin, imipenem, and metronidazole, although metronidazole resistant strains exist [13]. Our patient was treated with IV vancomycin which was discontinued on hospital day 10 post percutaneous splenic abscess aspiration and drainage. There is no gold standard for treating splenic abscesses [14]. Although

less invasive procedures can be successful in treating splenic abscess, there are some cases where splenectomy is the best treatment option. There are reports of people with splenic abscesses who did not get a splenectomy and eventually expired due to systemic complications [15]. Conservative treatment with *P. micra* can be risky as there is no set treatment for this microorganism. Thus, our patient underwent a splenectomy given the risk of conservative treatment failure. Splenic abscess has a high mortality rate therefore laparoscopic splenectomy is a promising alternative, with quicker recovery and shorter hospital stays [16].

P. gingivalis is an uncommon rare cause of bacteremia that has been associated with the development of septicemia causing hypotension, altered mental status, and hypovolemia from leaking capillaries [4]. Other organs can be affected such as the lungs and kidneys leading to ARDS and acute kidney injury as in this case [4]. Upon return to the ED, our patient developed hypoxic ARDS and acute kidney failure and required oxygen supplementation with 2L oxygen nasal cannula and IV fluid boluses. Any delay in administration of antibiotics can lead to increased morbidity and mortality; thus bacteremia requires urgent treatment of appropriate antibiotics [4].

Treatment options for *P. gingivalis* infections can include tetracyclines, macrolides, clindamycin, beta lactam antibiotics, and metronidazole [15]. However, later studies have shown *P. gingivalis* recently has been highly resistant to clindamycin, metronidazole, and amoxicillin [16]. Our patient was initially being treated with IV Zosyn and switched to Unasyn on hospital day 15 after splenectomy for a more targeted treatment. *P. gingivalis* is shown to be 100% sensitive to moxifloxacin and amoxicillin/clavulanic acid but moderate susceptibilities for other antibiotics [17]. Therefore, Unasyn may be effective in treating this pathogen.

During the patient's postoperative recovery, he developed acute respiratory failure. The etiology of his respiratory decompensation is not entirely clear, but may be due to aspiration pneumonia given multiple episodes of emesis the night prior to development of ARDS. Aspiration of gastric contents is the leading risk for ARDS [18]. He had two consecutive cardiac arrest events due to ongoing hypoxemia and metabolic acidosis. This pathogenic process was further complicated by his ongoing bacteremia infection and acute kidney injury that progressed to acute kidney necrosis, further worsening his condition. Ultimately, the combination of multiorgan decompensation led to his death.

Conclusion

In summary, *P. micra* and *P. gingivalis* are rare causes of splenic abscess and bacteremia, respectively. It is also rare for these bacteria to become bloodborne. While most patients with systemic *P. micra* or *P. gingivalis* bacteria usually present

with infective endocarditis that was not the case for our patient. Unasyn may be effective in treating this coinfection however, it is important to be cautious regarding postoperative complications following splenectomy.

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