CASE REPORT

Peptoniphilus asaccharolyticus-associated septic arthritis and osteomyelitis in a woman with osteoarthritis and diabetes mellitus

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SUMMARY

Peptoniphilus asaccharolyticus, a Gram-positive obligatory anaerobic coccus, is a commensal of the human vagina and gut and can be an opportunistic pathogen in immunocompromised patients. It is usually part of polymicrobial anaerobic infections such as skin and soft tissue infections in diabetics, bone and joint infections and surgical site infections; however, infections caused by *P. asaccharolyticus* in pure culture have been reported as well. Herein, we describe a case of septic arthritis and osteomyelitis caused by *P. asaccharolyticus* in a woman with osteoarthritis and diabetes mellitus.

BACKGROUND

Bone and joint infections caused by anaerobic bacteria are rare. Gram-positive anaerobic cocci (GPAC) are often detected in polymicrobial infections and not fully identified in routine microbiology laboratories owing to difficult culture and identification techniques involved in isolation of anaerobic bacteria. *Peptoniphilus asaccharolyticus* is a rare but important Gram-positive anaerobe, which has the potential of causing clinically significant bone and joint infections. Our case aims to spread awareness among readers regarding the pathogenic potential of this opportunistic bacterium.

CASE PRESENTATION

A 55-year-old Caucasian woman presented with a 6-day history of low back pain, left knee pain, left hip pain and inability to walk. She has had left hip pain for several years due to osteoarthritis. She underwent several left hip steroid injections with some short-term relief. Her pain was sharp, 6/10 in severity and she had a fever up to 101.2 degrees Fahrenheit. Pain was worse on the lateral aspect of left hip and in groin. She denied any bladder or bowel symptoms. A month prior to admission she was admitted for pyelonephritis and treated with ceftriaxone and ciprofloxacin for 10 days.

Her past history was significant for diabetes, hypertension, hypothyroidism, asthma, dyslipidaemia, depression, obesity and degenerative joint disease of the hip. She has had prior cholecystectomy and bilateral shoulder arthroplasties. She was a non-alcoholic and a non-smoker.

On examination, she weighed 220 lbs (99.7 kg) and had a body mass index of 43 kg/m². Her left leg was flexed; it was painful for her to straighten it

or bear weight on it. Left lateral hip and left groin were tender as well. There was significant pain on testing range of motion of left hip (especially with rotation). Straight leg raise was positive on the left side.

INVESTIGATIONS

On laboratory testing, she was found to have an elevated white blood cell count of 17 300 (normal: 4500–11 000/μL), haemoglobin 8.5 (normal: 12–15.5 mg/dL) and platelets 725 000 (normal: 150 000–450 000/μL). Erythrocyte sedimentation rate was 119 mm/h (normal: 0–29) and C-reactive protein was 25 mg/dL (normal: <3). Her blood glucose was found to be low which was corrected. Blood and urine cultures were drawn. The radiograph of the hip showed flattening of the left femoral head (figure 1). She was given intravenous fluids, analgesics and intravenous ceftriaxone in the emergency room. Later, the same night vancomycin was added by the admitting physician. However, the following morning antibiotics were discontinued by infectious disease physician to obtain aspirate from hip joint. Infectious disease staff ordered hip MRI. MRI of left hip confirmed findings of flattening of femoral head; however, it also showed fragmentation of femoral head with moderate-sized hip joint effusion, moderate amount of surrounding soft tissue oedema and fluid collection along the superficial lateral margin of iliopsoas tendon (figure 2). There was extensive post-gadolinium enhancement of the acetabulum, left femoral head and neck and the surrounding soft tissues showing changes suggestive of septic arthritis.

DIFFERENTIAL DIAGNOSIS

Differential diagnosis for septic arthritis may include primary arthritis due to connective tissue disorders/vasculitis, reactive arthritis and other common causes of septic arthritis such as streptococcus, staphylococcus, pseudomonas and other Gram-positive and Gram-negative bacteria. Given inflammation along the iliopsoas tendon, one should keep deep-seated ‘cold abscesses’ caused by mycobacterium tuberculosis in differential.

TREATMENT

Despite ultrasound-guided attempt, aspiration of hip joint was unsuccessful. Intravenous ceftriaxone was resumed. Orthopaedic services were

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Figure 1 Left hip radiograph showing flattening of the left femoral head.

consulted and patient underwent left hip surgery which included temporary total hip arthroplasty with placement of antibiotic spacer containing tobramycin and vancomycin, incision and drainage of septic hip joint and debridement of the left psoas tendon. Hip joint aspirate and tissue grew 2+ *P. asaccharolyticus* 9 days later in three out of four samples. Bacterium was sensitive to vancomycin. Fungal culture of left hip tissue was negative. Left femoral head pathology showed evidence of acute osteomyelitis without any evidence of malignancy. The patient was discharged to a nursing home on 6 weeks of intravenous vancomycin for the treatment of hip

Figure 2 MRI of left hip sagittal view showing flattening and fragmentation of the left femoral head with surrounding joint effusion.

osteomyelitis. She tolerated the entire course of antibiotics without any complications.

OUTCOME AND FOLLOW-UP

Six weeks later, she had a mechanical fall at home and presented with a periprosthetic mid shaft femur fracture of the left hip. She underwent open reduction and internal fixation of her left hip and was discharged to home.

DISCUSSION

GPAC are a diverse group of bacteria that colonise the surfaces of the human mouth, upper respiratory tract, gastrointestinal tract and genitourinary tract. Protective barriers typically prevent these commensals from causing infection or disease but in certain circumstances and populations, GPAC may act as opportunistic pathogens and may cause clinically significant infections. Conditions that increase the likelihood of GPAC becoming pathogenic include elderly state, immunocompromised individuals, introduction of prosthetic joints and other foreign material (eg, catheters, and so on). GPAC account for about 25%–30% of anaerobic infections occurring in the human body.¹ These are commonly isolated from abscesses and infections of skin, soft tissue, mouth, bone, joint and female genital tract.¹

P. asaccharolyticus, a GPAC, is a member of the Peptostreptococcaceae family, in the phylum Firmicutes.² Peptoniphilus species were originally classified in the genus Peptococcus, reclassified to the genus Peptostreptococcus and then again reclassified to the genus Peptoniphilus in 2001.³ *P. asaccharolyticus* produces butyric acid as the major metabolic end product and uses peptone and amino acids as its major energy sources, hence the name Peptoniphilus (peptone + philic). It does not use carbohydrates to produce acid. Most strains of *P. asaccharolyticus* are negative for urease, coagulase and alkaline phosphatase although some produce indole.³ The cells in this genus range in size from 0.5 to 1.5 µm in diameter and form circular, opaque colonies ranging from 1 to 2 mm in size.

P. asaccharolyticus has been associated with bacterial vaginosis and has been isolated from vaginal discharges, ovarian abscesses, peritoneal abscesses, spinal fluid, bone and joint infections, diabetic skin and soft tissue infections, pleural empyema and surgical site infections.^{1–5} Although rare, reports on blood stream infections caused by Peptoniphilus were found to be associated with underlying bowel or bladder disease (Crohns, bladder, colon and prostate cancer), pneumonia, chronic obstructive pulmonary disease exacerbations, soft tissue infection in immunocompromised patients and septic abortions.⁶

Individual GPAC have not been extensively studied due to the polymicrobial nature of these infections as well as difficulty culturing these bacteria. Isolation of anaerobes requires prolonged cultivation times causing a delay in receiving results, at which point treatment of the infection has already been initiated. However, they are increasingly being reported and accurately identified with the widespread use of non-biochemical methods including 16S rRNA sequencing techniques and matrix-assisted laser desorption ionisation time-of-flight mass spectrometry.⁷ Gene sequencing has enabled the description of numerous bacterial species of clinical importance including seven new species of Peptoniphilus since 2012.⁶

P. asaccharolyticus is usually susceptible to penicillin, penicillin–tazobactam, amoxicillin–clavulanate, vancomycin, daptomycin, tigecycline, dalbavancin, carbapenems, ceftobiprole, linezolid and metronidazole however treatment choices should be made based on local antibiotic susceptibility results.^{8–10}

Antibiotic susceptibilities against numerous strains of *P. asaccharolyticus* in diabetic foot infections were studied and showed that certain strains were resistant to levofloxacin and ceftazidime. Resistance to clindamycin in certain strains of *P. asaccharolyticus* has been reported as well.¹⁰ When treating anaerobic infections, in most cases, antibiotics may be the only necessary therapy required but surgical excision/revision may be a useful adjunct in case of bone and joint infections.

Septic arthritis is most commonly seen in the knee joint followed by the hip and shoulder joint. The risk of septic arthritis increases with trauma. The lower extremities are more commonly involved with trauma which thereby increases the incidence of septic arthritis in the knee and hips. This patient had a history of osteoarthritis of the hip as well as diabetes mellitus which may have increased her chances of acquiring an opportunistic pathogenic infection. Patients with septic arthritis clinically present with joint pain, a limp, or inability to use the joint. Swelling and fever, as seen in this patient, are other symptoms that are commonly present. Septic arthritis is an orthopaedic emergency due to the rapid onset and irreversibility of joint destruction. Infection can spread to the bone causing osteomyelitis. The most frequently isolated organisms from joint aspirates include

Staphylococcus aureus, *Streptococcus*, *Enterococcus* followed by *Escherichia coli* and *Haemophilus influenzae*. *P. asaccharolyticus* is a rare cause of septic arthritis. Early identification by joint aspiration analysis and prompt treatment with antibiotics and surgical drainage are essential for a successful outcome.⁷

Contributors RV and JJW saw the patient and were involved in clinical decision-making. RV, SM and JJW contributed to manuscript, reviewed and approved the final draft.

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Learning points

- ▶ *Peptoniphilus asaccharolyticus* is a rare but important cause of septic arthritis and is commonly part of polymicrobial infections.
- ▶ *P. asaccharolyticus* may be a primary pathogen isolated in pure culture as seen in our case.
- ▶ It is important to consider Gram-positive anaerobic cocci, including *P. asaccharolyticus* as a potential pathogen in cases of septic arthritis, especially in the setting of postsurgical patients with prosthetic devices and joint replacements.⁷

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