

Case report

Parvimonas micra spondylodiscitis with psoas abscessLi Jie Helena Yoo,¹ Muhamad Danial Zulkifli,² Margaret O'Connor,² Ruth Waldron³¹Department of Internal Medicine, University Hospital Limerick, Limerick, Ireland²Department of Therapeutics and Ageing, University Hospital Limerick, Limerick, Ireland³Department of Microbiology, University Hospital Limerick, Limerick, Ireland**Correspondence to**Dr Li Jie Helena Yoo;
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SUMMARY

Parvimonas micra (*P. micra*) is a Gram-positive anaerobic cocci, normally found in the oral cavity and rarely causes severe infections. We describe a rare clinical presentation of *P. micra* as spondylodiscitis and psoas abscess with haematogenous spread in an adult patient. MRI lumbar spine detected L2 and L3 spondylodiscitis. Blood cultures were positive at 48 hours of incubation and *P. micra* was identified on anaerobic culture after 72 hours. Isolates from bone biopsy confirms *P. micra*. She was successfully treated with ceftriaxone, followed by oral metronidazole for a total of 8 weeks. The suspected origin of her *P. micra* was a dental cavity. Anaerobic bacteria tend to be underestimated in spondylodiscitis. In cases of slow growing organisms, we emphasise the importance of performing accurate identification including anaerobic bacteria to guide management. *P. micra* should be considered in patients with spondylodiscitis who had recent dental intervention or perioral infection.

BACKGROUND

Spondylodiscitis (also termed vertebral osteomyelitis) most often results from haematogenous seeding from a distant focus, as the disc is avascular.^{1,2} *Staphylococcus aureus* is the most common microorganism implicated in spondylodiscitis due to its virulence, followed by *Enterococcus coli* (*E. coli*).²⁻⁴ Gram-positive anaerobic bacteria, such as *Parvimonas micra* (*P. micra*), are uncommon causes for spondylodiscitis. *P. micra* is normally found in the oral cavity, gastrointestinal and genitourinary tract. It is recognised as an important pathogen in intraoral infections and deep organ abscesses.⁵

CASE PRESENTATION

A 77-year-old woman with a background history of cerebrovascular accident, hypertension, hyperlipidemia and osteoporosis, presented to our hospital complaining of acute on chronic lower back pain, aggravated by recent heavy lifting. She has no history of diabetes mellitus, immunosuppressive disorders or cancer. Her mobility was limited with difficulty in weight bearing due to lower back pain, compared with her baseline which was independent in all activities of daily living. There was minimal relief from regular ibuprofen and paracetamol. She had no sensory loss, bladder dysfunction or fevers. She had completed a course of ofloxacin 3 weeks ago for a urinary tract infection with urine cultures that grew *E. coli*. Neurological examination was normal with intact perianal sensation and normal anal tone. Straight leg raise of her left leg elicited pain in her lower back and there was tenderness on

palpation of her lumbar spine at L2 and L3. There was no evidence of skin or soft tissue infections.

INVESTIGATIONS

Her laboratory findings were as follows: white cell count (WCC), $16.48 \times 10^9/L$; haemoglobin count, 115 g/L; platelet count, $338 \times 10^9/L$; C reactive protein (CRP) level, 90 mg/L; erythrocyte sediment rate (ESR) level, 77 mm/hour; serum total protein level, 61 g/L; albumin, 30 g/L; blood urea nitrogen level, 5.1 mmol/L; and creatinine level, 49 $\mu\text{mol/L}$. Urine cultures showed no growth. X-ray of lumbar spine was normal. T1-weighted MRI lumbar spine showed hypointensity at L2 and L3 vertebral bodies and L2–L3 disc space, suggestive of spondylodiscitis with the infection extending laterally causing a psoas abscess (figure 1A and B). There was no central spinal canal or neural foraminal stenosis. Initial blood cultures were positive for coagulase-negative staphylococci in the aerobic bottle only which was deemed likely to be a contaminant as the patient did not have any prosthetic material. A repeat set of blood cultures were positive at 48-hour incubation and Gram stain demonstrated Gram-positive cocci. *P. micra* was identified on anaerobic culture after 72 hours and was susceptible to penicillin, metronidazole and clindamycin based on European Committee on Antimicrobial Susceptibility Testing (EUCAST) methodology. Transcutaneous vertebral bone biopsy and disc aspirate confirmed the same organism as in blood cultures, *P. micra*.

DIFFERENTIAL DIAGNOSIS

Given her localised back pain aggravated by movements and elevated inflammatory markers, the main differential diagnosis was vertebral osteomyelitis. The patient was afebrile throughout her admission. Fever, however, is an inconsistent finding in bacterial vertebral osteomyelitis and is only present in ~45% of patients.¹ In addition, this patient was taking regular analgesics with antipyretic effects. An epidural abscess was high in the differential diagnosis as spinal tenderness was noted on palpation. Pain aggravated by hip movements also increased our clinical suspicion of a psoas abscess. Vertebral compression fracture was also likely given her history of osteoporosis, but there was no wedging on her lumbar spine X-ray. Herniated disc was considered as her pain was aggravated after recent heavy lifting but this did not explain the high CRP and ESR.

TREATMENT

Following bone biopsy, the patient was started on intravenous ceftriaxone 2 g once daily (OD) and



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Figure 1 (A) MRI T2 fat suppressed coronal image of the lumbar spine showing L2–L3 high signal abnormality with involvement of the left psoas muscle in keeping with acute spondylodiscitis and psoas abscess formation. (B) MRI T1 fat suppressed sagittal image of the lumbar spine showing L2–L3 high signal abnormality with involvement of the left psoas muscle in keeping with acute spondylodiscitis and psoas abscess formation.

intravenous metronidazole to target the *P. micra*. Her decline in mobility from being independent of all activities to needing assistance to transfer out of bed warranted regular physiotherapy. Her pain was a limiting factor and an adequate pain control regime was commenced with regular paracetamol, opioids, non-steroid anti-inflammatory agents and gabapentin. She did not require surgical intervention and was transferred to rehabilitation unit to improve her mobility. She was continued on dual cover with intravenous ceftriaxone and oral metronidazole to facilitate outpatient parenteral antimicrobial therapy.

OUTCOME AND FOLLOW-UP

The patient completed an 8-week course of ceftriaxone and 5-week course of metronidazole. Her WCC and CRP trended down to normal within 1 week of antibiotics. A follow-up MRI lumbar spine after 6 weeks of antibiotics showed resolution of her psoas abscess and marked improvement in her spondylodiscitis (figure 2A and B). Prior to discharge, she regained her confidence in walking and was back to baseline. Her recovery was complicated by *Clostridium difficile* infection (CDI) which occurred 3 weeks after completion of her prolonged course of antimicrobial therapy. She was treated with oral metronidazole. She was seen in the outpatient 1 and 4 months after discharge.



Figure 2 (A) MRI T2 fat suppressed coronal image of the lumbar spine post 6-week antibiotic treatment showing interval improvement with resolution of psoas abscess. (B) MRI T1 non-fat suppressed sagittal image of the lumbar spine post 6-week antibiotic treatment showing interval improvement with resolution of psoas abscess.

She was doing well and was discharged back to her primary care physician.

DISCUSSION

P. micra is a Gram-positive anaerobic cocci that was originally known as *Peptostreptococcus micros*, the organism was renamed to the *Micromonas* genus in 1999, and then reclassified within the *Parvimonas* genus in 2006.⁶ Papisian *et al*⁷ described the first reported vertebral osteomyelitis secondary to *P. micra* in 1986. Since then, there have been 16 reported cases of this rare pathogen in spinal infections.^{8,9} The diagnosis of this anaerobic bacterium can be challenging because they are slow growing. In this case, the blood cultures required 48 hours of incubation before flagging and the organism only grew on the anaerobic enrichment culture in the bone biopsy and aspirate. First-generation fluoroquinolones are inactive or marginally active against anaerobes,¹⁰ hence the course of ofloxacin was unlikely to have suppressed *P. micra* on her initial blood cultures. Owing to the widespread use of diagnostic technology such as matrix-assisted laser desorption ionisation-time of flight mass spectrometry and 16S rRNA sequencing,^{11,12} there has been an increasing number of *P. micra* being identified.^{8,13–17} Recently, Higashi *et al* described the melting temperature (T_m) mapping method which successfully detected *P. micra* in 3 hours, concluding it as a useful method in cases of bacterial infections where organisms are difficult to culture.⁸

Guidelines have suggested holding empiric antimicrobial therapy until a microbiological diagnosis has been reached in patients with stable haemodynamics and neurological examination, with an aim to increase the sensitivity of establishing a microbiological diagnosis.¹ This case highlights the importance of appropriate investigations including blood cultures and bone biopsy to confirm the diagnosis and direct therapy as empiric therapy may not have been appropriate for *P. micra*. This indicates the importance of anaerobic culture as well as bacterial identification using modern diagnostic technology to allow rapid and accurate identification of pathogenic microorganisms from clinical specimens to guide management, especially when *P. micra* is rarely identified with our limited knowledge on its epidemiological background.

The Infectious Diseases Society of America 2015 guidelines recommend 6-week duration of parenteral antimicrobial therapy for most patients with bacterial vertebral osteomyelitis.¹ Previous published case reports on *P. micra* spondylodiscitis involved antibiotic treatment with a mean total duration of 9 weeks (4–14 weeks); 15 cases involved treatment for ≥ 6 weeks and 5 cases were treated for ≥ 12 weeks.^{8,9} Murdoch⁵ reported that the strong proteolytic activity of *P. micra* could be important in abscess development. Dual cover with ceftriaxone and metronidazole was given initially in this patient due to the presence of a psoas abscess. She was stepped down to monotherapy to complete a total of 8 weeks of antimicrobials as she was not suitable for drainage of her psoas abscess.¹⁸

The use of broad-spectrum antimicrobials, multiple antibiotic agents and increased duration of antibiotic therapy contributed to her increased risk of CDI. The risk of hospital acquired-CDI remains greatest especially for third-generation cephalosporins¹⁹ and this patient was treated with ceftriaxone. A case-control study suggested that the risk for CDI was increased during antibiotic therapy and up to 3 months after cessation of therapy; the risk was highest during and in the first month after antibiotic use.²⁰

The association of *P. micros* with oral infections has been reported previously.^{8,9,13,15–17,21} It is recognised as an important pathogen in intraoral infections.⁵ In this case, there was a tooth cavity identified that necessitated urgent extraction. The

underlying cause for her *P. micra* spondylodiscitis was deemed secondary to a dental cavity.

To conclude, we describe herein a case of spondylodiscitis and psoas abscess due to *P. micra* secondary to a dental cavity, which was diagnosed based on blood cultures and bone biopsy. It highlights the importance of diagnostics to direct treatment for complex infections that will require prolonged antimicrobial therapy with inherent risks.

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Learning points

- ▶ In patients with spondylodiscitis, it is reasonable to hold empiric antimicrobial therapy until the underlying microorganism is identified only if neurological examination and haemodynamics are stable.
- ▶ Appropriate investigations are crucial to diagnose spondylodiscitis and to direct antimicrobial therapy, including use of modern diagnostic technology to allow rapid bacterial identification in cases of slow growing organisms.
- ▶ *Parvimonas micra* should be considered in patients with spondylodiscitis who had recent dental intervention or perioral infection.
- ▶ Prolonged antimicrobial therapy with broad spectrum antimicrobial therapy can lead to adverse events such as *Clostridium difficile* infection, with the highest risk during and in the first month after antibiotic use.

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