

Secondary anaerobic infection in a case of multidrug resistant tubercular paraspinal abscess: A rare presentation

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Abstract

Introduction. Paraspinal abscesses are most commonly caused by *Staphylococcus aureus* and some Gram-negative bacteria. In developing countries, *Mycobacterium tuberculosis* (MTB) contributes to almost 50% of cases. Even in proven cases of tubercular paraspinal abscesses, secondary infection of aerobic or anaerobic bacteria is possible and should be carefully evaluated for proper management.

Case report. A type I diabetes mellitus patient presented with chronic backache and lower limb weakness and radiological investigations showed paraspinal collections suggestive of tuberculosis. The patient was then started on anti-tubercular drugs, she initially responded and then showed gradual deterioration in the form of increased pain, fever and pus discharge. Aerobic cultures of pus were sterile and anaerobic culture grew *Peptoniphilus asaccharolyticus* sensitive to metronidazole. Appropriate treatment had resulted in clinical improvement.

Conclusion. Suspicion about co-infection with aerobic or anaerobic bacteria should be high even in proven cases of tubercular paraspinal abscess not improving despite proper anti-tubercular therapy.

INTRODUCTION

Spinal infection is an infectious disease which affects the vertebral body, intervertebral disc or the paraspinal tissues. These infections can spread hematogenously, or as an extension of infection from an adjacent source or even by direct inoculation. Classification of this spinal infection is primarily done by the location of infection like spinal abscesses (intra medullary, subdural or epidural abscesses), discitis, spondylitis or paraspinal infection. Paraspinal abscesses can be primary, occurring mainly in those aged less than 30 years or secondary in those aged between 10 to 50 years [1, 2]. Risk factors for the development of paraspinal and epidural abscesses reported from a meta-analysis are diabetes (15–53.7% cases), spinal surgery (22%), and intravenous drug use (8.8%) with few cases due to alcoholism and trauma [3, 4]. *Staphylococcus aureus* is the causative organism in over 88% of patients with primary iliopsoas abscess. Secondary iliopsoas abscess is caused by *Streptococcus* species 4.9% and *E. coli* 2.8%. *Mycobacterium tuberculosis* as a cause of iliopsoas abscess is very common in the developing countries as 50% of all spinal tuberculosis (TB) cases develop

paraspinal abscess [5]. The other causative organisms include anaerobes, *Proteus*, *Bacteroides*, *Clostridium*, *Yersinia enterocolitica*, *Mycobacterium kansasii*, and *Mycobacterium xenopi* [6]. Diagnosis of paraspinal abscesses is sometimes difficult as pain is usually mild to moderate because of the deep seated location and absence of other constitutive symptoms. Secondary infection from a primary tubercular iliopsoas abscess can be encountered and can be mono or polymicrobial. Here, we present a case report of a patient who presented with a secondary infection of an anaerobic organism in a previously diagnosed multidrug resistant *Mycobacterium tuberculosis* infection of paraspinal abscess.

CASE REPORT

A 28 year old female, known to have type I DM presented to the emergency room (ER) with history of backache and lower limb weakness. Contrast MRI of the lumbosacral region demonstrated loss of disc space with paraspinal collection at L3-4 extending into bilateral iliopsoas muscle suggesting tuberculosis. After work up, the patient was started on four anti-tubercular

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Keywords: multidrug resistant tuberculosis; paraspinal abscess; *Peptoniphilus asaccharolyticus*.

Abbreviations: ATT, anti-tubercular therapy; ER, emergency room; GPAC, gram positive anaerobic cocci; MALDI-TOF MS, matrix assisted laser desorption ionization mass spectrometry; MDR TB, multidrug resistant tuberculosis; MGIT, mycobacterium growth indicator tube; MTB, *Mycobacterium tuberculosis*.

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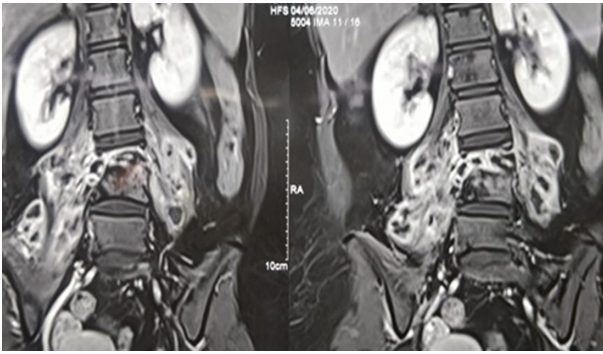


Fig. 1. MRI LS spine showing organised iliopsoas abscess before treatment.

drugs (ATT) regime of HRZE as per the protocol. After initial improvement in clinical and neurological status, the patient returned with relapse of back pain after 5 months of therapy. The repeated radiology demonstrated re-collection of organised pus. The needle aspiration of pus along with Xpert MTB/RIF and liquid culture (MGIT) both showed the presence of MTB resistant to rifampicin. Under USG guidance, a malecot catheter was inserted for drainage of the abscess. Patient was started on modified ATT and planned for surgical intervention and fixation in case of non-improvement or deterioration. After 2 months, the patient presented with high grade fever and discharge from the abscess site for which she was brought to the emergency department. MRI lumbosacral spine revealed infective pathology at L3/L4 segment with associated intra and extra-spinal abscesses causing neural compression in comparison with that of previous scans report (Fig. 1). Suspecting secondary infection, pigtail insertion was done to drain the abscess and cultures were sent for two consecutive days. Aerobic culture of the sample did not show growth of any bacteria and anaerobic culture showed growth of bacteria sensitive to metronidazole. The latter was identified as *Peptoniphilus asaccharolyticus* in both the samples by MALDI-TOF MS. Antibiotic sensitivity was

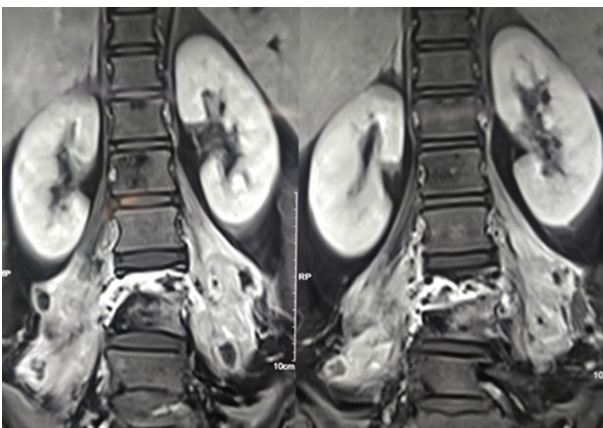


Fig. 2. MRI LS spine showing resolution of organised iliopsoas abscess after treatment.

put up by agar dilution method according to CLSI guidelines M11-A8 2012 [7] which was sensitive to clindamycin, cefoxitin, metronidazole, imipenem and piperacillin-tazobactam with MIC breakpoints of 0.25, 4, 0.25, 0.031 and 0.125 (mg/L) respectively. With the culture report, the patient was started on metronidazole I/V 500mg TDS and the patient's clinical symptoms like discharge of pus and fever drastically improved. Metronidazole was continued for a period of 14 days along with ATT. At the end of 14 days, patient had no signs of active pus discharge and there was complete resolution of fever. Follow up MRI after 14 days also revealed significant reduction in the loculated abscesses in the right iliopsoas muscles while the rest of the findings grossly remained the same (Fig. 2). Patient was discharged with continuation of oral metronidazole for five more weeks along with anti-tubercular drugs and insulin and surgical intervention once the secondary infection settled.

DISCUSSION

Paraspinal abscess due to anaerobic infections are very rare and only a few cases have been reported worldwide. The incidence of psoas abscesses was estimated from literature reports to be 12 cases per year worldwide in 1992 but in only 1 year, six cases have been reported from one institute by Thomas *et al.* which showed an increase in the number of spinal abscess cases. [8] In their study, the underlying conditions for psoas abscess were previous spinal surgery for lumbar vertebral fractures in two cases, one case of tuberculosis, and three cases of spondylodiscitis. This increase in number of cases could be advancement in diagnosis or the recurrence of TB in developed countries. Most commonly reported organisms in psoas abscess are *Staphylococcus aureus*, *Escherichia coli*, and other Gram-negative bacilli and in developing countries, *Mycobacterium tuberculosis* and even non-tuberculous mycobacterium [9]. Anaerobic organisms have been reported rarely and among them, the most common are the *Streptococcus* species. Apart from this, there are two case reports by *Parvimonas micra*, two by *Prevotella* species, one case report by *Fusobacterium*, *Bacteroides* and *Propionibacterium* each [10–14]. In all these anaerobic infections of psoas abscess, some or the other underlying cause have been reported are dental cavity, malignancy, muscle trauma, history of past surgery, decubitus ulcer and even diabetes mellitus. In the case report by Sawai *et al.* where *Parvimonas micra* has been reported as the causative organism, no primary focus could be identified [12]. Apart from this case report, most of the case reports had some underlying cause for anaerobic infection to occur. In our case we report coinfection with an anaerobic organism, *Peptoniphilus asaccharolyticus* in two consecutive pus cultures samples in a known MDR TB patient. As the patient was a known case of MDR TB and type I diabetes mellitus, this could have been the underlying risk factor for occurrence of the anaerobic infection. In general, wound infections are very common in diabetic patients because of increased blood sugar level, suppressed immunity and inadequate blood supply which favour polymicrobial growth including aerobes and anaerobes. Foul smelling discharge, presence of necrotic tissue or gangrene, proximity of infection to mucosal surfaces, long standing use of antibacterial drugs, aerobic culture being sterile, patient not responding to

regular antibiotics all suggest the presence of infection with an anaerobic organism [15, 16]. In this particular case also, the aerobic culture was sterile twice and despite ATT, patient had continuous fever and discharge of pus from the paraspinal site. As the presentation was suggestive of an anaerobic infection, appropriate cultures were put up which revealed the presence of anaerobic bacteria, later identified as *Peptoniphilus asaccharolyticus* by MALDI-TOF MS.

Peptoniphilus asaccharolyticus is an obligate Gram-positive anaerobic organism which causes opportunistic infection in immunocompromised patients. Gram-positive anaerobic cocci (GPAC) account for about 25–30% of anaerobic infections occurring in the human body and most of the GPAC infections have been reported to be polymicrobial. Virulence potential of *P. asaccharolyticus* has been demonstrated by researchers because of the production of extracellular enzymes like DNase, RNase, coagulase, and hemolysins, and synergistic interactions with facultative and other anaerobic organisms. Another important virulence factor is because of capsule formation [17, 18]. They can cause infection in any of the body sites but commonly isolated from abscesses and infections of skin, soft tissue, mouth, bone, joint and female genital tract [5, 19]. *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 [20].

Two case reports have been reported in literature where concomitant infection of TB and pyogenic bacteria of spine have been reported [21, 22]. In one case report, *Staphylococcus aureus* was isolated and in another *Nocardia asteroides* and *Moraxella catarrhalis* were grown from pus cultures. In both the case reports, the authors have showed the importance of Ziehl-Neelsen stain in abscess collections even though aerobic culture grew pyogenic bacteria. But in our case report, despite the patient's pus cultures growing *Mycobacterium tuberculosis* and aerobic cultures being sterile in two consecutive samples, sudden deterioration of the patient despite ATT raised the suspicion of anaerobic organisms and showed the importance of anaerobic cultures.

CONCLUSION

As paraspinal abscesses most commonly present with non-specific symptoms, they cause a delay in their diagnosis and subsequent treatment. The mortality rate of an undrained paraspinal abscess is reported to be nearly 100%. Hence early diagnosis is paramount for a better clinical outcome and the patient should be immediately started on antibiotics after routine cultures. In addition to this, a suspicion of anaerobic organisms in a spinal infection is necessary if the patient is not responding to routine antibiotic or in a known TB patient on ATT in spite of aerobic cultures being negative.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Ethical statement

Written informed consent for publication of their clinical details and clinical images was obtained from the patient.

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