

Case Report

Iliopsoas muscle abscess and *Proteus mirabilis* caused sepsis: a case report

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ABSTRACT

Musculus psoas abscess (MPA) is a relatively uncommon and potentially life-threatening infection. Diagnostics of MPA are challenging due to nonspecific clinical presentation and insidious onset. We present an 85-year-old patient with iliopsoas abscess and sepsis, who was admitted to an emergency department with fever, fatigue, anorexia, tenderness and limited range of motion in her right hip. Upon further diagnostics, it was discovered, that the bacterial cause of infection was *Proteus mirabilis*, which is a highly unusual finding. The case illustrates the difficulty of diagnosing MPA and discusses the possible origins of the primary infection.

Keywords: Musculus iliopsoas abscess, *Proteus mirabilis*, Sepsis

INTRODUCTION

Musculus psoas abscess (MPA) is a relatively uncommon and life-threatening infection. It is challenging to diagnose due to its wide-ranging clinical presentation, insidious onset, and rarity.

MPAs can be primary or secondary. The cause of a primary abscess is infectious spread through the circulatory or lymphatic systems from a distant source. In these cases, the infection is usually caused by a single pathogen. Primary MPAs account for 30% of documented cases.¹ It has also been found that the etiology of primary MPAs is linked to the geographical area-in Africa and Asia, approximately 90% of MPAs were primary, whereas in Europe only 17.8% of reported cases were primary in origin.²

A secondary abscess occurs due to infection in a nearby structure.³ Documented structures include the gastrointestinal tract, genitourinary system, musculoskeletal infections, and others. In these cases, it

is often uncertain whether the involvement of the contagious structure is the cause or consequence of the abscess.

Common MPA bacterial causes are *S. aureus* (including MRSA), *E.coli*, and *M. tuberculosis*. Microbiology varies according to the geography and the pathogenesis of the abscess.

The clinical features of MPA are highly variable and nonspecific. Common symptoms include back or flank pain, fever, inguinal mass, anorexia, and weight loss. The onset is often subacute and symptoms may be present for a few weeks to months. However, patients, when first admitted, may present with septic shock and nonspecific clinical features. The clinical presentation may direct healthcare providers to diagnoses such as septic arthritis or renal or gastrointestinal disease. Taking into account these factors, diagnosis and subsequent care are delayed.

We present a case of a suspected secondary iliopsoas muscle abscess caused by *Proteus mirabilis* infection.

CASE REPORT

An 85-year-old woman was admitted to the emergency department of a specialised orthopaedic hospital with complaints of pain and reduced range of motion in her right hip and subfebrile temperature for the last two days. During the last two weeks, the patient became fatigued, less communicative and experienced anorexia. The woman had a history of surgeries, including a right lung segmentectomy due to tuberculosis in 1960, total hip replacement in 1994 and 1996, and pacemaker implantation in 2014. Additionally, the patient had coronary heart disease, type 2 primary arterial hypertension with multiorgan damage, chronic heart disease, stable angina II functional class, arrhythmia, and chronic kidney disease. The patient daily used clopidogrel/aspirin 75/100 mg, spironolactone 25 mg, Bisoprolol 5 mg, trimetazidine 35 mg and Pantoprazole 20 mg. The patient had vascular dementia and regularly used memantine 20 mg per day. In March 2022, the patient underwent radiation therapy for basalioma near the right ear. The patient had no history of alcohol consumption or smoking. There was no information on family history.

The patient's condition was evaluated and examined in the emergency department by an orthopaedic surgeon, an anesthesiologist and an infectious disease specialist. The general condition of the patient was moderate, the patient had a fever (body temperature, 37.5 °C) and low blood pressure (100/80 mmHg). Palpatory pain, petechiae, and decreased range of motion were found locally during physical examination. Computed tomography (CT) was indicated for the patient.

A pelvic bone CT scan was performed, which revealed loosening of the endoprosthesis of both hip joints and a large (10-12 cm) partially circumscribed mass in the right epigastrium, extending distally into the pelvis along the wing of the intestine and involving the M. iliopsoas (Figure 1 A and B and Figure 2). The contents of the formation were a heterogeneous density of the fluid. As a result, an abscess was discovered. Laboratory tests show an increase in inflammatory parameters-C-reactive protein (CRO)-275.1 mmol/L and a decrease in the glomerular filtration rate-20 ml/min/ 1.73.

The patient required urgent surgery to drain the abscess. The patient undergoes surgery under general anesthesia, lying supine. The initial condition was stable, with an arterial blood pressure of 125/60 mmHg and a pulse of 60 beats/minute. An 8 cm incision is made over the crista iliaca anterior superior and the inferior tissues are dissected in a blunt-obtuse fashion and advanced into the pelvis. The wall of the abscess of M. iliacus and M. psoas was dissected, the pus was massively excreted, and the samples were taken for microbiological examination. The cavity contains about 500-700 ml of pus. The abscess cavity was flushed and suctioned until it was completely drained. The abscess cavity was drained with two active

aspiration drains after surgery. However, the patient's condition deteriorates rapidly during the operation and her arterial blood pressure drops to 90/50 mmHg. Therefore, the decision to start norepinephrine and fluid resuscitation was made. Initially administered at 0.08 mcg/kg/min, then reduced to 0.01 mcg/kg/min at the end of the operation.

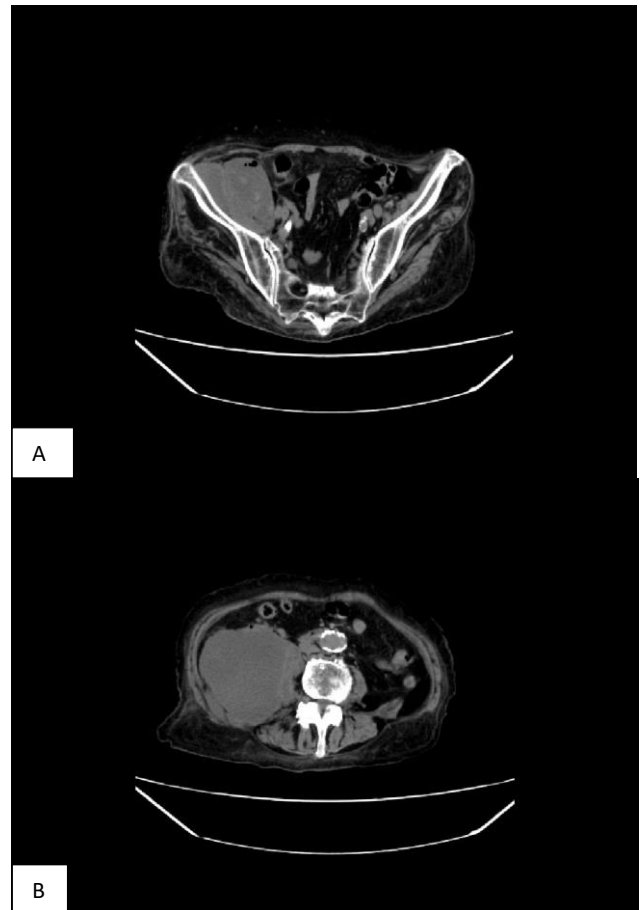


Figure 1 (A and B): CT scan of pelvis and abdomen cavity, shows right side M. iliopsoas abscess in the right side, about 10-12 cm in size.



Figure 2: Sagittal CT scan of patient.

The patient was transferred to the intensive care unit. Postoperatively, the patient's condition was assessed as severe with an infusion of norepinephrine maintaining mean arterial pressure. The results of the examination of the tissue material revealed *Proteus mirabilis*. An antimicrobial susceptibility test was performed, leading the patient to start antimicrobial therapy with piperacillin-tazobactam. Furthermore, the patient received a blood transfusion with several packed red blood cells and cryoprecipitates due to significant blood loss during the procedure.

Generally, the patient was responsive when starting treatment. CRO levels decreased during the following days, and body temperature was within the normal range limits. Still, the following day after surgery, a noticeable deterioration in the patient's renal parameters was detected: urea of 21.3 mmol / L and creatinine of 274 mmol/L and a reduced glomerular filtration (GFR) rate of 13 ml/min/ 1.73m³.

In the following days, renal insufficiency increased and the patient's condition became critical. As a result, seven days after surgery, the patient's condition deteriorates rapidly, and a lethal outcome is experienced due to sepsis and multiorgan damage. An autopsy showed signs of sepsis, marked clustering of pus in the pancreas and on the right hip endoprosthesis, and no evidence of possible bowel perforation or bladder or ureteral inflammation.

DISCUSSION

Proteus mirabilis is a gram-negative bacillus that belongs to the *Enterobacteriaceae* family and is typically part of the natural flora of the gastrointestinal tract. Most commonly *Proteus mirabilis* is associated with infections of the urinary tract, especially in patients with urine catheters.

MPA is a rare, serious, and potentially life-threatening infection. MPAs are classified as primary and secondary. The occurrence of primary invasive psoas abscess is attributed to the haematogenous or lymphatic dissemination of an infectious agent from a distant location. Conversely, secondary MPA arises due to the contiguous spread of an infectious or inflammatory process into the iliopsoas region.¹

In our case report a patient developed MPA, which ultimately lead to septic shock and later exitus lethalis. The causative agent was determined to be *Proteus mirabilis*, which is an uncommon finding as previously reported most common MPA causing organisms were *S. aureus* and *E. coli*.⁴ The data on MPA caused by *Proteus mirabilis* is very limited, as only a handful of case reports have been documented.

Due to the *Proteus mirabilis* being an uncommon pathogen, we speculate that this abscess is secondary to a previously undiagnosed gastrointestinal or genitourinary

infection. An autopsy was performed, which revealed no gastrointestinal or genitourinary pathology that could have been the source of dissemination. One case report described an abscess formation from a perforated bowel due to acute appendicitis.⁵ An autopsy revealed a purulent infectious process in the pancreas. This finding supports the previously mentioned theory of a secondary abscess, although it still is an unusual localization for seeding infection.

A theory worth mentioning is the incorrect intramuscular injection (IM) technique, which is frequently observed among chronic back pain patients who resort to self-administering nonsteroidal anti-inflammatory drugs through this route of administration. Abscess formation following intramuscular injections is rare but can result in major complications like bacteremia and generalized sepsis that can lead to multi-organ failure.⁶ The presented patient had a history of chronic back pain but they negated any instances of self-injecting medication via the intramuscular route, effectively leading to the elimination of the theory.

Additionally to the previously described MPA, the patient was also diagnosed with sepsis, which considerably complicated diagnostic workup. It has been described that the clinical presentation of bacteremia in geriatric patients is underwhelming due to their often already fragile hemodynamics and overall state.⁷ In our case, the clinical presentation of sepsis was even more convoluted by the vague features of MPA.

The patient's health deterioration might have started even before the original infection. The year before this hospitalisation she underwent radiation therapy for basalioma, which is known to arise in elderly immunocompromised patients.⁸

The lack of success in treating this patient in equal parts is due to the rarity and unusualness of the disease itself, the fact, that the patient was resistant to antibacterial and general therapy, and because the diagnosis was established late because of other factors. These factors include the fact that the patient's general practitioner was unaware of the seriousness of the condition, dismissing clinical presentation as irrelevant-this was the reason for delayed admittance to the emergency department.

In conclusion, MPA is a rare and serious infection that can be caused by a variety of bacterial pathogens. Our case report highlights the uncommon occurrence of MPA caused by *Proteus mirabilis*, which is typically part of the natural flora of the gastrointestinal tract and is most commonly associated with urinary tract infections.

The presented case demonstrates the challenges in diagnosing and treating MPA, particularly in geriatric patients who may present with vague symptoms and pre-existing medical conditions that complicate the diagnostic workup. Furthermore, the delayed admittance to the

emergency department due to the general practitioner's lack of awareness highlights the need for increased education and awareness among healthcare providers about the seriousness of MPA and its potential life-threatening complications.

The rarity and unusualness of the disease, coupled with resistance to antibacterial and general therapy, further contributed to the lack of success in treating this patient. Our case underscores the importance of early recognition and diagnosis of MPA and highlights the need for further research on this rare and potentially life-threatening infection.

CONCLUSION

MPA is a rare disease, with inconclusive clinical features and complicated diagnostics. In addition to complex clinical presentation, this case provides an example of an unusual bacterial cause *Proteus mirabilis*. Furthermore, even after an autopsy, the primary infection site is not conclusively determined, thus suggesting the need for further research on MPA etiology.

Our case highlights the need for clinicians to have a heightened index of suspicion for MPA in elderly, multimorbid patients with no apparent risk factors for MPA.

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REFERENCES

1. Shields D, Robinson P, Crowley TP. Iliopsoas abscess--a review and update on the literature. *Int J Surg*. 2012;10(9):466-9.
2. Ricci MA, Rose FB, Meyer KK. Pyogenic psoas abscess: Worldwide variations in etiology. *World J Surg*. 1986;10:834-42.
3. Buttaro M, González Della Valle A, Piccaluga F. Psoas abscess associated with infected total hip arthroplasty. *J Arthroplasty*. 2002;17(2):230-4.
4. López VN, Ramos JM, Meseguer V. Microbiology and outcome of iliopsoas abscess in 124 patients. *Medicine (Baltimore)*. 2009;88(2):120-30.
5. Zacharis N, Gavana M, Karagkouni, E. Psoas abscess following acute appendicitis due to *Proteus mirabilis* and *Klebsiella pneumoniae*. *Hellenic J Surg*. 2013;85:64-5.
6. Sambandam SN, Rohinikumar GJ, Gul A, Mounasamy V. Intramuscular Injection Abscess Due to VRSA: A New Health Care Challenge. *Arch Bone Jt Surg*. 2016;4(3):277-81.
7. Dellinger RP, Carlet JM, Masur H. Surviving Sepsis Campaign guidelines for management of severe sepsis and septic shock. *Intensive Care Med*. 2004;30(4):536-55.
8. Collins L, Quinn A, Stasko T. Skin Cancer and Immunosuppression. *Dermatol Clin*. 2019;37(1):83-94.

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