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METHICILLIN-SENSITIVE STAPHYLOCOCCUS AUREUS BACTEREMIA AND MENINGITIS ASSOCIATED WITH SPINAL AND PSOAS MUSCLE ABSCESS – CASE REPORT

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ABSTRACT

Methicillin-sensitive Staphylococcus aureus (MSSA) can cause a range of severe infections, including bacteremia and meningitis. While MSSA-related bacteremia and meningitis are serious on their own, they can also be associated with complex complications such as intraspinal and psoas abscesses. We report a case of a 72-year-old male with symptoms including lower back pain, leg weakness, malaise, fever and headache. Initial laboratory results showed leucocythosis, hyponatriemia and elevated CRP, while cerebrospinal fluid analysis indicated significant pleocytosis and neutrophilia. After admission, three blood cultures were obtained, all of which isolated *MSSA.* During hospitalization, a CT scan of the thorax and MR of the spine were performed, revealing bilateral pleural effusion, L5-S1 intraspinal abscess, and an abscess in the ileopsoas muscle. After 6 weeks of antibiotic therapy, a follow-up MRI was performed, which showed regression of the abscesses.

This case underscores the severe complications of *Staphylococcus aureus* infection, including meningitis, sepsis and abscesses. Effective management relies on prompt diagnosis, comprehensive evaluation, and targeted antibiotic therapy. The patient's positive outcome highlights the importance of early recognition and tailored treatment in complex infections.

Keywords: S.aureus, meningitis, bacteriemia, abscess

INTRODUCTION

Methicillin-sensitive *Staphylococcus aureus* (MSSA) is a major pathogen responsible for a range of infections, from mild skin conditions to life-threatening diseases. MSSA can cause severe systemic infections, including bacteremia, endocarditis, osteomyelitis, pneumonia, and meningitis. The ability of *S. aureus* to form biofilms, its resistance to host immune defenses, and the production of various toxins contribute to its pathogenicity and the severity of infections [1, 2].

One of the most serious complications of MSSA infections is **bacteremia**, which can lead to sepsis and affect multiple organs. **Meningitis** caused by MSSA is relatively rare but can occur, particularly in patients with underlying conditions such as immunosuppression, trauma, or concurrent infections. Delayed diagnosis and treatment can lead to severe neurological sequelae and high mortality rates [3]. In addition to meningitis, MSSA infections can lead to the development of **abscesses** in various anatomical locations. Spinal cord **abscesses** and **psoas muscle abscess** are particularly concerning, as they can cause significant morbidity and long-term disability if not diagnosed and treated promptly. The symptoms include back pain, neurologic deficits, fever and systemic signs of infection. These abscesses often require prolonged antibiotic therapy for optimal treatment outcomes.

The outcome of MSSA-related infections depends on timely and accurate diagnosis, which involves a combination of clinical evaluation, microbiological cultures, and imaging studies. Antibiotic therapy should be tailored based on susceptibility patterns. Early recognition and intervention are crucial for preventing severe complications such as sepsis, organ dysfunction, and neurological impairment.

CASE DESCRIPTION

A 72-years old patient presented at our clinic with symptoms that began four days before admission. These included lower back pain, malaise, pain and weakness in both legs and gait disturbance. One day before admission, he also experienced fever and chills. After initial evaluations by a neurosurgeon, abdominal surgeon, and gastroenterologist, the patient was referred to an infectious disease specialist due to suspected infectious etiology. The patient had no significant past medical history or underlying health conditions. On arrival, the patient was afebrile (36.9^0C), alert and oriented with stable vital signs: heart rate of 89/min, blood pressure of 130/60mmHg, respiratory rate of 16/min and oxygen saturation of 96% on ambient air. The physical examination revealed bilateral crepitations on pulmonary auscultation. Neurological evaluation demonstrated tremor and weakness in the lower limbs, along with positive meningeal signs. Initial laboratory investigations showed elevated white blood cells (WBC) with domination of neutrophils (Neut), hyponatremia and elevated C reactive protein levels (CRP). (Table 1). Initial cerebrospinal fluid analysis revealed pleocytosis with neutrophilia, elevated lactate and protein level concentration (Table 2).

Table 1. Initial patient laboratory data

Parameters	Level	Reference Range
Hb	121	120-180 g/L
RBC	4.17	4.3-5.8 x 10^{12}/L
WBC	21.7	4.0-.10.0 x 10^9/L
Platelets	163	150-400 x 10^9/L
Hct	0.35	0.40-0.54 L/L
Neut	0.90	0.40-0.70 %
Lym	0.02	0.21-0.25 %
BUN	8.5	1.7-8.3 mmol/L
Creatinine	50	62-133 µmol/L
Glycemia	17.4	4.1-6.3mmol/L
AST	83	10-47 U/L
ALT	103	10-52 U/L
Serum Na^+	128	134-145 mmol/L
CRP	233	0-10 mg/L

Table 2. Initial CSF analysis

Parameters	Result	Reference Range
Appearance	Yellow	Clear
Pandy	+	-
WBC count	8704/µL	<5cells/µL
Neutrophils	90%	<2%
Protein	38.1g/L	0.15-0.45g/L
Lactate	14.5mmol/L	<2.8mmol/L
Glucose	1.9mmol/L	>2.5mmol/L
Parameters	**Result**	**Reference Range**
Appearance	Yellow	Clear
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The CSF culture, incubated for 48 hours, yielded growth of MSSA. Additionally, three blood cultures obtained on admission were positive for MSSA, supporting the diagnosis of a systemic bacterial infection.

Initial treatment included a third-generation cephalosporin (ceftriaxone, 2 g intravenously every 12 hours) and a glycopeptide antibiotic (vancomycin, 1 g intravenously every 8 hours). Adjunctive therapy consisted of corticosteroids (dexamethasone 0.15mg/kg/day intravenously every 6 hours), antiedematous treatment with mannitol, and anticoagulant therapy with low-molecular-weigh heparin, symptomatic and supportive measures. Antihypertensive therapy with angiotensin-converting enzyme and calcium channel blockers was initiated after elevated blood pressure was noted. Additionally, treatment with rapid-acting insulin was provided based on blood glycose levels.

On the 7th day of hospitalization, a CT scan of the thorax and lumbar spine revealed bilateral pleural effusion and suspected spinal cord and psoas muscle abscesses.

Antibiotic therapy was subsequently adjusted to a carbapenem (meropenem, 2 g intravenously every 8 hours). Furthermore, albumin supplementation and diuretics were introduced. A diagnostic pleural puncture was performed, and microbiological analysis of the pleural fluid was negative. Histopathological findings classified the effusion as Group I, consistent with non-specific inflammation. After two weeks of treatment, a magnetic resonance imaging (MRI) scan was performed, confirming the diagnosis of an epidural abscess extending from L2 to C3 (Figure 1) and psoas muscle abscesses spanning their entire length (Figure 2). The MRI findings were reviewed in consultation with neurosurgeon, who determined that there was no indication for surgical intervention at this time. The recommendation was to proceed with conservative management, including continuation of the current antibiotic therapy. A subsequent lumbar puncture revealed pleocytosis with a white cell count of 89 cells/μL, neutrophil predominance (70%), a lactate level of 5.2 mmol/L, protein concentration of 3.67 g/L, and glycorrachia of 2.7 mmol/L. Blood cultures (three consecutive sets) were obtained during this period and were negative.

Over the final four weeks of hospitalization, the patient demonstrated significant clinical improvement. He remained afebrile, with stable vital signs, normal vesicular breath sounds, and no reports of pain. Additionally, the patient regained full ability to perform both passive and active movements. The clinical improvement was followed by the normalization of inflammatory markers (leucocytes: 5.7 x 10^9/L, CRP decreased to 7 mg/L) and normal CSF findings.

To confirm the therapeutic response, a control MRI was performed at the end of six weeks of treatment. This scan demonstrated significant regression of both the spinal cord and psoas muscle abscesses, with no evidence of new abscess formation or spinal involvement. With stable vital signs, resolved inflammation, and full independent mobility, the patient was discharged from hospital.

Figure 1. MRI demonstrating spinal epidural abscess

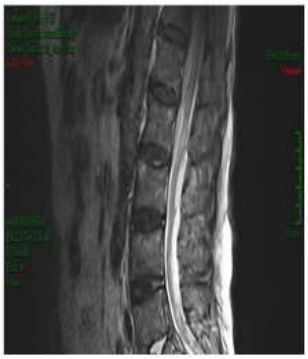
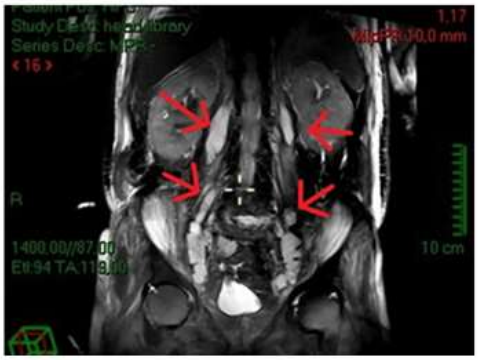


Figure 2. The red arrows indicated bilateral psoas abscess



DISCUSSION

Bacteremia and meningitis caused by MSSA, particularly when associated with spinal cord and psoas muscle abscesses, represent severe and life-threatening infections, especially in immunocompromised populations such as the elderly. These infections pose significant diagnostic and therapeutic challenges due to aggressive nature of the pathogen. Early recognition and initiation of appropriate antimicrobial therapy are critical for improving clinical outcomes. [4]. Delays in diagnosis can result in rapid progression of the disease, leading to significant neurological deficits, systemic complications, and increased mortality risk. Comprehensive imaging and microbiological evaluations are essential for accurate diagnosis and to guide targeted therapeutic interventions. Elderly patients, who often present with atypical symptoms and multiple comorbidities, required a high index of suspicion to identify MSSA-related infections promptly [5]. Multidisciplinary approaches, involving infectious disease specialists, neurosurgeons, radiologists, physical therapist, nurses and family support are crucial for effective management. [6]

CONCLUSION

This case underscores the critical importance of early detection and aggressive treatment strategies in managing MSSA bacteremia and meningitis with associated abscess formations. Enhancing awareness and clinical vigilance in at-risk populations can significantly reduce the adverse outcomes associated with these formidable infections.

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