

Septic paravertebral abscess and inferior vena cava thrombosis complicated by uro-sepsis: Case report

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ABSTRACT

Paravertebral abscess is an uncommon and potentially dangerous illness characterized by the buildup of pus in the anatomical area surrounding the spinal column. A 65-year-old female, who has diabetes and high blood pressure, came in with intense discomfort in her lower back that spreads to her lower limbs, making it difficult for her to move. She also has a high fever, excessive sweating, and has lost a large amount of weight. The blood tests indicate the following abnormalities: low Hb level of 9.6 g/dl, low MCV of 70 fl, elevated total white blood cell count of $15.8 \times 10^9/L$, elevated neutrophil count of $12.4 \times 10^9/L$, normal lymphocyte count of $2.8 \times 10^9/L$, high platelet count of $485 \times 10^9/L$, and elevated ESR of 110 mm/hr. The level of phosphatase was raised to 247 U/L, which is beyond the usual range of 40-150 U/L. The blood film reveals the presence of hypochromic microcytic red blood cells, which are indicative of iron deficiency anemia. There is also evidence of neutrophil leukocytosis in the white blood cells, with no immature cells observed. Additionally, an increase in platelets is observed in the film. The D-dimer level is 2009 ng/ml, which is within the normal range of less than 500 ng/ml. The CRP level is 48 gm/l, which is above the usual range of less than 6 gm/l. The bone marrow testing yielded normal results. The blood culture indicated the presence of *Streptococcus epidermidis* growth. Radiological tests revealed that a CE-MRI of the dorsal and lumbar spine indicated the presence of a para-aortic abscess together with septic thrombosis of the inferior vena cava. Paravertebral abscess is a critical emergent condition required a necessary therapy protocols to stabilize the patient status. The timing of intervention is crucial in cases of paravertebral abscess, as the existence of a mass can led to spinal cord compression.

Keywords: paravertebral abscess, inferior vena cava, thrombosis, sepsis

INTRODUCTION

A paravertebral abscess is an uncommon and potentially dangerous illness characterized by the buildup of pus in the anatomical area surrounding the spinal column [1]. The clinical manifestation of paravertebral abscesses is influenced by the structure of the spinal canal and dural tube. The epidural space is constricting in the cervical region and expanding in the lumbosacral region. The occurrence and localization of paravertebral abscesses are attributed to the existence of a genuine epidural space.

Closely packed within the anterior epidural space are the vertebral body's periosteum, posterior longitudinal ligament, and dura. Consequently, the back is where most paravertebral abscesses form [2].

Bacteria, fungi, and, very rarely, parasites can cause infection. It is common to encounter *S. aureus* and *M. tuberculosis* as single causative agents. The lumbar vertebrae are most commonly affected by pyogenic infections, while the thoracic or thoracolumbar vertebrae are most commonly targeted by tubercular infections.

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Factors that increase the likelihood of this condition include: diabetes mellitus, rheumatoid arthritis, infections, multiple system traumas, prior surgeries, alcoholism, chronic hepatitis, chronic kidney failure, organ transplants, immunosuppressed conditions (both inherited and acquired), long-term steroids, chemotherapy, intravenous catheters (both urinary and central), and drug misuse [3].

Clinical presentation

Back discomfort and muscular weakness are frequently observed symptoms in patients with paravertebral abscesses. Additionally, it is usual to have fever, chills, and localized discomfort specifically at the site of the abscess. If the infection puts pressure on the spinal cord or nerve roots, patients may have neurological impairments, such as weakness or sensory abnormalities. [4].

CASE REPORT

A 65 years old female with a history of DM and hypertension since 2013. She was well until 1 April, when she developed fever with disturbed level of consciousness. She was admitted to the hospital and was diagnosed and treated as urosepsis with septic shock, associated with acute kidney injury (AKI). She became better, her renal function returned normal and discharged well from the hospital.

Soon after discharge, she started to have gradual onset severe lower back pain in the lower lumbar vertebrae, radiating down to the level of the knee joint. It was severe, interfering with sleep and daily activities. It was continuous with intermittent exacerbations, especially at night. Simple motion, coughing, or resting flat made it worse, and over-the-counter analgesics only provided temporary relief. There was no rigor to the pain, but there was a high fever, it was constant, and there was perspiration. She reported numbness but no weakness in the lower limbs. There was no urinary or fecal incontinence. The patient denied any episode of such pain in the past. There was also no history of trauma. There was no headache or dizziness. She has lost more than 10 kg during the last 40 days.

Due to the patient's excruciating discomfort, she was unable to visit the doctor, so her relative conducted the tests.

Drug history

Not known drug allergy or drug misuse. The patient then came, and bone marrow aspirate has been done, which showed normal result, and further workup has started.

The investigations showed iron deficiency anemia with neutrophilic leukocytosis, and was given

parenteral Iron Sucrose (1200 mg given over 6 alternative days) with broad spectrum antibiotics. The doctor strongly recommended that the relatives bring the patient for a medical examination. The blood tests indicated the following abnormalities: low hemoglobin (Hb) level of 9.6 g/dl (normal range: 12-15 g/dl), elevated total white blood cell count of $15.8 \times 10^9/L$ (normal range: $4-10 \times 10^9/L$), elevated neutrophil count of $12.4 \times 10^9/L$ (normal range: $2-7 \times 10^9/L$), normal lymphocyte count of $2.8 \times 10^9/L$ (normal range: $1-3 \times 10^9/L$), high platelet count of $485 \times 10^9/L$ (normal range: $150-410 \times 10^9/L$), and an elevated ESR level of 110 mm/hr (normal range: ≤ 12 mm/hr). The levels of liver enzymes were within the normal range. Aspartate aminotransferase (AST) level was 9 U/L, which fell within the normal range of 5-34 U/L. Alanine transaminase (ALT) level was 18 U/L, also within the usual range of <44 U/L. Total serum bilirubin level was 8 $\mu\text{mol/L}$, within the normal range of 3-21 $\mu\text{mol/L}$. Alkaline phosphatase level was increased at 247 U/L, beyond the normal range of 40-150 U/L. The D-dimer level was 2009 ng/ml, which was within the normal range of less than 500 ng/ml. The CRP level was 48 gm/l, above the usual range of less than 6 gm/l. The results of the hepatitis A, B, and C virus screening were negative. The levels of urea, creatinine, and electrolytes were within the normal range. The blood film revealed the presence of hypochromic microcytic red blood cells, which are indicative of iron deficiency anemia. There was also evidence of neutrophil leukocytosis in the white blood cells, with no immature cells observed. Additionally, the blood film showed an increase in platelets. The bone marrow testing yielded normal results. The blood culture indicated the presence of *Streptococcus epidermidis* growth. The results of the Myeloproliferative Neoplasm (MPN) Panel were negative. Radiological tests revealed that a CE-MRI of the dorsal and lumbar spine indicated the presence of a para-aortic abscess together with septic thrombosis of the inferior vena cava. Based on historical records, the patient has been diagnosed with paravertebral abscess and inferior vena cava thrombosis, which has further led to urosepsis.

TABLE 1. The laboratory values of the patient

	Result	Normal range
hemoglobin	9.6 g/dl	12 - 15 g/dl
total white blood cell	$15.8 \times 10^9/L$	$4 - 10 \times 10^9/L$
neutrophil count	$12.4 \times 10^9/L$	$2 - 7 \times 10^9/L$
lymphocyte count	$2.8 \times 10^9/L$	$1 - 3 \times 10^9/L$
platelet count	$485 \times 10^9/L$	$150 - 410 \times 10^9/L$
ESR	67 mm/hr	≤ 12 mm/hr
aspartate	9 U/L	5 - 34 U/L
aminotransferase (AST)		
alanine transaminase (ALT)	18 U/L	< 44 U/L

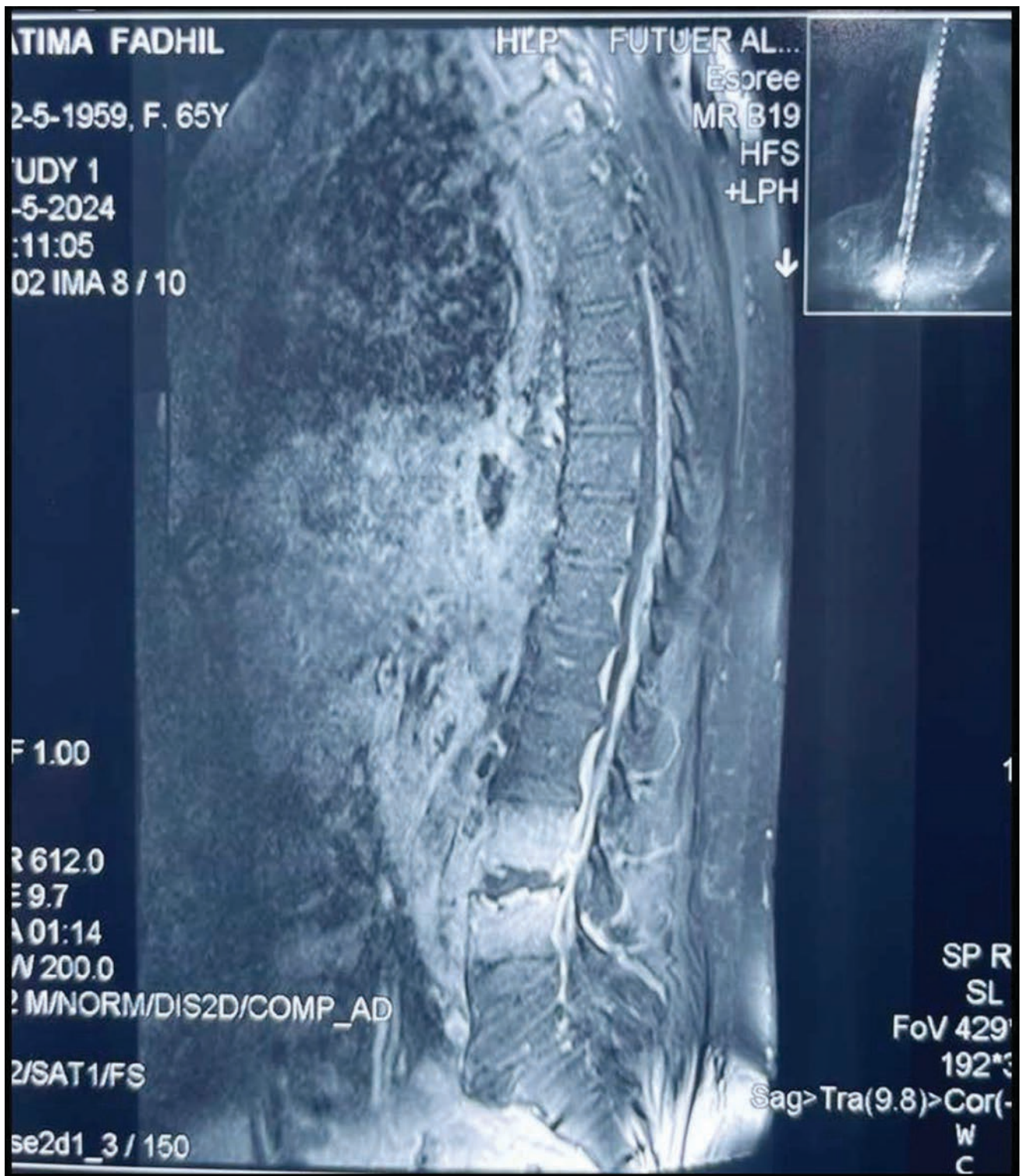


FIGURE 1. CE-MRI of the spine

The treatment approach consisted of:

- 1) administering a combination of broad-spectrum antibiotics (vancomycin, meropenem, and metronidazole) through the central venous route;
- 2) administering anticoagulation with an infusion of unfractionated heparin;
- 3) Surgical procedure performed by a neurosurgeon.

After a course of antibiotics and anticoagulant therapy lasting 2 weeks, the thrombosis in the inferior vena cava resolved completely and the paravertebral abscess showed partial improvement. A neurosurgical procedure was performed using a posterior route to drain an abscess and stabilize the damaged vertebra. The patient commenced ambulation three weeks postoperative, with all physiological indicators restored to their baseline values.

Treatment strategies

1- Antibiotic therapy: It is essential to promptly start treatment with powerful antibiotics administered intravenously in order to manage the underlying infection and stop the abscess from spreading further.

2- Evaluation conducted over the course of therapy to monitor progress and make necessary adjustments.

Conducting a clinical examination after 4 weeks is beneficial for evaluating the effectiveness of the treatment. Failure to see any change in symptoms (such as the absence of pain reduction or prolonged fever) or a consistently high level of C-reactive protein indicates a likelihood of treatment failure. MRI is of limited utility due to the weak association between clinical healing and improvement observed on MRI scans.

3- Surgical intervention: For big or intricate abscesses, surgical exploration and debridement may be required to eradicate the infection and facilitate the healing process [5].

DISCUSSION

Vertebral osteomyelitis and paravertebral abscess are rare infectious conditions that mostly affect adults through the bloodstream. Although infrequent, its prevalence has been noted in recent years because of a rise in the elderly population, hospital-acquired illnesses, and intravenous drug use [6].

The most common symptoms observed in patients with osteomyelitis and paravertebral abscess are back pain, pyrexia (fever), and muscular weakness. These symptoms were also present in our case. Additional clinical symptoms resulting from mass impact may include neurological impairment, changes in motor function, altered sensation, urine and intestinal problems, and paralysis [7].

MRI is a diagnostic imaging technology that is particularly effective in recognizing paravertebral abscess formation and high-signal-intensity marrow edema, which are hallmark signs of vertebral degeneration [8].

Streptococcus epidermidis infection, although formerly rare, has emerged as a significant opportunistic pathogen in recent years, mostly responsi-

ble for medical device-related infections. According to Pi Y et al., this pathogen has been identified as the cause of extensive spinal epidural abscess [9].

Farooq et al. found that inferior vena cava thrombosis can manifest as a complex paravertebral abscess [10].

Treatment:

1- If the patient does not exhibit any abnormal neurological examination or if imaging diagnostic tools do not indicate the presence of a spinal epidural abscess, then it is necessary to promptly start administering antibiotics.

- Acquire immediate imaging.
- Seek an immediate neurosurgical consultation.

2- If the imaging diagnostic tool indicates the presence of venous occlusion (VO), then:

- If the patient's cardiovascular system is unstable, promptly administer antibiotics.
- If the patient's cardiovascular system is stable, antibiotics can be postponed until after the biopsy, unless blood cultures indicate the presence of infection.
- It is recommended to have a consultation with a neurosurgeon.
- Conduct a neurological assessment at intervals of 4 hours.

If the patient's cardiovascular system is functioning normally and there are no indications of abnormalities in imaging or microbiological tests, it is advisable to explore alternative diagnosis.

- If the pain continues, have another imaging procedure in 1-3 weeks.

Seek guidance from the Infectious Diseases Service for assistance in managing antibiotics and conducting additional evaluation [11].

CONCLUSION

Paravertebral abscess is a critical emergent condition required a necessary therapy protocols to stabilize the patient status. The timing of intervention is crucial in cases of paravertebral abscess, as the existence of a mass can led to spinal cord compression. Prompt management is essential to prevent long-term damage.

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