

## Spondylodiscitis Associated with Multiple Vascular Accesses for Hemodialysis

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### Abstract

### Case Report

**Introduction:** Spondylodiscitis (also called vertebral osteomyelitis) is the most frequent form of bone involvement. The most frequently isolated pathogen is *S. aureus* (more than 50% of cases), which can lead to disabilities and even death [4]. The most common pathogenic route is hematogenous dissemination, favored by the irrigation system of the spinal column, mainly affecting the lumbar spine due to its greater vascularization [5]. **Case Report:** A 67-year-old female with a history of stage 5 chronic kidney disease secondary to nephroangiosclerosis due to arterial hypertension, on renal replacement therapy 13 years ago, initially with peritoneal dialysis for approximately 11 years, with subsequent admission to three-weekly hemodialysis 2 years ago. Presents sudden mild to moderate low back pain, increasing progressively for 2 weeks, becoming incapacitating; presented painful lumbar region with active movements; flexoextension of the lower limbs limited by pain, right lower limb: positive straight leg raise (SLR) test and Lasègue's sign. A magnetic resonance of the spine showed signs of spondylodiscitis between L4/L5 vertebrae, conditioning spinal canal stenosis; disc protrusion between L3-L4 and L4-L5 vertebrae; a probable abscess in the left multifidus muscles and a fluid collection in the right iliocostalis muscle. **Conclusions:** Early identification of high-risk patients could improve patients' safety and care. Implementation of diagnostic scores should be evaluated in centers with high flow of hemodialysis patients. Pain relief should be assessed appropriately and warranted for patients who overcome spondylodiscitis to improve their quality of life. Adequate treatment, initialized by prompt intravenous broad-spectrum antibiotic administration should be given to diminish morbidity and mortality.

**Keywords:** Spondylodiscitis, *S. aureus*, hematogenous dissemination, peritoneal dialysis, Adequate treatment.

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## INTRODUCTION

Osteomyelitis is an old disease, described from archeological animal fossils, that comprises an acute or chronic inflammatory process of the bone and its structures, caused by infection of pyogenic organisms (i.e., bacteria, mycobacteria, etc.). Through time, many terms were used to describe it until Nelaton came up with the current one in 1844. Before the introduction of penicillin in the 1940s, management of osteomyelitis was mainly surgical: extensive debridement,

saucerization, and wound packing, leaving the affected area to heal by secondary intention, resulting in sepsis and associated high mortality [1].

Spondylodiscitis (also called vertebral osteomyelitis) is the most frequent form of bone involvement, occurring more frequently in men > 50 years old [2]; with a dramatically rising annual incidence rate over the last decade: around 150 to 260%, leading to longer in-hospital stay and long-term

socioeconomic burden [3]. The most frequently isolated pathogen is *S. aureus*, accounting for more than 50% of cases. Patients with *S. aureus* bacteremia can develop complications that are often difficult to diagnose, which lead to disabilities and even death [4]. The most common pathogenic route is hematogenous dissemination, favored by the irrigation system of the spinal column, mainly affecting the lumbar spine due to its greater vascularization [5].

## CASE REPORT

A 67-year-old female with a history of stage 5 chronic kidney disease secondary to nephroangiosclerosis due to arterial hypertension, on renal replacement therapy 13 years ago, initially with peritoneal dialysis for approximately 11 years, with subsequent admission to three-weekly hemodialysis 2 years ago.

Dialysis access history:

- Tenckhoff catheter 13 years ago, functional for 10 years.
- Tenckhoff catheter 3 years ago, functional for 1 year.
- Left brachiocephalic arteriovenous fistula in December 2019, non-functional.
- Permanent right jugular hemodialysis catheter in December 2019, functional until November 2021.
- Temporal right jugular hemodialysis catheter in November 2021.
- Permanent right jugular hemodialysis catheter December 2021, dysfunctional plus multiple infections, removed in April 2022.

- Temporal left jugular hemodialysis catheter in April 2022.
- Permanent left jugular hemodialysis catheter in May 2022.

Patient present's sudden mild to moderate low back pain, which increases progressively for 2 weeks, becoming incapacitating, with irradiation to the lower extremities, accompanied by paresthesia, loss of strength and functionality, and malaise. On physical examination, she was febrile, with generalized pallor, with multiple ecchymoses in the upper limbs and anterior thorax; presented a hemodialysis catheter with no signs of infection; painful lumbar region with active movements; flexoextension of the lower limbs limited by pain, signs of radiculopathy in the right lower limb: positive straight leg raise (SLR) test and Lasègue's sign.

Subsequently, she was admitted to hospital where she received pain therapy and specialty management, without achieving favorable results, even with analgesia at maximum doses and corticosteroid infiltration.

A magnetic resonance of the spine was performed, showing signs of spondylodiscitis between L4/L5 vertebrae, conditioning spinal canal stenosis; disc protrusion between L3-L4 and L4-L5 vertebrae; a probable abscess in the left multifidus muscles and a fluid collection in topography of the right iliac muscle (Image 1).



**Image 1: Spine magnetic resonance. A,B: T1-weighted. C: T2-weighted SPAIR (spectral attenuated inversion recovery).**

Treatment focused on intravenous broad-spectrum antibiotics, surgical drainage of the abscesses

and pain therapy, achieving resolution of the infection, but poor pain control throughout short-term follow-up.

## DISCUSSION

The incidence of spondylodiscitis has been growing in recent years due to the increase in life expectancy, the use of immunosuppression treatments and especially to the increase in the incidence of nosocomial bacteremia secondary to intravascular device usage, these being the leading cause of bacteremia in hemodialysis patients [6].

As in this case, the diagnosis of spondylodiscitis is usually late, favoring the spread of the infectious focus, spinal cord compression and neurological deficits. The most frequent symptom is back pain in more than 85% of patients. It is an insidious, constant but nonspecific pain that progressively worsens over weeks and even months [7]. Fever, on the other hand, is only present in 30-52% of patients. Another diagnostic difficulty is that leukocytes can be normal in up to 50% of cases. An increase in acute phase reactants is usually observed in 80% of them, mainly the erythrocyte sedimentation rate and C-reactive protein. Its progressive decrease is an excellent marker of adequate response to treatment [5]. In contrast with the higher frequency of this pathology in men, in this case patient was female, leading to spread awareness despite patient sex, considering clinical history first.

Despite advances in diagnostic modalities and increasing medical awareness, spondylodiscitis is frequently overlooked, misdiagnosed, or mismanaged due to non-specific symptoms. Unfortunately, delayed diagnosis of this disease correlates with unfavorable treatment outcomes as well as a mortality rate of up to 27% [8].

A diagnostic score has been developed by Heuer *et al.*, called The Hamburg Spondylodiscitis Assessment Score (HSAS), for immediate evaluation of mortality risk on hospital admission [6]. In this study, 14% of patients with spondylodiscitis were deceased during their in-hospital stay at a tertiary center for spinal surgery; univariate and logistic regression analyses showed that age older than 72.5 years, rheumatoid arthritis, creatinine > 1.29 mg/dL, increased the risk of mortality 3.9-fold, 9.4-fold, and 4.3-fold, respectively, and, that *S. aureus* detection increased the risk of mortality by 2.3-fold [4]. Concluding that it showed a good fit identifying patients at low-, moderate-, high- and very high risk for in hospital mortality on admission (AUC: 0.795;  $p < 0.001$ ) [6]. Similarly, the SponDT (Spondylodiscitis Diagnosis and Treatment) spondylodiscitis scoring system showed that it could be used to support the diagnosis of spondylodiscitis, particularly in patients suffering from back pain and elevated levels of inflammation, and even could be used during treatment to optimize control of therapy [9]. Thus, implementation of these scores into

clinical practice and development of similar ones could ease identification of high-risk patients and improve the patient's safety and outcome.

Also, it is to be noted that since the availability of antibiotics, mortality rates from osteomyelitis, including staphylococcal osteomyelitis, have improved significantly. However, the risk of recurrence increases in the presence of accompanying illnesses such as diabetes mellitus, renal failure, or undrained epidural abscesses [1]. In this case, the vascular access history needs to be highlighted; multiple vascular accesses lead to an increased risk of hematogenous spread of bacteria. Therefore, in patients who require long-term hemodialysis, a fistula-first approach should be always considered.

Finally, even if the quality of life of patients who have been appropriately treated for spondylodiscitis has been found to be highly satisfactory in general, pain remains the most concern post-treatment, even long-term after hospital discharge; especially back pain [10].

## CONCLUSION

Early identification of high-risk patients could improve patients' safety and care.

Implementation of diagnostic scores should be evaluated in centers with high flow of hemodialysis patients.

Pain relief should be assessed appropriately and warranted for patients who overcome spondylodiscitis to improve their quality of life.

Adequate treatment, initialized by prompt intravenous broad-spectrum antibiotic administration should be given to diminish morbidity and mortality.

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