

# Infection of an Ankylosed Thoracolumbar Spine Segment: A Case Series.

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## Learning Point of the Article:

Early surgical intervention aimed at drainage or stabilization of infectious lesions is crucial to disease control in cases with ankylosing spinal disorders.

## Abstract

**Introduction:** Ankylosing spinal disorders present significant challenges in cases of trauma, and the treatment of ankylosed spine infections may also be challenging. However, to the best of our knowledge, only one study to date has addressed this topic, reporting a mortality rate of 62%.

**Case Report:** Our patients were four men and one woman with a mean age of 72 years. Treatments consisted of intravenous antibiotics, a hard brace, and surgical interventions including percutaneous pedicle screw fixation in two patients, laminectomy and evacuation of the epidural abscess in one, and percutaneous lavage of the affected disc in two. The time from referral to intervention averaged 16 days. The mortality rate was 0% with healing of the infection with segmental bony fusion in four patients.

**Conclusion:** This is the second reported case series of ankylosed spine infections. Early surgical intervention aimed at drainage or stabilization of the infectious lesions is crucial to disease control.

**Keywords:** Ankylosing spinal disorders, infection, spondylodiscitis, percutaneous pedicle screw fixation.

## Introduction

Ankylosing spinal disorders (ASDs) such as ankylosing spondylitis and diffuse idiopathic skeletal hyperostosis are chronic conditions with major symptoms of reduced mobility and deformity of the trunk [1, 2]. They present significant challenges in cases of trauma, given the unstable configuration of ankylosed spine fractures [3-5]. Likewise, the treatment of ankylosed spine infections may also be challenging due to the destructive nature of the infectious processes. However, information is scarce as, to the best of our knowledge, only one study has addressed this topic, reporting 13 patients with ankylosed spine infection [6]. Here, we report five cases of

ankylosed spine infection and discuss treatment outcomes and the significance of surgical intervention.

## Case Report

Case 1 was a 70-year-old male with a history of urethral cancer treated with total cystectomy. He was referred for severe back pain with destructive lesions of the mid-thoracic vertebrae. At referral, the patient had difficulty moving due to back pain. Physical examination found no motor weakness or sensory disturbance. Computed tomography (CT) scans showed destruction of the T7, T8, and T9 vertebrae with paravertebral soft-tissue swelling (Fig. 1a and b). In addition, ankylosis of the

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## Author's Photo Gallery



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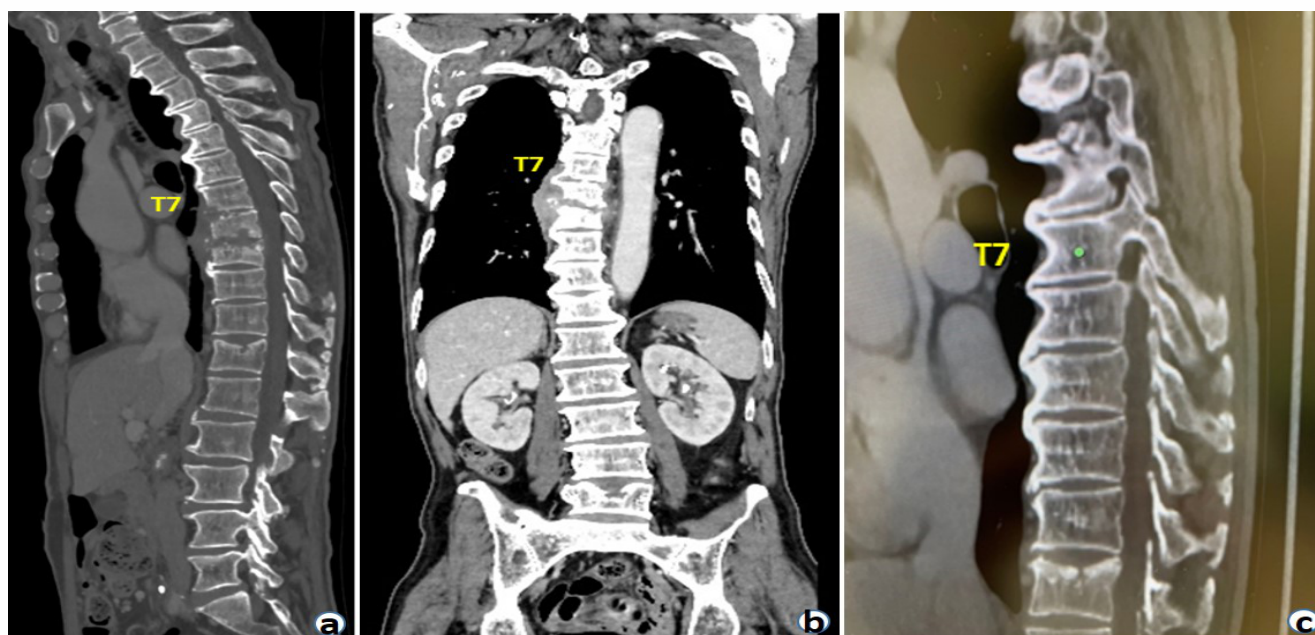
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**Figure 1:** (a) Sagittal image of a plain computed tomography (CT) scan showing destruction of the T7, T8, and T9 vertebrae and ankylosis of the spine from T2 to T7 with ossification of the anterior longitudinal ligament (ALL). (b) Coronal image of a contrast-enhanced CT scan showing paravertebral soft-tissue swelling at the T7, T8, and T9 vertebrae with vertebral destruction and ankylosis of the spine from T9 to L1. (c) Sagittal CT image taken 1 year before the referral demonstrating the presence of ankylosis with ossification of the ALL in the thoracic spine including the T7, T8, and T9 vertebrae.

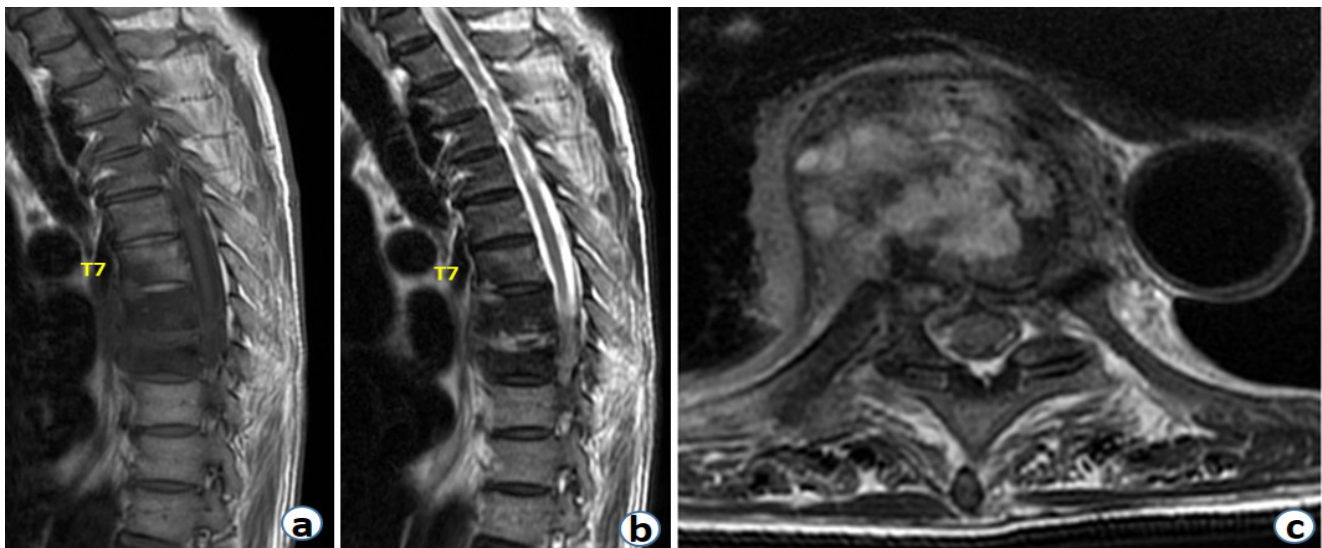
spine was noted from T2 to T7 and from T9 to L1 with ossification of the anterior longitudinal ligament. CT scans taken 1 year earlier demonstrated ankylosis from T7 to T9 (Fig. 1c), indicating the formation of ankylosis from T2 to L1 before the present examination. Magnetic resonance imaging showed discovertebral signal changes in the T7-T9 vertebrae with putative formation of an intradiscal abscess at the T8/9 intervertebral disc level (Fig. 2a, b, c). Laboratory test results revealed a white blood cell count of 9300/ $\mu$ L and C-reactive protein (CRP) of 16.03 mg/dL. Blood cultures confirmed methicillin-resistant *Staphylococcus aureus* (MRSA). On the diagnosis of infectious spondylodiscitis in the T7, T8, and T9 vertebrae within the ankylosed thoracolumbar segment (T2-L1), intravenous antibiotic therapy was initiated, followed by percutaneous posterior instrumentation from T4 to T12 at 1 week (Fig. 3a and b). CRP normalized 1 week after the surgical treatment. Follow-up CT scans confirmed fusion of the T7, T8, and T9 vertebrae at 14 months postoperatively (Fig. 4a, b, c).

Table 1 summarizes the clinical features of the five cases. There were four men and one woman with a mean age of 72 years (range: 64–79 years). Levels of ankylosis included the thoracic (T5-T12), thoracolumbar (T1-L3, T2-L1, and T3-L2), and thoracolumbosacral (T3-S1) spine. Four patients had infection in the ankylosed spine (T5-T8, T7-T9, T9-T10, and L3-L4), and one patient had infection at the end of the ankylosed spine

(ankylosis: T1-L3; infection: L3-L4). The patient with spondylodiscitis of the T9-T10 vertebrae had an epidural abscess at the T11 level. The causative organisms were MRSA in two patients and methicillin-sensitive *S. aureus*, *Acinetobacter baumannii*, and *Candida albicans* in one patient each.

The present treatments consisted of intravenous antibiotics and a hard brace. In addition, two patients with thoracic spine infections underwent percutaneous pedicle screw (PPS) fixation. The patient with the epidural abscess at T11 underwent laminectomy and evacuation of the epidural abscess for progressive paraplegia. The remaining two patients with lumbar spine infections received percutaneous needle biopsy and lavage of the affected disc. The time from referral to intervention averaged 16 days (range: 7–29 days).

In the two patients who underwent PPS fixation and the patient who underwent laminectomy, the infection healed with bony fusion in about 1 year with no recurrence. In the two patients who underwent disc lavage, CRP levels returned to normal within 4 months. However, the disease flared up following the discontinuation of intravenous antibiotic therapy. One case ultimately required 4 years until the infected vertebrae fused. The other patient had failed to achieve fusion of the affected vertebrae at the final follow-up at 1 year.



**Figure 2:** A T1-weighted sagittal magnetic resonance (MR) image (a), a T2-weighted sagittal MR image (b), and a T2-weighted coronal MR image (c), showing discovertebral signal changes in the T7-T9 vertebrae with putative formation of an intradiscal abscess at the T8/9 intervertebral disc level.

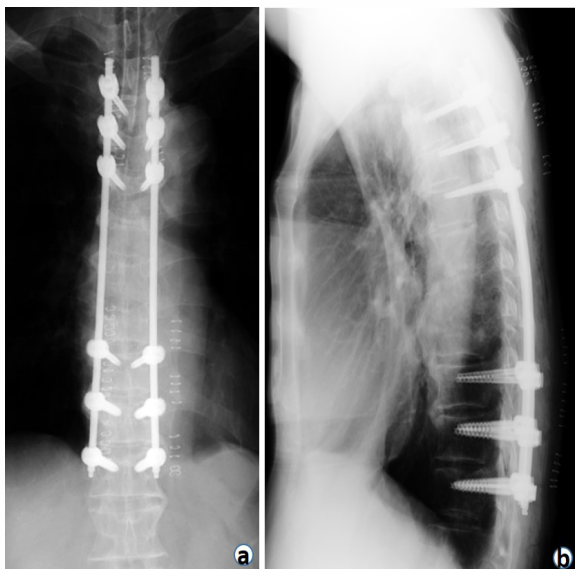
### Discussion

In this report, we present five cases of bacterial or fungal infections of an ankylosed thoracolumbar spine segment. To the best of our knowledge, the literature includes only one other study addressing the same topic [6]. Therefore, we compare these two reports in our discussion of the treatment courses and outcomes of the patients.

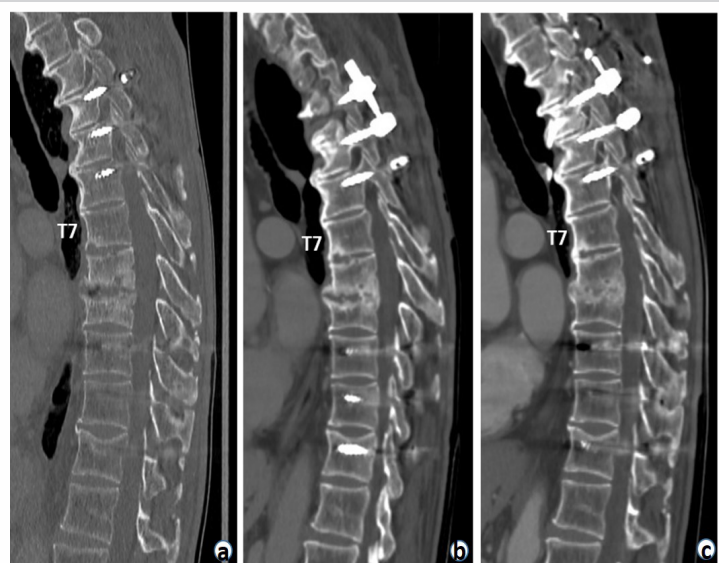
A significant finding in the study by Yamada et al. [6] reporting 13 patients with ankylosed spine infections is their poor life

expectancy, with a mortality rate of 62% (eight patients). In contrast, the mortality rate was 0% in our five patients during follow-up periods from 12 months to 54 months. In Yamada's study, one patient died of heart failure at 2 year after treatment, and all of the remaining seven patients died within 0.9 year [6], suggesting that the short follow-up periods of our study almost certainly did not affect the difference in mortality rates.

The difference in mortality rates between the two studies may be due to the management of the patients, including surgical interventions. In Yamada's et al. study [6], only 3 of the 13



**Figure 3:** Post-operative anteroposterior (a) and lateral (b) X-rays.



**Figure 4:** Post-operative sagittal computed tomography scan images at 4 months (a), 8 months (b), and 14 months (c). The affected vertebrae (T7, T8, and T9) were fused at 14 months postoperatively.

Case	Age	Sex	Ankylosis	Infection	Microorganisms	Intervention	Interval to bone fusion
1	70	M	T2-L1	T7-T9	MRSA (B)	PPS (T4-T12)	14 m
2	64	M	T5-T12	T5-T8	MSSA (B)	PPS (T2-T11)	19 m
3	71	F	T3-T12	T9-T10 (T11 EA)	MRSA (B)	Laminectomy (T10-T11)	12 m
4	76	M	T3-S1	L3,4	Candida albicans (PA)	Disc lavage	54 m
5	79	M	T1-L3	L3,4	Acinetobacter baumannii (IVD)	Disc lavage	Not achieved at 12 m

**EA: Epidural abscess, MRSA: Methicillin-resistant Staphylococcus aureus, MSSA: Methicillin-sensitive Staphylococcus aureus, B: blood, PA: Psoas abscess, IVD: Intervertebral disc, PPS: Percutaneous pedicle screw instrumentation**

**Table 1: Clinical pictures of five cases.**

patients underwent surgical intervention (posterior drainage in two and anterior debridement and fusion in one). In contrast, in our series, all five patients underwent surgical intervention within an average of 16 days, suggesting the importance of early surgical intervention. In support of this interpretation, a current meta-analysis [7] and a binational comparative study [8] have demonstrated that early surgical intervention significantly outperformed conservative management in mortality rates in patients with pyogenic spondylodiscitis.

As in the case of patients with fractures of the ankylosed spine, the pre-existing frailty of this population of patients, who are typically older and have medical morbidities, is a major obstacle to surgical intervention. To address this issue, the authors used percutaneous techniques including PPS and percutaneous disc lavage in cases of infection, based on our previous experience of percutaneous techniques in trauma cases [9, 10].

### Conclusion

This is the second reported case series of ASD-related spinal infections. Early surgical intervention aimed at drainage or stabilization of the infectious focuses may play a more important role in disease control in cases with ASDs than in those without.

### Clinical Message

The treatment of ankylosed spine infections may be as much challenging as that of ankylosed spine fractures. However, information is scarce as only one study to date has addressed this topic, reporting a mortality rate of 62%. Early surgical intervention aimed at drainage or stabilization of the infectious lesions is crucial to disease control and better clinical outcomes in cases with ASDs.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Conflict of interest:** Nil **Source of support:** None



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