



# Multimodal management for low-back pain associated with spondylodiscitis

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## Abstract

Spondylodiscitis is a rare and severe condition which can lead to progressive spinal deformities and poor functional outcomes. Clinical management of low-back pain associated with spondylodiscitis has not been reported, as low back pain often persists even after appropriate treatment of spondylodiscitis. A 70-year-old woman with a 4-month history of nonspecific low-back pain and spondylodiscitis presented to the chiropractic clinic for conservative management. The symptoms started with abdominal discomfort, diarrhea, intermittent bilateral gluteal pain, and lower-extremity soreness. Gastritis and urinary tract infection were initially diagnosed. Thoracic radiography, magnetic resonance imaging (MRI), and computed tomography (CT) were indicative of spondylodiscitis at the T10/11 level, and her low-back pain was treated successfully with systemic antibiotics, scraping therapy, and spinal manipulative therapy. As there are limited data to suggest treatment modalities and extend care of spondylodiscitis, we report a case of successful management of low-back pain associated with spondylodiscitis, with multimodal therapy in a faster recovery time.

**Keywords:** chiropractic, intervertebral disc, multimodal management, spondylodiscitis

## Introduction

Spondylodiscitis is characterized by an initial infection of the intervertebral disc, which is followed by its destruction, and a secondary infection of the vertebrae, beginning at the endplates [1]. It is a rare condition that has seen an increase in diagnoses in recent years and it is linked to significant morbidity and mortality rates [2]. It is crucial for clinicians to recognize the signs and symptoms, establish a prompt diagnosis, and treat this problem using a multidisciplinary approach to avoid more serious complications [3]. As there are limited data to suggest treatment modalities and extend care [4], we report a case of multimodal management featuring systematic antibiotic and chiropractic therapy of low-back pain associated with spondylodiscitis.

## Case History

A 70-year-old retired female,

former hospital administrator, presented to a chiropractor with a 4-month history of nonspecific low-back pain and spondylodiscitis. The symptoms started with abdominal discomfort, diarrhea, intermittent bilateral gluteal pain, and lower extremity soreness. Her lower-back pain was rated 4/10 on an 11-point numeric pain scale, where 0 indicated no pain and 10 indicated the worst pain imaginable. She first visited a gastrointestinal specialist where she received medications, with no improvement. After 2 weeks, she developed on-and-off fever and dysuria and was admitted to a local hospital. Laboratory tests indicated infection with high levels of white blood cells (WBC) and mild acute kidney injury (AKI) with creatine (Cr). The bacterial culture was positive for urosepsis from *Proteus mirabilis* infection. During admission, she showed signs of mild fluid overload with shortness of breath, dry cough, and lower leg edema. Her chest radiograph was

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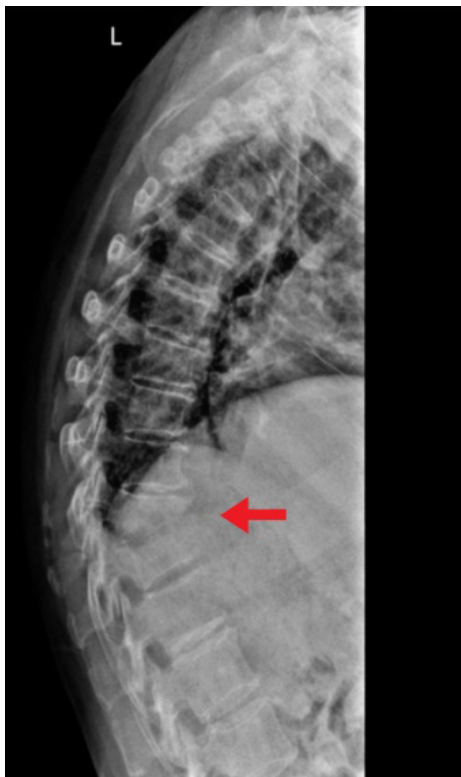
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## Case Report

consistent with mildly congested lungs (Figure 1). Urinary tract infection was diagnosed and treated with rocephin and lasix for 4 weeks. Her WBC and Cr levels returned to normal, and she was discharged with a home prescription of ammonia and ipecacuanha mixture, pantoprazole sodium sesquihydrate, aspirin, and paracetamol for 6 weeks.



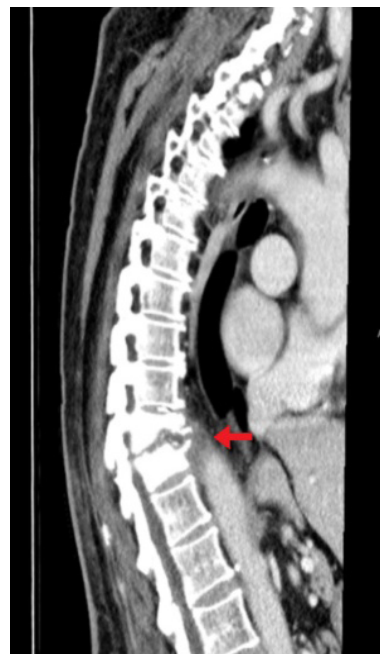
**Figure 1.** Her chest radiograph identified bilateral apical pleural thickenings, which was consistent with mild congested lungs.



**Figure 2.** The thoracic radiograph showed destructive osseous process centered at T10/11 disc space with end plate erosion and significant paraspinous soft tissue, compatible with spondylodiscitis.

However, her lower-back pain remained the same. She underwent acupuncture and physiotherapy for two weeks, with no improvement. She then presented to the chiropractor and had radiographs of the thoracic and lumbar regions (Figure 2). Spondylodiscitis at T10/11 segments was diagnosed, and she was immediately referred to the orthopedic department in the district hospital. During hospital admission, the patient developed non-exceptional chest discomfort without radiating symptoms.

During the 2 months of hospital admission, contrast-enhanced computed tomography (CT) (Figure 3) showed T10/11 spondylodiscitis with 0.6-cm-thick epidural component, cord compression, and a small 1-cm-thick right posteromedial empyema. Her blood test results were positive for elevated C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). Percutaneous fine-needle aspiration biopsy of the vertebra with imaging guidance, Gram stain, acid-fast bacillus smear, and fungus tests were all negative. Repeated biopsy was recommended, but the patient refused to repeat the test. Based on the radiological examinations and clinical findings, spondylodiscitis was diagnosed. Intravenous augmentin and rocephin treatment was administered for 2 months, and her ESR improved and CRP normalized. Repeated CT of the thorax and thoracic spine revealed similar T10/11 spondylodiscitis with epidural components. She was discharged with home prescriptions of levofloxacin, rifampicin, paracetamol, and physiotherapy for four weeks. As her lower-back pain remained the same after traditional medical treatment, she returned to her chiropractor for additional conservative therapy.



**Figure 3.** The contrast-enhanced computed tomography (CT) showed T10/11 spondylodiscitis with 0.6-cm-thick epidural component and cord compression and small 1-cm-thick right posteromedial empyema.

On chiropractic examination, the patient walked slowly with her husband and cane. Observation of the standing posture revealed hyperkyphosis in the upper back region. The symptoms were exacerbated when lifting, twisting, or holding heavy objects, and in pain. Coughing and sneezing also caused the aggregation of mild symptoms. However, getting off from the chair after prolonged sitting (30 min) and right lateral lumbar flexion exacerbated her lower-back pain. Prolonged walking (2 blocks) and sleep on the back also induced symptoms. She reported that holding her abdominal area with her hands also reduced the symptoms. Magnetic resonance imaging (MRI) of the thoracic region (Figure 4) revealed prevertebral soft tissue edema at the T10/11 level. Endplate irregularity and moderate reduction of anterior vertebral body height at T10 and T11 were noted. Mild-to-moderate stenosis of the central canal due to retropulsion of the partially collapsed T10 and T11 vertebral bodies was noted. Bilateral neural foraminal narrowing due to uncovertebral joint hypertrophy was observed. Motion palpation examination revealed intersegmental restriction at the C3/4, C5/6, T4/T5, T9/10, T10/11, T11/12, and L4/L5 levels. Soft tissue palpation of the T10–12 elicited tenderness. T10–12 Spinous process had percussion tenderness, and no obvious stepping. The sensory and reflex functions were identical and intact bilaterally. The motor function was rated 4 in the right iliopsoas. Hypertonic muscle fibers were identified in the right upper trapezius, bilateral quadratus lumborum, right gluteal muscles, and lateral hamstrings. Her clinical and radiological findings were consistent with spondylodiscitis T11/2.



**Figure 4.** Magnetic resonance image (MRI) of the thoracic region revealed prevertebral soft tissue edema is present at T10/11 level. Endplate irregularity and moderate reduction of anterior vertebral body height of T10 and T11 was observed. There is mild-to-moderate stenosis of the central canal due to retropulsion of the partially collapsed T10 and T11 vertebral bodies. Bilateral moderate neural foraminal narrowing due to uncovertebral joint hypertrophy.

Multimodal chiropractic therapy included gentle manipulative therapy of the restricted joints and scraping therapy on the muscular hypertonicity. The treatment plan

started with three sessions a week. After the first week, she described that the pain symptoms improved from 4/10 to 1/10. She slowly reduced her pain medication on the second week because she felt that the medication could not help the symptoms. Cervical spinal manipulation, thoracolumbar mobilization along with muscle stretching, such as quadratus lumborum, gluteal squeeze, hamstring stretch, and squat, were applied to increase muscle strength and improve spinal alignment. Non-surgical spinal decompression therapy (Shinhwa Medical, Busan, Korea) with thoracic extension was also applied (Figure 5). The treatment plan was modified to two times a week for three weeks.



**Figure 5.** Non-surgical spinal decompression therapy (Shinhwa Medical, Busan, Korea) with thoracic extension was also applied to the patient in supine position. The patient's knee is flexed with three fasten belt stabilized the chest, rib cage, and iliac crest.

All symptoms including full hip and back mobility were recovered 1 month after the beginning of chiropractic treatment. Her World Health Organization quality of life score (WHOQOL) improved from 44% to 92%. No adverse events were reported. Her posture improved (Figure 6), motor function remained at 5/5, and she was able to move freely without assistance.



**Figure 6.** Standing posture observation revealed hyperkyphosis of the upper back region (left). Improvement of posture was recorded after multimodal chiropractic therapy (right).

### Discussion

Spondylodiscitis is very rare, but it has been linked to serious morbidity and mortality rates [2]. The prevalence of spondylodiscitis was estimated at 5.8 per 100,000 persons in a Danish population-based study and 30 per 250,000 persons in the German Federal Statistical data [5]. Early identification and management of spondylodiscitis are essential for maximizing the probability of a positive outcome, although they are frequently delayed owing to its vague presentation and absence of fever [5]. This condition can result in disability and advanced spinal deformities [4].

Patients with spondylodiscitis mostly have generic clinical symptoms such as low-back pain without fever, and they are often misdiagnosed or delayed in diagnosis [1]. In addition to pathogen testing, magnetic resonance imaging (MRI) is the gold standard for the radiological investigation of spondylodiscitis [5]. It also provides observations of the spatial extent of the infection and the formation of abscesses with a specificity of 96% and a sensitivity of 92% [5]. Radiography and CT are utilized for follow-up imaging and surgery. If tissue cultures and laboratory tests are negative, performing open surgical biopsies rather than CT-guided biopsies is preferred [2]. Thoracic radiography, CT, and MRI imaging showed strong evidence of spondylodiscitis at the T10/12 level in our case. However, with negative findings in blood culture and CT-guided biopsy, our case has a limitation in the diagnosis, as the patient refused to undergo open surgical biopsy.

The objectives of spondylodiscitis treatment are to eliminate infection, restore spinal function, and alleviate pain [5], and the symptoms can lead to high disability and poor quality of life [1]. Some patients may have protracted, chronic infections that continuously damage the vertebral body and intervertebral disc, leading to substantial spinal deformity and low WHOQOL [1]. Starting with conservative therapy, systemic antibiotics are effective in eliminating infection [5], scraping therapy is effective in improving soft tissue healing and alleviating pain [6]; and spinal manipulative therapy is effective in restoring spinal function, alleviating pain, and improving quality of life [7,8]. Non-surgical spinal decompression therapy is effective in reducing neurological pain caused by the spinal disc [9]. Surgical intervention is only applied when the clinical presentation involves spinal instability, sepsis, neurological impairments, and intraspinal empyema [5]. However, lower-back pain often persists even after appropriate treatment for spondylodiscitis [5].

The surgical treatment plans are based on the severity of spondylodiscitis [2]. Surgery may lead to a significant pain reduction for spondylodiscitis than medications alone, according to the functional results between patients who received medications and surgery, but patients often do not feel improvement for several months [1]. There is limited data to suggest treatment modalities and extending care [4]. Physical therapy and rehabilitation play significant

roles in enhancing the functional prognosis of patients with spondylodiscitis [10]. Early rehabilitation is essential to reduce mortality and financial costs [10]. However, extensive drug therapy and slow rehabilitation have been identified in most patients with spondylodiscitis [11]. As chiropractic therapy is an effective therapy with very rare adverse events [12], multimodal therapy featuring systemic antibiotics, gentle manipulative therapy, and scraping therapy were utilized in managing symptoms of spondylodiscitis in this case. Gentle manipulative therapy mobilized the restricted joints and reduced the pain [13], and scraping therapy relaxed hypertonic muscles and created physiological responses to stimulate immune system [6]. Together, they provide quicker recovery of the symptoms and improvement of the quality of life.

### Conclusion

Persistent lower-back pain without radiculopathy may be a sign of spondylodiscitis. Early detection of symptoms, appropriate examinations, timely diagnosis, and multidisciplinary management are essential to avoid severe complications. MRI is considered the gold-standard diagnostic tool for thoracic spondylodiscitis. Low-back pain associated with spondylodiscitis can be treated with systemic antibiotics and chiropractic therapy, with a faster recovery time. Surgical intervention is only applied when conservative treatments fail, as low-back pain often persists even after the appropriate treatment of spondylodiscitis.

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