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Lumbar Spondylodiscitis Caused By Morganella Morganii

Morganella Morganii'nin Neden Olduğu Lomber Spondilodiskitis

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ABSTRACT

To report of a case of lumbar spondylodiscitis caused by Morganella morganii and to discuss surgical treatment of spondylodiscitis by an extended posterior paramedian approach and posterior instrumentation. Instrumentation was performed by an extended posterior paramedian approach for our patient, although instrumentation remains controversial in patients with pyogenic vertebral infection. The patient recovered well with combined surgical and medical treatment. Morganella morganii, a facultative anaerobe inhabitant of the human gastrointestinal tract, grew on cultures. Morganella morganii is a rare offending agent of spondylodiscitis. An extended lumbar posterior paramedian approach in combination with simultaneous posterior interbody grafting and internal fixation with pedicle screws may be a suitable procedure for treatment of lumbar spondylodiscitis. Posterior instrumentation may be performed safely in the presence of spinal pyogenic infection.

KEY WORDS: spinal osteomyelitis, spinal infection, posterior spinal approaches, spinal instrumentation, Morganella morgagnii

ÖZ

Morganella morganii'nin neden olduğu bir lomber spondilodiskit olgusunun sunulması ve genişletilmiş arkadan paramedian girişim ve arkadan enstrümantasyon ile cerrahi tedavinin tartışılması. Pyojenik omurga infeksiyonu olan olgularda enstrümantasyon uygulanması tartışmalı olmasına rağmen, hastada genişletilmiş arkadan paramedian girişim ile enstrümantasyon uygulandı. Hasta cerrahi tedavi ve ilaç tedavisi kombinasyonundan yarar gördü. Alınan örneklerde insan mide-barsak sistemi florasının fakültatif anaerob bir üyesi olan Morganella morganii üredi. Morganella morganii spondilodikitte ender saptanan bir etken ajandır. Lomber spondilodiskit tedavisinde genişletilmiş arkadan paramedian girişimle arkadan omurlar arası greft konulması ve pedikül vidası ile enstrümantasyon uygun bir seçenek olabilir. Omurgada piyojenik infeksiyon varlığında arkadan enstrümantasyon güvenle uygulanabilir.

ANAHTAR SÖZCÜKLER: Omurga osteomyeliti, omurga infeksiyonu, arkadan omurga girişimleri, omurga enstrümantasyonu, Morganella morgagnii

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INTRODUCTION

Pyogenic infection of the intervertebral disc and adjacent vertebral bodies is a rare disease, with the incidence ranging from 1 in 100,000 to 1 in 250,000 (11). It can cause serious morbidity if recognition of the infectious agent and installation of appropriate antimicrobial therapy are delayed. Although some bacteria of intestinal flora, especially Escherishia coli, have been reported as the offending agents in patients with spinal infections, there have been no reported cases caused by Morganella morganii, another inhabitant of the human gastrointestinal tract.

We performed debridement, posterior interbody grafting and posterior instrumentation by an extended posterior paramedian approach to treat lumbar spondylodiscitis in a patient with pyogenic infection caused by Morganella morganii. The rarity of this infectious agent in this location and the characteristics of surgical treatment by posterior approaches and primary instrumentation in pyogenic spondylodiscitis are described.

CASE REPORT

A 48-year-old man was admitted with 3-month history of progressive low back and leg pain, and one week history of numbness and weakness in his right foot. The medical history revealed an abdominal trauma with an incisive tool followed by an abdominal operation at another hospital 4 months ago. Details of the trauma and the operation could not be obtained.

On physical examination, there was a 20 cm median abdominal incision scar. There was no fever. On neurological examination, straight leg raising test was positive at 20 degrees on the right side and at 30 degrees on the left. There was also a paresis with 3/5 muscle strength on dorsal flexion of the right foot, and an L5 dermatomal hypoesthesia on the right side. The lower lumbar area was tender and painful.

The only striking laboratory abnormality was the erythrocyte sedimentation rate (ESR) at 103 mm/h. There was an irregularity at the L4-5 disc level and an irregular radiolucent area at the L4 body on spinal X-ray examinations (Figure 1 A and B). MR

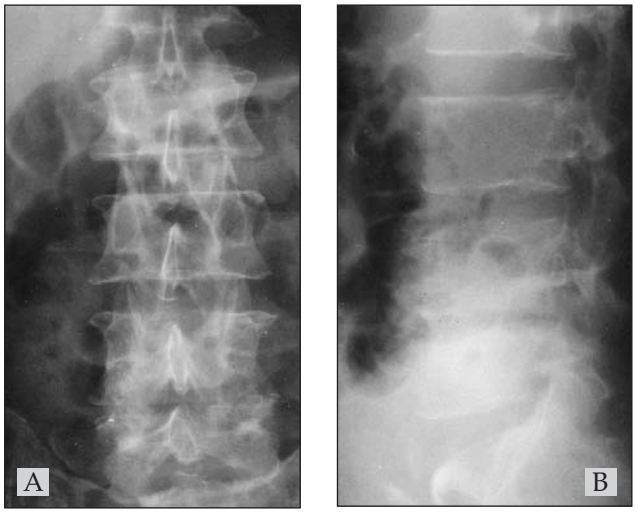


Figure 1: Preoperative lumbar AP (A) and lateral (B) X-ray examinations of the patient. Note the irregularity at the L4-5 disc level and irregular radiolucent area at the L4 body.

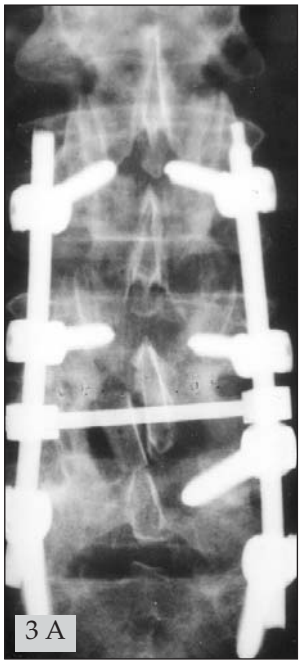
examination of the lumbosacral spine showed decreased signal intensity at the L4 and L5 vertebral bodies on sagittal T1-weighted images (Figure 2 A), an increased signal intensity and irregularity at the L4-L5 disc on sagittal T2-weighted images (Figure 2 B), and an epidural mass compressing the dural sac and roots at the L4-L5 disc level on axial images (Figure 2 C). After gadolinium administration, contrast enhancement at the interface between the infected disc space and vertebral bodies and a homogeneous enhancement at the epidural mass was seen (Figure 2D).

The tuberculin skin test was positive while the Wright agglutination test on blood was negative. There was no urinary infection. Chest radiograph showed a suspicious opacity superimposed on the clavicle and first rib at the right lung. On chest computed tomography, this nodular opacity at the superior segment of the inferior lobe of the right lung was accepted as an old and inactive tuberculosis lesion. There was no peculiarity on abdominal ultrasound examination.

During surgery, bilateral extended L4-L5 fenestration, facetectomy, discectomy, debridement of epidural granulation tissue, extended resection of end-plates, posterior interbody fusion with an iliac autograft and posterior stabilisation with pedicle screws and rods between L3 to S1 were carried out

Figure 2: Preoperative lumbosacral MR examination of the patient. A-Sagittal T1-weighted section. Note the decreased signal intensity at the L4 and L5 vertebral bodies. B-Sagittal T2-weigthed MR section. Note the increased signal intensity and irregularity at the L4-L5 disc. C-Axial MR section. Note the epidural mass compressing the dural sac and the roots. D-Sagittal T1-weighted MR section with gadolinium administration. Note the homogeneous enhancement at the epidural mass and interfaces between disc and end-plates.

by an extended posterior paramedian approach (Figure 3 A and B). Bone chips were spread out on decorticated laminae, facet joints and spinous processes for posterior fusion. At the L5 vertebra, a pedicle screw was performed at only the left side because the infection was spread out on the right



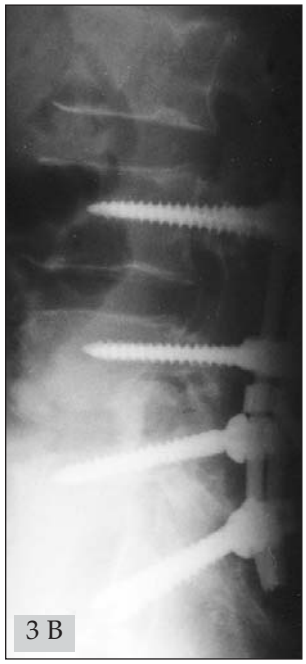


Figure 3: Postoperative lumbar AP (A) and lateral (B) X-ray examinations.

pedicle. Only one transverse bar was placed because the second transverse bar fell down during the operation.

The leg pain, paresis and hypoesthesia subsided within a few days following the operation and back pain decreased gradually. Acid-resistant bacilli were not seen in the removed material. Morganella morganii grew on cultures. Anaerobic cultures and cultures for Mycobacteriae failed to recover any organism. Histopathological examination revealed a chronic necrotizing inflammation consisting of polymorphonuclear leukocytes, histiocytes, lymphocytes, plasma cells and multinuclear giant cells.

The patient was mobilised with no orthesis on the first postoperative day. He was treated with ciprofloxacine and gentamicin according to the culture results. Therapy was continued intravenously for 4 weeks, and then orally with ciprofloxacine alone for 2 weeks. The ESR gradually returned to normal levels with antibiotic treatment.

There was no abscess or epidural granulation tissue on the control MR examination after 6 months, and there was no neurological deficit or sign of recurrent infection after 24 months.

DISCUSSION

Although infection of the intervertebral disc and adjacent vertebral bodies is a rare disease, severe neurological impairment is not uncommon and often requires emergent surgical intervention. However, treatment of this condition is not uniform, and the role of surgery and type of surgical approach remain controversial.

A wide spectrum of offending agents may be involved in pyogenic spondylodiscitis. Staphlococcus aureus is the most commonly isolated organism in every major series (6, 9, 10, 11, 25, 28, 29, 31). Sapico and Montgomerie reviewed the literature on pyogenic spondylodiscitis, finding that Gram-positive bacteria accounted for 68% of cases and Gram-negative bacteria for 29% (28). Morganella morganii is a Gram-negative microorganism belonging to the Enterobacteriaceae family. It is a facultative anaerobe present in the human gastrointestinal system as normal flora. Clinically, the organism is important when it manifests as an opportunistic pathogenic infection elsewhere in the body such as a postoperative infection (15), septic arthritis (19), or meningitis (22). It causes infection when a predisposing factor such as immunosuppression is present. Although some bacteria of intestinal flora such as Escherishia coli, Salmonella species, Proteus species, and Streptococcus milleri have been reported as offending agents in patients with spondylodiscitis (1, 9, 16, 17, 28, 31) there are no reported cases caused by Morganella morganii.

There are associated illnesses in 85-93.5% of patients with spontaneous pyogenic spondylodiscitis (9, 25). These illnesses are conditions suppressing the immune system such as diabetes mellitus (18-58%), long-term steroid administration, chronic renal failure, chronic alcoholism, malignant tumours and obesity; severe polytraumatism, previous infections and bacteremia, recent spinal surgery, and smoking (5, 9, 23, 25, 28, 29). Fifty-eight per cent of the patients of Colmenero et al. (5) had previous extravertebral infections such as skin and urinary tract infections. Dietze et al. (9) have also reported urinary tract infection as a potential risk factor. According to Sapico and Montgomerie (28), 37% of cases have an unknown source.

The offending agent was Morganella morganii in the case presented here. The predisposing factor could not be determined for either spondylodiscitis or the Morganella infection. The only factor that could lead to spondylodiscitis was a history of abdominal incisive trauma and abdominal operation one month before the beginning of complaints. Details of the trauma or the operation could not be obtained.

The treatment of pyogenic spondylodiscitis with intravenous antibiotics is universally agreed upon. More than 75% of patients can be treated with intravenous antibiotics and immobilisation (11). Although no difference in clinical outcomes has been observed when comparing antibiotics alone with antibiotics plus surgical debridement (24), debridement of infected and dead tissue removes the source of continuing sepsis, may allow a shorter courses of antibiotic treatment and may also allow early mobilisation of the patient (14,29). Surgical treatment is commonly required in patients with a neurological deficit, with a sepsis course and clinical toxicity, failure of the needle biopsy to provide a diagnosis, and failure of intravenous antibiotics to eradicate the infection (11). We treated our patient surgically because of rapidly progressive foot weakness.

The vertebral body and the disc space are almost always affected, and most authors strictly advocate anterior debridement and subsequent bone grafting using anterior, anterolateral and posterolateral approaches with postoperative prolonged immobilisation (3, 11, 12, 14, 24, 29). However these procedures often bear a high risk for the elderly and debilitated patients and the access to neural elements is limited, particularly in cases of concomitant epidural suppuration (25). On the other hand, some degree of stability is usually still maintained by intact posterior elements in this disease. Decompressing laminectomy, which must be extended to the facet joints and pedicles to access the anteriorly located focus of infection, may therefore further destabilise the spine and result in increased neurological deficits (2, 23, 25).

Posterolateral approaches such as costotransversectomy and the lateral extracavitary approach for the thoracic spine and the lateral retroperitoneal approach for the lumbar spine have been used,

especially for treatment of spinal tuberculosis. With the development of microsurgical techniques and different instrumentation systems, more limited posterior paramedian approaches have been described and used for management of thoracolumbar spinal tumors, trauma, or infections (13 ,18 ,20 ,27 ,30). In these approaches, laminae, facet joints, pedicles and transverse processes are removed in different combinations and with different techniques, to provide decompression of the spinal canal without any damage to neural tissue.

In the patient presented here, a tuberculosis infection was suspected initially as the tuberculin skin test was positive and the disease is endemic in our country. We therefore preferred an extended lumbar posterior paramedian approach, which has been used routinely for the treatment of thoracolumbar tuberculosis in recent years. A bilateral extended fenestration with facetectomy, debridement of epidural granulation tissue, discectomy, resection of end-plates and sequestrated and infected bone, posterior interbody grafting, and posterior instrumentation with pedicle screws were performed. This approach allows sufficient debridement of infected disc, bone tissue and granulation tissue, and also drainage of paravertebral abscess if present.

We prefer pedicle screw systems for posterior stabilization with this procedure because they provide rigid segmental fixation along all three columns of the spine and enable exact repositioning and correction of the spinal deformity (7). They allow intraoperative distraction, facilitating the debridement of the vertebral bodies and disc space, as well as definitive compression after autogenous interbody bone grafting. Screws can even be placed into affected vertebrae if the upper part of the body is not destroyed by infection. Thus, spinal fixation can be reduced to a minimum number of segments (25). In this patient, only one pedicle screw could be performed at L5 vertebra as the right pedicle of L5 was infected.

The use of spinal instrumentation in the presence of spinal infection has not been thoroughly addressed in the literature. Scar tissue, which forms around the instruments, is believed to act as a refuge for bacteria because the vascular supply in these areas is poor. Theoretically, the poor blood supply enables microorganisms to escape the bactericidal effects of antibiotics (11). Owing to a reluctance to use foreign implants for fear of perpetuating infection, there are only a few reports on a small number of patients who underwent instrumentation in the presence of the spinal infection (2, 4, 7, 9, 16, 25, 26, 29). However, primary stabilization of the infected spine by instrumentation may facilitate nursing care, allow early mobilization of the patients, and therefore reduce the risk of the complications of long-term bed rest such as thromboembolic disease, pulmonary infection, and pressure sores (25). In pyogenic spondylodiscitis patients who underwent instrumentation, there was no evidence of recurrent infections on follow-up (9, 16, 25, 26, 29). In addition, some other reports detail the successful treatment of infected spinal instrumentation without its removal (8,21,32).

In the patient presented here, there was also no evidence of recurrent infection on two years follow-up.

CONCLUSIONS

Morganella morganii, an opportunistic microorganism, may be the offending agent of spondylodiscitis without any predisposing factor in middle-aged patients. An extended lumbar posterior paramedian approach in combination with simultaneous posterior interbody grafting and posterior internal fixation may be a suitable procedure for the treatment of lumbar spondylodiscitis. Instrumentation may be performed safely in the presence of spinal pyogenic infection. It facilitates the early mobilization of patients following a single-stage operation.

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