

Methicillin resistant staphylococcus aureus thoracic spondylitis late after cervical spine surgery

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Abstract

Background: Spondylodiscitis is a known and serious complication of spinal surgery. A rare case of a late and remote thoracic spondylitis due to methicillin resistant staphylococcus aureus following cervical surgery is presented.

Case report: A 50 year-old-male was treated for cervical degenerative disease via a combined anterior and posterior cervical approach (discectomy with fusion and laminectomy). Three years later a cervical epidural abscess was formed which was treated successfully conservatively. After 18 months he developed spondylitis of the second thoracic vertebra. The patient was further treated surgically via a dorsolateral extracavitary thoracic approach. Laboratory analysis revealed Methicillin Resistant Staphylococcus Aureus (MRSA) spondylitis sensitive to linezolid. Inflammation markers declined and clinical symptoms ameliorated. At 12-month follow-up the patient did not show any evidence of recurrence of the infection.

Conclusions: A high rate of suspicion must be maintained in patients presenting with signs of spinal infection and neurological impairment even many years after the initial operation. Optimal investigation and outcome require close clinical monitoring and a well coordinated multidisciplinary approach. Hippokratia 2009; 13 (1): 49-51

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Postprocedural spinal infections are known complications of spinal surgery. Early diagnosis of them is difficult and serious sequelae are frequent^{1,2}. Postoperative spondylodiscitis and/or spondylitis are costly and debilitating sequelae of spinal operations^{3,4}. Their prevalence is constantly increasing due to a significant rise of spinal fusion procedures the recent year^{5,6}.

A case of cervical discitis at a level adjacent to the operated site has been published recently². A rare case of a late and remote thoracic spondylitis due to methicillin resistant staphylococcus aureus (MRSA) following cervical spine surgery is presented. The possible underlying pathomechanisms are also discussed.

Case description

A previously healthy 50-year-old male presented at Outpatient Department of Hippokratia Hospital in October 2000 complaining of neck pain which was radiating to the right arm. Clinical examination revealed C6 and C7 radiculopathy and discrete signs of myelopathy.

Cervical MRI scan demonstrated disc herniation at C5-C6 and C6-C7 and significant stenosis of the spinal canal. The patient underwent a combined, two-stage, anterior and posterior cervical approach. A C5-C6 and C6-C7 discectomy and fusion using titanium cages was carried out, followed by C5 and C6 laminectomy. The patient experienced significant improvement of the pre-

operative symptoms.

In October 2002 he underwent a left nephrectomy due to a stage I renal mass (Grawitz tumor). He didn't receive any adjuvant treatment and the follow-up did not show any evidence of recurrence.

In September 2004 he presented again with high fever and progressive fatigue. His erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels were elevated. The magnetic resonance imaging (MRI) scan clearly showed an epidural abscess formation extending from C5 to C7. All cultures were negative. Intravenous clindamycin was administered for 6 weeks. Signs of infection subsided and the epidural fluid collection resolved with concomitant clinical improvement (Figure 1).

In April 2006 he manifested again fever, upper back pain radiating to the left side, increased sensitivity in the upper thoracic spine, decreased muscle power, muscle atrophies, progressive gait disturbances and dysphagia. Infection markers were again high (WBC: 16000 mm³, ESR: 96 mm/h, CRP: 140 mg/dl). Blood and urinary cultures were negative. Tumor markers, Wright and Widal reactions were also negative. He was initially treated with analgesics and intravenous clindamycin. The MRI scan of the cervical and the thoracic spine showed a significant Th2 vertebral height loss of the second thoracic vertebra with signs of spondylitis and marked spinal cord compression (Figure 2).



Figure 1: Sagittal T1 weighted post contrast MRI demonstrating epidural abscess formation extending from C5 to C7 vertebrae (left) and resolution of the anterior epidural collection two months after antibiotic treatment (right).



Figure 2: Sagittal T2 weighted MRI showing evidence of spondylitis, vertebral collapse and severe compression of the spinal cord at the level of the second thoracic vertebra (arrow).

A percutaneous vertebral biopsy was negative for malignancy and tuberculosis. Subsequent biopsy cultures failed to isolate any microorganism. Further conservative treatment with antibiotics showed little effect. ESR and CRP remained elevated, pain became more intense and signs of myelopathy were progressing. These facts led to the decision for surgical intervention.

A dorsolateral extracavitary approach was performed.

A Th2 vertebrectomy and reconstruction with titanium cage and transpedicular screw placement from C7 to Th5 was carried out. Instrumentation (material?) from the initial operation was not removed. Vertebral body cultures grew MRSA sensitive to linezolid. He received linezolid for 6 months (600 mgx2 orally). ESR and CRP returned to normal levels, while pain symptoms lessened over the ensuing 2 months. At the 12-month follow up, his clinical condition remained unchanged. Radiological and hematological investigations, confirmed solid fusion and provided no evidence of infection recurrence (Figure 3).

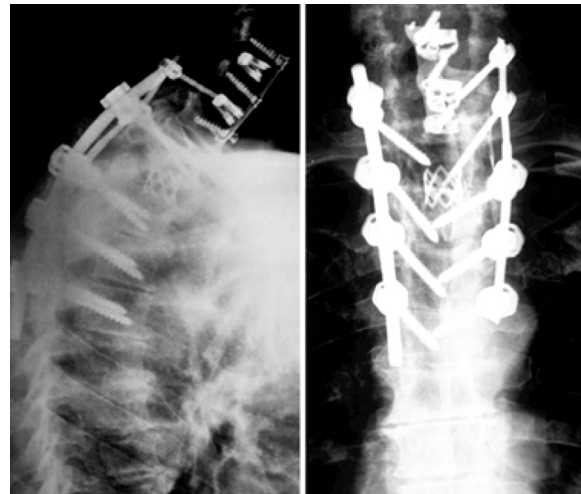


Figure 3: Postoperative x-rays of the cervicothoracic region. Optimal and stable positioning of the instrumentation material from C7 to Th5.

Discussion

Postoperative spine infections are infrequent due to the rich blood supply of the vertebrae and the prophylactic use of antibiotics^{2,7}. Reconstructive and lengthy procedures with the use of hardware during spinal instrumentation exhibit a higher risk of infection^{3,4,8}. It is difficult to define the exact incidence of postprocedural spondylodiscitis. However the absolute number of cases is constantly increasing⁶. The exact pathogenetic mechanism of postoperative spondylodiscitis is yet to be determined. It is assumed to be the result of direct inoculation of the offending pathogen during surgery and/or dissemination from other infection sites^{4,6}.

A case of remote MRSA spondylitis five years after the initial operation has not been previously reported in the literature. Many patients with spondylodiscitis have one or more predisposing conditions such as underlying disease (diabetes mellitus, cancer, human immunodeficiency virus), previous spinal intervention (surgery for degenerative disease or trauma, drug injection, catheter placement), or a potential local or systemic cause of infection (osteomyelitis, soft tissue infections, epidural fluid collection, sepsis, analgesic procedures, nerve acupuncture)^{4,5,9,10}.

In the present case the predisposing factors of epidural abscess formation and subsequent spondylitis were smoking and recent surgery for neoplastic renal disease. However, this patient had already reduced significantly his smoking during the last years and no additional treatment in terms of radiotherapy and chemotherapy was carried out after the nephrectomy. The possibility of spondylodiscitis secondary to esophageal perforation was also encountered due to the progressive dysphagia. The patient did not manifest severe systemic symptoms. He underwent detailed endoscopic examination of the upper gastrointestinal tract which excluded esophageal perforation. The extensiveness of the two-stage procedure was also considered. Surgically induced tissue trauma such as endplate injury, accidental bone fractures, hematomas, necrotic tissue and needle punctures for radiological localization can also be regarded as precipitating factors for infection. The long period from the initial surgery to epidural abscess formation and manifestation also excluded this possibility.

The key point to explain the occurrence of distant MRSA spondylitis was most probably the previous formation of the epidural cervical abscess. This developed in the anterior epidural space, occupying three vertebrae from mid C5 to lower C7. Although all cultures were negative, the diagnosis was suspected from the clinical findings, the medical history and the imaging studies. Antibiotic treatment targeted to Gram (+) bacteria appeared to be effective and no further treatment was required at that time. The vertebral infection presumably resulted from local extension of the residual anterior epidural abscess to the inferior vertebra via spinal venous plexuses skipping in between vertebrae.

CRP is a very useful parameter for supporting the clinical diagnosis and following the course of the disease. ESR is a non-specific inflammation marker since a large number of patients with an uneventful postoperative course and without spondylodiscitis have a raised ESR¹¹. Although the CRP value is also non-specific, it is more conclusive than the ESR. Moreover, it is used with increasing frequency as a laboratory marker in the detection of spinal infections, including epidural abscess and spondylodiscitis^{4,6}.

MRI is the radiographic imaging modality of choice in diagnosing spinal epidural abscess and spondylodiscitis with reported sensitivity close to 100%^{5,6}. It delineates both the longitudinal and parasagittal extension of the abscess, while post-contrast enhancement both in the disc and in the vertebral endplates, has a diagnostic value as a sign of bacterial spondylodiscitis^{5,12}. Furthermore, it may help to differentiate infection from cancer on the basis of the appearance and the signal intensity of the image^{5,13}.

An aggressive approach to debride the infected area as well as to decompress the epidural space is necessary in cases of failed conservative treatment, neurological

compromise, intractable pain, progressive deformity and failure to obtain a culture through less invasive methods^{2,6,14}. The issue of leaving the instrumentation from the previous surgery in place is controversial. In the present case the former fusion material was not removed since they did not seem to maintain the infection. Moreover, radiological signs of active inflammation were lacking.

Conclusions

Patients with unexplained, persistent or recurrent spinal infections must be thoroughly assessed and closely monitored in order to elucidate the etiology and carefully plan the optimal therapeutic approach. In cases of MRSA spondylitis, long-term antibiotic administration is of undisputed value. A combination of prolonged antibiotic treatment and aggressive surgery when necessary is imperative in order to obtain a favorable result.

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