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An Extensive Epidural Abscess of Cervicothoracic Spine Resolved by a Combined Approach – a Case Report

Rozsáhlý epidurální absces cervikotorakální páteře řešený kombinovaným přístupem – kazuistika

Abstract
This case report describes a methodology for removal of epidural abscess located at the anterior side of spinal canal with tetraplegia AIS (ASIA – American Spinal Injury Association Impairment Scale) grade B. The abscess was first evacuated by the anterolateral Smith-Robinson approach using Caspar distractor. No other instrumentation was used. T6–T7 laminectomy and decompression was performed two weeks later to manage residual abscess. This improved motor strength to AIS grade D. MRI examination confirmed that the abscess was completely healed without postlaminectomic kyphosis. The anterior approach eliminated a risk of cervical spine kyphosis.

Souhrn
Je prezentován případ epidurálního abscesu uloženého na přední straně páteřního kanálu cervikotorakální páteře s tetraplegií AIS (ASIA – American spinal injury association Impairment Scale) stupně B. Nejprve byl evakuován z anterolaterálního Smith-Robinsonova přístupu za užití Casparova distraktoru bez následné instrumentace. Pro reziduum abscesu byla po dvou týdnech provedena laminektomie a dekomprese T6–T7. Došlo ke zlepšení hybnosti končetin na stupeň AIS D. Na kontrolní MR bylo potvrzeno vyhojení abscesu bez vzniku postlaminektomické kyfózy hrudní páteře. Riziko kyfózy krční páteře bylo eliminováno užitím předního přístupu.

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Introduction
The spinal epidural abscess (SEA) is an infectious spinal disease with a collection of purulent substance within epidural space, often associated with neurological deterioration. Risk factors include diabetes mellitus, alcohol abuse and intravenous drug use and clinicians vary greatly in their opinions on optimal therapy.

Presented here is a rare case of an extensive epidural abscess of cervicothoracic spine with tetraplegia AIS (ASIA – American Spinal Injury Association Impairment Scale) grade B performed surgically with a combination of anterior and posterior approach without the spine stabilization.

Case report
A female patient, age 67, was admitted to a surgical department of a regional hospital due to sudden fever and difficulties with urination. Biochemical screening

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revealed CRP 126 mg/l and leukocytosis 22.7 × 10^9/l. Patient's medical history included diabetes mellitus managed with a diet, alcohol abuse and smoking. A CT examination confirmed an extensive left kidney inflammation. Urine cultivation confirmed infection with *Pseudomonas aeruginosa*. An antibiotic therapy reduced the inflammation to CRP 44 mg/l and leukocytosis 13.1 × 10^9/l. However, motor strength in extremities worsened substantially within a week, reaching tetraplegia AIS B and including cauda equina syndrome. An MRI detected anterior epidural abscess between C1–T10 combined with T9 spondylitis and degenerative changes with a maximum at C4–C5–C6––C7 (Fig. 1). The patient was transferred to the Department of Spinal Surgery at the Teaching Hospital Motol, Prague where the abscess was evacuated by discectomy and C5–C6 decompression with Caspar distractor using the anterolateral Smith-Robinson approach without stabilization. Approximatelly 40 ml of purulent liquid was removed and drainage left. Cultivation of the liquid did not provide any microbiological finding, probably due to the antibiotic treatment. Motor strength of the upper and lower extremities improved by 2 degrees and 1 degree, respectively, within two days after the surgery. However, due to post-surgical deterioration of the patient's condition, subsequent surgical intervention could not be carried out. Two weeks later, when the patient was fully stabilized, a new MRI scan was performed, revealing a residual abscess within C7–T10 (Fig. 2). Based on this MRI examination, T6–T7 laminectomy was performed and, once again, approximately 60 ml of purulent liquid was removed. Cultivation results were, once again, negative. Motor strength of the lower extremities improved. The patient was gradually verticalized to underarm crutches. A follow up MRI performed a year later confirmed complete healing of the abscess and showed T9 spondylitis without spine deforming deterioration (Fig. 3). At present, three years after the treatment, the patient does not report any difficulties originating from the cervicothoracic spine region. The motor strength is currently AIS D and the sphincter difficulties ceased completely.

Discussion

The spinal epidural abscess (SEA) is an infectious lesion of the spine localized within the epidural space. There are solitaire and/or frequent bases formed both on anterior and posterior side of the spinal canal, combined with other infectious spine lesions in some patients, e.g. purulent arthritis of an intervertebral joint [1] and/or spondylodiscitis or, as in this case, spondylitis [2]. *Staphylococcus aureus* is the most common infectious agent [3,4] and the prime infection is often localized within urogenital tract, though dermal infection may also be the source. A iatrogenic factor, present after a spine surgery, epidural injection therapy or intradiscal oxygen-ozone chemonucleolysis is also quite common [5], though frequently, the source remains unidentified. Risk factors include diabetes mellitus [6], alcohol abuse and intravenous drug application. The incidence of SEA is 0.2 to 2 cases per 10,000 hospital admissions, with middle aged and older patients being the most commonly affected and males having higher incidence than females [7]. The condition is very rare in children and adolescents [8,9].

Symptoms of spinal epidural abscess include pain, signs of inflammation, fever, exhaustion, CRP rise and leukocytosis; frequently present are neurological disorders resulting from compressed epidural space [2]. At our departments, X-ray and/or MRI, superior techniques for abscess detection, are the examination methods of the first choice. When an X-ray indicates skeletal lesion, the CT examination is of value to prove osteolysis.

A surgery is, therefore, the most common solution for neurological lesions



Fig. 1. An MRI of an anterior epidural abscess within C1–T10.



Fig. 2. An MRI of a residual abscess within C7–T10 after the ventral surgery.



Fig. 3. An MRI of a completely healed abscess.

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caused by compression, though cases of conservative approach have also been reported, where intensive treatment with antibiotics resulted in complete neurological recovery and abscess healing [8–10]. In our opinion, conservative treatment should be limited to children, where the risks of iatrogenic deterioration during surgery are higher.

Decompression and subsequent stabilization made from posterior approach [11–13] prevail among current surgical techniques as it provides good access to the spinal canal along the entire length of the spine. The anterior approach is less common [14]. However, posterior approach is associated with an increased risk of postlaminectomic kyphosis, especially at the lumbar and cervical spine areas. The risk can be reduced when spinal instrumentation suitable for inflammatory lesion of the anterior column is used. However, any external material can impede healing of the inflammation.

In literature we found several cases of extensive spinal epidural abscesses [11,12] that always crossed between the anterior and posterior side. These cases were resolved by limited laminectomies of cervical, thoracic and lumbar spine. No case similar to ours, involving a large abscess within the anterior epidural space only, has been reported.

We decided to first evacuate the abscess out of the subaxial cervical spine using the anterolateral Smith-Robinson approach that is less damaging to soft tissues. Caspar distractor enabled us to create a sufficient space to evacuate the abscess. Since the cervical spine was neither affected by spondylitis, resp. spondylodiscitis, nor the stability of anterior column was damaged through the surgery, the stabilization was not needed. Unfortunately, the initial surgery did not fully remove the abscess and, therefore, we needed to provide further decompression. This was the main reason why we chose to use posterior rather than anterior approach; it is less harmful to a patient. In addition, rigidity of chest decreases a risk of postlaminectomic kyphosis.

In correctly diagnosed patients, anterior approach to the cervical spine without instrumentation to treat an epidural abscess located at the anterior side of the spinal canal is a good alternative to cervical laminectomy. The main advantage over laminectomy is minimized stress to a patient and lower risk of cervical spine kyphosis.

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