



Reversal of tetraplegia in a patient with haematogenous cervical epidural abscess

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Pyogenic haematogenous cervical epidural abscess complicated by tetraplegia is an uncommon entity, but its clinical importance overshadows its rarity. Predisposing risk factors for spinal epidural abscess include diabetes, intravenous drug abuse, liver disease, renal failure, malignancy, HIV, infection elsewhere, rheumatoid conditions, trauma and a number of spinal interventions. Lack of recovery and death are much more frequent when complete paralysis exists since more than 24 to 48 hours. Most authors combine decompressive laminectomy and antibiotics. Anterior decompression and needle aspiration are rarely used, the former more specifically in case of anterior abscess formation. A high index of suspicion along with reliance on gadolinium-enhanced MRI is essential to diagnose the pathology and institute appropriate treatment on an individual basis. The authors report on a diabetic male patient who developed a cervical epidural abscess with tetraplegia after dental extraction. He was treated within six hours by one stage anterior/posterior decompression and fusion, with complete recovery.

Keywords: haematogenous cervical epidural abscess ; reversal ; tetraplegia ; surgical intervention.

INTRODUCTION

Epidural abscess, especially at the cervical level, is a rare and sometimes dramatic condition (10,20, 22,32) with significant morbidity and mortality (11, 21,29). The initial complaints, mainly neck pain and fever, are vague and cause a delay in diagnosis

which leads to neurological deterioration in a short span of time (7,12,35,36,37). Taking into account all the predisposing risk factors (6,29,32), an optimal and successful therapy is only possible with early diagnosis and immediate proper treatment (6,20, 29,41), because a complete neurologic deficit existing for 24 hours (25,42) to 48 hours (31) is associated with the worst possible neurological impairment

CASE REPORT

A 72-year-old male diabetic was seen in a peripheral hospital on May 17, 2007 with a headache, low fever, and severe neck pain, two weeks after the

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extraction of a second molar. After clinical examination he was sent home on pain medication with a diagnosis of muscle spasm. Plain radiographs were interpreted as normal. The pain improved because of the analgesics, but the fever increased, while progressive dysphagia and numbness of the upper and lower extremities developed. On May 28, the patient was admitted to the University Hospital because of total tetraplegia (Frankel A). The body temperature was 38.3°C, the blood pressure 95/75 mm Hg, the pulse rate 94/min and the respiratory rate 20/min. White blood cell count : 15.400 WBC/mL ; blood formula : 86% neutrophils ; sedimentation rate 110 mm/h ; C-reactive protein 7.2 mg/L. Blood sugar : moderately elevated ; Na 133 mEq/L ; K 3.10 mEq/L. Gadolinium-enhanced MRI showed a large high-signal intensity epidural abscess with a diameter of 10 mm, involving the anterior epidural space from C1 to C4, and leading to marked compression of the spinal cord (Fig. 1). The ideal surgical approach was not obvious. Firstly, MRI findings demonstrated a homogeneous enhancement of the C1-C4 ventral spinal epidural abscess suggestive of solid and suppurative granulation tissue, not proper for evacuation. Secondly, the solid abscess was located very high to be treated via an anterior approach which is technically demanding and exposes to esophageal and neurovascular injuries. Thirdly, a single posterior approach would necessitate extensive manipulation of the spinal cord in order to reach the anterior mass. For these three reasons a combined anterior/posterior approach was chosen. At first a corpectomy C3 was performed via a left anterior approach. At that time the patient had been tetraplegic for 6 hours. The abscess was débrided, irrigated and evacuated. Specimens were sent for culture and broad spectrum antibiotics were administered intravenously : clindamycin 1.8 g/day and ofloxacin 2 g/day. A titanium mesh, filled with bone grafts from the iliac crest, was placed between the vertebral bodies C2 and C4, after which an anterior plate was applied (Orthofix, Blackstone). Finally a posterior midline approach allowed a wide laminectomy, partial facetectomy, diligent irrigation and débridement. A polyaxial screw-rod system (Medtronic Sofamor Danek, NJ, USA) was

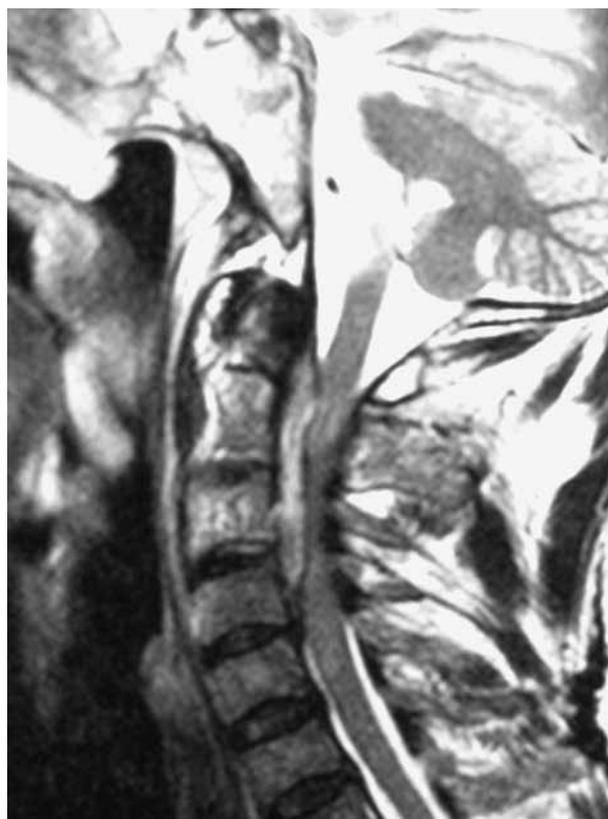


Fig. 1. — Cervical sagittal T2-weighted MRI-scan at the time of admission, revealing an anterior epidural collection C1-C4. Note the high signal intensity of the cord.

used for fixation occiput-C5 through the lateral masses (Fig. 2). Forty-eight hours postoperatively the fever subsided while the neurological condition showed some improvement to Frankel C. The pathogen isolated from the pus was *Staphylococcus aureus*, resistant to methicillin, so that the antimicrobial therapy was changed to Teicoplanin 400 mg/day, according to the antibiogram : 6 weeks intravenously and 6 weeks perorally. After one week an intensive rehabilitation program was started. Two months later, the patient was discharged with a Frankel D stage, being ambulatory and self-care. Six months after diagnosis MRI showed resolution of all inflammatory tissue : 3 years after surgery a Frankel E stage was reached, while MRI was absolutely normal without signs of myelopathy (Fig. 3). The patient returned to normal life.

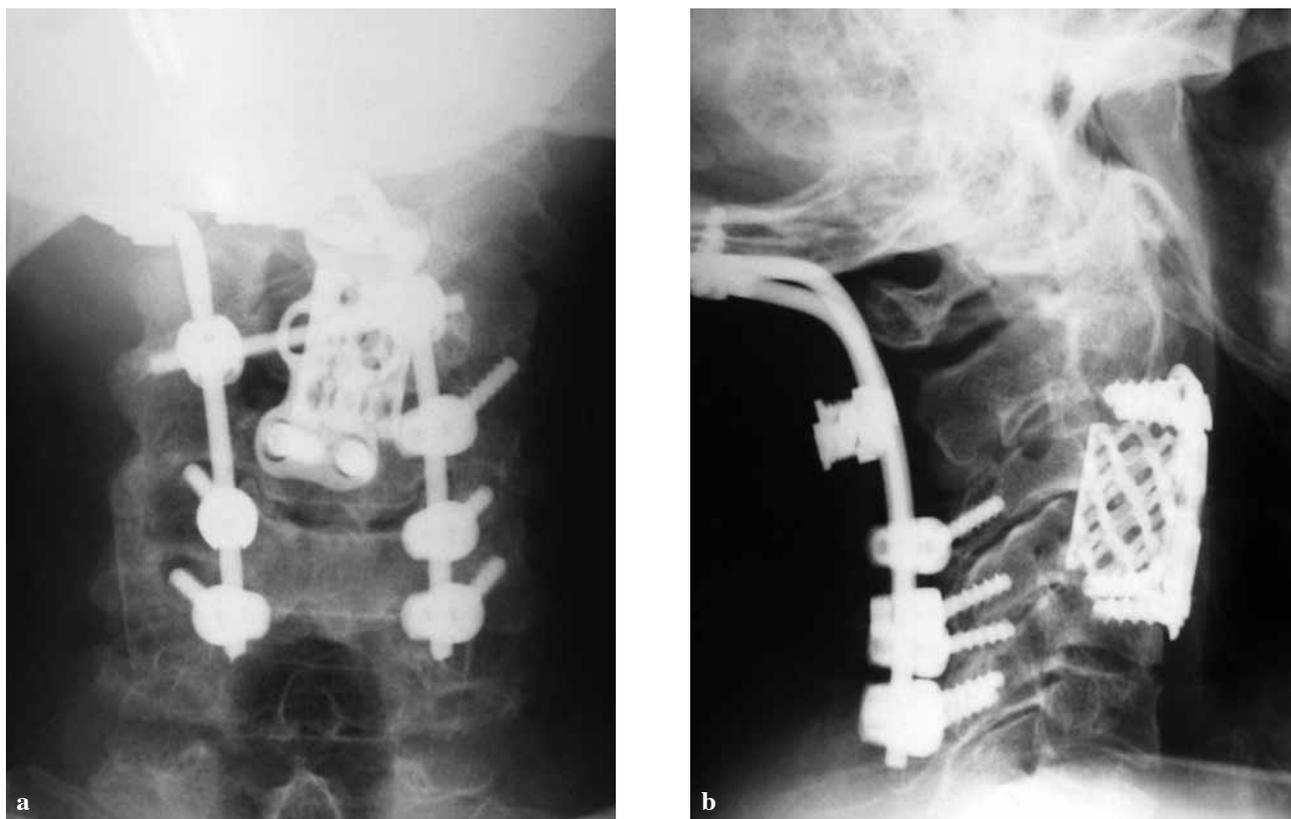


Fig. 2a,b. — Anteroposterior and lateral plain radiographs, nearly three months postoperatively

DISCUSSION

Cervical epidural abscess complicated by tetraplegia is an emergency. It usually occurs in individuals between age 30 and 60, more often in men (14,28,32). Reihnsaus *et al* (31), in a meta-analysis of the international literature, found 915 cases of epidural abscess at all levels, 140 of which or 19% were located at the cervical level; the death rate was 15% for epidural abscesses in general, treated between 1991 and 1997. Extension from a discitis or a vertebral osteomyelitis occurred in 59 out of 915 cases. Inoculation from distant infections was much more frequent. A wide range of organisms can cause an epidural abscess, but *Staphylococcus aureus* is the first offender (11,21,29,30,32,33). This means that isolation of the responsible agent and an antibiogram are necessary in order to secure appropriate antimicrobial treatment; this succeeds in 35% to 70% (6,29). Open surgery remains the most

successful way to obtain the pathogen (14,19,29,32). Although much less common, *E.Coli* is predominant among the Gram-negative bacteria, which may be more common in drug users (17). The dental extraction was probably at the origin in the current case (9,17,40). A haematogenous or a lymphatic spread might have been involved. The venous network of the oral cavity communicates with the intracranial venous sinuses, which communicate with the vertebral venous plexuses (39).

The clinical picture varies from slight spinal pain to severe neurological disability, with a tendency to progress insidiously from the former to the latter (20,22). In addition to neurological findings, patients usually develop fever and elevated inflammatory markers (12,14,19,22,29).

All publications confirm the great value of MRI for diagnosis and follow-up. It yields multiplanar images with high contrast between soft-tissue structures, and without bone artifacts (21,22,26,29,33).



Fig. 3. — Cervical sagittal T2-weighted MRI three years after diagnosis : all inflammatory changes have resolved. The signal intensity of the cord is normalized.

Gadolinium-enhanced MRI allows better delineation of the abscess from contiguous structures and can predict its intraoperative appearance, thereby guiding the surgical approach and management (13, 24, 26).

The almost universally accepted therapeutic strategy consists of laminectomy combined with the proper antibiotic treatment. Most cases associated with spondylodiscitis are located anteriorly to the spinal cord, and thus surgical débridement with or without stabilization is usually performed via an anterior approach (4, 27). The goal of reconstruction is to maintain alignment, prevent deformity, achieve fusion and decompress the spinal canal (5, 16). However, the use of instrumentation in grossly infected areas remains controversial. The authors preferred a single stage anterior/posterior débridement and fusion (8), while others prefer a two-stage débridement, decompression, and stabilization (16, 27, 29, 31). The two most common prerequisites for conservative management are the absence of severe neurological deficits (3, 20, 21, 23, 38) and the indirect identification of the causative microorganism (1, 2, 3, 11, 34, 38).

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