

## New Perspectives in Acute Spinal Epidural Abscess Illustrated by Two Case Reports

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### Summary

The histories of two patients with spinal epidural abscess are reported. Attention is drawn to the route of infection by means of direct inoculation of pathogens in the wake of paravertebral infiltration of local anaesthetics for relieving lower backpain, furthermore we emphasize the rare occurrence of a relapsing acute spinal epidural abscess. Additionally the diagnostic superiority of nuclear magnetic resonance tomography is described in a patient known to be allergic to commonly used contrast material.

### Introduction

Acute spinal epidural abscess (E.A.) is a rarely encountered neurological diagnosis, according to Leys (1984) one out of 3,600 admissions to a neurological department being due to it<sup>11</sup>. This infection, usually located in the dorsal epidural space of the midthoracic or lower lumbar region<sup>7, 8, 13</sup>, is mostly the result of haematogenous dissemination of bacteria from foci of infection in the skin, respiratory or urinary tract<sup>2, 6–8, 11, 13</sup>. The primary septic foci, however, are not found in up to one half of patients<sup>1, 8</sup>. Direct bacterial inoculation by lumbar puncture<sup>3, 15</sup>, epidural anaesthesia<sup>10</sup> or paravertebral infiltration of local anaesthetics for relieving lower back-pain due to degenerative disease of lumbar vertebrae is reported to be very rare.

The clinical features associated with spinal epidural abscess should be well recognized, but the diagnosis is still often not made before severe neurological deterioration has set in. CSF findings are not always conclusive<sup>2, 7</sup>. Standard radiographs may reveal signs of infection of discs and vertebrae<sup>4</sup>; Gallium scanning often shows increased uptake in the adjacent bones, confirming their infection<sup>3, 4, 9</sup>. Myelography usually demonstrates blockage, thus presenting a diagnostic key feature<sup>5, 10, 11, 13</sup>. The same applies to the spinal

computed tomography (CT) scan, either with intravenous or intrathecal contrast material administration<sup>4, 16</sup>.

The main purpose of this paper is threefold. By presenting the case reports of our two most recently admitted E.A. patients, we would like to direct attention

— firstly, to the mode of infection by means of direct inoculation of pathogens in the wake of paravertebral infiltration of local anaesthetics for relieving lower backpain,

— secondly, to the rare occurrence of a relapsing E. A.,

— thirdly, to the diagnostic superiority of nuclear magnetic resonance (MR) tomography in spinal E. A. in a patient known to be allergic to commonly used contrast material (C. M.).

### Case Reports

*Case 1:* A 45-year old male was admitted to our department and had a previous history of an acute spinal epidural abscess in 1981, treated in another hospital. Prior to 1981 he had suffered from severe longstanding backpain which were treated repeatedly by paravertebral infiltration with local anaesthetics. Because of gradual deterioration and development of a cauda equina syndrome hemilaminectomy (lumbar vertebra 4 and 5) was performed. An epidural abscess was found, the pus evacuated and drained. Since post-operative recovery was very slow, control-myelography was done, which resulted in a life-threatening anaphylactic reaction with shock, unconsciousness and generalized seizures.

Fortunately this could be contained, the further course was uneventful and, finally, the patient was discharged without neurological sequelae. He was well until 4 days prior to the admission to our department in December 1984, when he developed again lower backpain and sciatica on the left side.

On admission he was febrile, 39 °C, and complained of severe headache.

The neurological examination showed marked neckstiffness, bilateral positive Laségue's signs and a mild motor and sensory cauda

equina lesion. Lumbar puncture was performed and the CSF revealed a highly increased protein content (320mg%), 2,560 cells, mainly polymorphonuclear leucocytes. On culture staphylococcus aureus was grown. Suboccipital CSF showed rather the same result. There was leucocytosis (24,000/mm<sup>3</sup>) and the ESR was raised (67 mm/first hour). EEG and CT-scan of the brain were normal, as were the chest-x-ray and electro-cardiogram. Antibiotic treatment was initiated immediately with Penicillin G, Chloramphenicol and Latamoxef-Dinatrium. A lumbar CT-scan was done, showing an isodense space-occupying lesion within the recessus lateralis ranging from the fourth lumbar vertebra to the upper edge of the sacral bone (Fig. 1 a and b).

Because of the known allergy, no contrast medium could be administered; therefore differentiation of this mass (granulation tissue, abscess?) was not possible.

A deterioration of the cauda equina symptoms prompted us to do an emergency MR tomography scan, which confirmed the diagnosis of a spinal epidural abscess (Fig. 2 a-d). This was done on a 0.15 tesla resistive magnet, using SE 400, 1,600 and 2,000 msec, TE 40 and 120 msec. The median sagittal scan did not show any abnormality, but on transverse sections a large area of increased signal intensity within the left paravertebral muscles (4th and 5th lumbar vertebra) was visible.

These appearances were assumed to be the primary abscess cavity with communication into the epidural space. Laminectomy was performed at the level of the 4th and 5th lumbar vertebra and the pre-operative findings were confirmed. The abscess cavity and the epidural space were evacuated and drained.

Antibiotic therapy with Penicillin G and Latamoxef-Dinatrium was continued. The post-operative course was uneventful, the motor and sensory symptoms as well as the sphincter disturbances returned slowly to normal.

**Case 2:** A 37-year-old female, suffering from lower backpain for years, was treated by repeated paravertebral infiltration of xylocaine. In October 1984 she experienced an aggravation of the backpain 5 days after such an infiltration, associated with elevated temperature. A few days later she noticed a motor weakness of the lower limbs, hypaesthesia and finally sphincter disturbances.

Ten days after the beginning of these symptoms she was admitted to our department presenting with a raised body temperature (39.6°C) and an almost complete motor and sensory cauda equina lesion. Lumbar puncture was performed and pus aspirated. On culture staphylococcus aureus was grown. Descending myelography revealed a complete block of intrathecal C.M. between the 9th and 10th thoracic-vertebra. Antibiotic therapy with Penicillin and Latamoxef-Dinatrium was initiated, decompressive laminectomy was done and the pus evacuated and drained. The post-operative course was uneventful, although recovery was very slow and only partial.

## Discussion

Epidural abscess may be caused by different organisms<sup>5, 7-11, 13, 17</sup>, the most frequent being staphylococcus aureus<sup>7, 8, 11, 13</sup>, which was also grown in the cultures of both our patients, who presented with acute E. A. The infection is mostly haematogenous from foci of the skin, respiratory or urinary tract<sup>2, 6-8, 11, 13</sup>. According to various authors<sup>1, 8</sup>, in up to 50% of E. A. patients the primary source of infection is not found.

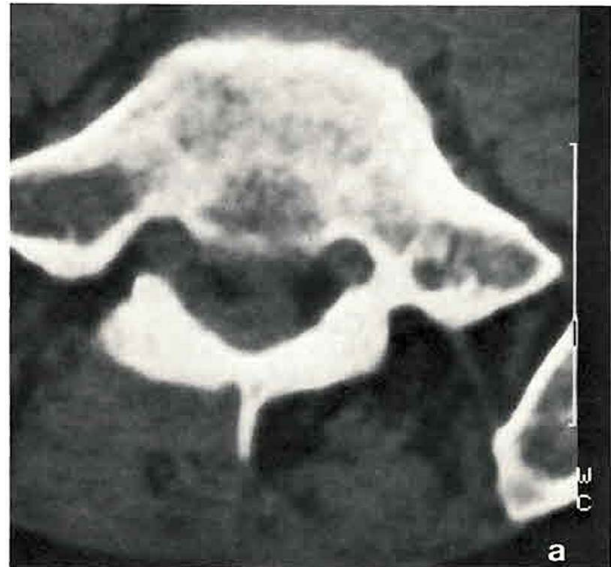


Fig. 1 a. Axial spinal CT scan at the level of the 4th lumbar vertebra: within the spinal canal the epidural fat is absent suggesting spread of the abscess into the epidural space

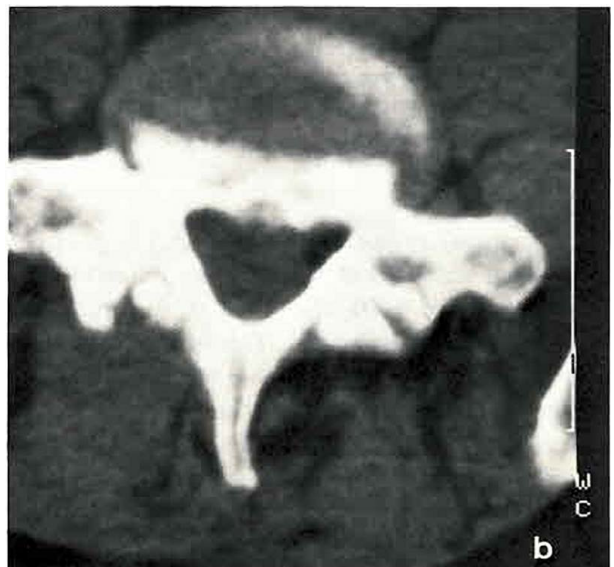


Fig. 1 b. Additionally to Fig. 1 a a paravertebral mass of homogeneous density is visible involving the paravertebral muscles at the level of the disc of L<sub>4/5</sub>. Fat is entirely absent on the affected side. The abscess cavity as it is seen in the MR section cannot be identified in the CT scan

Direct bacterial inoculation by lumbar puncture<sup>3, 15</sup> or epidural anaesthetics<sup>12</sup> are only rarely observed. Paravertebral infiltration of anaesthetics for relieving backpain due to lumbar spondylosis and osteochondrosis, is practiced very frequently and bears a potential risk of bacterial contamination. Case 2, who had suffered for years from lower backpain due to degenerative ver-



Fig. 2a. Median sagittal SE MR-scan (TR 500 msec, TE 40 msec) shows no abnormality within the vertebral canal, but fractures of the 2nd, 3rd, and 4th vertebral body

tebral changes, was repeatedly infiltrated with xylocaine by her family doctor. Only a few days after the last infiltration the local pains exacerbated, she became febrile and developed finally signs of a motor and sensory cauda equina lesion. Neither respiratory nor urinary tract infection nor any skin affection preceded the onset of the neurological symptoms. Thus, the route of infection by direct contamination is obvious.

Elective spinal operations for non-inflammatory disease may also present a possible cause of E. A.<sup>3, 4</sup>. Reports of recurrency at the site of a previous surgically treated E. A., years after the decompressive laminectomy, are not known to us. Patient 1 presented with a relapsing E. A. although we could not clarify whether a focus of staphylococci persisted within a pocket of the scar or granulation tissue throughout the period of three years, or if a new haematogenous infection from an unknown primary source had occurred at the "locus minoris resistentiae".

The former is supported by the presence of an abscess cavity within the paravertebral musculature.

At present, myelography and C. M. enhanced spinal CT scan are the most important neurodiagnostic procedures<sup>4, 5, 10, 11, 13</sup>. Diagnostic problems arise in a patient known to have suffered from a life threatening anaphylactic shock due to C. M. hypersensitivity.



Figs. 2b-d. Multiple axial SE MR-images at the level of 4th lumbar vertebra (slice thickness 5 mm, TR 2,000 msec, TE 120 msec) demonstrate an area of highly increased signal intensity within the left paravertebral muscles suggesting an abscess cavity. Arrow indicates the sinus to the epidural portion of the abscess

Standard radiography and Gallium scanning might be helpful but are not always conclusive<sup>3, 4, 9, 16</sup>. Similar considerations apply to spinal CT scan without intrathecal and intravenous C. M. administration<sup>4, 16</sup>. In patient I the plain CT scan showed an isodense space-occupying lesion and did not allow differentiation between an abscess or scar and granulomatous tissue respectively (Fig. 1). Additionally, the extent of the potential abscess was not defined well enough for prompt surgical intervention.

An emergency MR-tomography, however, enabled us to establish definitely the diagnosis of E. A.; in particular, its exact localization and cranio-caudal extension could be clearly visualized. Thus, the superiority of MR lead to the quickest possible diagnosis and emergency surgical intervention.

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