

Spinal epidural abscess following epidural cannulation for flail chest analgesia: a case report

Ropień nadtwardówkowy w następstwie znieczulenia zewnątrzoponowego zastosowanego w leczeniu wiotkiej klatki piersiowej: opis przypadku

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Abstract

Epidural abscess after epidural catheterization is a rare complication. Neurological manifestations vary and the patient described here presented with complete paraplegia. He was managed by surgical decompression and did well postoperatively. We present a case report and review of the literature of thoracic epidural abscess following catheterization for epidural analgesia with near total neurological recovery.

Key words: thoracic epidural abscess, surgical decompression, epidural analgesia, near total recovery, laminotomy.

Streszczenie

Ropień nadtwardówkowy jest rzadkim powikłaniem wprowadzenia cewnika do przestrzeni nadtwardówkowej. Objawy neurologiczne są różne; u opisywanego chorego wystąpiło porażenie kończyn dolnych. Leczenie polegało na chirurgicznym odbarczeniu. Przebieg pooperacyjny był niepowikłany. Przedstawiono opis przypadku i przegląd piśmiennictwa dotyczącego ropnia nadtwardówkowego w piersiowym odcinku kanału kręgowego, powstałego w następstwie wprowadzenia cewnika do znieczulenia nadoponowego, z prawie całkowitym ustąpieniem objawów neurologicznych.

Słowa kluczowe: ropień nadtwardówkowy w odcinku piersiowym kanału kręgowego, odbarczenie chirurgiczne, znieczulenie nadoponowe, prawie całkowite wyzdrowienie, laminotomia.

Introduction

Regional analgesia for pain is a common practice in cases of poly-trauma, particularly flail chest, in many centres. In general, the method is safe. However, a potentially fatal complication after epidural catheter insertion is the development of spinal epidural abscess [1]. A prospective national one-year survey reported

nine cases of epidural abscesses in a series of 17 372 epidural catheters (incidence 1 : 1930) [2]. Spinal epidural abscess, although rare, is associated with high rates of morbidity and mortality [3]. When there is a neurological deficit associated with spinal epidural abscess, the treatment is usually decompressive surgery in conjunction with antibiotic therapy [1]. We report a case of spinal epidural abscess formation after epidu-

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ral catheter placement for analgesia in a case of poly-trauma following a motor vehicle accident.

Case report

A 40-year-old man with no known co-morbidity was brought to our hospital with a history of a motor vehicle accident. He had sustained multiple injuries which included left flail chest with tension pneumothorax, right haemothorax, haemoperitoneum, mild head injury (GCS 14/15) and a 6-cm contaminated lacerated wound over his upper back. His blood pressure was not recordable, heart rate 120/min (feeble in volume), respiratory rate 30/min. Bilateral tube thoracostomy was done along with active resuscitation which included crystalloids, colloids and blood. The patient was then taken for exploratory laparotomy. Intra-operative findings included one litre of haemoperitoneum, two large liver lacerations which were not actively bleeding, right non-expanding and moderate size retro-peritoneal haematoma and right renal injury. Postoperatively, a thoracic epidural cannula was inserted for flail chest analgesia management as per institutional protocol. Subsequently, the patient did well. He was started on an oral diet and bilateral chest tubes were removed. From the 4th postoperative day the patient started having several episodes of high spiking fever. Fever work-up and routine cultures were negative. On the 9th postoperative day, the patient suddenly developed paraplegia. On examination, muscle tone in lower limbs was decreased and deep tendon reflexes were exaggerated. There was no voluntary movement of both lower limbs. An urgent neurosurgery opinion was taken. Magnetic resonance imaging (MRI) of the thoraco-lumbar spine was done; it showed a large elliptical collection postero-laterally, which was displacing the thoraco-lumbar spinal cord anteriorly (Figs. 1-3). The patient was taken for urgent surgical exploration. T3-T6 laminotomy and T7-T10 laminotomy were performed. Thick whitish pus about 60 cc in volume was seen extending from T3-T10 and displacing the spinal cord anteriorly. Pus was drained out, along with thorough irrigation of the epidural space. Pus culture grew *Enterobacter* and appropriate antibiotics were started. Postoperatively, the neurological status improved. Motor power was 5/5 in the right lower limb and 4+/5 in the left lower limb on the 20th post-operative day. He is continent for stools but bladder sensations have returned partially. He has had 4 follow-up visits to the outpatient department during which he started walking with support. He still requires a catheter for bladder care.

Discussion

Spinal epidural infection is characterized by a collection of pus or inflammatory granulation tissue between the dura mater and the overlying vertebral column [1]. The incidence of spinal epidural abscess formation after epidural catheter placement is low, but varies widely depending on the presence of predisposing factors.

One risk factor is long-term catheter placement (≥ 3 days) [2]. Another important factor is the site of the epidural cannula insertion. Due to the decreased space, thoracic cannula placement is technically difficult, which may result in a greater incidence of epidural haematoma, which in turn may act as a nidus for infection. Also factors such as immune status of the patient, diabetes mellitus, chronic renal failure, alcoholism, malignancy and long-term steroid injections play an important role [3].

Many reports have been published regarding epidural abscess unrelated to anaesthesia, which has an estimated incidence of 0.2-1.2 per 10 000 hospital admissions. Most of these cases are the consequence of trauma, spinal procedure, spreading of infection or haematogenous seeding from a distant focus. Despite the fact that the incidence of epidural catheter contamination is reported to be as high as 22%, epidural abscess associated with epidural catheter is extremely rare [3].

Several routes might be possible for the introduction of microorganisms into the epidural space. Infection might have originated from the skin flora, by haematological spread of bacteria, via contaminated local anaesthetics, or directly during insertion of a contaminated catheter [4].

Infective organisms causing spinal epidural abscesses in order of frequency are *Staphylococcus aureus* (60%), Gram-negative rods, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella* spp., *Streptococcus* spp., viridans group streptococci, *Streptococcus agalactiae*, *Streptococcus pneumoniae*, *Enterococcus* spp., coagulase-negative staphylococci, anaerobes, and *Mycobacterium* spp. Our case grew *Enterococcus* species in pus culture.

Classical symptoms of spinal epidural abscess include spinal pain, fever and neurological deficits. However, according to recent studies, this triad is only present in 10-15% of the cases at first physician contact. Other symptoms may be neck stiffness, confusion, headache, and nausea/vomiting. Importantly, a thorough neurological examination, including the evaluation of reflex-



Fig. 1. Sagittal T2-weighted image of the thoracic spine showing a hyperintense extradural collection compressing and anteriorly displacing the cord from T3 to T10 level



Fig. 2. Sagittal T1-weighted image of the thoracic spine showing an extradural collection compressing and anteriorly displacing the cord from T3 to T10 level

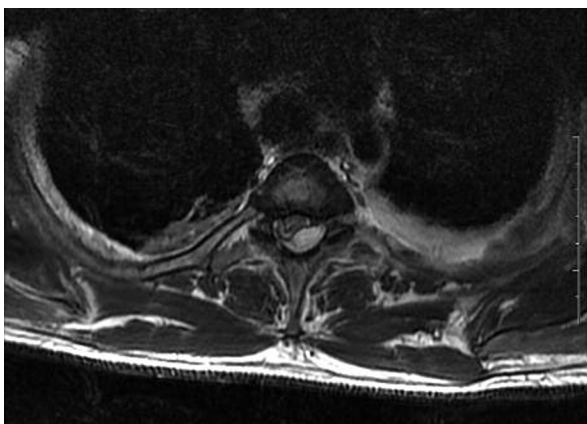


Fig. 3. Axial T2-weighted image shows the extradural collection displacing the thecal sac anteriorly and to the right

es, sensory and motor functions, anal sphincter tone and the ability to completely void the bladder, is mandatory in patients presenting with severe localized back pain. Special attention should be paid to the extremities and dermatomes corresponding to the affected spine level. Grading the muscle activity (i.e. British Medical Research Council M-scale, M5 to M0) can also be helpful to follow the motor function during the course of the disease [5].

MRI is the most common imaging technique for the diagnosis of spinal epidural abscess, with a sensitivity close to 100% [6].

An extensive literature search shows an overall recovery rate for patients with paresis/plegia after epidural abscess at around 20%. However, no patients with pare-

sis/plegia following a thoracic abscess recovered, in contrast to a 50% recovery rate for patients with a lumbar epidural abscess in a large series from Denmark [7]. Comparatively, our patient has had a near complete recovery, which we attribute to the early surgical intervention and aggressive management.

Immediate spinal cord decompression, drainage of the abscess, and long-term antibiotics are the mainstays of treatment. The surgical approach and techniques are tailored to the patient, and depend on abscess location and surrounding inflammatory tissue, as well as instability of the spinal column [1]. Surgical management goals are to preserve neurological function, prevent sepsis, and permanently eradicate infection [8].

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