Spinal epidural abscess—-a rare complication after epidural analgesia for labour and delivery

T. H. Schroeder¹*, W. A. Krueger¹, E. Neeser², U. Hahn³ and K. Unertl¹

¹Department of Anaesthesiology and Critical Care Medicine, ²Department of Gynecology and Obstetrics and ³Department of Neuroradiology, Tübingen University Hospital, Tübingen, Germany

*Corresponding author: Department of Anaesthesiology and Critical Care Medicine, Tübingen University Hospital, Hoppe-Seyler-Strasse 3, D-72076 Tübingen, Germany. E-mail: torsten.schroeder@uni-tuebingen.de

We report a case of spinal epidural abscess formation after short-term epidural catheter placement for analgesia during labour and delivery. The patient was previously healthy and did not have any predisposing factors. Increasing back pain was the only complaint. A contrast-enhanced CT study on day 5 was inconclusive. Magnetic resonance imaging was performed and showed a large triangular-shaped abscess with adjacent inflammation of the paravertebral muscles. One day later, the patient developed a sensory deficit in the left lower limb. The neurological deficit completely resolved after surgical decompression and debridement, which was followed by antibiotic treatment.

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Regional anaesthesia and analgesia for pain and delivery is a common practice during labour. In general, the method is safe. However, a potentially fatal complication after epidural catheter insertion is the development of spinal epidural abscess. The incidence is low but currently unknown. A prospective national 1-yr survey reported nine cases of epidural abscesses in a series of 17 372 epidural catheters (incidence 1:1930).¹ The frequency might be slightly higher in postoperative patients and was reported to be 0.125% in a recent retrospective study.² These cases refer mainly to patients after long-term catheter placement. The development of spinal epidural abscess after short-term epidural analgesia for labour and delivery in healthy women is extremely rare. In our case, the catheter remained in situ for 6 h only.

Case report

A nulliparous parturient woman received an epidural catheter for pain relief for labour and delivery. Uncomplicated lumbar catheter placement (L2–L3) was performed by standard loss of resistance technique using saline. No blood or liquor was in the catheter when aspirated. The skin at the insertion site was disinfected with red-tinted chlorhexidine solution 0.5% in alcohol 70%. The attending anaesthetist wore a face-mask and sterile gloves. Epidural anaesthesia was achieved by ropivacaine 30 mg and a bolus of sufentanil 10 µg, followed by continuous infusion of ropivacaine 16 mg h⁻¹. The baby was delivered approximately 3 h after catheter placement via the vaginal route.

The catheter was removed approximately 6 h after insertion. During the following days the patient suffered from progressively severe back pain. She did not show any signs of infection, such as fever, leucocytosis, elevated C-reactive protein, or signs of local infection at the insertion site. Additionally, no sensory, or motor neurological abnormalities were noted.

Five days after delivery, the back pain became unbearable. At that time, the white blood cell count was 10.1 × 10⁹ litre⁻¹ and C-reactive protein had increased to 26.0 mg dl⁻¹. A contrast-enhanced lumbar CT study was performed but was inconclusive. However, a median, sagittal T2-weighted magnetic resonance image (MRI) showed an intraspinal, ellipsoid fluid collection in the dorsal epidural space at disc level L2–L3 with compression of the dural sac (Fig. 1). Axial T1 MRI (after administration of contrast fluid) showed an intraspinal hypointense triangular-shaped fluid collection with peripheral rim enhancement in a dorsal epidural location, typical of epidural abscess formation at the disc space L2–L3 (Fig. 2). Empirical antibiotic treatment with ceftriaxone,
rifampin and metronidazole was started. The following day, the patient developed a sensory deficit in the left lower limb. Posterior surgical decompression and drainage of a pustular abscess was performed on that day. Antibiotic therapy was changed to clindamycin for 4 weeks, after oxacillin-sensitive S. aureus had been cultured from the abscess fluid. She recovered quickly with no remaining neurological deficit.

Discussion

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) and has been highlighted previously.\(^1\) Spinal epidural abscess formation after catheter insertion for labour and delivery is rare. A frequency of 1 in 506 000 cases was reported in a retrospective study of obstetric patients with epidural catheterization.\(^3\) In another study, not a single case of epidural abscess was reported over a 5-year period (5000 cases) in obstetric patients receiving epidural catheterization.\(^2\) Until recently, no reports of spinal epidural abscess formation after short-term (hours) catheter placement have been published. In recent years, sporadic reports have indicated that the incidence may be higher than previously calculated.\(^4\) The present case adds to this observation, as our patient did not have any predisposing risk factors, such as diabetes mellitus, malignant disease, immunosuppression or older age, but developed a spinal epidural abscess after short-term (6 h) epidural catheter insertion for pain relief during labour and delivery.

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. Antiseptics have proved to be effective in decontaminating the transient skin flora but not the deeply placed resident flora, which remains colonized even after skin disinfection. The risk of haematogenous seeding of an infection from the wound after vaginal delivery is minimal, but cannot be excluded completely. The intraluminal spread of microorganisms via a contaminated local anaesthetic solution is also very unlikely and was prevented by the use of an in-line bacterial filter. In our case, the attending anaesthetist wore a facemask, and sterile gloves, but no sterile gown. This is common practice in our institution. It is generally believed that a sterile environment prevents direct contamination, but no systematic investigation was conducted. A survey from Australasia showed that there were wide variations in what was considered to be essential aseptic precautions for placement of epidural catheters on the labour ward. Most likely, variations exist in other countries, including Germany. The authors of the survey suggested essential aseptic precautions, including wearing a facemask, sterile gloves and sterile gown, removal of wristwatch, handwashing, proper skin preparation, and a properly placed sterile drape.\(^5\) Since a clean, aseptic work field is inexpensive.

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**Fig 1** Median sagittal T2-weighted MRI showing intraspinal, ellipsoid fluid collection (arrow) in the dorsal epidural space at disc level L2–L3, compressing the dural sac.

**Fig 2** Axial T1-weighted MRI after administration of contrast fluid at disc space L2–L3, showing intraspinal hypointense triangular-shaped fluid collection with peripheral rim enhancement in a dorsal epidural location, typical of epidural abscess formation (long arrow). Additionally, contrast enhancement is seen in the left paraspinal muscles and surrounding the left facette joint (short arrow), corresponding to diffuse inflammation.
and easy to achieve, it is prudent to respect these recommendations.

Back pain is the leading complaint during the development of a spinal epidural abscess, and is reported in up to 90% of cases. However, the incidence of back pain is high after delivery, regardless of the use of epidural analgesia. Therefore, back pain without accompanying signs of infection rarely allows the diagnosis of abscess formation. Our patient complained about increasing back pain over 5 days, but the examination of the catheter insertion site did not show any evidence for local infection and the white blood cell count was not elevated until day 5. A CT study was initiated in the absence of neurological deficits but a clear diagnosis could only be established after MRI. MRI is the most common imaging technique for the diagnosis of spinal epidural abscess, with a sensitivity of close to 100%. CT myelography is reported to be as sensitive as MRI but is an invasive procedure which carries the risk of additionally contaminating the subarachnoidal space. Therefore, a CT myelography should only be performed when MRI is not available or not possible, e.g. in cases of incompatible implants. A CT scan without myelography is of little diagnostic information, and therefore not considered to be the method of choice.

*S. aureus* is isolated from epidural abscesses in more than 50% of patients and aerobic and anaerobic streptococci account for approximately 15% of the isolates. Gram-negative rods are found in approximately 15–20% and anaerobes in 2%, and rare cases include the isolation of *Cryptococcus, Nocardia, Aspergillus, Eikenella, Mycobacterium* and others. Approximately 15% of abscesses are culture-negative. Thus, the empirical antibiotic treatment should definitely cover *S. aureus*, streptococci and Gram-negative rods, especially in cases with septic symptoms. It is recommended that treatment should be continued for up to 6 weeks and should be extended to 8 weeks in cases of accompanying osteomyelitis. In our case, the organism was not phage-typed and traced. The source of infection remains unclear.

Conservative management is possible in cases without any neurological symptoms. In patients with neurological signs, the degree of thecal sac compression correlates with permanent neurological damage. Therefore, urgent surgical decompression and debridement is the treatment of choice when neurological signs have developed. In our case, broad-spectrum antibiotic treatment was started as soon as the diagnosis was made. However, when the patient developed a sensory deficit, immediate surgical decompression and debridement was performed. Once neurological symptoms have developed, severe disabilities or even death have been reported in up to 50% of patients. Several factors are associated with negative outcomes, such as higher age, a high degree of thecal sac compression, sepsis, and a long duration of symptoms. Favourable outcomes have been reported for abscesses located in the lumbosacral area and for patients with pustular abscesses. In this case the patient had all advantageous factors and recovered without neurological deficit.

In summary, spinal epidural abscess formation after epidural analgesia for labour and delivery in previously healthy women is rare, but should be taken into consideration in cases with severe back pain, even in the absence of infectious signs and neurological deficits. MRI is considered the diagnostic tool of choice, and surgical treatment is necessary once neurological deficits have developed to avoid permanent neurological sequelae.

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**References**