

Spinal Cord Compression due to an Iatrogenic Lumbar Epidural Abscess

Jl Arrotegui*

Department of Neurosurgery, General University Hospital, Tres Cruces s/n, 46014-Valencia, Spain

Abstract

The development of epidural abscess after intermittent epidural administration of local anesthetics and steroids is a rare condition with an unknown incidence. Magnetic Resonance Images (MRI) offers the appropriate approach to determine its effects on the spinal canal.

A 60-year-old woman with a diagnosis of central disc at L4-L5, with sciatic pain in the left leg, was treated by means of two consecutive single-shot epidural injections of local anesthetic and depo-steroids with a time span of one week between them, 72 hours after the second injection, local infection developed, but after 17 days of antibiotic therapy the back pain worsened, with weakness and areflexia in both legs, as well as fever and normocytic anemia. At this stage, the patient was referred to our hospital where emergency MRI revealed an epidural abscess at L2-L3 level, and was taken to the emergency operating room where a laminectomy for emergent decompression and drainage of the abscess was performed.

Symptoms improved in the immediate postoperative period, with 4/5-knee flexion, but sciatic pain persisted.

Conclusion: Epidural abscess is rare condition if correct methodology is applied, but failure to promptly diagnose and treat it may be associated with a poor outcome, Magnetic Resonance Images being the diagnostic method of choice.

Introduction

The epidural approach is currently an option in treating pain and in anesthesia. According to the literature [1-4], a rare complication of this technique involves the infection of deep tissues around the catheter or the formation of an epidural abscess (the true incidences of these problems remain uncertain), estimated to have developed in approximately 0.2-1.2% of every 10,000 hospital admissions [1].

Epidural abscess following injection has been regarded as the result of either bacteremic colonization or as a consequence of the injection of contaminated material. The administered substances are frequently local anesthetics alone or in combination with corticosteroid compounds [4-10], which epidural use is related to undesirable effects [4,6,11-13].

The few reports of such complications published to date rarely include Magnetic Resonance Image (MRI) data, although this technique is regarded the most adequate complementary imaging diagnostic tool [14,15].

In the present study we describe a case of epidural abscess caused by repeated single-shot epidural administration of depocorticosteroids, analyzing the different reasons for its development based on MRI evaluation.

Clinical Materials and Method

A 60-year-old woman with sciatic pain in the left leg for over one year was hospitalized due to marked exacerbation of the pain over the last three months. Her previous medical history showed no pathological findings.

One month after admission, and since non-steroid anti-inflammatory drugs, myorelaxants and complete bed rest failed to relieve the pain, MRI was performed with the diagnosis of central disc at L4-L5, along with an L3-L4 disc protrusion.

Epidural administration of local anesthetic and steroid was decided on, and two consecutive single-shot injections were performed using an aseptic technique. In both cases the skin was cleansed with a solution of

2.5% chlorhexidine in 70% alcohol, and the puncture performed with the needle bevel parallel to the ligaments and dural fibers, using a loss of resistance technique (air) with an 18G Tuohy needle (Perifix, B Braun Medical, Germany). 72 hours after the second injection signs of local infection were observed and empirical treatment with Teicoplanin was commenced. Penicillin-resistant *Staphylococcus aureus* was isolated from blood samples. Simultaneously, a computed tomography scan (CT) demonstrated infection of the subcutaneous cellular tissue without involvement of deep structures. The patient's evolution was initially favorable, i.e., the fever disappeared and symptoms abated. However, after 17 days of antibiotic therapy, the back pain worsened, with weakness and areflexia in both legs, rising temperature and normocytic anemia, but there was no sphincter dysfunction.

At this stage the patient was referred to our hospital where emergency MRI revealed an epidural abscess at L2-L3 level, with negative blood cultures, and underwent immediate surgery.

The pre-anesthetic examination revealed a body temperature of 37°C, blood pressure of 90/60 mm Hg and a heart rate of 82 bpm. Hydration and nutritional status were acceptable. The patient showed paleness of the skin and mucosae. Lymph nodes were absent, and cardiopulmonary auscultation proved normal. Abdominal exploration was uneventful. Pain was elicited by pressure at the L2-S1 spinal processes, with bilateral referred pain in response to percussion at L2-L4, but there were no signs of local surface inflammation. The Lasegue test was negative in both legs, the knee and Achilles reflexes were

*Corresponding author: Jl Arrotegui, Department of Neurosurgery, General University Hospital, Tres Cruces s/n, 46014-Valencia, Spain, E-mail: athbio@yahoo.es

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abolished, and the patient suffered weakness and diminished muscle tone in both legs. She had good mobility while in bed but not against resistance. Sensory capacity was preserved.

An L2-L3 decompressive laminectomy was performed, revealing an epidural abscess involving the ligamentum flavum. The abscess was intimately joined to the dural sac by granulation tissue and, to avoid dural damage and the possibility of meningeal complication. It was, therefore, also decided to only carry out a surgical drainage alone, taking cultures from the abscess.

In the immediate postoperative period the motor symptoms improved with 4/5 knee flexion and the reflexes recovered although the underlying sciatic pain persisted. Cultures of the purulent material grew *Staphylococcus aureus*. The patient was discharged 10 days after emergency admittance and referred back to the hospital of origin.

Discussion

In an evaluation by Baker et al. [1] at Massachusetts General Hospital corresponding to the period 1947-1974, only 1 of the 39 epidural abscesses recorded was related to the placing of a catheter. Pegues et al. [3], in a review of the period 1980-1992, followed by a prospective study from January to June 1993, only observed 9 catheter-related infections, including three cases of deep tissue infection.

Although abscess formation is a rare complication of an epidural injection, this possibility must always be taken into account in order to avoid unnecessary delays in treatment that may adversely affect the quality and cost of healthcare, as well as the associated morbidity.

Different factors may contribute to the low incidence of infection after epidural catheterization: the adoption of a sterile technique [16], and the use of the fewest approaches possible, in order to minimize the risk of a breach in sterility [12] given that, despite the maintenance of asepsis, 30% of all catheter contaminations arise from the puncture site [17]. Thus, in the study by Nickels [16] involving 200 epidural catheterizations with a 5-day duration and using a sterile technique, positive catheter tip cultures were obtained in four cases, although the author stresses that contamination may have occurred as a result of skin contact on extracting the catheter. Germs may also gain access as a consequence of analgesic contamination on coming into contact with the syringe or on passing through the catheter, particularly when the latter is frequently used [18,19]. *In vitro*, local anesthetics are able to arrest bacterial growth [12,13], however, this capacity decreases with diminished anesthetic concentration. With 1% lidocaine or 0.125% bupivacaine concentrations, *S. aureus* growth is not detained - this being the microorganism implicated in most cases published. On the other hand, lidocaine has also shown the ability to diminish latex phagocytosis by leucocytes [20]. Additionally, lymphocytic transformation is seriously impaired by high concentrations of anesthetics [21]. However, the experimental data obtained do not allow the *in vivo* confirmation of a possible antimicrobial effect of local anesthetics, or the potential risk of infection.

Steroids are habitually used to control inflammatory pain and epidural abscesses related to their administration are reported [4-10]. However, to date, it has not been possible to establish the cause-effect relationship involved, and the conclusion of most studies is that the incidence of abscess formation after intermittent epidural administration of local anesthetics and steroids is rare and the frequency is unknown. Thus, Waldman [10], in a prospective study including 790 epidural blocks with steroids, followed by a six-week observation period, observed only one case of slight infection; however, treatment

with extradural steroids has also been related to prolonged latencies in the manifestation of abscesses [4-6].

It must be considered that in diabetic patients and in patients with rheumatoid arthritis, an increased frequency of infections occurred [8,9]. The relationship between abscesses and diabetes must be due to the reduced resistance to infection worsened by the immunosuppression produced by the steroids. Perhaps in our case the possibility of an asymptomatic epidural hematoma related to the effect of anti-inflammatory drugs on platelet function, may predispose to local infection.

The development of infection in the epidural space is often accompanied by neurological problems that may even become permanent [6]. In most instances treatment implies surgery, which means that the diagnosis must be quickly and definitively established. In this way it is possible to avoid the risks presented by other techniques such as myelography, particularly bearing in mind that the development of infection constitutes a complication, stemming from treatment. In this sense, MRI is the most appropriate and sensitive of the non-invasive techniques available [15]. However, it is unable to differentiate pus from other fluids, such as blood, and is relatively costly [6].

Conclusion

Given the multiple benefits derived from epidural treatment with local anesthetics and corticoids and, in view of the low incidence of infectious complications involved, it does not seem reasonable to oppose the utilization of this method. Nevertheless, emphasis is placed on the need to adopt a strict aseptic technique with a minimum number of punctures, as these are the two main factors that condition the low incidence of abscesses as a result of epidural injection. If an epidural abscess is suspected, blood cultures must be taken, an urgent MRI performed, and specific antibiotic treatment for *Staphylococcus aureus* started.

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