



Subdural Empyema by *Streptococcus pyogenes* after Epidural Anesthesia

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Abstract

Central nervous system infections may occur after performing an epidural or spinal puncture, although they are rare. As reported in different articles, the most common causative microorganism is *Streptococcus*, particularly those from the Viridans group. We present the case of a postpartum woman with an epidural empyema due to *Streptococcus pyogenes*, which is manifested with paraesthesia in the upper left limb and headache, so a nuclear magnetic resonance is performed where a right extra-axial frontal-parietal collection suggestive of subdural empyema is described. The patient was treated with broad-spectrum antibiotic therapy and underwent surgical removal, with a resolution of the clinical picture.

Introduction

Central nervous system infections secondary to epidural or spinal anesthesia are a rare entity (<1/12000 patients), although it is a severe complication that can cause neurological sequela or even death [1,2,5]. The microorganism that most frequently causes infection of the Central Nervous System (CNS) after performing a lumbar puncture is the genus *Streptococcus*, primarily the Viridans group [3]. Except for in PubMed we have not found any case of subdural empyema after epidural anesthesia in which the isolated microorganism was *Streptococcus pyogenes*.

Case Presentation

We present the case of a 45-year-old woman with a history of cesarean section 13 days before admission, which received epidural anesthesia during the procedure. She arrives on the Emergency Department with paresthesia in the upper left limb and headache that had lasted for several days. An exploration of the incomplete right-hemispheric syndrome is confirmed, so cranial CT is performed where a right hemispheric subdural collection is observed that causes compression and edema of said cerebral hemisphere (Figure 1A). The patient does not report fever or dysthymic sensation, and the blood sample shows leukocytosis (22200/uL with 95% neutrophils) and elevation of acute phase reactants (RCP 41.5 mg/dL, procalcitonin 6.05 ng/mL), as well as coagulopathy (INR 1.4, PT 62%) and acute non-oliguric renal failure (creatinine 1.28 mg/dL, urea 68 mg/dL). Empiric antibiotic treatment with meropenem and vancomycin is initiated for sepsis coverage. Lumbar puncture is not performed given the presence of significant cerebral edema.

After 24 h of admission, the patient has focal epileptic seizures with left oculoccephalic deviation and clones of the upper left limb, without loss of consciousness. Antiepileptic treatment is initiated, and she is admitted to the ICU for surveillance.

Since the clinical evolution worsens with the persistence of seizures and progression of the hemispheric syndrome with paresis of left limbs, we decide to perform MRI where right extra-axial frontal to parietal collection suggestive of subdural empyema is described (Figure 1B-1E).

Antibiotic treatment is modified by replacing vancomycin with linezolid, and the case is discussed with Neurosurgery who decides on urgent surgical intervention, draining purulent fluid (Figure 2). The surgical samples are sent to Microbiology, and gram-positive cocci growth is reported.

The patient returns to the ICU where she remains 48 h more, with good evolution, so she is transferred to the Department of Neurosurgery, without presenting new seizure episodes after six days of admission, and not presenting epileptic form electrical activity in EEG since the 9th day of admission. She is discharged after 16 days of admission, with the only hypoesthesia in left-hand

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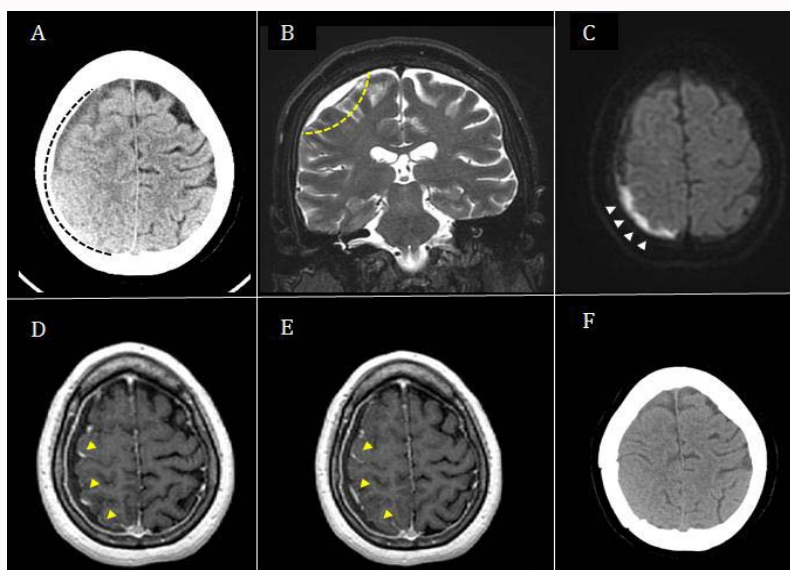


Figure 1A-1F: A. First cranial CT. B. Axial T2 MRI. C. Axial diffusion MRI. D,E. Weighted gadolinium-enhanced MRI. F. Post surgical CT.

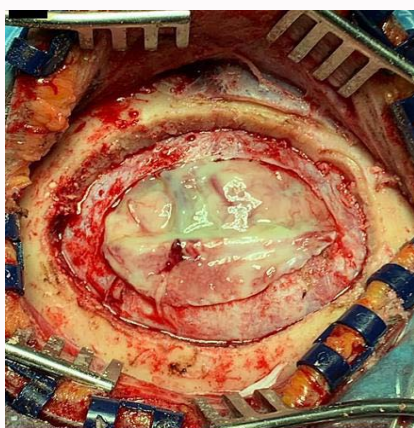


Figure 2: Evacuation of subdural empyema by craniotomy.

fingers.

From an infectious point of view, Microbiology reported the isolation of *Streptococcus pyogenes* in the subdural collection, so she is discharged with antibiotic treatment with metronidazole and linezolid.

Discussion

There are several ways in which a microorganism can reach the CNS after an epidural puncture: lumbar puncture during a period of bacteremia, intrathecal administration of contaminated substances or lack of asepsis in the puncture site. However, it is not usually possible to find out what is the mechanism of infection in most cases.

Streptococcus pyogenes is a group A *Streptococcus*, gram-positive facultative anaerobic. It is capable of producing multiple infections, including CNS infections, although these are rare, and less than 5% of cases of community bacterial meningitis caused by this microorganism [4,5]. However, the presence of subdural empyema in these patients is familiar, being present in more than 30% of cases [5].

In a review article by Videira et al. [2], meningitis secondary to the performance of an epidural puncture was defined as any meningitis

that occurred after one week of the epidural puncture. They describe 3 cases, which begin with headache, nausea, malaise, or drowsiness 24 h to 72 h after the epidural puncture. Although the microorganism involved in 2 of the 3 cases described was of the genus *Streptococcus*, none of them were *Streptococcus pyogenes*.

The diagnosis should be made with lumbar puncture whenever possible, as well as an imaging test. Viola et al. [6] described the case of a 5-year-old male with subdural empyema by *Streptococcus pyogenes*, with normal results on the CT, and was finally diagnosed through nuclear magnetic resonance imaging (MRI). Younis et al. [7] reviewed 39 cases of patients with sinusitis and intracranial complications, observing greater accuracy in the diagnosis with MRI when compared to CT, so they establish that MRI is the best method for the diagnosis of intracranial infections.

Jim et al. [8] published a case series of patients with complicated community bacterial meningitis with subdural empyema, finding an incidence of 2.7% and a mortality of 18%. The microorganism most frequently associated with this condition was *Streptococcus pneumoniae*, and 4% of patients had a positive culture for *Streptococcus pyogenes*. At the time of admission, 85% of the patients had a headache and 80% fever.

With regard to treatment, all were treated with beta-lactam antibiotics, penicillin/amoxicillin being the most common regimen (36%), although the use of third-generation cephalosporins or carbapenems in monotherapy or combination was also frequent. Adjuvant corticosteroid therapy was used in 89% of the patients, and surgical evacuation was performed in 18%, the latter being more frequent in those patients who presented midline deviation.

With respect to invasive *Streptococcus pyogenes* infections during pregnancy and childbirth, an increase has been observed since the 1980's. However, the incidence of puerperal sepsis with positive cultures at the CNS is very low (after more than 8 days of childbirth only one case has been reported), and the heterogenicity of the signs and symptoms as well as the places where the bacteria have been isolated after this period of time suggest that the infection does not have to do directly with an ascending vaginal infection [9]. However, in the case of our patient, no vaginal exudate culture was performed,

so we cannot completely rule out that this was the origin of the sepsis that finally conditioned the subdural empyema.

Conclusion

Infection of the central nervous system after performing an epidural puncture is a rare entity, but with high morbidity and mortality, so it should be suspected in patients who present with symptoms of infection, especially if they have neurological symptoms, after an epidural puncture. The most accurate imaging test to detect them is MRI, and the most indicated treatment would be antibiotic therapy with beta-lactams or lincosamides if resistance to the first ones is known, as well as surgical evacuation mainly if empyema generates mass effect or displacement of the midline.

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