

White Lumbar Puncture (“Dry Tap”) in Suspected Bacterial Meningitis: A Case Report and Literature Review

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Abstract

Case Report

A white lumbar puncture is a rare but challenging clinical situation that may delay the diagnosis of severe bacterial meningitis. We report the case of a 74-year-old woman admitted to the intensive care unit with acute neurologic impairment, septic shock, and respiratory distress, in whom the lumbar puncture yielded no cerebrospinal fluid despite a clinical presentation highly suggestive of meningoencephalitis. Blood cultures subsequently identified an invasive *Staphylococcus aureus* infection, complicated by a fulminant progression to refractory multiorgan failure. This case highlights the diagnostic challenges associated with a white tap and emphasizes the importance of early empiric antibiotic therapy in severe presentations [1–3].

Keywords: white lumbar puncture, bacterial meningitis, septic shock.

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INTRODUCTION

Lumbar puncture (LP) remains the key diagnostic test for confirming bacterial meningitis. However, there are exceptional circumstances in which the LP is “white,” characterized by the absence of cerebrospinal fluid (CSF) drainage. This phenomenon, reported in fewer than 1% of lumbar punctures, represents a significant diagnostic pitfall, particularly when the clinical presentation strongly suggests acute meningitis [1]. Several mechanisms have been proposed to explain this absence of CSF outflow, including intracranial hypotension during severe sepsis, increased CSF viscosity in purulent meningitis, or mechanical obstruction preventing the passage of CSF through the needle [2–4].

In patients with severe septic shock, *Staphylococcus aureus* meningitis constitutes a major therapeutic emergency. Invasive forms of this pathogen may rapidly progress to severe neurologic impairment and multiorgan failure, even in the absence of an initial CSF analysis [5]. In this context, international guidelines strongly recommend the immediate initiation of empiric antibiotic therapy, regardless of LP results [6]. We report a case illustrating the diagnostic limitations of a white lumbar puncture and the fulminant course of *S. aureus* meningitis.

OBSERVATION

A 74-year-old woman with a medical history of type 2 diabetes treated with oral hypoglycemic agents and hypertension controlled with ACE inhibitors was admitted to the intensive care unit for acute alteration of consciousness associated with septic shock and respiratory distress. The symptoms had begun two days earlier with severe low back pain, nausea, and vomiting, progressing to fever and profound asthenia. On admission, the patient presented with a Glasgow Coma Scale score of 8, marked tachypnea, severe hypotension requiring immediate vasopressor support, and signs of peripheral hypoperfusion consistent with shock.

Laboratory tests revealed a severe inflammatory syndrome, elevated lactate levels, and acute kidney injury. Blood cultures were obtained before initiating antibiotics. A brain CT scan showed no acute abnormalities. A lumbar puncture was performed due to strong suspicion of bacterial meningitis, but the procedure resulted in a “white tap,” meaning no cerebrospinal fluid could be obtained despite multiple technically adequate attempts. This absence of CSF significantly complicated the diagnostic approach and prevented immediate microbiological confirmation.

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Given the persistent neurological deterioration, septic shock, and inability to obtain CSF, broad-spectrum empiric antibiotic therapy was initiated according to current recommendations. Within hours, blood cultures returned positive for *Staphylococcus aureus*, confirming the diagnosis of invasive staphylococcal infection, likely complicated by acute bacterial meningitis despite the absence of CSF analysis. The clinical course rapidly worsened, with progressive respiratory distress requiring endotracheal intubation, followed by refractory multiorgan failure despite aggressive intensive care measures.

The patient ultimately died from refractory septic shock secondary to invasive *S. aureus* infection, with the absence of CSF outflow during lumbar puncture representing a major initial diagnostic obstacle. This case illustrates the difficulty of interpreting a white tap in suspected meningitis and underscores the importance of early empiric treatment in severe presentations.

DISCUSSION

A white lumbar puncture is a rare but recognized phenomenon that occurs in a minority of clinical situations, mostly in the context of severe sepsis, intracranial hypotension, or fulminant infectious processes. It is defined as the complete absence of cerebrospinal fluid outflow despite correct technique, accurate needle placement, and no apparent mechanical obstruction [1]. This unusual scenario, often unexpected at the bedside, constitutes a major diagnostic challenge, as it may dangerously delay the initiation of adequate therapy for bacterial meningitis, particularly in fulminant forms. The absence of CSF available for analysis deprives the clinician of a key diagnostic element, even when the clinical suspicion is high.

Several physiopathological mechanisms may explain the absence of CSF outflow. The first involves intracranial hypotension, a direct consequence of systemic vasoplegia and the hemodynamic collapse characteristic of severe sepsis. In such cases, the opening pressure is markedly reduced, making spontaneous CSF drainage impossible even when the needle is correctly positioned [2]. The second mechanism relates to the physico-chemical alterations of CSF in purulent bacterial meningitis. In some infections, particularly those due to *Staphylococcus aureus*, the fluid becomes thick, highly inflammatory, fibrinous, or loculated, increasing its viscosity and potentially obstructing the needle or preventing drainage [3,4]. Additional mechanisms include anatomical or inflammatory barriers such as epiduritis, epidural abscesses, or arachnoid adhesions, which may alter the meningeal spaces and mechanically impede CSF collection, as reported in some aggressive staphylococcal infections [5].

In this context, the absence of analyzable CSF may create a false sense of reassurance, whereas bacterial meningitis may still be present despite a white

tap. Several studies have shown that, in severe sepsis, blood cultures often become positive early and may provide essential diagnostic information before CSF analysis is possible [6]. In our patient, the white tap delayed microbiological confirmation, although the clinical deterioration—marked by rapid neurologic and hemodynamic decline—strongly suggested fulminant bacterial meningitis. The rapid positivity of blood cultures for *S. aureus* played a decisive role in establishing the diagnosis despite the initial inability to obtain CSF [7].

Given a white tap in a clinical picture suggestive of acute meningitis, international guidelines emphasize the need to initiate empiric antibiotic therapy immediately, without waiting for CSF results, as prognosis is tightly linked to treatment promptness [6]. The combination of a third-generation cephalosporin and vancomycin is recommended in suspected or confirmed staphylococcal meningitis, corresponding to the treatment administered to our patient. The extremely rapid deterioration observed in this case underscores the exceptional severity of invasive *S. aureus* infections, whose mortality remains high and may exceed 40% in certain series [8]. This case strongly highlights the need for heightened vigilance when encountering a white lumbar puncture, which should never rule out bacterial meningitis nor delay the initiation of appropriate therapy.

CONCLUSION

This case highlights the diagnostic and therapeutic challenges posed by a white lumbar puncture in the context of suspected bacterial meningitis. Although rare, the absence of cerebrospinal fluid despite correct technique should never delay treatment when clinical suspicion is high. Invasive *Staphylococcus aureus* meningitis may progress rapidly, and early empiric antibiotic therapy remains essential to improving outcomes. This report underscores the importance of maintaining a high level of vigilance when encountering a dry tap and reinforces the need for immediate, guideline-based management in severe sepsis and acute neurologic deterioration.

BIBLIOGRAPHIE

1. Hasbun R, Abrahams J, Jekel J, Quagliarello V. Computed tomography of the head before lumbar puncture in adults with suspected meningitis. *N Engl J Med*. 2001 ;345 :1727-33.
2. Ko JY, Lee JH, Lee JH et al. Anatomical changes after lumbar spinal surgery and their impact on lumbar puncture. *J Clin Neurosci*. 2014 ;21(6) :1043-7.
3. Marik PE, Varon J. The management of intracranial hypertension. *Chest*. 2002 ;122 : 2022-32.
4. Weisfelt M, van de Beek D, Spanjaard L, Reitsma JB, de Gans J. Clinical features, complications, and outcome in adults with pneumococcal meningitis. *N*

- Engl J Med.* 2006 ;354 : 241-50. (Données extrapolées aux méningites purulentes visqueuses).
5. Jensen AG, Espersen F, Skinhøj P, Frimodt-Møller N. Bacteremic *Staphylococcus aureus* spondylitis. *Arch Intern Med.* 1997;157: 509-17.
 6. Tunkel AR, Hartman BJ, Kaplan SL et al. Practice guidelines for the management of bacterial meningitis. *Clin Infect Dis.* 2004 ;39 :1267-84.
 7. Van de Beek D, de Gans J, Spanjaard L, Weisfelt M, Reitsma JB, Vermeulen M. Community-acquired bacterial meningitis in adults. *N Engl J Med.* 2004 ;351 :1849-59.
 8. Holland TL, Arnold C, Fowler VG Jr. Clinical management of *Staphylococcus aureus* bacteremia: a review. *JAMA.* 2014 ;312 :1330-41.