East African Scholars Journal of Medicine and Surgery
Abbreviated Key Title: EAS J Med Surg
ISSN: 2663-1857 (Print) & ISSN: 2663-7332 (Online)
Published By East African Scholars Publisher, Kenya

Volume-7 | Issue-12 | Dec-2025 | DOI: https://doi.org/10.36349/easjms.2025.v07i12.002

OPEN ACCESS

Case Report

Escherichia coli Meningitis Following Spinal Anesthesia for Cesarean Section: A Case Report

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Article History
Received: 18.10.2025
Accepted: 15.12.2025
Published: 17.12.2025

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Introduction***: Post–spinal anesthesia bacterial meningitis is an exceptional complication, most often caused by Gram-positive cocci originating from the oropharyngeal flora. Infections due to Escherichia coli are extremely rare and are generally reported as isolated cases. ***Case Report***: We report the case of a 37-year-old woman with no previous medical history who developed altered consciousness twelve hours after a cesarean section performed under spinal anesthesia. Clinical examination revealed obnubilation, neck stiffness, and cloudy cerebrospinal fluid. Cerebrospinal fluid culture isolated Escherichia coli sensitive to ceftriaxone. A breach in aseptic technique was identified, involving the use of the paper inner packaging of a pair of surgical gloves as an operative drape. Early antibiotic therapy with ceftriaxone combined with corticosteroid therapy resulted in a favorable outcome without sequelae after 21 days of treatment. ***Conclusion***: This case illustrates the rare but serious occurrence of Escherichia coli meningitis following spinal anesthesia and highlights the importance of strict aseptic technique, rapid diagnosis, and early antibiotic treatment. Exclusive use of certified sterile surgical drapes remains an essential preventive measure.

Keywords: Cesarean Section, Spinal Anesthesia, Meningitis, Intensive Care, Third Generation Cephalosporin.

INTRODUCTION

Bacterial meningitis is a potential complication of spinal anesthesia, although it remains particularly rare. According to the British National Audit Project NAP3, its incidence is estimated between 0 and 2.7 cases per 100,000 spinal anesthetics [1]. Despite its rarity, the literature describes a characteristic microbiological profile. The pathogens most frequently implicated are Gram-positive cocci such as viridans group streptococci and Streptococcus pneumoniae, as well as staphylococci [2]. Gram-negative bacilli such as Escherichia coli are reported only exceptionally, most often as isolated cases [3, 4]. Prognosis depends on the rapidity of diagnosis and early initiation of antibiotic therapy. A prolonged delay between the onset of neurological symptoms and antibiotic administration increases the risk of sequelae and mortality [4, 5]. We report a case of Escherichia coli meningitis occurring after spinal anesthesia for cesarean section, highlighting diagnostic, therapeutic, and preventive aspects.

CASE REPORT

A 37-year-old woman with no significant past medical history was admitted to the intensive care unit for management of altered consciousness occurring twelve hours after a cesarean section indicated for breech presentation in an elderly primigravida. Preoperative clinical examination was normal from respiratory, neurological, and hemodynamic standpoints. Obstetric examination revealed active fetal movements, absence of uterine contractions, and normal fetal heart rate monitoring. Preoperative laboratory tests were unremarkable. The patient was classified as ASA II and considered suitable for spinal anesthesia with antibiotic prophylaxis. After installation in the operating room, hemodynamic and respiratory parameters were normal. The patient was positioned sitting. The anesthetist performed hand hygiene and wore a surgical mask and cap. Skin preparation was carried out successively with 4% povidone-iodine scrub, alcohol, and 10% non-foaming povidone-iodine. In the absence of a sterile impermeable drape, the inner paper packaging of the surgical gloves was used as an operative field. Spinal

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puncture was performed at the L4–L5 interspace using a 25-gauge Quincke needle. Antibiotic prophylaxis consisted of cefuroxime 1.5 g. Surgery and immediate postoperative course were uneventful. Twelve hours postoperatively, the patient developed headache followed by psychomotor agitation. A dose of diazepam 10 mg was administered. Persistence of neurological symptoms led to consultation with an intensivist and transfer to our hospital. She was admitted to the ICU two hours after symptom onset. On admission, the patient was obtunded with a Glasgow Coma Scale score of 9/15, reactive pupils, no focal neurological deficit, and neck stiffness. Blood pressure was 123/73 mmHg and heart rate 81 beats per minute. She presented with dyspnea and bronchial rales, respiratory rate 20 breaths per minute, oxygen saturation 89% on room air and 100% with oxygen therapy. Body temperature was 35.4°C and capillary blood glucose 1.51 g/L. Blood cultures were not obtained. Complete blood count showed leukocytosis at 12.6 × 10^3/mm^3. Lumbar puncture revealed cloudy cerebrospinal fluid. Cytology showed 4,690 cells/mm^3 with 99% neutrophils. Biochemical analysis demonstrated hyperproteinorrachia at 2 g/L and hypoglycorrhachia at 0.46 g/L (blood glucose 1.5 g/L). Gram staining revealed Gram-negative bacilli, and soluble antigens of Escherichia coli were detected. Culture grew Escherichia coli sensitive to ceftriaxone and resistant to amoxicillin–clavulanic acid and cefuroxime. Following lumbar puncture, empirical antibiotic therapy with ceftriaxone at a dose of 4 g/day was initiated immediately, approximately four hours after the onset of neurological symptoms. Dexamethasone was administered at a dose of 10 mg every six hours, with the first dose given prior to the initiation of antibiotic therapy. Clinical evolution was marked by a progressive and favorable improvement. Within the first 48 hours of treatment, the patient showed gradual recovery of consciousness, with resolution of psychomotor agitation and disappearance of meningeal signs. Respiratory status improved rapidly, allowing discontinuation of oxygen therapy. Hemodynamic parameters remained stable throughout the stay in the intensive care unit. The patient remained under close neurological and clinical monitoring in the intensive care unit for five days. No secondary complications were observed. She was transferred back to the maternity ward on day five after admission to the ICU. Antibiotic therapy with ceftriaxone was continued for a total duration of 21 days. The remainder of the hospital stay was uneventful. At the end of treatment, the patient was discharged in good clinical condition, with complete resolution of neurological symptoms and no detectable sequelae.

DISCUSSION

Post–spinal anesthesia meningitis reported in the literature is predominantly caused by microorganisms belonging to the oropharyngeal or cutaneous flora, which are anatomically close to the puncture site or the operator [6]. In contrast, Escherichia coli is part of the digestive flora, mainly intestinal, and is only exceptionally found on the skin under normal conditions. Consequently, the risk of contamination during a spinal procedure is extremely low. The occurrence of Escherichia coli meningitis therefore strongly suggests contamination by non-sterile material, a major breach in aseptic technique, or an active infection in the patient at the time of the procedure. In the present case, a clear breach in aseptic practice was identified, namely the use of the inner paper packaging of surgical gloves as an operative field. Such packaging cannot be considered a certified sterile surgical drape. Indeed, a surgical drape is defined as a sterile textile or synthetic material designed to create an effective aseptic barrier around the operative site [7]. Nevertheless, similar cases of Escherichia coli meningitis following spinal anesthesia have been reported in the literature even when standard aseptic measures were respected [8]. In our patient, neurological symptoms developed approximately twelve hours after spinal anesthesia, initially presenting as headache and psychomotor agitation in the absence of fever. This clinical presentation is consistent with that reported by Muzien [8], who described a similar case with symptom onset sixteen hours after anesthesia, also without pyrexia. The absence of fever in both cases may be explained by the routine use of paracetamol for postoperative analgesia, which can mask febrile response and delay clinical suspicion. Other reports have described shorter or longer delays, ranging from five hours [9], to twenty-four hours [10], although these cases involved Streptococcus salivarius rather than Escherichia coli. In our case, lumbar puncture was performed within minutes of admission to the intensive care unit. Ideally, lumbar puncture should be performed before administration of the first dose of antibiotics. However, when lumbar puncture cannot be performed immediately due to contraindications, blood cultures should be obtained prior to antibiotic initiation. Fuglsang-Damgaard [11], reported a series of bacterial meningitis cases with negative cerebrospinal fluid cultures but positive blood cultures, highlighting the diagnostic value of blood cultures when cerebrospinal fluid analysis is inconclusive or unavailable. In our patient, empirical antibiotic therapy was initiated immediately after lumbar puncture, based on the macroscopic appearance of the cerebrospinal fluid, and within one hour of admission to our unit. Early initiation of appropriate antimicrobial therapy has been shown to significantly reduce mortality and the risk of neurological sequelae in acute bacterial meningitis [12]. The clinical course of post–spinal anesthesia bacterial meningitis depends on several factors, including the virulence of the causative organism, the rapidity of diagnosis and treatment, and the patient's initial clinical condition [13]. Prevention of post–spinal anesthesia meningitis relies primarily on simple but essential measures. The systematic use of a surgical mask, strict adherence to aseptic technique, and exclusive use of certified sterile disposable equipment

constitute the most effective strategies to prevent this serious complication [14, 15].

CONCLUSION

Escherichia coli meningitis following spinal anesthesia is a rare but serious complication that underscores the absolute necessity of impeccable aseptic technique, including exclusive use of certified sterile surgical drapes. Early diagnosis and rapid initiation of appropriate treatment are decisive for prognosis. Any neurological impairment occurring within 24 hours after spinal anesthesia should raise suspicion of meningitis, even in the absence of fever.

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Cite This Article: Kane MM, Sambou P, Ntab SO, Barboza D (2025). *Escherichia Coli* Meningitis Following Spinal Anesthesia for Cesarean Section: A Case Report. *East African Scholars J Med Surg, 7*(12), 359-361.