

Editorial

Spinal anaesthesia-linked fungal meningitis: a health crisis unfolds in the United States and Mexico

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Received: 31 August 2025

Accepted: 07 November 2025

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An outbreak of uncommon cases of central nervous system infection (CNSI) linked to spinal anesthesia was reported in May 2023 by the United States and Mexico. The cases were identified in five female patients undergoing certain surgical procedures with spinal anesthesia in Mexico, in two private hospitals. These cases were tested positive for Fungal meningitis caused by a pathogenic fungus under laboratory investigations. Following the outbreak, as of 26 May 2023, the USA and Mexico have reported 20 more cases with signs and symptoms of CNSI which also includes 2 deaths reported by the United States of America centers for disease control and prevention (US CDC).¹

A rare and potentially fatal medical emergency involving swelling around the brain and spinal cord is called a fungal infection. It may arise from a fungal infection that enters the brain and spinal cord from other areas of the body. *Candida*, *Cryptococcus*, *Histoplasma*, *Blastomyces*, and *Coccidioides* are a few of the fungi that can cause fungal meningitis. Individuals with compromised immune systems are more vulnerable to contracting this infection. A reduced immune system can result from a number of drugs, illnesses, and surgical operations. Examples include steroids, anti-TNF drugs, HIV, cancer, and others.² Infection control protocols may not be followed, or medical equipment infected with fungi may result in the transmission of this infection to patients undergoing uncommon medical and surgical operations. Healthcare-involved cases of fungal meningitis have occurred among patients who received spinal anesthesia.³

The outbreak began on May 8, 2023, when the Emerging Infections Network notified the Texas Department of State Health Services and the Cameron County Health Department of two female patients hospitalized in Texas for meningitis. The patients' meningitis began about two to four weeks after they underwent cosmetic procedures at River Side Surgical Center in Tamaulipas, after they had received epidural anesthesia. A further two female patients admitted to the Texas Medical Center experienced 1-8 weeks of probable fungal meningitis following aesthetic operations performed under epidural anesthesia in Matamoros, Mexico. Five female patients have been identified as of May 12, 2023; all had a history of spinal anesthesia-related surgical procedures. One of these individuals passed away while they were all hospitalized.⁴ Following cosmetic procedures using spinal anesthetic, the patients all had comparable symptoms, including headache, nausea, vomiting, fever, and unconsciousness. As of May 26, 2023, the US CDC had documented two deaths in addition to the 20 other patients that had signs and symptoms consistent with CNSI. After conducting all of the necessary investigations, it was discovered that between January 2023 and April 2023, 547 individuals had undergone these surgical operations in these two clinics; 304 of them (56%) are Mexican, 237 of them (43%) are American, and one is Canadian. All patients who had procedures under epidural anesthesia in these clinics from January 1 to May 13, 2023, are at risk for suspecting fungal meningitis.^{1,3} As of June 29th, 161 individuals are under investigation, 15 suspected cases, 10 probable cases, 9 confirmed cases, and 7 deaths reported in the US as well as reported cases in Mexico.³

The issue has grown into a multistate, global fungal meningitis outbreak as of July 7, 2023. In 2023, obtaining epidural anesthesia at the clinics of interest may put 185 individuals from 22 US states and territories at risk of fungal meningitis. Among These patients have been identified; there are 11 suspected, 10 probable, and 10 confirmed US incidence with eight fatalities and serious vascular complications. *Fusarium solani* species complex has been identified as the causative agent, with antifungal susceptibility testing of a single isolate demonstrating poor *in vitro* activity for most available antifungals.⁵ Individuals at increased risk for fungal meningitis include those with HIV/AIDS, cancer, or using steroids/medications.

All the patients complained of similar symptoms such as headache, fever, vomiting, nausea, sensitivity to light, and losing consciousness after receiving surgical treatments in the hospitals.² If surgical and medical instruments, drugs, or infection control methods are not used properly, fungal meningitis may result. This particular pathogen associated with healthcare can result in fatal illness or other severe conditions. There have been instances of individuals under spinal anesthesia developing fungal meningitis. Fungal meningitis is a rare condition but requires immediate medical care or can be fatal and result in death.¹

Treatment for *F. solani* fungal meningitis is complex and varies among patients. Based on clinical experience during the current outbreak in Durango, Mexico, and the United States, the MSGERC provides preliminary recommendations. Every patient, even those without symptoms, who underwent epidural anesthesia at the impacted Matamoros clinics as of January 1, 2023, should seek immediate evaluation, including a lumbar puncture. These actions aim to address the high mortality rate and prior asymptomatic cases. Comprehensive cerebrospinal fluid (CSF) testing is vital, especially for patients with elevated white blood cell counts, leading to further tests, such as pan-fungal PCR and CSF β -D-glucan. Antifungal susceptibility testing is essential due to challenges in treating *F. solani*.^{6,7}

Asymptomatic patients with normal CSF need no antifungal therapy but may require follow-up. Elevated CSF white blood cell counts warrant empiric antifungal treatment while consulting infectious disease specialists and neurologists. Brain MRI is recommended for those with abnormal CSF results. Triple therapy, comprising voriconazole, liposomal amphotericin B, and fosmanogepix, is the current course of treatment. Monitoring kidney function, electrolytes, and drug interactions is crucial. Intrathecal therapy with amphotericin B is considered for refractory cases under expert guidance. Fosmanogepix is a potential treatment, though the ideal dosage is unclear. Patients intolerant to voriconazole should avoid certain antifungals. Repeated CNS MRIs, extended therapy, and post-treatment

monitoring are necessary for managing complications and potential relapse.^{6,7}

High incidence of neurovascular consequences, such as stroke, mycotic aneurysms, cerebral bleeding, and vasculitis, are present in patients who are affected by this outbreak. Usually, these vascular events have occurred in the cerebellum, brain stem, and basilar circulation. Patients have also had intracranial hypertension and brain edema, which often necessitate the use of ventriculoperitoneal shunts, external ventriculostomy devices, lumbar drain implants, and/or recurrent lumbar punctures. Some people who have developed corticosteroids and/or endovascular operations have been treated with neurovascular issues, but it is unknown if they are effective or when they should be used. Patients are advised to receive treatment in facilities with access to advanced neuroimaging and neurological intensive care units due to the high frequency of these problems and the advanced management techniques needed.⁵

In conclusion, this outbreak of fungal meningitis is a serious, multistate, and international health crisis, affecting a significant number of individuals. The cases have been associated with complications, including neurovascular issues, and have prompted a coordinated response from healthcare authorities. While extensive investigations are ongoing to determine the source of the outbreak, treatment recommendations have been provided to address the complexities of managing *F. solani* fungal meningitis. Healthcare providers must remain vigilant in responding to this evolving situation, and further research is essential to better understand and control this public health challenge.

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Cite this article as: Ahmed A, Shakeel A, Zeeshan M. Spinal anaesthesia-linked fungal meningitis: a health crisis unfolds in the United States and Mexico. *Int J Sci Rep* 2026;12(1):51-3.