

Candida parapsilosis ventriculoperitoneal shunt infection in a 1-year-old child: A case report emphasizing the role of source control

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ABSTRACT

Fungal infections involving the central nervous system are rare but associated with high morbidity and mortality, especially in patients with neurosurgical implants. *Candida non-albicans* species have emerged as significant pathogens, particularly in patients with ventriculoperitoneal (VP) shunts. We report a case of a pediatric patient with recurrent *Candida non-albicans* infection following VP shunt surgery, where delayed source control contributed to relapse. Early recognition, prompt antifungal therapy, and surgical removal of infected hardware were key to successful management. This case emphasizes the importance of integrating microbiological findings with clinical scenarios and adhering to evidence-based recommendations for fungal shunt infections. Source control remains the gold standard.

Key words: Antifungal therapy, *Candida non-albicans*, Fungal meningitis, Source control, Ventriculoperitoneal shunt

Infections associated with ventriculoperitoneal (VP) shunts remain a serious complication in neurosurgical practice, occurring in 5–15% of shunt placements [1]. Although bacterial pathogens, particularly *Staphylococcus* species, predominate, fungal infections, especially those caused by *Candida* species, are increasingly recognized, often in immunocompromised hosts or after prolonged antibiotic or steroid therapy [2,3]. *Candida non-albicans* species such as *Candida parapsilosis*, *Candida tropicalis*, and *Candida glabrata* have emerged as important pathogens due to their resistance patterns and biofilm-forming ability [4]. Central nervous system (CNS) infections caused by *Candida* are rare but can occur following neurosurgical interventions, leading to meningitis or ventriculitis [5,6]. The Indian Council of Medical Research and Infectious Diseases Society of America (IDSA) guidelines consensus highlight the dual importance of antifungal therapy and surgical source control for managing these infections [7,8].

We report a pediatric case of recurrent *Candida non-albicans* infection following VP shunt surgery, underscoring the need for the early source control and timely antifungal management. Fungal ventriculitis caused by *Candida* species is extremely rare in pediatric neurosurgical patients, and infections due to

C. parapsilosis are even more uncommon. This case is unique because the child experienced recurrent fungal infection despite receiving appropriate antifungal therapy, which was ultimately traced to delayed removal of the infected VP shunt.

CASE REPORT

A 1-year 4-month-old male child presented with complaints of recurrent fever and irritability. The child was an operated case of VP shunt insertion done at Civil Hospital on August 22, 2025, for hydrocephalus. He later underwent right frontoparietal craniotomy and tumor excision for pilomyxoid astrocytoma on September 05, 2025, followed by revision VP shunt placement on September 08, 2025. Post-operative recovery was stable, and he was discharged with advice for further follow-up.

On September 18, 2025, during an outpatient visit, cerebrospinal fluid (CSF) analysis showed *few budding yeast cells* on direct potassium hydroxide, and CSF culture grew *Candida non-albicans* after 43 h. It was considered a contaminant; hence, no antifungal therapy was started. The child was readmitted on September 21, 2025, with recurrent fever. Repeat CSF again showed budding yeast cells, and culture confirmed *C. parapsilosis* within 27 h. Blood cultures were negative. He was started on Amphotericin B and Flucytosine, but the VP shunt was

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not removed at this stage. Due to persistent infection, the child required a second readmission on October 14, 2025. CSF again remained positive for *Candida* non-albicans. The neurosurgery team subsequently removed the VP shunt and placed an Ommaya reservoir. Post-shunt removal, CSF cultures turned sterile. The child was febrile and irritable during the second and third admissions. Vitals otherwise stable.

Amphotericin B (Liposomal) 25 mg intravenous daily was given from September 23, 2025, to October 06, 2025. Flucytosine 160 mg q6h was given from September 23, 2025, to September 29, 2025. Despite adequate antifungal therapy, persistent infection occurred due to a retained shunt. From October 15, 2025 onward, oral fluconazole 100 mg daily started as step-down therapy. After stabilization with an Ommaya reservoir, the child was discharged in hemodynamically stable condition with follow-up for future VP shunt requirement.

DISCUSSION

Candida infections of the CNS are uncommon but represent a serious and often underdiagnosed complication in neurosurgical patients. Biofilm formation on implanted hardware, including VP shunts, plays a pivotal role in pathogenesis, conferring resistance to antifungal therapy [9]. In this case, *C. parapsilosis* was identified through matrix-assisted laser desorption/ionization-time-of-flight, consistent with emerging trends in non-albicans infections in India [10]. The patient's initial management with Amphotericin B and Flucytosine without shunt removal resulted in only transient improvement, highlighting the necessity of surgical source control. Literature strongly supports the removal of the infected shunt to achieve microbiological cure [7,11,12]. Delayed source control, as seen here, likely contributed to recurrence despite appropriate antifungal therapy.

C. parapsilosis, though less virulent than *Candida albicans*, exhibits strong biofilm production and resistance to Amphotericin B, making eradication difficult without device removal [13]. According to the 2016 IDSA guidelines, management of *Candida* meningitis or ventriculitis requires liposomal Amphotericin B $\pm$ Flucytosine, followed by step-down therapy with oral fluconazole once sterile CSF is achieved [7]. Our patient followed this trajectory only after shunt removal, achieving full clinical and microbiological resolution. After the Ommaya reservoir, there was a requirement for a VP shunt. After the Ommaya, the patient was discharged with a hemodynamically stable condition.

A review of Indian literature reports increasing frequency of non-albicans *Candida* infections in post-neurosurgical cases, with delayed diagnosis and suboptimal hardware management as key contributors [8,14]. This case reinforces the essential role of microbiology-clinician collaboration. Rapid communication of culture results, avoidance of dismissing potential contaminants, and timely surgical decision-making can significantly improve outcomes in fungal CNS infections.

CONCLUSION

Fungal ventriculitis due to *Candida* non-albicans following VP shunt surgery is rare but clinically significant. This case highlights that antifungal therapy alone is often insufficient in the presence of an infected shunt. Definitive management requires early source control, prompt shunt removal alongside antifungal therapy guided by susceptibility testing. Adhering to international and national guidelines is crucial to prevent recurrence and ensure full recovery.

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