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Fungal infections of cerebrospinal fluid shunt in pediatric patients: a systematic literature review with a case report

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ADMINISTRATIVE INFORMATION

Support - No financial support.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 March 2025 and was last updated on 12 March 2025.

INTRODUCTION

Review question / Objective The purpose of the present study was to systematically review the literature to determine the management of fungal infections affecting cerebrospinal fluid shunts in children.

Condition being studied Shunt infection is a common complication that occurs in approximately 5-15% of cerebrospinal fluid shunts. It appears within the first few months post-surgery, with the majority detected within the first 30 days. The condition results mainly from contamination during surgery, with cutaneous commensal organisms, including coagulase-negative staphylococci and Staphylococcus aureus as the most frequently involved pathogens, or less commonly, Propionibacterium spp. Fungal infections, with Candida species being the most common, rarely occur due to extended antibiotic treatment and prolonged use of external ventricular drain.

METHODS

Participant or population This study aimed to systematically review the available literature on fungal cerebrospinal fluid (CSF) shunt infections in the pediatric population. Additionally, we report on our institutional case of a 13-month premature patient with C. albicans infection of ventriculo-peritoneal (VP) shunt.

Intervention This review evaluated the antifungal therapies and surgical interventions in the treatment of fungal CSF shunt infections. The pharmacological approaches involved intravenous, intraventricular, intrathecal and oral administration of medicaments based on monotherapy, politherapy or sequential therapy. The assessed surgical Interventions included shunt removal, placement of external ventricular drainage, and new shunt implementation.

Comparator Not applicable.

Study designs to be included This study included case reports, retrospective case series, prospective case series, letters to the editor, and research letter.

Eligibility criteria The study was considered eligible, when it reported on clinical data of pediatric patients (<18 years of age at the time of diagnosis) with fungal CSF shunt infection. Contrarily, papers describing patients over 18 years of age at the time of diagnosis, and those in which the age bracket was unspecified, were excluded. Additionally, studies regarding HIV-infected patients were considered ineligible. Only publications written in English were considered.

Information sources A systematic review of articles published from inception until 6 September 2024 in PubMed (MEDLINE), Scopus, Web of Science, Mendeley, and Cochrane Library databases was conducted.

Main outcome(s) This study aimed to determine the demographic and clinical characteristics of patients with fungal CSF shunt infections, diagnostic process, treatment strategy, and outcomes.

Quality assessment / Risk of bias analysis Not applicable.

Strategy of data synthesis The data synthesis was conducted using qualitative and quantitative methods on case-based studies. Narrative approach was used to summarize and integrate qualitative findings in the discussion. Meta-analysis wasn't feasible due to the high heterogeneity of included studies and insufficient data.

Subgroup analysis Not applicable.

Sensitivity analysis Not applicable.

Country(ies) involved Poland.

Keywords hydrocephalus; Candida albicans; amphotericin B; shunt infections.

Contributions of each author
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Author 4 - Lukasz Antkowiak.
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