





Review article

Medical management for cerebellar mutism syndrome following posterior fossa surgery: A systematic review

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Highlights

- **Novel Insights into Cerebellar Mutism Syndrome:** Comprehensive analysis of 13 cases, highlighting clinical characteristics and management
- **Pediatric Predominance:** The Study shows most cases are pediatric, with medulloblastoma as the common brain pathology linked to cerebellar mutism
- **Timely Onset and Transient Nature:** Mean onset at 3.9 days post-operatively, suggesting ischemic and edematous mechanisms with a mean duration of 52.3 days, medical management is crucial.
- **Medication Strategies:** Effective medications such as bromocriptine, fluoxetine, midazolam, and zolpidem in alleviating cerebellar mutism symptoms, offering new treatment options.

- Implications for Future Research and Clinical Practice: This Study emphasizes the need for controlled trials to optimize management and improve outcomes in cerebellar mutism.

Abstract

Introduction

Cerebellar mutism syndrome (CMS) is a serious complication of posterior fossa surgeries affecting mainly pediatric age group. The pathophysiology is still not fully understood. It adversely affects the recovery of patients. There is no definitive and standardized management for CMS. However pharmacological therapy has been used in reported cases with variable effectiveness. We aim through this review to summarize the available evidence on pharmacological agents used to treat CMS.

Method

A thorough systematic review until December 2022, was conducted using PubMed Central, Embase, and Web of Science, databases to identify case reports and case series of CMS patients who underwent posterior fossa surgery and received pharmacological treatment. Patients with pathologies other than posterior fossa lesions were excluded from the study.

Results

Of 592 initial studies, 8 studies met our eligibility criteria for inclusion, with 3 more studies were added through manual search; reporting on 13 patients. The median age of 13 years (Standard deviation SD=10.60). The most frequent agent used was Bromocriptine. Other agents were fluoxetine, midazolam, zolpidem, and arpiprazole. Most patients recovered within 48 hours of initiating medical therapy. The median follow-up period was 4 months (SD=13.8). All patients showed complete recovery at the end of follow-up period.

Conclusion

Cerebellar mutism syndrome is reported after posterior fossa surgeries, despite attempts to identify risk factors, pathophysiology, and management of CMS, it remains a challenging condition with significant morbidity. Different Pharmacological treatments have been proposed with promising results. Further studies and formalized clinical trials are needed to evaluate available options and their effectiveness.

Introduction

Cerebellar mutism syndrome (CMS) is a post-operative complication after posterior fossa tumor resection; it is characterized by the temporary but complete absence of sound and speech in a conscious person. In 1958, David Daly first reported a case of akinetic mutism in a 14-year-old boy after bilateral suboccipital craniectomy.[1] Fraioli and Guidetti (1975) and Hirsch (1979) recognized mutism as a side effect of posterior fossa surgery.[2], [3] The risk of developing complications varies among patients, with some having low risks while others have a 40–50% chance.[4] The pathophysiology of this condition is still unclear.[5] Currently, the only approved treatments for mutism are supportive care and speech rehabilitation.[6], [7] Further research is needed to increase the number of controlled interventional trials to enhance knowledge about possible medications that could speed recovery from CMS.[4]

In this review, we aimed to identify all published data, summarize the current knowledge regarding the medical management of cerebellar mutism, and present the best available evidence for clinical and research practice.

Section snippets

Database and literature search strategy

This systematic review was conducted and reported according to the Preferred Reporting Items for Systematic Review and Meta-analysis Statement (PRISMA) Methods guidelines.[8] An electronic search of online databases, including PubMed Central, Embase, and Web of Science, was conducted from their inception until December 2022. We systematically searched for all relevant studies that included medical management of cerebellar mutism after posterior fossa surgery using a comprehensive set of search ...

Study characteristics and patient demographics

Fig. 1 presents the PRISMA flow chart of the included articles. A total of 760 articles were identified through database and manual searches. Following the removal of 168 duplicates, we screened the titles and abstracts of the remaining 592 articles, resulting in the exclusion of 570 articles; the remaining 22 articles were evaluated in full text and 11 were excluded. Finally, 13 documented cases from 11 published articles met the inclusion criteria. Patients presented with a median age of 13...

Discussion

CMS has multiple descriptions in the literature, with some terms used interchangeably. These terms include akinetic mutism, transient cerebellar mutism, and mutism with subsequent dysarthria. Mutism is commonly associated with behavioral changes, apathy, emotional instability, eating dysfunction, eye closure, and urinary retention. Patients with CMS may experience ataxia, hypotonia, or irritability. When cranial nerves are involved, the condition is referred to as posterior fossa syndrome....

Pathophysiology

Several factors could be potential causes of cerebellar mutism, and some researchers have suggested preserving the inferior vermis during surgical resection to minimize this risk. [[20], [21]] Thus, the telovelar approach has emerged as a superior technique. However, other investigators have not reached the same conclusion.[22] An important surgical nuance is avoiding excessive retraction of the medial cerebellar structures, vermis, and superior cerebellar peduncles. Injury to the dentate...

Medical treatment

There is no standardized treatment for CMS. Various medications, such as corticosteroids, fluoxetine, bromocriptine, midazolam, zolpidem, and thyrotropin-releasing hormones, have been used with variable efficacies.[30]...

Non-medical treatment

The value of non-pharmaceutical therapies for CMS was emphasized by Roka,Y et al. and Mortimer D et

al.[37], [38]. Rehabilitation therapy for patients with CMS is challenging and must be comprehensive, addressing the psychological, emotional, and environmental factors associated with school and family involvement.[39] Initiating physiotherapy, occupational therapy, and speech-language therapy has a significant impact on advancing early motor and communication recuperation in individuals with...

Strengths and limitations

It is important to acknowledge the limitations of this study when interpreting its findings. First, the use of case reports with non-random samples limits the generalizability of the findings. Moreover, many cases lacked relevant clinical details, hindering claims to causality. In addition, the pathology and surgical techniques used in the reported cases varied significantly. Therefore, more patients should be studied to better understand this association.

Despite these limitations, the study...

Conclusion

Medical management, specifically the use of medications such as bromocriptine, shows promise for achieving complete recovery or improvement in most cases of cerebellar mutism. In some persistent cases, additional treatment options such as speech therapy may be necessary. However, further research and intervention trials are required to gain a better understanding of cerebellar mutism and effectively manage the condition....

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CRediT authorship contribution statement

Alaa Turkistani: Writing – review & editing, Writing – original draft, Project administration, Formal analysis, Data curation. **Soha Alomar:** Supervision. **Sara Aljohani:** Writing – review & editing, Writing – original draft. **Wafa Aldhafeeri:** Writing – review & editing, Writing – original draft. **Thamer alsharif:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation....

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