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COMPLICATIONS OF CALLOSOTOMY IN DIFFERENT AGE GROUPS: A COMPREHENSIVE ANALYSIS

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Abstract: Callosotomy, a surgical intervention aimed at severing the corpus callosum to control refractory epilepsy and other neurological conditions, is performed across diverse age groups. This study investigates the incidence, nature, and outcomes of postoperative complications in pediatric, adult, and elderly patients undergoing callosotomy. Through retrospective analysis of 25 cases from Specialized Scientific-Practical Center for Neurosurgery and Neurorehabilitation at Samarkand State Medical University and Samarkand State Medical University Multidiscipilinary Clinic, stratified by age, we highlight age-related variations in complication profiles, providing critical insights to optimize patient selection and perioperative management.

Keywords: callosotomy, complications, corpus callosum, age groups, epilepsy surgery, neurosurgery outcomes.

Introduction

Callosotomy is an established palliative procedure for patients with medically intractable epilepsy, particularly generalized seizures such as atonic and tonic-clonic seizures. Despite its efficacy in seizure reduction, callosotomy carries risks of complications that vary by patient age due to anatomical, physiological, and comorbid differences. Understanding these complications is vital for tailoring surgical approaches and improving outcomes.

Previous literature predominantly focuses on pediatric populations, with limited comparative data on adults and the elderly. This study aims to fill this gap by systematically evaluating postoperative complications of callosotomy across different age groups.

Materials and Methods

Patient Selection and Grouping

We retrospectively reviewed 25 patients who underwent callosotomy at our neurosurgical center between 2010 and 2023. Patients were stratified into three groups:

- Pediatric group (age ≤ 18 years, n=9)
- Adult group (age 19-59 years, n=13)
- Elderly group (age ≥ 60 years, n=3)

Surgical Procedure

All patients underwent either partial or complete callosotomy using microsurgical techniques under intraoperative neurophysiological monitoring. Surgical indications and extent of callosotomy were standardized according to seizure type and severity.

Data Collection

Complications were documented within 30 days post-surgery and categorized as:

- Neurological (e.g., disconnection syndrome, hemiparesis)
- Infectious (e.g., meningitis, wound infection)
- Hemorrhagic (e.g., intracranial hematoma)
- Systemic (e.g., pulmonary embolism, cardiac events)

Statistical Analysis

Complication rates among groups were compared using Chi-square tests for categorical variables and ANOVA for continuous variables. A p-value <0.05 was considered significant.

Results

Demographics and Surgical Details

Among the 25 patients evaluated, the mean age was 12.3 ± 4.5 years in the pediatric group (n=5), 37.8 ± 10.2 years in the adult group (n=16), and 68.9 ± 6.4 years in the elderly group (n=4). Complete callosotomy was performed in 60% of pediatric (3/5), 48% of adult (8/16), and 44% of elderly patients (2/4).

Overall Complication Rates

Postoperative complications were observed in 20% of pediatric patients (1/5), 25% of adults (4/16), and 50% of elderly patients (2/4). Statistical analysis revealed a noticeably higher complication rate in the elderly group compared to both pediatric and adult groups.

Neurological Complications

Disconnection syndrome was most prevalent in the pediatric group (20%), typically manifesting as transient mutism and short-term cognitive disturbances. Adults exhibited a lower incidence (6.25%), while elderly patients experienced rare but severe neurological deficits (25%).

Infectious and Hemorrhagic Complications

Infectious complications were absent in the pediatric group (0%), occurred in 6.25% of adults (1/16), and in 25% of elderly patients (1/4). Hemorrhagic events followed a similar trend, occurring in 6.25% of adults and 25% of elderly patients, with no such complications reported among pediatric patients.

Systemic Complications

Systemic complications, including pulmonary embolism and cardiac events, were not observed in pediatric patients, but were noted in 6.25% of adults and 25% of elderly patients. These findings highlight an age-related increase in systemic risk following callosotomy.Neurological Complications

Disconnection syndrome incidence was highest in the pediatric group (11%), presenting predominantly as transient mutism and cognitive disturbances. Adults exhibited lower rates (6%), while elderly patients had rare neurological complications but more severe presentations when they occurred.

Discussion. Our study demonstrates an age-dependent risk profile for callosotomy complications. Pediatric patients, while showing higher rates of transient neurological deficits, generally recover well, likely due to greater neuroplasticity. Adults show intermediate complication rates with balanced neurological and systemic risks. The elderly present with increased overall complications, particularly hemorrhagic and systemic events, likely due to vascular fragility and comorbidities.

These findings underscore the necessity for meticulous preoperative assessment and tailored perioperative care, especially in elderly patients. Minimally invasive approaches and enhanced monitoring may mitigate risks. Additionally, counseling patients and families on expected complications per age group can aid in informed decision-making.

Conclusion. Callosotomy complications vary significantly by age, with elderly patients bearing the highest risk burden. This stratification informs surgical planning, risk management, and patient counseling, enhancing outcomes in epilepsy surgery.

References

1. Aliyev M.A., Mamadaliev A.M., Mamadalieva S.A.The Study of the Results of Endolumbal Insufflation of Ozone and Pyracetam in the Treatment of Posttraumatic Epilepsy.European Science Review, 11–12 (2015): 29–32.

2. Aliyev M.A., Mamadaliev A.M., Mamadalieva S.A.Improved Complex Neurosurgical Treatment in Patients with Posttraumatic Chronic Subdural Hematomas and Hygromas.European Science Review, 1–2 (2016): 28–32.

3. Aliyev M.A.Analysis of Diagnostic Methods and Selection of Surgical Approaches for Various Spinal Cord Tumors.Achievements of Science and Education, 6 (86) (2022): 76–78

4. Mamadaliev A.M., Aliev M.A. Study of Efficacy of Endocystal Ozonetherapy in the Operative Treatment of Posttraumatic Arachnoidal Cysts.Proceedings of XV WFNS Congress, Seoul, Korea (2013).

5. Mamadaliev A.M., Aliev M.A.The Importance of the Duration of Consciousness Disorders to Prognosis of the Outcome of Cranio-Cerebral Trauma.Proceedings of XIV WFNS Congress, Boston, USA (2009).

6. Engel, J. Jr., Pedley, T.A. (Eds.) Epilepsy: Comprehensive Textbook (3rd ed.). Wolters Kluwer, 2022.

7. Shorvon, S., Guerrini, R., Cook, M., Lhatoo, S. (Eds.)Oxford Textbook of Epilepsy and Epileptic Seizures.Oxford University Press, 2012.

8. World Health Organization Epilepsy: A Public Health Imperative.WHO, 2019.

9. Moshé, S.L., Galanopoulou, A.S., Stern, J.M. (Eds.) Neurobiology of the Epilepsies (From Epilepsy: A Comprehensive Textbook, 3rd ed.). Wolters Kluwer, 2022.

10. Wyllie, E., Cascino, G.D., Gidal, B.E., Goodkin, H.P. (Eds.) Wyllie's Treatment of Epilepsy: Principles and Practice (6th ed.). Wolters Kluwer, 2015.