AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 3, Issue 2, 2025 ISSN (E): 2993-2149

CLINICAL EXPERIENCE OF MICROSURGICAL REMOVAL OF INTRAVENTRICULAR EPIDERMOID TUMOR

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Abstract: Intraventricular epidermoid tumors (cholesteatomas) are relatively rare, slow-growing neoplasms that are usually associated with hydrocephalus. They form due to the failure of epidermal remnants to regress during embryogenesis. Epidermoid cysts have a lipid-like consistency and are most commonly localized in the brain's ventricles and basal structures. As these tumors grow, they can obstruct the ventricular system, leading to increased intracranial pressure and obstructive hydrocephalus viruses, bacteria.
Key words: tumor, intraventricular, epidermoid, removing

Introduction

This article presents a clinical case of microsurgical removal of an intraventricular epidermoid tumor that had spread to both lateral ventricles, the third ventricle, the fourth ventricle, and the Sylvian aqueduct, using modern microsurgical techniques. Epidermoid tumors are classified as dysembryogenetic neoplasms that result from the retention of ectodermal cells during neural tube formation. Epidermoid cysts were first described by Cruveilhier in 1829, and later in 1928, Cushing classified them as slow-growing tumors prone to causing obstructive hydrocephalus. The primary pathogenic mechanisms of their growth include:

- Accumulation of keratin and cholesterol, leading to an increase in tumor volume.
- Slow infiltrative growth without invasive spread to surrounding tissues.
- A pronounced inflammatory reaction in case of capsule rupture, which can cause aseptic meningitis.

According to modern research (Peltier et al., 2014), epidermoid tumors most commonly occur in the cerebellopontine angle (~40-50% of cases) and basal cisterns, while intraventricular localization is seen in less than 1% of cases.

Clinical Manifestations

The symptoms of epidermoid tumors depend on their location and the degree of compression of surrounding structures. The most common symptoms include:

- Hydrocephalic syndrome (headaches, nausea, vomiting, altered consciousness).
- Neurological deficits due to compression of adjacent structures (paresis, ataxia, visual disturbances).
- Epileptic seizures resulting from irritation of cortical structures in larger tumors.

According to Choremis et al. (2018), the average age of symptom onset is 30-40 years; however, some tumors remain asymptomatic until they reach significant sizes.

Diagnostic Methods

Modern imaging techniques allow timely diagnosis of epidermoid tumors, even in early stages. The primary diagnostic tools include:

- **Magnetic Resonance Imaging (MRI):**
  - On T1-weighted images (T1-WI), epidermoid tumors appear isointense or hypointense relative to cerebrospinal fluid.
  - On T2-WI, they appear hyperintense, distinguishing them from arachnoid cysts.
  - Diffusion-weighted imaging (DWI) clearly visualizes epidermoid tumors due to their high diffusion restriction, which is a key diagnostic criterion.
- **Computed Tomography (CT):**
  - Detects tumor capsule calcification, observed in approximately 20% of cases.
  - Used to assess hydrocephalus and ventricular system obstruction.
- **Cerebrospinal fluid analysis (if hydrocephalus is present):**
  - May show elevated protein levels without signs of inflammation.

Surgical Treatment

Microsurgical removal is the primary treatment for intraventricular epidermoid tumors. The main surgical approaches include:

- **Transcallosal approach** (preferred for tumors in the lateral and third ventricles).
- **Endoscopic interventricular approach**, used for small tumors and predominantly fluid-filled cysts.
- **Subtentorial and paraventricular approaches**, applied when the tumor extends into the fourth ventricle.

Radical resection rarely leads to recurrence; however, partial removal results in tumor regrowth in 20-30% of cases within 10-15 years (Morales et al., 2020). Special attention is given to preventing capsule rupture, as damage can trigger chemical meningitis requiring prolonged anti-inflammatory therapy.

Prognosis and Recurrence

The prognosis after surgical treatment is favorable when complete tumor resection is achieved. However, patients with partial tumor removal face a risk of recurrence, requiring continuous monitoring.

Key Prognostic Factors:

- Tumor size and location—proximity to basal structures complicates complete removal.
- Surgical technique—microsurgical approaches significantly reduce the risk of damage to surrounding structures.
- Patient age—younger patients exhibit slower tumor growth, while older patients are more prone to complications.

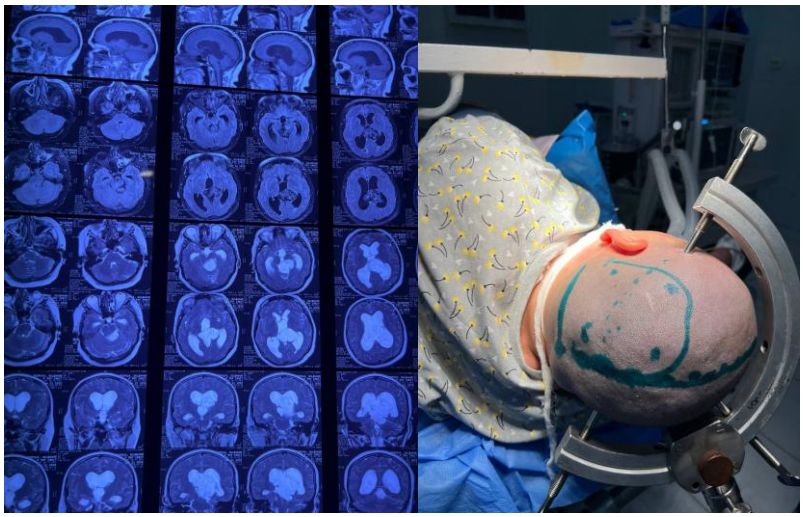
According to Kim et al. (2021), the 5-year survival rate after complete resection is 95%, whereas partial resection lowers this rate to 70%.

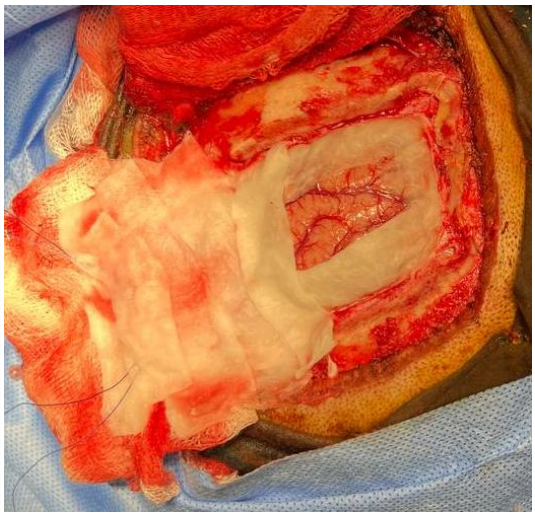
Clinical Case Description

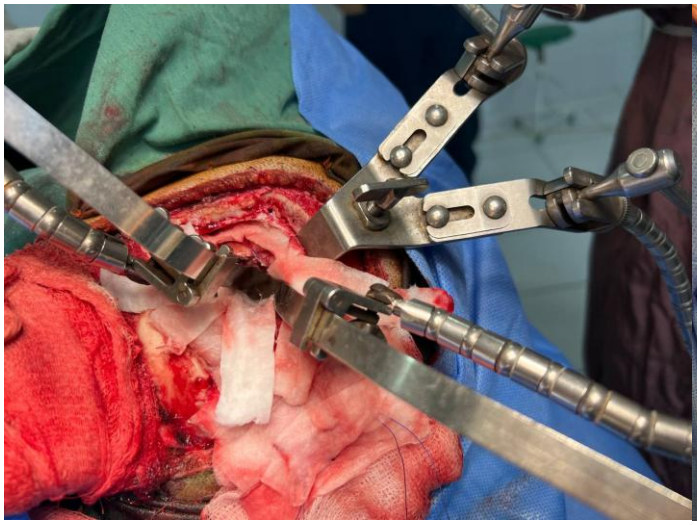
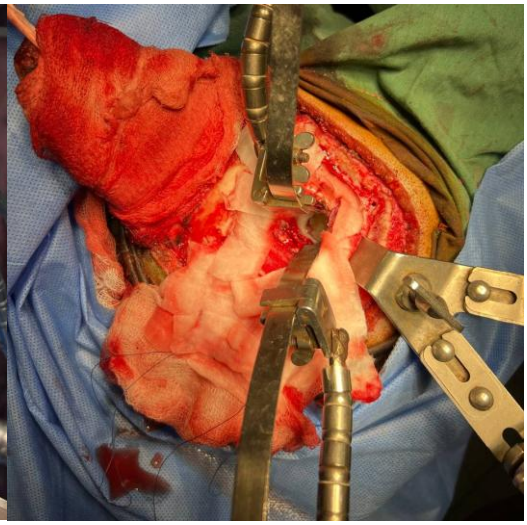
Disease Code: D44.5 – Neoplasms of the brain and spinal cord. **Primary Diagnosis:** Obstructive hydrocephalus caused by an intraventricular mass. **Patient Complaints:** Headaches, vision impairment, dizziness, nausea, vomiting, and general weakness. Neurosonography and MRI revealed a mass filling both lateral ventricles, the third ventricle, and extending to the pineal and diencephalic regions.

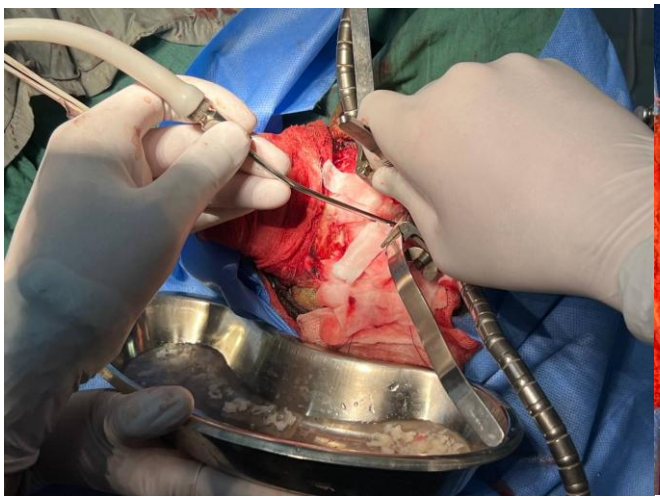
Surgical Procedure (Date: 28.01.2025):

- **Craniotomy:** Performed in the left parieto-occipital region.
- **Tumor Visualization:** Upon opening the lateral ventricle, a large mass was identified, fully occupying the third ventricle.
- **Tumor Resection:**
  - The tumor appeared white, with a lipid-like consistency, and was not adherent to surrounding tissues.
  - Using microsurgical instruments, the tumor was fragmented and removed.
  - The tumor had spread to the bodies and posterior horns of the lateral ventricles, the fourth ventricle, the Sylvian aqueduct, the pineal, and diencephalic regions. It was completely removed.
  - The tumor matrix in the third ventricle underwent bipolar coagulation.
- **Final Stage:**
  - Surgicell was placed in the encephalotomy area.
  - The dura mater was sutured tightly.
  - A chlorovinyl drainage tube was inserted into the epidural space and fixed to the skin.
  - The skin and aponeurotic layers were sutured, and a sterile dressing was applied.






Results and Discussion

Postoperatively, the patient was transferred to intensive care for dynamic monitoring. Follow-up neurosonography confirmed reduced hydrocephalus. The postoperative period showed:

- Significant reduction in headaches and restored vision.
- Stabilization of the patient's general condition and regression of neurological symptoms.

- MRI confirmed complete tumor resection.

Microsurgical access plays a key role in removing intraventricular tumors, allowing for maximal resection while preserving surrounding structures. Epidermoid tumors exhibit slow growth and weak adhesion to surrounding tissues, facilitating their surgical removal.

Conclusions

This clinical case of successful microsurgical removal of an intraventricular epidermoid tumor highlights the importance of timely diagnosis and optimal surgical planning. The use of modern microsurgical and neuroendoscopic techniques minimized damage to healthy tissues, reduced postoperative complications, and ensured a favorable prognosis for the patient.

Advancements in surgical methods and the integration of new technologies continue to improve treatment outcomes for intraventricular epidermoid tumors, making this case a valuable example for neurosurgeons in the field.

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