

Supratentorial Intraventricular Tumors: Experience from a Tertiary Neurosurgical Center in Nepal

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Abstract

Introduction: Supratentorial intraventricular tumors are rare central nervous system neoplasms located deep within the ventricular system. Their proximity to eloquent neural pathways and critical vascular structures makes surgical management technically challenging. Data from low and middle income regions remain limited. This study evaluates the clinical features, histopathological patterns, surgical approaches, and outcomes of patients treated at a tertiary neurosurgical center in Nepal.

Material and Method: A retrospective observational study was conducted including 27 consecutive patients who underwent surgical resection of supratentorial intraventricular tumors between September 2020 and August 2025. Demographic, clinical, radiological, histopathological, operative, and postoperative data were collected and analyzed. Statistical analysis included descriptive statistics, chi-square testing, logistic regression modeling, and calculation of confidence intervals. Institutional Review Committee approval was obtained prior to study initiation.

Results: The mean age was 24.9 ± 13.2 years, with a male predominance of 21 (77.8%). Headache was the most common presenting symptom, occurring in 14 (51.9%) patients. Colloid cyst was the most frequent histopathological diagnosis, identified in 7 (25.9%) patients, followed by subependymal giant cell astrocytoma in 5 (18.5%) and choroid plexus tumors in 5 (18.5%). The transcortical-transventricular approach was most frequently utilized in 14 (51.8%) cases. Postoperative hydrocephalus requiring cerebrospinal fluid diversion occurred in 5 (18.5%) patients. Overall mortality was observed in 3 (11.1%) patients. No statistically significant association was found between tumor type or surgical approach and postoperative complications.

Conclusion: Microsurgical resection remains the cornerstone of management for supratentorial intraventricular tumors in resource-limited settings. Although acceptable surgical outcomes can be achieved, postoperative hydrocephalus continues to be a significant challenge. Larger prospective multicenter studies are needed to optimize surgical strategies and improve patient outcomes.

Keywords: Brain neoplasms, Hydrocephalus, Neurosurgical procedures, Treatment outcome, Ventricular neoplasm

Introduction

Supratentorial intraventricular tumors constitute an uncommon and diverse group of neoplasms arising within the ventricular system above the tentorium. They represent approximately 1-3% of all intracranial tumors and therefore remain relatively infrequent in routine neurosurgical practice^{1,2}. Despite their rarity, these lesions pose significant clinical challenges because

of their deep-seated location and their tendency to obstruct cerebrospinal fluid (CSF) pathways, frequently resulting in hydrocephalus³.

The ventricular system is surrounded by critical neuroanatomical structures, including the corpus callosum, fornix, thalamus, basal ganglia, and internal capsule, as well as major venous channels. Surgical intervention therefore demands meticulous selection of operative corridors in order to preserve neurological function while achieving maximal tumor resection^{1,4}. The lateral ventricles are most commonly involved, followed by the third ventricle^{1,5}.

Histopathologically, intraventricular tumors encompass a wide spectrum of entities. Benign lesions such as colloid cysts, subependymal giant cell astrocytomas, and choroid plexus papillomas coexist with more aggressive tumors including ependymomas, central neurocytomas, and metastatic deposits^{4,6}. Colloid cysts represent a particularly important subgroup, accounting for a notable proportion of intraventricular tumors despite their overall rarity among intracranial neoplasms^{6,7}. Although histologically benign, these lesions may precipitate acute neurological deterioration secondary to abrupt CSF obstruction⁷.

Clinically, patients typically present with symptoms attributable to raised intracranial pressure. Headache, nausea,

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vomiting, visual disturbances, altered consciousness, and seizures are frequently observed^{4,6}. The choice of surgical approach remains individualized and is influenced by tumor location, ventricular size, and available expertise. Traditional microsurgical techniques include the transcortical-transventricular and interhemispheric transcallosal routes^{1,8}. In recent decades, endoscopic and endoscope-assisted approaches have gained increasing acceptance due to reduced cortical disruption and shorter recovery times in selected cases^{8,9}. However, access to advanced neuroendoscopic infrastructure is not universal, particularly in low and middle income countries.

While numerous reports describe surgical outcomes from high resource settings, region specific data from South Asia remain limited. The present study summarizes a five-year institutional experience from Nepal, contributing contextual data on surgical management and outcomes in a resource constrained environment.

Materials And Methods

Study Design and Ethical Approval

This retrospective observational study was conducted at Tribhuvan University Teaching Hospital, Institute of Medicine, Kathmandu, Nepal. Ethical approval was obtained from the Institutional Review Committee of the Institute of Medicine, Tribhuvan University. The research proposal titled “Supratentorial intraventricular tumors: experience from a tertiary center in Nepal” was formally approved on September 4, 2025 (Reference No. 155/082/083). The study adhered to institutional ethical guidelines.

Study Population

All consecutive patients undergoing surgical resection of supratentorial intraventricular tumors between September 2020 and August 2025 were included. Patients with infratentorial tumors or those managed non-operatively were excluded.

Data Collection

Data were extracted from hospital medical records and operative logs. Variables included age, sex, presenting symptoms, radiological findings, tumor histopathology, surgical approach, postoperative complications, need for cerebrospinal fluid diversion, and mortality.

Statistical Analysis

Continuous variables are presented as mean \pm standard deviation. Categorical variables are presented as frequency and percentage. Ninety-five percent confidence intervals were calculated for key proportions.

Associations between tumor type, surgical approach, and postoperative complications were assessed using chi-square testing. Logistic regression was performed to evaluate potential predictors of complications. A p-value less than 0.05 was considered statistically significant.

Results

A total of 27 patients underwent surgical resection for supratentorial intraventricular tumors during the five-year study period. The mean age of the cohort was 24.9 ± 13.2 years. Patients ranged from adolescence to middle adulthood. A clear

male predominance was observed, with 21 male patients (77.8%) and 6 female patients (22.2%), yielding a male-to-female ratio of approximately 3.5:1 (Table 1).

TABLE 1: Demographic Characteristics of the Study Population (n = 27)

SD: Standard deviation

Variable	Value	95% Confidence Interval
Age (years), mean \pm SD	24.9 \pm 13.2	19.7–30.1
Sex, n (%)		
Male	21 (77.8%)	58.6–89.2%
Female	6 (22.2%)	10.8–41.4%

Headache was the most frequent presenting symptom, followed by vomiting and visual disturbance (Table 2).

TABLE 2: Clinical Presentation

Symptom	Number (%)	95% Confidence Interval
Headache	14 (51.9%)	33.1–70.1%
Vomiting	9 (33.3%)	17.2–54.6%
Visual disturbance	6 (22.2%)	10.8–41.4%
Altered sensorium	4 (14.8%)	5.9–33.3%
Seizures	3 (11.1%)	3.9–28.1%

Histopathological evaluation demonstrated a heterogeneous spectrum of tumor types. Colloid cyst was the most frequently identified tumor type, followed by subependymal giant cell astrocytoma and choroid plexus tumors (Figure 1).

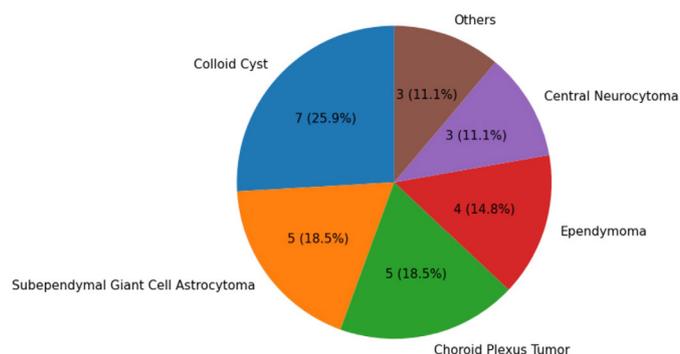


FIGURE 1: Histopathological Distribution of Supratentorial Intraventricular Tumors (Pie Diagram)

The transcortical-transventricular approach was the most frequently employed surgical corridor, followed by the interhemispheric transcallosal approach and, less commonly, endoscopic procedures (Figure 2). The transcortical route was predominantly chosen for lateral ventricular tumors, particularly when ventricular dilatation provided adequate access. The transcallosal approach was preferred for midline or third ventricular lesions. Endoscopic techniques were selectively employed in appropriately sized cystic or well-circumscribed tumors.

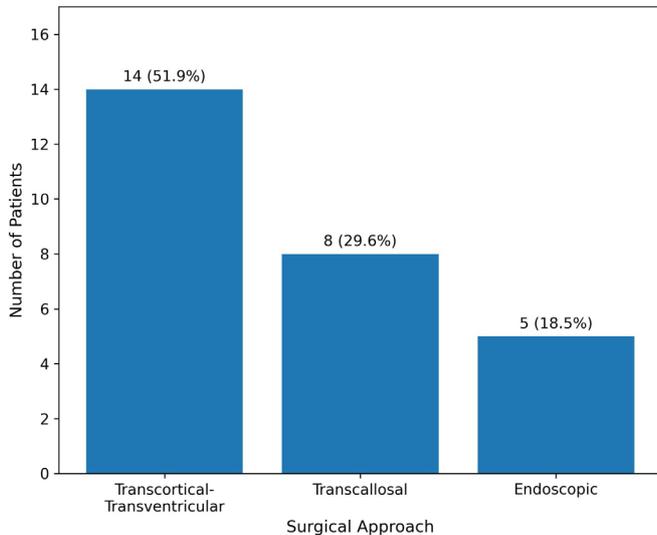


FIGURE 2: Distribution of Surgical Approaches (Bar Diagram)

Postoperative hydrocephalus requiring cerebrospinal fluid diversion occurred in 5 patients (18.5%). One patient (3.7%) developed a transient neurological deficit that resolved prior to discharge. There were 3 perioperative deaths (11.1%), all attributable to complications related to severe intracranial hypertension or medical comorbidities (Figure 3).

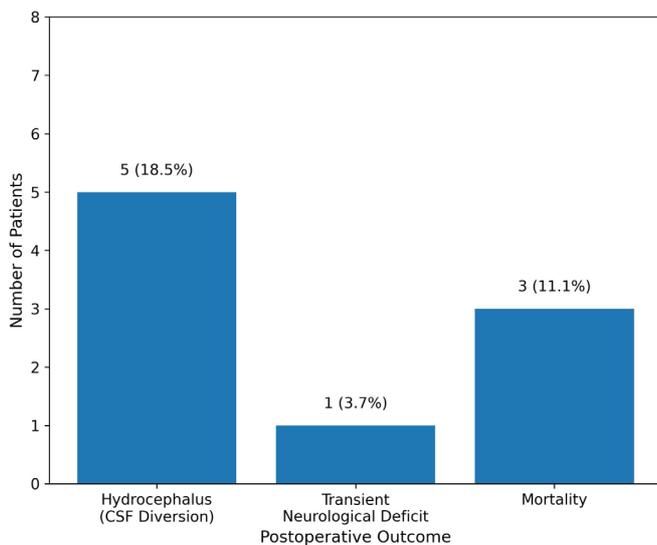


FIGURE 3: Postoperative Complications and Mortality (Bar Diagram)

Chi-square testing revealed no statistically significant association between tumor type and postoperative complications ($\chi^2 = 2.14$, $df = 5$, $p = 0.71$). Similarly, no significant association was observed between surgical approach and complication occurrence ($\chi^2 = 1.83$, $df = 2$, $p = 0.60$). Binary logistic regression analysis did not identify any independent predictors of postoperative complications (Table 3). The Hosmer-Lemeshow goodness-of-fit test indicated adequate model calibration ($p = 0.82$). Post hoc power analysis demonstrated limited statistical power (41%) to

detect moderate effect sizes, indicating that larger sample sizes would be necessary to identify subtle associations.

TABLE 3: Association Between Tumor Type, Surgical Approach, and Postoperative Complications

χ^2 : Chi-square; df : degree of freedom

Variable	Category	Complicatio n (n)	No Complication (n)	Total (n)	χ^2	df	p - value	Cramér's V
Tumor Type	Colloid cyst	2	5	7	2.145	5	0.71	0.18
	Subependymal giant cell astrocytoma	1	4	5				
	Choroid plexus tumor	1	4	5				
	Ependymoma	1	3	4				
	Central neurocytoma	0	3	3				
	Others	1	2	3				
	Transcortical-transventricular	3	11	14				
Surgical Approach	Interhemispheric	2	6	8	1.832	2	0.60	0.26
	transcallosal	1	4	5				
	Endoscopic	1	4	5				

Discussion

Supratentorial intraventricular tumors remain surgically demanding because of their anatomical depth and proximity to eloquent neural structures. The risk of CSF pathway obstruction and hydrocephalus further complicates management and often necessitates urgent intervention^{3,7}. Careful preoperative planning and selection of an appropriate operative corridor are therefore central to optimizing outcomes.

The relatively young mean age observed in this cohort aligns with previously reported demographic patterns in intraventricular tumor series^{4,6}. Although sex distribution varies among studies, a mild male predominance has been described in some cohorts without a clearly established biological explanation⁴. Younger patients, particularly those presenting with ventricular obstruction, often pose additional perioperative challenges related to intracranial pressure dynamics and brain compliance¹⁰.

Colloid cysts constituted the most frequent pathological diagnosis in our series. Although benign, these lesions are well recognized for their potential to cause sudden clinical deterioration due to acute obstruction of the foramen of Monro⁷. The occurrence of postoperative hydrocephalus in our cohort underscores the importance of vigilant perioperative CSF management. Predictive factors for shunt dependency after intraventricular tumor resection remain incompletely defined, although extent of resection and ventricular involvement have been implicated in prior analyses^{3,11}.

The transcortical-transventricular route was the most commonly utilized approach in our institution. Microsurgical series have emphasized that both transcortical and transcallosal corridors can be effective when tailored to tumor location and ventricular size¹. Ventricular enlargement may facilitate a safer transcortical trajectory by minimizing cortical retraction injury. In contrast, the interhemispheric transcallosal approach avoids cortical incision but carries its own risks, including callosal

disconnection and venous injury^{1,12}.

Endoscopic and endoscope-assisted techniques have demonstrated favorable outcomes in carefully selected intraventricular lesions, with reduced morbidity and shorter hospital stays reported in contemporary studies^{8,9,13}. Nevertheless, successful implementation requires specialized equipment and technical expertise. In many low resource settings, conventional microsurgical approaches remain the mainstay of treatment.

The postoperative hydrocephalus rate observed in our cohort is comparable to rates reported in other surgical series^{11,14}. Mortality rates in the literature vary widely, reflecting differences in case complexity, tumor biology, perioperative care, and institutional infrastructure¹²⁻¹⁴. Our findings suggest that acceptable surgical outcomes can be achieved even in resource constrained environments when careful operative planning and attentive postoperative monitoring are prioritized.

The absence of statistically significant predictors of complications in our study likely reflects the limited sample size rather than the absence of meaningful associations. Multicenter collaboration within South Asia may enhance statistical power and provide more definitive insights into risk stratification and outcome predictors in this patient population.

Limitations

This study has several limitations. It was a retrospective, single-center analysis with a relatively small sample size, which limits statistical power and generalizability. Long-term functional and neurocognitive outcomes were not systematically evaluated. Additionally, the limited number of complication events restricted robust multivariable analysis. Larger prospective multicenter studies are required to validate these findings.

Conclusions

Supratentorial intraventricular tumors represent rare but clinically significant neurosurgical entities. In our five-year institutional experience, colloid cysts were the most frequent pathology, and headache was the predominant presenting symptom. The transcortical-transventricular approach was most commonly employed. Microsurgical resection remains the cornerstone of management in resource-limited settings.

Postoperative hydrocephalus continues to be the most frequent complication. Although mortality was within the range reported in international literature, improvement in perioperative care and expanded access to minimally invasive techniques may further enhance outcomes.

Larger prospective, multicenter studies are warranted to refine operative strategies and identify predictors of complications. Regional collaboration will be essential to strengthen the evidence base for management of supratentorial intraventricular tumors in low- and middle-income countries.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article

References

1. Milligan BD, Meyer FB. Morbidity of transcortical and transcortical approaches to lesions in and around the lateral and third ventricles: a single-institution experience. *Neurosurgery*. 2010;67(6):1483–1496. <https://doi.org/10.1227/NEU.0b013e3181f7eb68>
2. Barber SM, Rangel-Castilla L, Baskin DS. Neuroendoscopic resection of intraventricular tumors: a systematic outcomes analysis. *Minimally invasive surgery*. 2013;2013(1):898753. <https://doi.org/10.1155/2013/898753>
3. Harter PN, Rejeski K, Blobner J, et al. Shunt dependency in supratentorial intraventricular tumors depends on the extent of tumor resection. *Acta Neurochir (Wien)*. 2023;165(5):1053–1064. <https://doi.org/10.1007/s00701-023-05532-7>
4. Aftahy AK, Barz M, Krauss P, et al. Intraventricular neuroepithelial tumors: surgical outcome, technical considerations and review of literature. *BMC Cancer*. 2020;20(1):1077. <https://doi.org/10.1186/s12885-020-07570-1>
5. Beaumont TL, Limbrick DD Jr, Rich KM, et al. Natural history of colloid cysts of the third ventricle. *J Neurosurg*. 2016;125(6):1420–1430. <https://doi.org/10.3171/2015.11.JNS151396>
6. Mathiesen T, Grane P, Lindgren L, et al. Third ventricle colloid cysts: a consecutive 12-year series. *J Neurosurg*. 1997;86(1):5–12. <https://doi.org/10.3171/jns.1997.86.1.0005>
7. Abdou MS, Cohen AR. Endoscopic treatment of colloid cysts of the third ventricle. *J Neurosurg*. 1998;89(6):1062–1068. <https://doi.org/10.3171/jns.1998.89.6.1062>
8. Ebel F, Greuter L, Licci M, et al. Endoscopic and endoscopically-assisted resection of intraventricular lesions using a neuroendoscopic ultrasonic aspirator. *J Clin Med*. 2021;10(17):3889. <https://doi.org/10.3390/jcm10173889>
9. Cinalli G, Imperato A, Mironi G, et al. Initial experience with endoscopic ultrasonic aspirator in purely neuroendoscopic removal of intraventricular tumors. *J Neurosurg Pediatr*. 2017;19(3):325–332. <https://doi.org/10.3171/2016.10.PEDS16352>
10. Tawadros K, Elshazly K, El-Shazly AA. A comparative study of anterior trans-callosal and frontal transcortical approaches for lateral intraventricular tumors. *Egypt J Neurosurg*. 2026;41(1):90. <https://doi.org/10.1186/s41983-026-01090-8>
11. Xu P, Zhou Y, Guo Z, et al. A predictive nomogram for postoperative hydrocephalus after intra- and paraventricular tu-

mor resection: a retrospective study of 196 patients. *World Neurosurg.* 2023;169(1):e59–66. <https://doi.org/10.1016/j.wneu.2022.10.026>

12. Abdelrahman HS, Elkatatny AA, El Refaee EA, et al. Transcortical approaches to large intraventricular tumors: a prospective trial. *Egypt J Neurosurg.* 2021;36(1):12. <https://doi.org/10.1186/s41984-021-00112-2>
13. Grondin RT, Hader W, MacRae ME, et al. Endoscopic versus microsurgical resection of third ventricle colloid cysts. *Can J Neurol Sci.* 2007;34(2):197–207. <https://doi.org/10.1017/S0317167100006041> Park SH, Cho J. Prediction of shunt-dependent hydrocephalus after primary supratentorial intracerebral hemorrhage with a focus on the influence of craniectomies. *J Korean Neurosurg Soc.* 2022;65(4):582–590. <https://doi.org/10.3340/jkns.2021.0142>