

# OUTCOME OF TRANS-CORTICAL TRANS-VENTRICULAR APPROACH FOR COLLOID CYST OF THE THIRD VENTRICLE: A STUDY OF ELEVEN CASES

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## ABSTRACT

**Objective:** To assess the immediate surgical outcome of Trans-cortical Trans-ventricular approach for colloid cyst of brain.

**Material and Methods:** This study was conducted on 11 consecutive patients with colloid cyst of 3<sup>rd</sup> ventricular presented to the Department of Neurosurgery, Government Lady Reading hospital Peshawar from March 2008 to March 2009. Patients presented with different clinical scenario were operated via Trans-cortical Trans-ventricular approach. All patients were followed up for six months.

**Results:** A total of 11 patients were operated in one calendar year. Male to female ratio was 4.5:1 with the mean age of 28 years. All patients presented with headache and Papilloedema. Nine patients were operated from the right side while two were approached from left side due to ipsilateral uni-ventricular dilatation. Mean operative time was 138 ( $\pm 23$ ) minutes. Mild intra ventricular hemorrhage was noted in 3 cases (27.3%) and treated conservatively. Minor wound infection (9.1%), post operative seizures (9.1%), subgaleal hematoma (9.1%) and subdural hematoma (9.1%) were the main complications. Only one (9.1%) patient required V.P shunt after surgery due to persistence of hydrocephalus. Postoperatively there was no increase in memory impairment. No permanent neurological deficit and no mortality occurred. Mean hospital stay of patients was 6.8 days.

**Conclusion:** Trans-cortical Trans-ventricular approach is reasonably safe for patients with colloid cyst of brain. However well planned larger scale studies are required to study the early and late outcome of Trans-cortical Trans-ventricular approach.

**Key words:** Colloid cyst of 3<sup>rd</sup> ventricle, Hydrocephalous, Trans-Cortical Approach, Trans-Ventricular Approach.

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## INTRODUCTION

Colloid cyst of the third ventricle is a relatively rare congenital, benign intracranial neoplasm with an incidence of 3.2 per 100,000 population.<sup>1</sup> Colloid cysts account for 0.5-2% of all intracranial tumours, 15-20% of all intra-ventricular tumours and the most common tumour of the 3<sup>rd</sup> ventricle.<sup>2-4</sup> Colloid cysts are slow-growing tumors affecting children to adults with onset of symptoms varying from 20 and 50 years of age.<sup>2</sup> Patients may present with headache, vomiting, gait disturbances, cog-

nitive impairment, disturbed mentation, blurred vision, incontinence and dizziness.<sup>5</sup> The common findings in patients with symptomatic colloid cyst are papilloedema, gait disturbance, hyperreflexia, incoordination and nystagmus.<sup>6</sup>

Asymptomatic patients may be treated conservatively and closely monitored for clinical deterioration with serial neuroimaging for increase in size of cyst or development of hydrocephalus.<sup>7</sup> According to de Witt Hamer PC et al the risk of acute deterioration in asymptomatic patient with an incidental colloid cyst is significantly lower and this risk is estimated to be 34% in a symptomatic patient with a colloid cyst.<sup>8</sup> In case of clinical deterioration or radiological evidence of increase in size of tumour or hydrocephalus, patients are offered prompt neurosurgical intervention to prevent the serious neurological deficit or sudden death from this benign lesion.<sup>9</sup>

Various options of neurosurgical interventions available for colloid cyst of 3<sup>rd</sup> ventricle of brain include microneurosurgery with transcortical or interhemispheric transcallosal approach, endoscopic neurosurgery and stereotactic aspiration.<sup>10,11</sup> Each approach has certain

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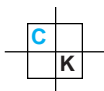
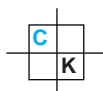
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benefits and some specific risks and complications. In Pakistan, not much work regarding management of colloid cyst of third ventricle has been published and only a few case reports are available.<sup>12-14</sup> This study was conducted to assess the immediate surgical outcome of Trans-cortical Trans-ventricular approach for colloid cyst of brain in our set up.

**MATERIAL AND METHODS**

This descriptive study was carried out at the department of Neurosurgery PGMI Lady Reading Hospital, Peshawar from March 2008 to March 2009. Eleven consecutive patients with colloid cyst of 3<sup>rd</sup> ventricle presented to our department with different clinical scenario were managed surgically. All these patients were either admitted from OPD or referred from other hospitals as indoor cases. Proper documentation of the data was recorded and relevant investigations were preformed. These patients were having hydrocephalus as well, therefore, were subjected to trans-ventricular approach. Left sided approach was adopted in 2 cases due to ipsilateral left ventriculomegaly while rest of cases was approached from right side. All clinical and radiological status was recorded. Histological diagnosis was also made after surgery. No ventricular drain was put in and all patients recovered safely with few minor complications. Only one patient required VP shunt due to persistent hydrocephalus.

**Operation techniques:**

Patients with colloid cyst of 3<sup>rd</sup> ventricle having dilated ventricular system are ideal cases for trans-cortical trans-ventricular approach. After general intubational anesthesia, head up position slightly deviated toward left sided in case of right sided approach and toward right side in case of left sided approach is adopted. Lazy S shaped incision is marked centered at coronal suture. Pericranial flap is dissected separately with help of craniotome. Bone flap was made with beveled edges. Dura is opened via a cruciate incision and cannulation of frontal horn of lateral ventricle is performed. Once CSF start coming no more CSF is aspirated to prevent collapse of brain parenchyma. Self retaining retractor system is applied and corticotomy up to 1.5 cm is performed at cannulated sight under microscope. Lateral ventricular anatomy is seen further. CSF is drained from ventricle gradually and choroids plexuse is identified in the inferolateral wall extending towards foramen of Monro, cyst is seen at this level. It is punctured with brain cannula on a syringe and aspirated; careful dissection is made to spare septal and thalamostriate vein. The rest of cyst is excised carefully from its attachment. 3<sup>rd</sup> ventricle and opposite foremen of monro, fornex and ventricular anatomy is inspected. Any bleeding points are stopped. Irrigation of the surgical field with normal saline is performed. Watertight Dural closure is done and bone flap is repositioned. Pericranial flap is approximated and galia is closed.

**RESULTS**

A total of 11 patients with colloid cyst of 3<sup>rd</sup> ventricle were operated within one calendar year from March 2008 to 2009 in Neurosurgery Department of Lady Reading Hospital, Peshawar. There were nine males and two females with male to female ratio of 4.5:1. There age ranged from 22-38 years with mean age of 28 years. The clinical features and radiological findings are shown in Table I and II respectively. All these patients were operated via Trans-cortical Trans-ventricular approach, two patients from left side and 8 patients from right side. Mean operative time was 138 (±23) minutes. There was no mortality. Mild intra ventricular hemorrhage was noted in 3 cases (27.3%) and treated conservatively. One (9.1%) patient developed minor wound infection which was treated with intravenous antibiotics and aseptic daily dressing. Subgaleal and subdural hematoma was noted in one (9.1%) patient each, which resolved with conservative measures. Residual blood was noted in lateral ventricle on post operative CT imaging which abolished within three weeks on follow up. Post operative seizures were observed in one case (9.1%) only. Two of our patients were having previous shunt surgery with complications. In one patient shunt was removed after 02 weeks

**CLINICAL FEATURES OF 11 PATIENTS OF COLLOID CYST OF BRAIN**

Clinical Features	Number of cases	%
Headache	11	100%
Vomiting	7	63.6
Behavior Problem	3	27.2
Memory Impairment (Preoperative)	3	27.2
Urinary Incontinence	2	18.1
Seizures	2	18.1
Papilloedema	11	100%

Table I

**RADIOLOGICAL FINDINGS OF 11 PATIENTS OF COLLOID CYST OF BRAIN**

Features	Number of cases	%
Hyperdense round anterior 3 <sup>rd</sup> ventricular mass	11	100%
Biventricular dilatation	9	81.8
Univentricular Dilatation (Left)	2	18.1

Table II

due to infection and in another patient disconnection of peritoneal catheter followed migration in pelvis with residual ventricular catheter in brain was noted. Only one (9.1%) patient required V.P shunt after surgery due to persistence of hydrocephalus.

Postoperatively there was no increase in memory impairment. No permanent neurological deficit and no mortality occurred. Mean hospital stay of patients was 6.8 days. All patients were followed for six months with no serious morbidity and mortality.

## DISCUSSION

Despite the availability of various neurosurgical options, the colloid cyst management remains controversial. Over the years, open cranial microsurgery has been advocated as the gold standard for excision of colloid cyst of 3<sup>rd</sup> ventricle. Microsurgical approach has been favored against the endoscopic approach as it offers several advantages like the possibility of complete resection of the cyst, the better haemostatic control during the procedure and a better exposure of the anatomical landmarks.<sup>5</sup> Open cranial procedure ensures complete resection of the hidden remnant underneath the roof of the third ventricle. Trans-cortical trans-ventricular approach is better and easy procedure adopted in hydrocephalic patients due to colloid cyst.<sup>15</sup> Sampath R et al supported the microsurgical approach as it offered more favourable cognitive outcomes with short operative time and short hospital stay.<sup>16</sup>

We performed gross total resection via trans-cortical trans-ventricular approach. We adopted the approach on left side in two cases as relatively largely dilated ventricles were present on left side indicating the obstruction of foramen of Monro mainly on left side. Right-sided approach was performed in nine cases having Bi ventricular dilatation. Our study showed reasonable results regarding short term outcome measures with acceptable transient morbidity and zero mortality. There was no serious neurodeficit. Mean operative time was 138 minutes and mean hospital stay was 6.8 days. There was no deterioration in postoperative cognitive status.

Open cranial surgery for excision of colloid cyst of is blamed to be a relatively unsafe, time consuming and associated with larger complication as compared with endoscopic resection. The duration of surgery may be longer by 60-100 minutes while hospital stay does not appear to be different.<sup>17</sup> The transcortical approach is associated with an increased risk of postoperative epilepsy.<sup>18</sup> With transcallosal approach, the risk of epilepsy is decreased but prolonged retraction increases the risk of venous infarction and contralateral leg weakness.<sup>19</sup> Various studies have recommended endoscopic approach for resection of colloid cysts and described it as safe, effective and minimally invasive method with lower complication rate.<sup>20-22</sup> Gross total and subtotal excision of the tumour has been achieved with endoscopic approach.<sup>21,22</sup> However a higher recurrence rate is affect-

ing the long term results of the procedure.<sup>20,23</sup> Analysis of the different published studies indicate the attachment of colloid cyst remnant with the roof of 3<sup>rd</sup> ventricle caudal to the foramen of Monro after endoscopic surgery which leads to symptomatic recurrence of these remnant cyst up to 10%.<sup>24</sup> Larger intraventricular lesions with high vascularity or firm consistency are especially difficult to be completely and safely resected by endoscopic procedures.<sup>25</sup> Stereotactic aspiration of the colloid cyst is minimally invasive but at times the aspiration may be difficult due to increased viscosity or solid nature of the colloid material.<sup>26</sup>

Patients with incomplete / residual cyst remains symptomatic either need redo-surgery (endoscopic) or open cranial surgery (craniotomy) or palliate procedure like ventriculoperitoneal (VP) shunt.<sup>24</sup> VP shunt as CSF diversion procedure is still performed by certain surgeons due to their different indication and reservation. However, if patient is clinically stable and there is no neurological deterioration, CSF diversion/VP shunt is not advised as enlarged ventricles may facilitate the surgical excision of the lesion.<sup>27</sup> In our study only one (9.1%) patient required post operative VP shunt due to persistence of hydrocephalus. Mild intra ventricular hemorrhage occurred in 3 cases (27.3%) were successfully treated conservatively. We succeeded in gross lateral resection of cyst in all our cases.

## CONCLUSION

Operating eleven cases in a short period of one year shows that the colloid cyst of the 3<sup>rd</sup> ventricle is not as rare as reported in the literature. Our experience of trans-cortical trans-ventricular approach is reasonably safe for patients with colloid cyst of 3<sup>rd</sup> ventricle with hydrocephalus. However well planned larger scale, randomized controlled studies are required to study the early and late outcome of Trans-cortical Trans-ventricular approach as compared to endoscopic approach.

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**CONFLICT OF INTEREST**  
 Authors declare no conflict of interest  
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 NONE DECLARED