



Neuro Endoscopic Excision of third Ventricular Colloid Cyst- Our Institutional Experience

Authors

Prof. M.M. Sankar.M.Ch.¹, Pallavan. M.ch.², S. Rajkumar. Mch.³,
R.Saravana Santhosh Kumar.M.Ch.⁴

¹Chief of Neurosurgery, ²Neuro surgery Post graduate

Dept of Neurosurgery, Government Stanley Medical College, Chennai, Tamilnadu, India

Abstract

Objective: *Colloid cyst of the third ventricle is a rare intracranial benign condition. Though micro neurosurgical technique is preferred for total resection, still subtotal resections and higher post operative morbidity like disconnection syndrome occur even with best surgical hands. Recently, Neuroendoscopy is emerging as an effective alternative to open craniotomy and microsurgical procedures. We present our neuroendoscopic technique for complete removal of third ventricular colloid cyst*

Material and Methods: *The study was carried out on 15 patients (Males-10, Females-5) spanning over a period of 4 years. The age group of the patients ranged from 16years-60 years. Depending on the radiological appearance, The procedure was performed with a right or left precoronal burr hole. We planned for complete excision of the entire cyst, including the cyst wall using the technique pioneered by our senior authors^[4,5]. All patients were operated by precoronal uniportal transventricular technique using a rigid neuroendoscope of 2.7 mm in diameter, with an optical 30°.circumferential coagulation of the colloid wall, followed by a puncture aspiration of cystic contents and gross total resection of its wall by grasping and rotating the grasping forceps until the cyst wall separated from the attachment and removal of cyst with endoscope as a whole with the sheath.*

Results: *Complete excision was possible in 14 cases, In one patient a small part of the cyst was left to avoid venous injury. Two case of intra ventricular bleed needed External Ventricular Drainage (EVD). The operative time ranged between 50 minutes to 90 minutes. The inpatient stay time range from 5-10 days. The mean follow-up time was two years Pre operative signs and symptoms improved in all our patients without any mortality.*

Conclusion: *These results shows that neuro endoscopy with our technique is a safe and effective alternative to the well established approaches of craniotomy with microsurgical excision and stereotactic aspiration with a short recovery time, hospital stay and low or negligible direct surgical morbidity.*

Keywords: *Neuroendoscopic Excision; Micro neurosurgery; Craniotomy; Colloid Cysts.*

Introduction

Colloid cyst is a slow growing benign, congenital, epithelium lined, endodermal cyst, almost always

arises in the anterosuperior third ventricle, near the foramina of Monro. Colloid cyst of the third ventricle is found in 0.5-1% of intracranial tumors

[1,2,3], and in 15-20% of intra-ventricular lesions⁽⁴⁾. It is the most common type of neuroepithelial cyst, as well as the most common tumor in the third ventricle^[5,6]. They are responsible for an acute obstructive hydrocephalus because of the location. Sudden death is reported in literature^[2,5,6]. Commonly diagnosed as an incidental finding during brain imaging. The recommended various neurosurgical options^[7,8] are transcallosal or transcortical-transventricular approach^[1,9,10]. Olden days ventriculo-peritoneal shunt as an alternative to the direct approach^[11] of the cyst in some low resource setting hospitals. The less invasive techniques have been developed over the years, including the simple puncture, stereotactic aspiration, and in the recent past years, cyst endoscopic aspiration. Nowadays neuro endoscopy is emerging as an effective alternative to treat third ventricular colloid cyst^[10]. In our department, neuro-endoscopy is available and we reporting our institutional experience with complete excision of third ventricular colloid in 15 patient

Materials and Methods

The study was carried out with fifteen patients (Males-10, Female-5) from August 2014 to July 2018. The age group of the patients ranging from 22 to 45 years. All patients are clinically examined and evaluated with routine blood investigations and imaging..

CT imaging was done for all the patients who underwent surgery. All the surgeries were performed by two of our senior authors and assisted by other authors. Right or Left Precoronal uniportal transventricular technique employed in all according to the cyst site and ventricular size. Operative time, length of hospital stay, intraoperative and post operative complications were documented and analysed.

Surgical technique

All patients were operated in the same manner and by the two surgeon. Under general anesthesia, Ceftriaxone IV was given as prophylactic

antibiotic during induction time and continued for 48 hours postoperatively. Patients were put in the supine position, head in 30 ° elevation with ring cushion head support, infiltration of scalp incision done with 2% lignocaine with adrenaline^[12]. After prepping and draping, with vertical cutaneous incision of about three cm, a burr hole was made two cm anterior to the coronal suture and 12 cm to nasal bridge or root and 2.5 cm to midline^[13]. After ventricular catheterization, the neuroendoscope connected to the camera with cold light source was introduced into the lateral ventricle. The irrigation system was set up immediately. Intraventricular anatomical route was visualized through which neuroendoscope progressed ahead of choroid plexus to foramen of Monro. The colloid cyst site obstructing foramen of Monro was identified. The cyst wall was carefully cauterized, allowing retraction then puncture made in the cyst wall to decrease its volume as well as the intra-cystic pressure to facilitate its removal from the other parts, A French 3 Fogarty catheter is then inserted through the puncture site to dilate it and to evacuate the remaining cyst contents under steroid IV coverage and copious amount of irrigation with Ringer Lactate solution. The cyst wall grasped with grasping forceps introduced through the endoscope instrument port and rotated until the cyst wall separated from the attachment. The endoscope was withdrawn with grasping forceps after visually confirming the cyst removal status after and haemostasis. The burr hole was plugged with appropriate size Gelfoam. Scalp closed in layers. Sterile dressing applied.

Results

The study was carried out on 15 patients (Males-10, Females-5) spanning over a period of four years. The age group of the patients ranged from 22years-45years. The presenting symptoms of our patients were headache (15 patients), vomiting (5 patients), Altered mentation (2 patients), drop attacks (3 patients), and symptomatology of Normal Pressure Hydrocephalus in 1 patient.

(Table 1). On CT Imaging there was evidence of hyperintense lesion in all patients, On Magnetic Resonance Imaging there was evidence of hyper intense lesion in 11 patients, isointense lesion in 3 patients and hypointense in 1 patient. Five of the patients had asymmetric hydrocephalus. The size of the cyst range from 12 mm to 18mm in maximum diameter [Table 1].

All patients were operated by transforaminal approach. One patient required trans-septal approach. Complete excision was possible in 12 cases, while in three patients a small part of cyst was left to avoid venous injury. The operative time ranged between 30 to 45 minutes (Table 2). With increase in experience the operating time decreased. Two patients developed postoperative

chemical meningitis that was successfully controlled with steroids. Postoperative transient memory disturbance was observed in 3 patients. One patient had a postoperative CSF leak which required shunt surgery. One patient who postoperatively had signs of raised intracranial tension responded to temporary placement of an External Ventricular Drain. One patient with incomplete excision was reoperated endoscopically after three days on the basis of residual size seen on post operative scan. The total inpatient period range from 5-10 days Total hospital stay of these patients ranged from 5days to 10 days. The average follow-up period was 24 months.

Table.1. Master chart of patient demographics, clinical presentation and imaging characteristics and surgical outcome

S.no	Age/Sex	Signs and Symtoms	Cyst size in mm in Imaging	Surgical procedure time in minutes	Excision status	In patient stayal period in days
1	34/M	Head ache, vomiting	12	35	Total	5
2	35/F	Head ache	14	40	Total	5
3	40/M	Head ache,Vomiting	18	45	partial	
4	22/F	Head ache,Altered mentation	14	35	Total	5
5	35/M	Head ache,Vomiting	15	40	partial	7
6	40/M	Head ache	17		Total	5
7	44/M	Head ache,NPH triad	15	35	Total	
8	32/F	Head ache, Altered mentation	18	45	partial	7
9	40/M	Head ache,Drop attack	14	36	Total	5
10	27/F	Head ache	14mm	30	Total	5
11	40/M	Head ache,Vomiting	16mm	30	Total	10
12	34/M	Head acheDrop attack	15		Total	5
13	23/F	Head ache	13	35	Total	5
14	35/M	Head ache,Vomiting	16	35	Total	5
15	42/F	Head ache,Drop attack	18	30	Total	5

M- Male; F- Female; mm- Millimeter; + Present

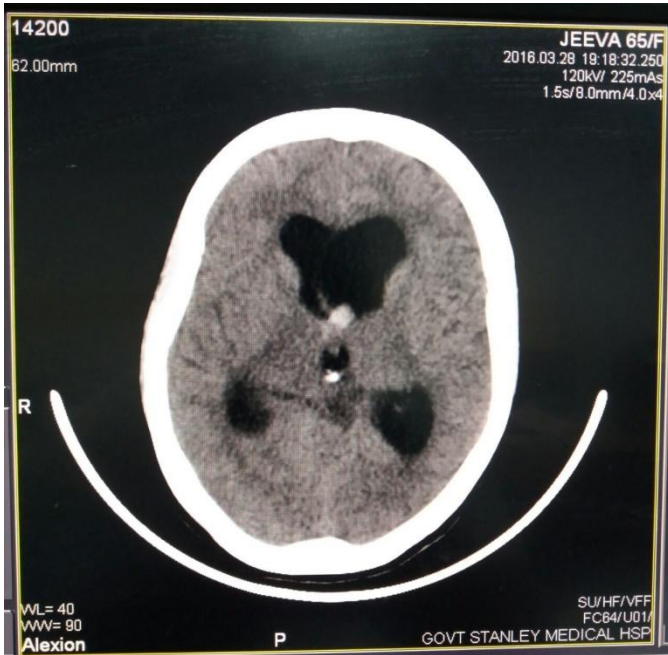


Figure 1 Third ventricular colloid cyst with hydrocephalus in CT scan



Figure 2 Patient positioning



Figure 3 Pre coronal burr hole incision marking

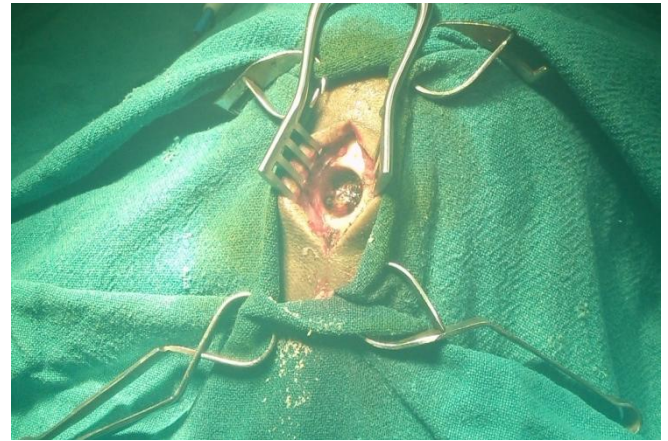


Figure 4 Precoronal burr hole



Figure 5 Neuro endoscopy team members position

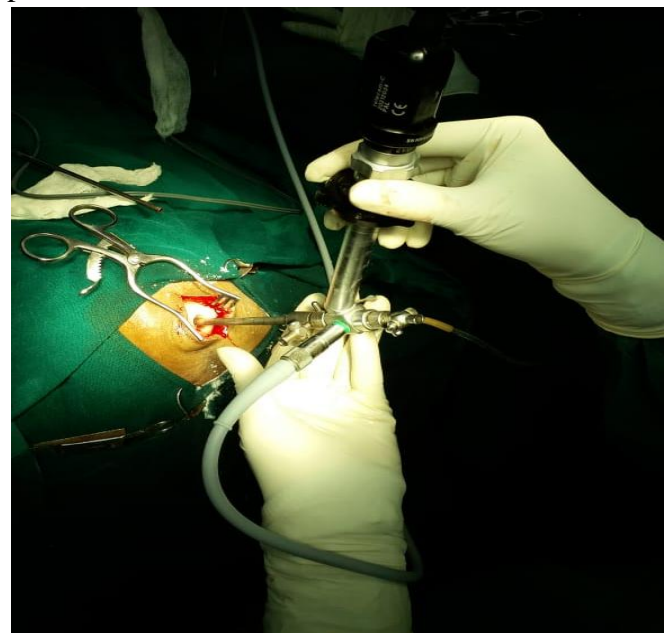


Figure 6 Neuro endoscope with the sheath in the burr hole



Figure 7 Neuro endoscopic view of Third ventricular colloid cyst

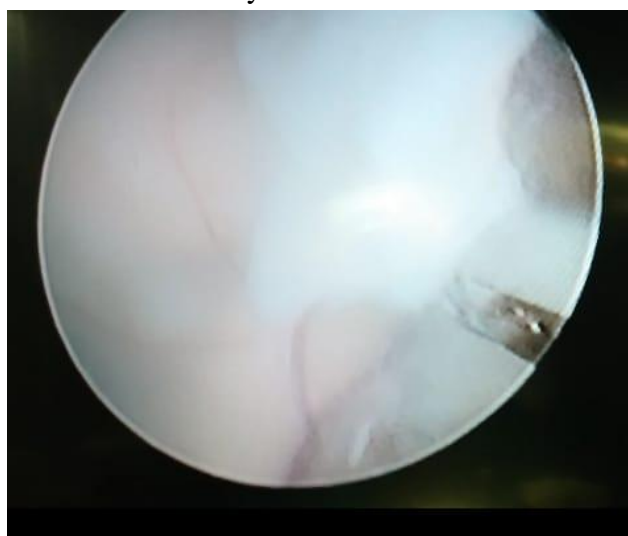


Figure 8 Neuroendoscopic view of grasping forceps holding the colloid cyst wall

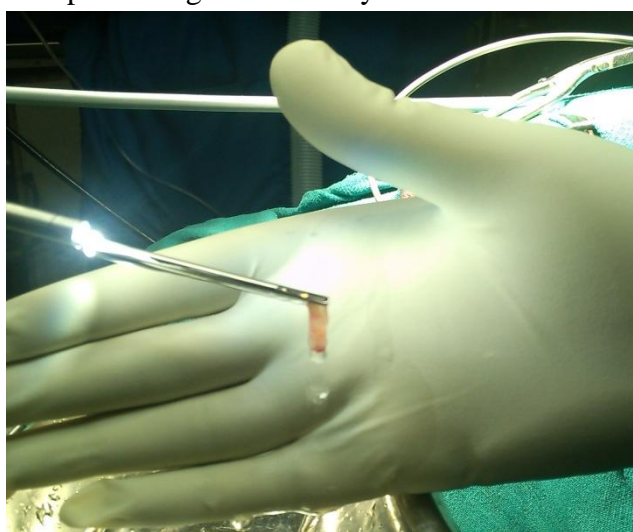


Figure 9 The whole cyst wall removed as a complete assembly of endoscope with grasping forceps in situ. The technique pioneered by our senior author



Figure 10 Complete excision of Third ventricular Colloid cyst with our special neuro endoscopic technique pioneered by our senior author



Figure 11 Probe inside the colloid cyst cavity with complete wall

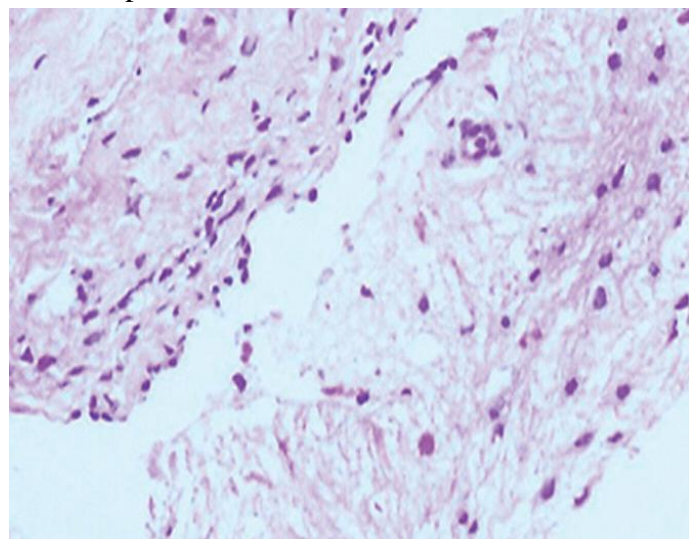


Figure 12 Eosin and Haematoxylin stain of Third ventricular colloid cyst

Discussion

The colloid cyst composed of an outer fibrous layer and an inner epithelium of ciliated or mucin producing cells. Nearly 60% of these mucinous cysts are incidental findings during brain imaging and mostly asymptomatic. Colloid cyst described by Wallman for the first time in 1858^[11], are rare tumors^[12]. The size of colloid cyst reported in literature is five centimeters. In our study the size range from 12-18mm^[13,14,15,16]. The clinical manifestations of colloid cysts are nonspecific. However, the positional paroxysmal headache is the most common symptom and is rather specific. It is due to variation of the interventricular foramina obstruction by the cyst by a valve mechanism. Commonly, the disease is manifested as intracranial hypertension due to an acute obstructive hydrocephalus. Two patients showed intracranial hypertension with severe disturbance of consciousness (Glasgow score 6/15). Other clinical signs were visual disturbances, decreased visual acuity, optic disc swelling, nausea, vomiting, dizziness, motor deficits and seizures. The risk of sudden death occurred as a complication of colloid cysts requiring surgical management of symptomatic cases and regular monitoring of cysts with a few symptoms or cases of accidental diagnosis. The other complication of colloid cyst is the intra-cystic hemorrhage. This is an extremely rare complication, which achieves an apoplexy of the cyst and abruptly increases the volume of the cyst and accounts for a rapid severe intracranial pressure.

The advantage of neuroendocopy are minimal invasiveness shorter procedure time, shorter patient recovery time. minimal post operative complications, double benefit of both the lesion and hydrocephalus can be treated in one procedure.

The disadvantages are costly instruments and maintenance is complex, partial excision and recurrence rate are reported high in the literature, vessel injury are difficult to manage and sometimes additional open procedures are

mandatory in case of severe bleeding or excision procedure failure.

Conclusion

Our single centre study shows good results for endoscopic colloid cyst excision. Since we achieved total excision in most of the cases, short procedure time, minimal post operative morbidity and no post operative mortality, we consider the endoscopic technique of colloid cyst excision method is a viable alternative to more invasive classical open craniotomy and excision procedures. Small sample size and single centre study are the two major draw backs for this study.

Conflict of interest

The authors have no conflicts of interest and none to declare

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