

Endoscopic Aspiration and Marsupialization for Colloid CYST

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ABSTRACT

Background: Colloid cyst is a benign intracranial tumor found in the anterior third ventricle. Due to location of this tumor, it has propensity to cause obstruction to CSF flow causing hydrocephalus. Treatment options include excision or aspiration of cyst through open or endoscopic procedures or CSF diversion procedures. Recent years have seen a shift towards endoscopic approach to treatment of colloid cyst due to its relative simplicity among endoscopic procedures and other favorable patient related factors. We share our experience with endoscopic aspiration and marsupialization of colloid cyst.

Methods: This descriptive retrospective study was done at Neuro surgery department of Neurosurgery, SMBB Institute of Trauma, Dow University of Health Sciences, Dr. Ruth K. M. Pfau Civil Hospital Karachi, Pakistan. Data of patients who had endoscopic aspiration and marsupialization of colloid cyst between February 2017 and October 2020. Patient demographics, clinical presentation, radiological features, operative course and post-operative course was recorded. Clinical or radiologic recurrence was noted on follow-up.

Results: Ten patients were operated during the study period. Headache was most common presenting symptom. Mean size of cyst was 21mm. There was incomplete aspiration in 3 patients as observed per-operatively and by residual cyst content on immediate post-operative CT scan which disappeared completely on subsequent scans. CSF leak was observed in 3 patients and 2 developed meningitis. No symptomatic recurrence occurred.

Conclusion: Endoscopic aspiration with marsupialization of cyst wall is a safe and effective technique for treatment of colloid cyst. Incomplete aspiration of cyst contents may not require further intervention as the radiological resolution of cyst is observed over time. Further follow-up and larger sample size is needed to further establish the safety and efficacy of this procedure.

Keywords: colloid cyst, endoscopic, follow-up studies

INTRODUCTION

Colloid cyst is a benign intracranial tumor found in the anterior third ventricle. It causes symptoms due to obstruction at the foramen of Monroe causing hydrocephalus or due to compression of adjacent brain structures like hypothalamus and fornix.¹ Treatment options include stereotactic aspiration of the cyst contents, excision of the cyst through open or endoscopic procedures or simple CSF diversion procedures.^{2,3} Stereotactic aspiration was commonly employed for treatment of these cysts in the past but has largely been abandoned in favor of open or endoscopic excision due to high rates of recurrence.⁴ However, this recurrence was found to be more in those with incomplete aspiration compared to those achieving complete aspiration.

Recent years have seen a shift towards endoscopic approach to treatment of colloid cyst due to its relative simplicity among endoscopic procedures, smaller skin incision and lesser post-operative complications than the open microsurgical procedures.⁵ However, there is concern among physicians about higher rates of recurrence than open microsurgical procedures due to higher rates of incomplete excision in endoscopic procedures. Despite its benign and cystic nature, surgeons are more inclined towards achieving gross total resection rather than simple decompression of the cyst.

There is reported higher recurrence in endoscopic procedures compared to open, but with lower morbidity and a meta-analysis by Sheikh and colleagues supports this.⁶ However, there is huge variation in study design, follow-up duration and stratification of complications and recurrence according to degree of resection achieved. Boogaarts and colleagues reported that 6 out of 33 patients had recurrence even after gross total resection, while 18 out of 22 patients did not require re-surgery despite incomplete excision.⁷ So, cyst excision or aspiration is not a consistent risk factor for recurrence. No consistent data is comparing only aspiration of cyst contents with excision. Decq and colleagues report their experience of endoscopic aspiration and coagulation of cyst wall of 15 cases with only one patient having radiologic recurrence.⁸ In study of Mishra and colleagues, there was one patient who underwent aspiration only and he had not developed recurrence for 6 years, till the publication of the study.⁹ Rajshekhar reported that symptomatic recurrence occurred much later than radiological recurrence in patients undergoing stereotactic aspiration.¹⁰ Considering the morbidity associated with

complete excision of the capsule and the duration of resolution of symptoms achieved only with complete aspiration of the colloid cyst, endoscopic aspiration with marsupialization appears to be a viable option. Here, we share our experience with endoscopic aspiration and marsupialization of colloid cyst.

MATERIALS AND METHODS

This descriptive retrospective study was done at Neuro surgery department of Neurosurgery, SMBB Institute of Trauma, Dow University of Health Sciences, Dr. Ruth K. M. Pfau Civil Hospital Karachi, Pakistan. Study included all patients who had endoscopic treatment between 1st February 2017 and 30th October 2020 for colloid cyst. After approval from hospital Ethical Review Committee was obtained, patient demographics, clinical presentation, radiological features, operative and post-operative course was retrieved from hospital record. Clinical follow-up and imaging via CT scan were also noted. Data was entered in IBM SPSS Statistics for Windows, IBM Corp. Released 2013, Version 22.0. Armonk, NY: IBM Corp. Mean was calculated for numerical data and frequency and percentages were calculated for all other categorical data. All patients had general anesthesia after which incision and burr hole was made at the right Kocher's point. Using free hand technique with a rigid 4mm 0° endoscope (HOPKINS® II, Karl Storz Endoskope, Tuttlingen, Germany), cyst was punctured, and 8 Fr gastric tube whose end was custom beveled at the most proximal opening was used to aspirate the cyst contents. (Figure 1) Portion of cyst wall denuded of any vessels was cauterized and opened with Kocher's maneuver. The beveled side of the tip of tube was kept towards the medial side while aspirating to achieve maximum aspiration. Small amount of wall tissue was taken for histopathology. Bipolar cautery was used to coagulate the walls of fenestration and cyst marsupialization was done. EVD was placed as a safety measure through the same burr hole if any blood-tinged CSF was noted at the end of procedure. EVD was kept clamped and removed after 48 hours of surgery once the post-operative scan was satisfactory. Minimum patient follow-up was of 1.5 months. Clinical evaluation as well as radiological follow-up with CT scan and/or MRI was performed.

RESULTS

A total 10 patients were operated via endoscopic approach during the study period out of which 9 patients were male. Mean age of

patients was 37 years. Most patients presented with headache followed by vomiting and difficulty walking. Median duration of symptoms was 4 months, maximum being 24 months. Mean size of cyst was 21 mm ranging from 13 mm to 33 mm. CT showed iso-dense cyst in 3 patients and hydrocephalus was present in all patients. On MRI, 5 were hypo-intense on T2WI. Table 1

Mean endoscopy time was 23 minutes, range 15 to 38 minutes. There was incomplete aspiration in 3 patients as observed during surgery and by residual cyst contents on immediate CT scan. This content disappeared completely on subsequent CT within 2 weeks. (Figure 2, 3 and 4) EVD was inserted in 3 patients but none of the patients had the need for permanent shunt.

2 out of 3 patients who had CSF leak developed meningitis which responded to conservative management. Mild intraventricular hemorrhage was seen in occipital horn of 3 patients. There were no seizures or memory deficits. There was no mortality. Minimum follow up duration was 1.5 months, maximum being 22 months. One patient displayed residual thick cyst wall 22

months after surgery. No symptomatic recurrence or redemonstration of colloid cyst had occurred, results shown in table 2.

Table 1: Demographic and clinical characteristics of patients (n=10)

Variables	Statistics	
Age (Mean+SD)	37.5+5.12 years	
Median duration of symptoms	4 months	
Mean size cyst	21+4.12 mm	
Mean endoscopy time	23+5.66 minutes	
Symptoms	Headache	8 (80.0%)
	Vomiting	3 (30.0%)
	Decreased vision	1 (10.0%)
	Fits	1 (10.0%)
	Drop attacks	2 (20.0%)
	Difficulty walking	2 (20.0%)
	Altered sensorium	1 (10.0%)
	Vertigo	2 (20.0%)
	Memory problems	2 (20.0%)

Table 2: Clinical outcomes of patients n=10

S. No	Gender	Age (yrs)	Size (mm)	CT density	T1 weighted image intensity	T2 weighted image intensity	Aspiration	CSF leak	Intra ventricular hemorrhage	Follow-up (month)
1	Male	64	19	Iso	Hypo	Hyper	complete	No	No	6
2	Male	40	17	Hyper	Iso	Hypo	incomplete	Yes	No	2
3	Male	35	33	Hyper	Hyper	Hypo	complete	Yes	Yes	1.5
4	Male	13	13	Hyper	Iso	Hypo	incomplete	No	Yes	22
5	Male	50	21	Hyper	Hyper	Hypo	complete	No	No	6
6	Male	38	17	Hyper	Hyper	Hypo	complete	No	No	2
7	Female	28	17	Iso	Iso	Hyper	complete	Yes	No	3
8	Male	38	30	Hyper	Hypo	Hyper	complete	No	Yes	3
9	Male	19	21	Hyper	Iso	Hypo	incomplete	No	No	1.5
10	Male	50	21	Hyper	Hyper	Iso	complete	No	No	1.5

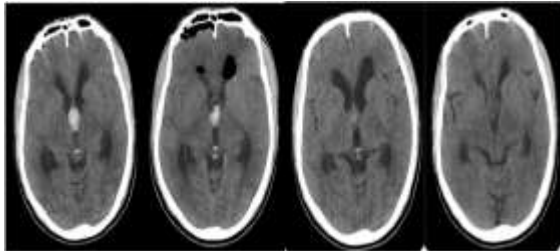


Figure 1: Serial CT scans showing incomplete aspiration of cyst which resolved over time

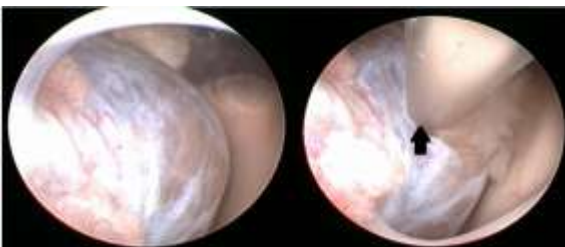


Figure 2: Colloid cyst (left), aspiration done with feeding tube shown by arrow (right)

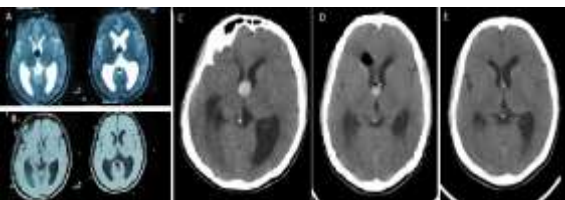


Figure 3: MRI images of colloid cyst showing hypointense cyst content on T2 weighted images(A) and isointense on T1 weighted images (B). Pre-operative CT scan (C) showing hyperdense cyst with subsequent resolution of cyst content (D and E)



Figure 3: Colloid cyst (left), 6 months follow following aspiration and marsupialization showing reduction in size of ventricles and patent foramen of Monroe as shown by arrow (right)

DISCUSSION

Treatment options vary widely for colloid cyst depending on the clinical presentation, radiology and local resource availability. Despite the benign nature of the cyst, many surgeons are in favor of complete resection of the cyst due to fear of recurrence. Stereotactic aspiration has been applied for a long time for treatment of colloid cyst but has been going out of favor due to higher recurrence rates and availability of more advanced techniques.⁴ However, recurrence rates of 2.5% are reported even after excision of colloid cyst via endoscopic techniques.¹¹

We observed that despite a large amount of residual cyst content on immediate post-operative scan in patients with incomplete aspiration, the cyst contents disappeared on subsequent scans. There was immediate reduction of hydrocephalus which was maintained in the delayed post-operative scan. This is most likely due to coagulation of walls of fenestration which allows drainage of the cyst contents and opening of the CSF pathways. Robert and colleagues have reported the case of complete washout of colloid cyst after partial removal over the period of 4 years.¹² Kumar and colleagues also report disappearance of remaining cyst contents after partial stereotactic aspiration in 3 patients over a 12-week period.¹³ Therefore, we recommend that even if complete aspiration is not achieved, coagulation of the wall of the opening is done. Boogarts and colleagues did not show any relation between extent of resection and recurrence.⁷ Yadav also reported no recurrence in 3 of the patients with sub-total resection and follow-up of up to 3 years.¹⁴

But Hoffman and colleagues showed higher recurrence in patients with cyst wall remnants than those with complete resection but the former group had almost double the follow-up duration.¹⁵ Sribnick and colleagues also reported one recurrence in patient with complete removal in his case series.⁵

Yadav and colleagues reported 3 patients who developed aseptic ventriculitis in his series.¹² Sribnick and colleagues reported one mortality due to meningitis.⁵ In our two patients who developed signs of infection CSF cultures showed growth of bacteria which responded to antibiotic therapy. EVD placement during surgery is surgeon's preference with some surgeons placing EVD in all cases while others decide intra-operatively for its placement.^{5,11} We feel that EVD placement places the patients at risk for infections so should be used in case specific scenarios.

Compared to stereotactic aspiration, endoscopic aspiration provides a real time analysis of the cyst aspiration, thus providing a satisfactory cyst aspiration. It also gives a good view of the surrounding structures while puncturing the cyst. Marsupialization of the cyst cavity theoretically does not allow the cyst contents to accumulate therefore preventing enlargement of this benign cyst and development of symptoms due to mass effects. Recurrence has been reported in as short as one month duration in incomplete resection of colloid cyst patients.¹¹ Considering this time frame, all our patients had resolution of their presenting symptoms at the time of discharge and continued to remain symptom-free till their last follow-up.

CONCLUSION

Endoscopic aspiration with marsupialization of cyst wall is a safe and effective for treatment of colloid cyst. Incomplete aspiration of cyst contents may not require further intervention as the radiological resolution of cyst is observed over time. Further follow-up and larger sample size is needed to further establish the safety and efficacy of this procedure.

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