



Comparison of Endoscopic Surgery and Transcallosal Microsurgery in Colloid Cysts of the Third Ventricle

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Abstract

Introduction: Treatment of colloid cysts in symptomatic patients is surgery. Two most frequently used methods are transcallosal microsurgery and endoscopic surgery. However, the question as to which method is more effective remains to be controversial. Better results as compared to the past have been reported especially on recent advancements in endoscopic techniques and the technology. In the light of these recent advancements, we aimed to compare both methods employed in our clinic.

Methods: Twenty-six patients operated in our clinic due to the colloid cyst of the third ventricle between the years 2012 and 2017 were included in the study. Fourteen patients that underwent transcallosal microsurgery and 12 that underwent endoscopic surgery were compared as two groups. The two groups were compared in terms of surgical duration, hospitalization duration, bleeding, total resection, reoperation, and shunt necessity.

Results: Complaints of patients at the time of arrival at the clinic and the neurological findings and demographic data relating thereto were identified to be the same in both groups. While total resection and complication rates were observed to be higher in the transcallosal microsurgery group; hospitalization duration, surgical duration, shunt necessity, and bleeding were determined to be lower.

Discussion and Conclusion: Endoscopic surgery is as effective in the excision of the colloid cysts of the third ventricle as microsurgery. Furthermore, it reduces surgical duration, bleeding, hospitalization duration, and shunt necessity.

Keywords: Colloid cysts; endoscopic surgery; transcallosal microsurgery.

Colloid cyst is a congenital tumor located in the third ventricle. Colloid cysts constitute 0.5–1% of all brain neoplasms. Fifteen to twenty percent of intraventricular tumors are colloid cysts^[1,2]. If asymptomatic in elderly patients, and in the absence of hydrocephalia; follow-up of hypointense lesions in T2-weighted sequences in small scale and magnetic resonance imaging might be recommended^[3]. However, it might lead to the obstruction of the foramen of Monro and disruption of cerebrospinal fluid (CSF) circulation, thus leading to hydrocephalia. It might

appear with clinical pictures ranging from headache to deep coma and sudden death^[4,5]. Despite being a benign tumor, its treatment is surgical resection as it leads to clinical findings extending all the way to sudden death^[6]. Difficulty of surgical resection due to their deep location has led to the emergence of different options in the treatment of these tumors. Among surgical treatment options, such as craniotomy and microsurgical approaches as transfrontal transforaminal, transcallosal, infratentorial supracerebellar, frontobasal translamina terminalis, and less invasive meth-

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ods such as endoscopic resection, stereotactic microchirurgical approach, and stereotactic aspiration method have been widely used^[7-9]. Thanks to the technological advancements and the increase in surgical experience in the recent years, increased success rates are reported in endoscopic surgery. Therefore, in the light of new technological advancements, we thought that endoscopic surgery and transcallosal microsurgery need to be compared once again. In our study, two frequently used methods, endoscopic resection and microscopic interhemispheric transcallosal resection, are compared.

Materials and Methods

Twelve patients operated with endoscopic surgery and 14 patients operated with the transcallosal approach in our clinic between the years 2012 and 2017 were included in the study. The groups were designated as the endoscopy group and the microsurgery group. Data belonging to the patients was investigated retrospectively through the hospital information system and files. The patients were evaluated in terms of age, sex, complaints at the time of arrival

at the clinic, examination on arrival at the clinic, amount of bleeding, surgical duration, blood use, hospitalization duration, and complications.

Results

In the endoscopy group, seven patients were male and five patients were female. In the microsurgery group, on the other hand, there were eight male patients and six female patients. The age average was determined to be 32.6 in the endoscopy group and 34.7 in the microsurgery group. Average follow-up period was determined to be 52.3 months in the endoscopy group and 62.4 months in the microsurgery group. Average surgical duration, bleeding, blood use, and hospitalization duration were detected to be lower in the surgery group (Table 1).

As for the complaint at the time of arrival at our clinic, the most frequent clinical symptom was headache followed by nausea-vomiting (Table 2).

As for the examination of the patients on arrival at our clinic, the most frequent clinical finding was papillae edema followed by gait abnormality in both groups (Table 3). Demo-

Table 1. Demographic and clinical findings observed in both groups

	Endoscopy group	Transcallosal microsurgery group
Age	Average 32.6 (min: 19, max: 47)	Average 34.7 (min: 17, max: 77)
Sex	F/M 5/7 71.4%	F/M 6/8 75%
Bleeding	Average 132 ml	Average 442.6 ml
Surgical duration	116 min	196 min
Blood use	-	336 ml
Hospitalization duration	3.2 days	10.4 days

Table 2. Complaints at the time of arrival at our clinic

	Endoscopy group	Transcallosal microsurgery group
Headache	8 (8/12 66.6%)	9 (9/14 64.2%)
Nausea-vomiting	6 (6/12 50%)	6 (6/14 42.8%)
Gait abnormality	4 (4/12 33.3%)	3 (3/14 21.4%)
Dizziness	3 (3/12 25%)	2 (2/14 14.2%)
Blurred vision	2 (2/12 16.6%)	1 (1/14 7.1%)

Table 3. Arrival examination findings of the patients

	Endoscopy group	Transcallosal microsurgery group
Papillae edema	7 (7/12 58.3%)	7 (7/14 50%)
Gait abnormalities	4 (4/12 33.3%)	6 (6/14 42.8%)
Normal examination	4 (4/12 33.3%)	5 (5/14 35.7%)
Hyperreflexia	3 (3/12 25%)	3 (3/14 21.3%)
Blurred vision	2 (2/12 16.6%)	1 (1/14 7.1%)

graphic features and complaints on arrival and findings of the examination on arrival were of similar nature in both groups.

When the patients are evaluated in terms of complications, infection was the most frequent complication in both groups. When considered in terms of major complications, total excision could not be achieved in two patients in the endoscopy group and one of these patients was repeated with microsurgery. In the microsurgery group, on the other hand, exitus developed in one patient with comorbidities (Table 4).

Discussion

Colloid cysts of the third ventricle constitute 0.5–2% of all intracranial tumors^[1,10]. In the study they carried out, Horn et al.^[11] found out the age average to be 36.4 and reported colloid cysts to be more frequent among males. In our study, the age average of the patients was 32.6 and colloid cysts were observed to be more frequent among males than females. Age and sex features of both groups were the same.

As was the case in previous studies, the most frequent complaint among patients was headache followed by nausea-vomiting in our study, too. In the clinical examination of the patients, papillae edema followed by gait abnormality was the most frequent symptoms observed^[2,12]. No differences were identified between the two groups in terms of complaints and examinations at the time of arrival.

In their article reporting their 8-year experience in colloid cyst resection with endoscopy, Mishra et al.^[6] stated that endoscopic surgery shortens surgical duration, reduces the amount of bleeding, and reduces hospitalization duration to a significant extent. In the extensive systematic screening carried out by Sethi et al.^[13] it was emphasized that the surgical procedure was completed with minimal tissue damage as the endoscopic method is a minimal invasive intervention^[8,9,13]. In the study carried out by Powell et al.^[14] it was emphasized that, with minimal neural dam-

age, endoscopic resection can be thought of as a first-line therapy in colloid cyst treatment.

In our study, operation duration and the amount of bleeding were also detected to be less in the surgery with endoscopy. Patients in the endoscopy group did not need blood transfusion and average hospitalization duration was observed to be shorter than the microsurgery group.

Rate of total resection in transcallosal microsurgery still holds the field against endoscopic surgery in the literature. However, rates of total resection in endoscopic series have increased in the recent years as compared to the past. Grondin et al.^[15] reported that they performed total resection in 24 out of 25 cases and that none of them developed recurrence. Similarly, Charalampaki et al.^[16] reported that none of the 28 cases developed recurrence. Kwiek et al.,^[3] on the other hand, reported that they could perform total resection at the rate of 47%. They argued that such a low total resection rate was due to the learning curve. They also reported that they did not encounter any recurrence as a result of patient follow-ups of up to 130 months. Longatti et al.,^[17] on the other hand, reported 41% total resection and 11% recurrence. Interestingly, they detected recurrence in four patients that had undergone total resection. When evaluated in the light of the literature, the effect of total resection on recurrence and secondary surgery is still controversial. Microsurgery is still more successful on the matter of total resection, but a sufficient level of resection can be performed in endoscopic surgery, as well. In our series, recurrence was not encountered in the microsurgery group, while residue was detected in two patients in the endoscopy group. Surgery with transcallosal approach was performed on one of the two patients with a residue following a 42-month follow-up. Surgery has not been regarded as necessary in the clinical 48-month follow-up of the other patient.

When considered in terms of complications; the most fre-

Table 4. Post-operative complication rates in both groups

	Endoscopy group	Transcallosal microsurgery group
Infection	3 (3/12 25%)	4 (4/14 28.5%)
Ventriculoperitoneal shunt necessity	1 (1/12 8.3%)	2 (2/14 14.25%)
Epileptic seizure	2 (2/12 16.6%)	2 (2/14 14.25%)
CSF fistula	1 (1/12 8.3%)	1 (1/14 7.12%)
Residue mass	2 (2/12 16.6%)	0
Exitus	0	1 (1/14 7.1%)

quent complication among the patients was identified to be infection followed by ventriculoperitoneal (VP) shunt necessity, which was the case in previous studies^[6,18]. Infection was the most frequent complication in both groups and it occurred with similar frequency in both groups. The second most frequent complication, on the other hand, in both groups was VP shunt necessity. VP shunt necessity was more frequently encountered in the microsurgery group than in the endoscopy group. The reason for this might be the use of the irrigation system in endoscopic surgery. Irrigation might be washing away the foreign matters that developed in CSF due to the surgery, thus avoiding the disruption of CSF circulation. Endoscopic surgery is superior in terms of surgical shunt necessity, but the results are better in terms of performance of total resection in the microsurgery group. Similar results have been obtained in both groups in terms of other complications. Exitus developed in one patient with additional pulmonary problems and obesity in the microsurgery group due to pulmonary embolism that developed in the post-operative period.

Inclusion of a small number of patients in our study and its being a retrospective study can be considered as the drawbacks of our study. Prospective studies carried out with a large number of participants and with long follow-up periods will be more helpful.

Conclusion

Endoscopic surgery is as effective in the excision of colloid cysts of the third ventricle as microsurgery. Furthermore, when compared to the microsurgery method, endoscopic surgery reduces the surgical duration, bleeding, hospitalization duration, and shunt necessity. Endoscopic surgery can be employed with an increasing rate of success in the hands of experienced surgeons upon advancements in its technique. However, it should not be forgotten that rate of total resection is relatively lower in endoscopic surgery.

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