

Original Article**Microsurgical Management of Symptomatic Intracranial Arachnoid Cyst: Experience of 15 Cases**Md. Shafiul Alam¹, Kaisar Haroon², Jakirul Alam³, Tayseer Farzana⁴, Rejaul Hasan⁵, AZM Saifuddin⁶**Conflict of Interest:** There is no conflict of interest relevant to this paper to disclose.**Funding Agency:** Was not funded by any institute or any group.**Contribution of Author:** Principal Investigator- Dr. Md. Shafiul Alam, Manuscript Preparation- Dr. Kaisar Haroon

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Copyright: ©2021 bang.BJNS published by BSNS. This published by BJNS. This article is published under the creative commons CC-BY-NC license. This license permits use distribution ([http://creativecommons.org/licenses/by-nc/4-0/](http://creativecommons.org/licenses/by-nc/4.0/)) reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.**Received:** 10 September, 2020**Accepted:** 20 September, 2020**Abstract****Background:** Arachnoid cysts are fluid-filled sacs that occur on the arachnoid membrane that covers the brain. In most of the cases these cysts are asymptomatic and do not require any treatment. Only symptomatic arachnoid cysts require treatment.**Objectives:** The objective of this study was to see the results of microsurgical treatment of intracranial arachnoid cyst.**Methods:** This retrospective cross sectional study was carried out in the Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh. Total 15 cases were included in this study for a period of 3 years. Data were collected including their operation procedures and follow up by questionnaires and finally observed the results.**Results:** Among the 15 patients about one third were presented in the second decades of life with male predominant. Significant clinical improvement was observed among most of the patients. The radiological decrease of the size of the cysts was also found. The results of microsurgical excision were better than other procedures.**Conclusions:** Surgical treatments are needed only in symptomatic cases. Clinical and radiological outcome of the surgical treatment is satisfactory.**Key words:** Intracranial arachnoid cyst, Microsurgery, Clinical and Radiological outcome.*Bang. J Neurosurgery 2021; 11(1): 13-17***Introduction**

Arachnoid cysts are benign cystic lesion that occurs along the craniospinal axis. Bright was the first to accurately describe the condition in 1831¹. Formerly it was named as Bright's disease. Arachnoid cysts can be classified as primary developmental cysts or secondary cysts. Primary cysts arise from the splitting of the arachnoid membranes in utero, resulting in the development of anomalous collections of cerebrospinal fluid (CSF). Secondary cysts are less common, often appearing after trauma, surgery, infection, or

intracranial hemorrhage. Arachnoid cysts comprise 1% of all intracranial space-occupying lesions². The prevalence in adults is approximately 1.4% with a female preponderance, while the prevalence in children is 2.6%³.

The clinical features of arachnoid cysts vary according to their size and location. Small cysts are usually asymptomatic, requiring observation and follow up. However, larger cysts can have a mass effect on neurovascular structures, leading to neurological

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symptoms⁴. Headaches are the most common symptom, accounting for a share of 66%. Other presenting features include: epilepsy, gait disturbances, cognitive disturbances, focal deficits, weakness, and local or general enlargement of head.

The aetiology of arachnoid cysts has been a controversial subject and still remains unclear⁵. Arachnoid cysts usually arise within and expand the margins of CSF cisterns rich in arachnoid. Arachnoid cysts consist of liquid formations surrounded by an arachnoidal sheet.

Only symptomatic patients need surgical treatment. The treatment options include microsurgical resection of the cyst wall, microsurgical fenestration, endoscopic fenestration, combined endoscopic fenestration and cystoventriculostomy or cystocisternostomy, cystoperitoneal shunt, and stereotactic aspiration⁶. The choice of surgery depends on the age of patient, the distance between the lesion and the neighboring ventricle or cistern, presence of hydrocephalus, mass effect caused by cyst, relation with surrounding structures⁷. This study reports retrospective analysis of 15 consecutive patients with symptomatic Intracranial Arachnoid Cyst treated surgically.

Materials and Methods:

This is a retrospective cross sectional study carried out in the Department of Neurosurgery of the National Institute of Neurosciences and Hospital, Dhaka, Bangladesh. Patients with symptom of raised intracranial pressure and radiological diagnosis of intracranial arachnoid cyst by Magnetic Resonance image(MRI) were included in the study. Asymptomatic and recurrent cases were excluded from the study. A total 15 patients underwent surgery between the periods of January, 2018 to December, 2020 were included in this study. After selection of patients, the surgical procedure encountered in our study was discussed with patient’s attendants with full illustration for advantages and disadvantages and possible complications and then final decision was made for each patient. After written consent from patient’s relatives, all patients were operated by microscopic marsupialization and fenestration into basal cistern with excision of the cyst wall.

Results:

In our study most of the patients (about 1/3) were presented at the second decade of life. Male were more than female (Figure-1). Most of the cysts were located in the fronto-parietal, parietal and posterior fossa of the brain (Table-II). Craniotomy was the most

common surgical approach for the supra-tentorial arachnoid cysts while sub-occipital craniectomy was done for posterior fossa lesions (Table-III).

Table-I
Distribution of patients by age

Age Group (Years)	Number of Patients	Percentage
0-10	1	6.67
11-20	5	33.33
21-30	3	20
31-40	3	20
41-50	1	6.67
51-60	2	13.33
Total	15	100

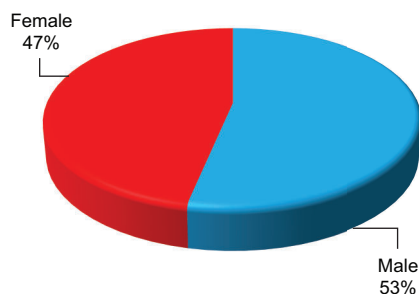


Fig.-1: *Distribution of patients by sex*

Table-II
Location of cyst

Location of Cyst	Frequency	Percent
Frontal	2	13.3
Parietal	3	20.0
Temporal	1	6.7
Post. Fossa	3	20.0
Fronto-parietal	3	20.0
Spheno-orbital	1	6.7
CP angle	1	6.7
Temporo-parital	1	6.7
Total	15	100.0

Table-III
Surgical approach

Approach	Frequency	Percent
Craniotomy	10	66.66.7
Temporal Craniectomy	1	6.66.7
Sub-Occipital Craniectomy	3	20.0
Retro-sigmoid Craniectomy	1	6.7
Total	15	100.0

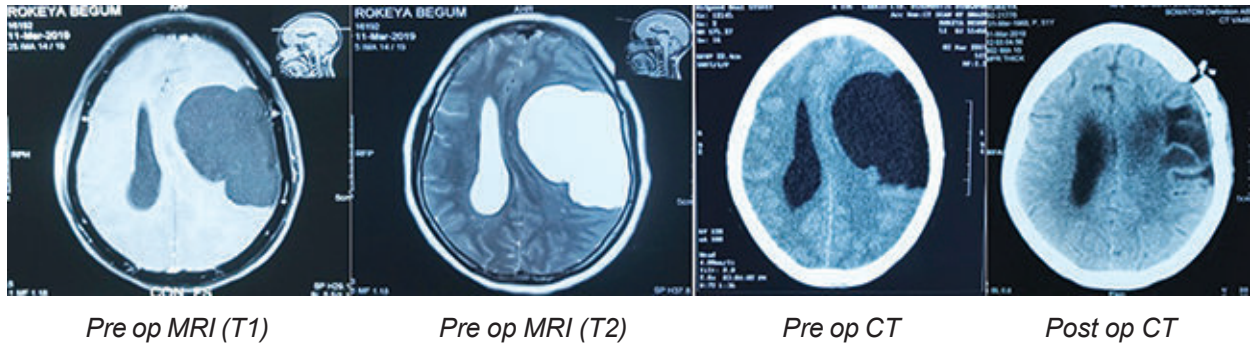


Fig.-2: Pre operative MRI and CT scan of the brain with Post operative CT scan of the brain.

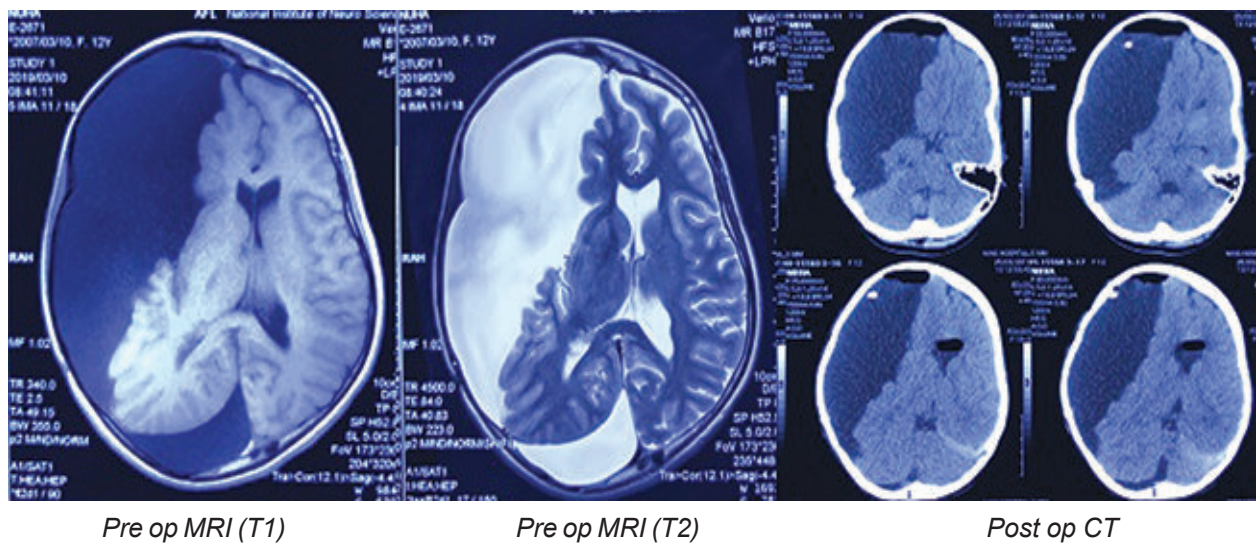


Fig.-3: Pre operative MRI and Post operative CT scan of the brain.

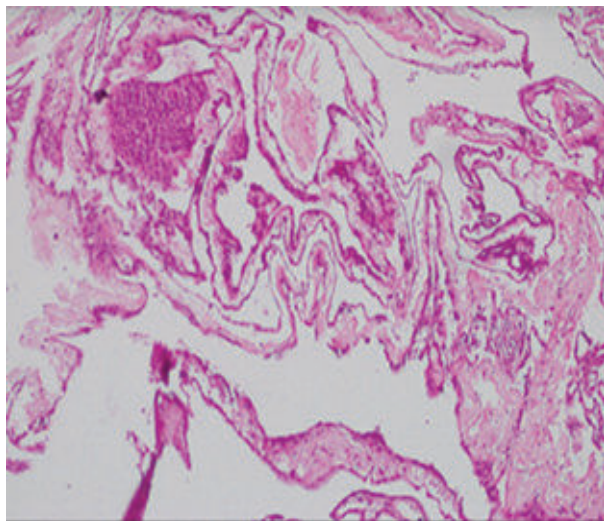


Fig.-4: Histopathological picture of arachnoid cyst.

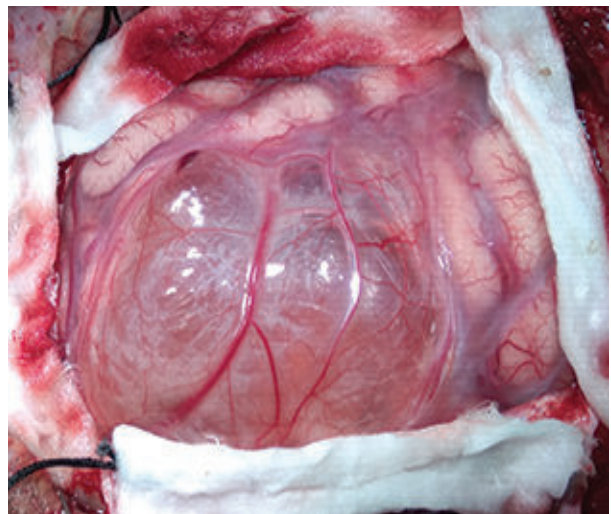


Fig.-5: Arachnoid cyst after opening the dura

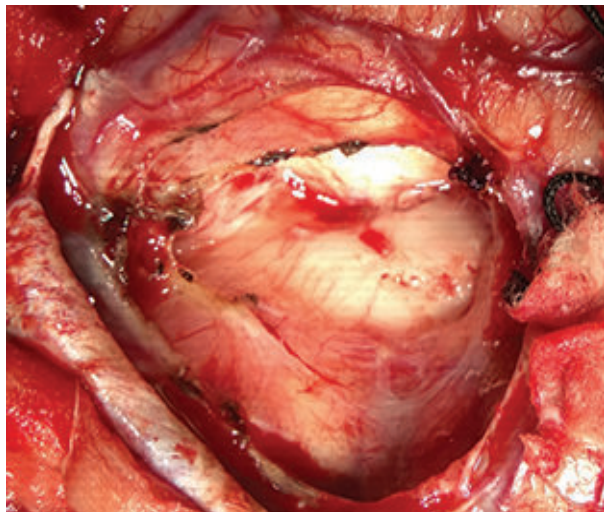


Fig.-6: Arachnoid cyst after excision

Discussion

Arachnoid cysts are benign cystic lesions containing cerebrospinal fluid. The increasing use of intracranial imaging specially MRI, has led to more frequent diagnosis of arachnoid cysts⁸. Intracranial Arachnoid Cyst can be supratentorial or infratentorial. In supratentorial region cyst can be in sylvian fissure, cerebral convexity, sellar or suprasellar, interhemispheric or quadrigeminal. In infratentorial region cyst can be in posterior midline, clival, cerebellopontine angle, vermis or in cistern magna. Craniotomy was done for supratentorial lesions and suboccipital craniectomy was done for infratentorial lesions. The mainstay of surgical treatment has been craniotomy with microsurgical fenestration and/or cyst wall removal. A microsurgical approach allows for a wider operating corridor and the option for resection of the cyst wall; however it is a more significant undertaking for the patients, whereas endoscopic surgery is minimally invasive, less traumatic and thus has a faster recovery time. Endoscopic surgery is also better able to reach deeper midline cysts than open surgery and allows for third ventriculostomy to treat any associated hydrocephalus. Endoscopic procedures for deep midline cysts allow for a combined ventriculocystocisternostomy rather than simple fenestration which appears to have lower rates of repeat surgery⁹.

Craniotomy and microsurgical excision provides a full space for the total resection of the arachnoid cyst¹⁰. This approach also allows the surgeon to perform other

procedures like focus excision, cortical thermocoagulation, or local skull cranioplasty.

In patients with symptomatic arachnoid cysts, treatment may lead to lasting relief of focal neurological deficits. Seizures and headaches, however, often persist despite adequate surgical treatment of the cyst, as illustrated by the results of some studies but in our study seizures and headache were relieved following surgery.

Significant reduction in size of the cyst in post-operative CT scan also observed in our study (Figure-2, 3).

No significant difference in the therapeutic effect and reoperation rate between microsurgical craniotomy and endoscopy was observed in other studies. Microsurgical craniotomy was more invasive than endoscopy, but the microsurgical technique can obtain greater control of hemostasis because of the ability to use bipolar forceps¹¹. A full space ensures the ability to perform another operation for cyst-related diseases, particularly in cyst-related epilepsy. Extensive and mature application of endoscopy is expected to replace microsurgical craniotomy gradually.

Conclusion

Arachnoid cysts are frequently discovered incidentally on intracranial imaging. Most arachnoid cysts are asymptomatic. Only symptomatic cases are indicated for surgery. Selection of the surgical modality depends on proper evaluation, surgeon experience, socioeconomic level of the patient and his consent. Surgical marsupialization and fenestration into basal cistern and excision of the wall could reduce the ability of secretion of cyst fluid and thus will reduce the possibility of recurrence. Modality of surgery doesn't create any difference in the outcome, though Endoscopy has the advantage of minimal invasiveness.

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