Section: Neurosurgery

Case Series

MANAGEMENT OPTIONS IN SYMPTOMATIC INTRACRANIAL ARACHNOID CYSTS - CASE SERIES AND REVIEW OF LITERATURE

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Abstract

The recommended consensus on the single best management strategy for large arachnoid cysts is lacking. The most frequently used methods for treating arachnoid cysts are craniotomy and microsurgical or endoscopic fenestration with cystocisternostomy, cyst marsupialization with or without cystocisternostomy and cystoperitoneal shunting. We treated five cases of arachnoid cysts which required different treatment approaches in view of their different locations and varied symptoms. Various surgical approaches, their advantages, and drawbacks are discussed.

INTRODUCTION

The ideal management of intracranial arachnoid cysts is still a matter of debate in the neurosurgical literature. Major concerns relate to Sylvian cysts because of their relatively increased incidence. Various surgical options are available and a single treatment option may not suffice for all cases or a single option may not be enough for an individual case. Significant controversy exists on the appropriate treatment of these lesions. Here we present a few cases to illustrate the various means to manage these patients.

MATERIALS AND METHODS

These cases were managed in the Institute of Neurosurgery at Madras Medical College, between January 2018 and January 2019. Patients who presented to the Neurosurgery department with symptomatic arachnoid cyst and were willing for surgery were included in the study. Informed written consent was obtained from the patients. Surgical techniques used in our study were microsurgical fenestration/cystocisternostomy of the cyst, cyst marsupialization, cystoperitoneal shunt and simple burr hole drainage.

Illustrative Cases

Case 1

A 63-year-old male presented with progressively worsening suboccipital headache and dysarthria with intermittent episodes of vomiting. He was initially treated in another hospital where a diagnosis of a posterior fossa arachnoid cyst was made and a single burr hole drainage of the cyst was performed. The patient improved following this. However, he had a recurrence of the same symptoms after a period of 6 months and he presented to our hospital. On examination higher mental functions (HMF) were normal, fundus examination showed grade 1 papilloedema, and he had cerebellar type of dysarthria with scanning speech was present. Motor and sensory examinations were normal and other signs of cerebellar dysfunction were absent. Computerised Tomogram (CT)brain revealed a midline posterior fossa arachnoid cyst [Figure 1]. Patient underwent cystoperitoneal shunt [Figure 2]. The patient improved symptomatically post-operatively and is being regularly reviewed once in three months for the last one year.

Case 2

61-year-old female presented with progressive holocranial headache and also had episodes of disorientation and irrelevant speech. Examination showed left hemiparesis (power 4-/5) with hypertonia and hyper-reflexia. Magnetic Resonance Imaging (MRI) brain showed large right fronto-temporal arachnoid cyst with significant mass effect and midline shift [Figure 3]. Patient underwent craniotomy and cyst marsupialization with cystocisternostomy into the optico-carotid and inter-optic cisterns [Figure 4]. Her symptoms improved in the immediate post-operative period. After 3 days, she developed right hemiparesis. On evaluation with brain imaging, a left frontotemporoparietal acute subdural hematoma was noted. She underwent an emergency craniotomy and evacuation of the subdural hematoma was done. Following the second surgery the patient improved clinically and her

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headache and weakness improved. She is on regular follow-up and is doing well.

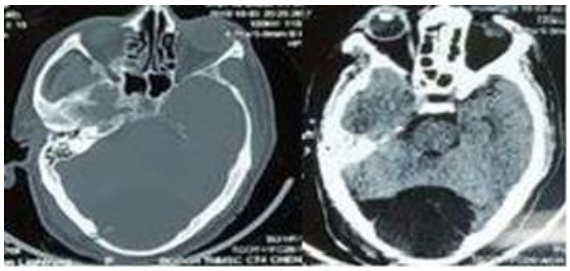

Figure 1: CT brain plain shows midline posterior fossa arachnoid cyst with thin septations and scalloping of the occipital bone

Figure 2: Immediate post-operative CT brain showing shunt tube in situ.

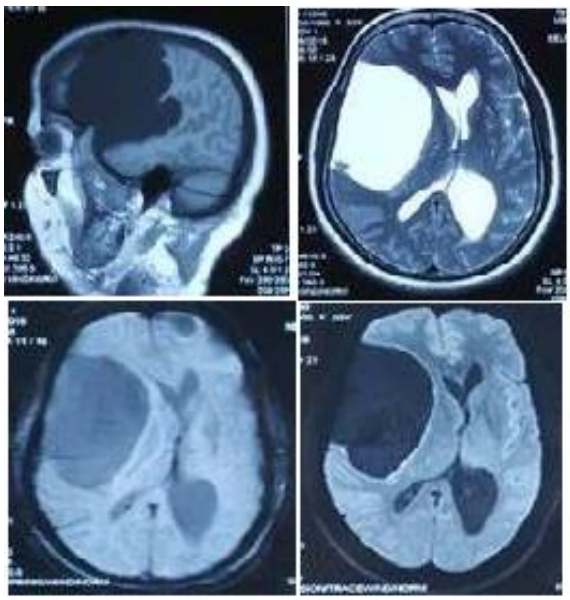

Figure 3: MRI brain showing right frontotemporal large arachnoid cyst with significant mass effect and midline shift with subfalcine herniation.

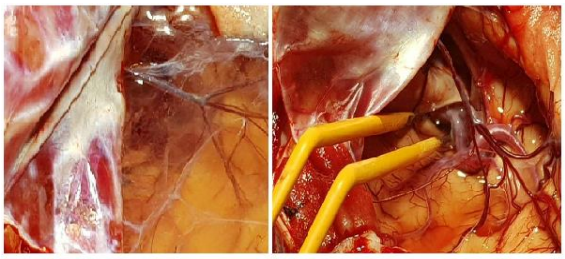

Figure 4: Arachnoid cyst in case II, prior to and after fenestration.

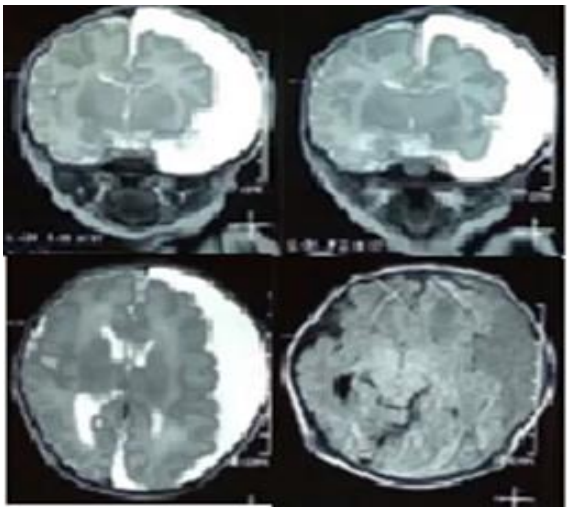

Figure 5: Left frontotemporal arachnoid cyst in the patient described in case III

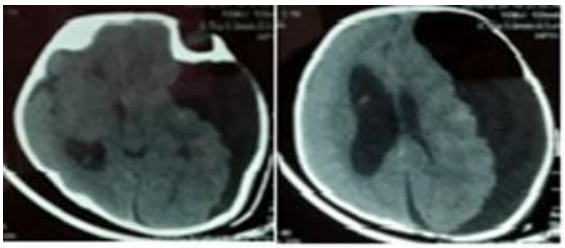

Figure 6: Immediate postoperative image of the same patient in case III after burr-hole drainage, showing residual cyst fluid and air pockets.

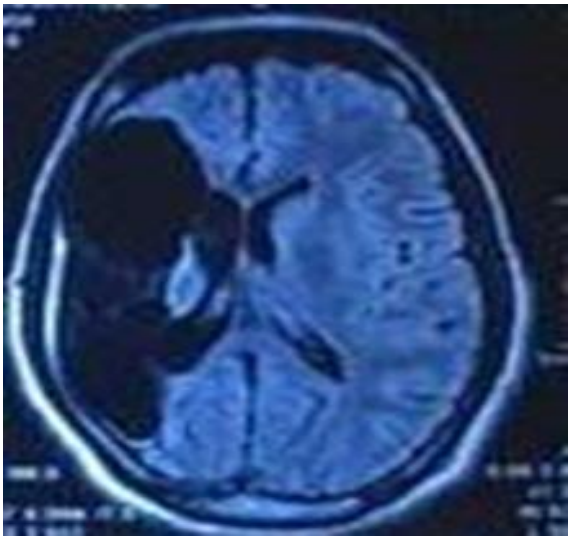

Figure 7: Right frontotemporopaietal arachnoid cyst in case 4

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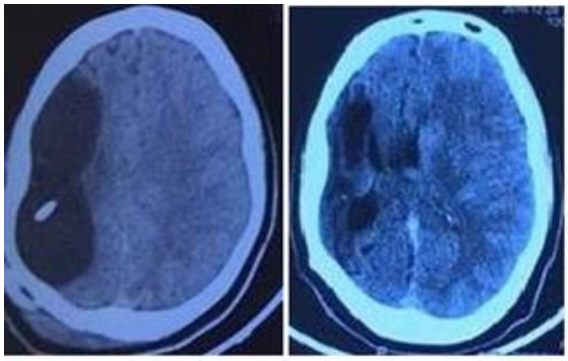

Figure 8: The same patient as in case 4. The CT image on the left shows immediate post-operative image with shunt in situ. Image on the right is a follow-up scan after 6 months which shows decrease in size of the cyst.

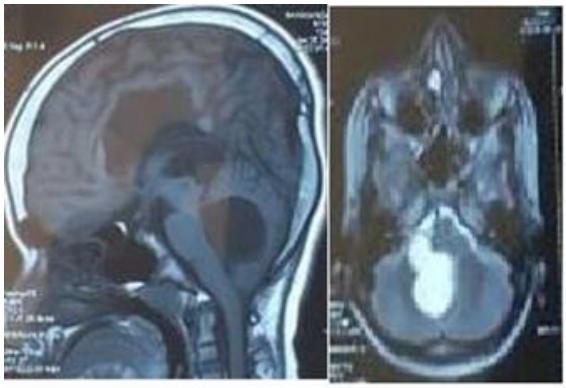

Figure 9: MRI showing posterior fossa arachnoid cyst, compressing the 4th ventricle and causing obstructive hydrocephalus. Note the agenesis of the corpus callosum.

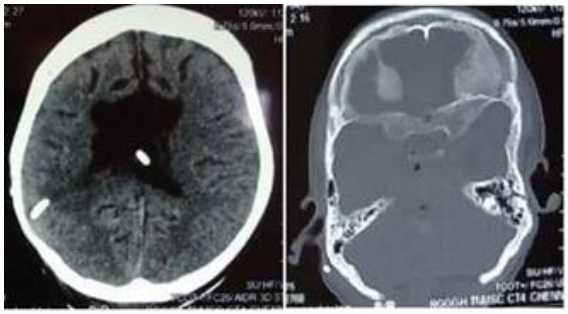

Figure 10: Post-operative CT brain of the patient mentioned in case V, showing the right(previously inserted) and left VP shunts in situ. Sub-occipital craniectomy defect can be seen in the picture on the right

Case 3

A three months old female child was brought with complaints of drowsiness and increase in head size since birth. On examination head circumference was 42 cm and anterior fontanelle was full and tense. MRI brain showed left fronto-temporal arachnoid cyst [Figure 5]. Patient underwent burr hole drainage of the cyst alone because of poor weight and increased risk for major surgery [Figure 6]. The child's sensorium improved to normal post-operatively and was discharged. Child is on regular follow-up with us and there has been no abnormal increase in head circumference (which has remained at 42cm for last 1 year).

Case 4

22 years old male came with complaints of headache, vomiting and weakness of left upper and lower limbs. Examination revealed left hemiparesis. MRI brain showed a large right front temporoparietal arachnoid cyst [Figure 7]. Patient underwent cyst peritoneal shunting following which his symptoms improved. Patient is being regularly reviewed and follow up CT showed decrease in size of the cyst [Figure 8].

Case 5

10 years old male patient with a cystic lesion in the posterior fossa with hydrocephalus who had undergone right ventriculoperitoneal shunt 2 years back in another hospital was brought to our hospital with recurrent episodes of vomiting. MRI showed a posterior fossa arachnoid cyst, compressing the 4th ventricle and causing obstructive hydrocephalus [Figure 9]. Patient underwent left ventriculo-peritoneal shunting which did not relieve his symptoms. Hence he underwent further sub-occipital craniectomy and microsurgical cyst marsupialization with cystocisternostomy into the cisterna magna [Figure 10]. Following surgery his vomiting subsided. He was discharged and is on regular follow-up.

DISCUSSION

Arachnoid cysts are benign non-neoplastic fluid collections within the arachnoid mater layer of the meninges and account for about 1% of all intracranial space-occupying lesions.[1,2] Most are congenital in origin with a male preponderance in adults and children with a male: female ratio of 2:1.[3] Arachnoid cysts arising secondary to trauma, hemorrhage and meningitis have also been reported.[4,5] The cysts generally contain clear, colourless fluid resembling CSF.[6] The most accepted theory for the origin of congenital arachnoid cysts is that, they arise due to abnormal embryological development of the arachnoid membrane.[7] The presence of slit valves detected in arachnoid cyst wall membrane provides the most convincing explanation for the increase in size seen in symptomatic cysts causing parenchymal compression.[8] Most arachnoid cysts are asymptomatic and are only incidentally detected while imaging for other reasons. These cysts are more common in the middle cranial fossa and retrocerebellar region. Middle cranial fossa cysts have been classified by Galassi et al into three types.[9] Cysts located in the cerebello-pontine angle, quadrigeminal cistern, sella, and ambient cisterns tend to be more symptomatic. Children usually present with progressive macrocephaly, headache, hydrocephalus, and developmental delay. Headache is the most common symptom noted in adults. Other presenting symptoms in adults include ataxia, vertigo, hearing loss and seizures.[10] Various surgical treatment options have been described for these cysts.

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Microsurgical resection of cyst wall or cyst marsupialisation, microsurgical fenestration, combined microsurgical fenestration and cystoventriculostomy or cystocisternostomy, endoscopic fenestration with cystoventriculostomy or cystocisternostomy, cystoperitoneal shunting and stereotactic aspiration are the different surgical techniques used for the treatment of these cysts.[11,12] Microsurgical cyst marsupialisation with cystocisternostomy, cystoperitoneal shunting, and burr hole drainage are the three methods that we have used in our patients. The advantages of microsurgical techniques include obtaining better haemostasis and treatment of other lesions associated with the cyst such as cyst related epileptic foci.[12] The possible complications associated with microsurgery include the risks of post-operative hydrocephalus following cystoventriculostomy and also a risk of bleeding either in the cyst bed or in the subdural space due to rapid fluid shifts. Cystoperitoneal shunts are relatively easier to perform and allow slower egress of the fluid, but predispose the patient to shunt-related complications. Neuroendoscopic techniques have emerged as an effective alternative to microsurgical procedures. Endoscopic cystoventriculostomy and cystocisternostomy give equivalent results as compared to open procedures in case of suprasellar, quadrigeminal, and posterior fossa cysts.[13]

CONCLUSION

While treatment options remain many and controversial, microsurgery appears to be a superior choice after a comprehensive review of the literature while cystoperitoneal shunts are simpler.

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