Intracranial arachnoid cyst surgery

Conventionally, ACs are managed with either micro-surgical excision or cerebrospinal fluid (CSF) diversionary procedures such as a shunt. Effective treatment modality still remains controversial. Advances in neuroendoscopy have helped in the effective management of this benign condition in a minimally invasive method. [1)].

Options

Neuroendoscopic fenestrations.

Microsurgical fenestrations +/- marsupialisation

Cystoperitoneal shunt.

Case series

A total of 95 endoscopic procedures in 87 patients with 88 intracranial ACs performed at the authors' departments between February 1993 and October 2018 were retrospectively analyzed. Particular respect was given to surgical technique, complications, patients' outcome, and radiological benefit in relation to cyst location.

Patients' ages ranged from 23 d to 81 yr (mean: 29.9 yr). Cysts were located temporobasal (n = 31; 35.2%), paraxial supratentorial (n = 14; 15.9%), suprasellar/prepontine (n = 14; 15.9%), quadrigeminal (n = 12; 13.6%), infratentorial (n = 11; 12.5%), and supratentorial intraventricular (n = 6; 6.8%). Four different endoscopic techniques were applied: cystocisternostomies (n = 48; 50.5%), ventriculocystostomies (n = 23; 24.2%), cystoventriculostomies (n = 14; 14.7%), and ventriculocystocisternostomies (n = 10; 10.5%). Pure endoscopic technique was feasible in 89 of the 95 surgeries (93.7%). Clinical improvement was documented after 82 surgeries (86.3%) and radiological benefit after 62 surgeries (65.3%). Recurrences developed in 8 cases (8.4%). Overall complication rate was 21.1% (n = 20), postoperative new shunt dependency was observed in 4.2% of the cases (n = 4).

Pure endoscopic AC fenestration is a safe, effective, and less invasive technique providing high success and low permanent complication rates. The most frequent temporobasal cysts are the most difficult to treat endoscopically. A long-term follow-up is recommended because recurrences may occur many years after first treatment [2)].

In a retrospective case note review of all patients with intracranial arachnoid cysts treated surgically at the Department of Neurosurgery, Wessex Neurological Centre, Southampton General Hospital, over a 15 year period. Data on clinical presentations and outcomes was collected from the patient notes and the pre- and post-operative cyst volumes were calculated by creating 3-dimensional volumetric models.

Eighty-two patients were identified of which 45 were treated endoscopically, 34 microscopically and 3 underwent cysto-peritoneal shunting. The most common cyst location was the middle fossa (n = 25). Amongst the symptomatic patients, improvement or resolution of symptoms was seen in 35 out of 40 cysts treated endoscopically (88%), 28 out of 32 treated microsurgically (88%) and 3 out of 3 treated by shunting (100%, p = 0.79). The reoperation rate was not significantly different between the endoscopic and microsurgical groups (24.4% vs 14.7%, p = 0.49). The endoscopic and shunted groups had a shorter length of stay than the microsurgical group (3.0 vs 3.0 vs 4.5 days, p = 0.04). All three treatment modalities had a similar percentage reduction in cyst volume after surgery (30.0 vs 41.7 vs 30.9%, p = 0.98).

This cohort series shows that endoscopic and microsurgical approaches to treat intracranial arachnoid cysts produce comparable clinical and radiological outcomes. Endoscopic fenestration is associated with a shorter length of stay as would be expected from a minimally invasive procedure [3)].

Open surgery advantages include, direct inspection of the cyst, biopsy sampling, fenestration in multilocular cysts and, in certain locations, cyst communication to basal cisterns [4)].

Surgery for AC can be performed with a fairly low risk of complications and yields significant improvement in quality of life correlated to postoperative improvement in headache and dizziness. These findings may justify a more liberal approach to surgical treatment for AC [5)].

Choi et al., analyzed pediatric patients under 18 years of age who underwent surgical management for intracranial AC between January 2000 and December 2011. Patients with a follow-up period of less than 1 year were excluded. A total of 75 patients were enrolled in this study. These patients were assessed by subjective symptoms and by a clinician's objective evaluation. The radiological assessment of AC after surgery was also evaluated.

The median age of patients at the initial operation was 5 years. The median follow-up period was 38 months. The goal of surgery was achieved in 28% (21/75) of patients. The radiological alteration of AC after initial fenestration surgery was diverse. The results of the clinical and radiological assessments did not always coincide. A total of 35 complications occurred in 28 patients. Subdural fluid collection was the most common unexpected radiological complication.

The study showed that the fenestration procedure for AC produced unsatisfactory clinical improvements compared to the relatively high complication rate. Therefore, surgical treatment for AC should be strictly limited to patients who have symptoms directly related to AC [6)].

A consecutive series of 68 adult patients (43 males, mean age 30.3 years, range 18-42 years) with IAC were surgically treated between January 2004 and January 2011 in the Department of Neurosurgery, West China Hospital of Sichuan University, Chengdu, China.

The cysts were supratentorial in location in 53 and infratentorial in 15 patients. Symptoms at presentation, location of the IAC, surgical treatment modalities, and postoperative complications were evaluated.

Of the 51 patients with headache, 44 (86.27%) patients had complete relief of the headache, five (9.80%) patients had significant improvement, and two (3.92%) had no worthwhile change. Three of the four patients with hydrocephalus and gait disturbances had relief of the symptoms and one patient had significant improvement. Of the five patients with cognitive decline and weakness, three (60.00%) patients showed improvement, and two (40.00%) patients had no significant change. Five (62.50%) of the eight patients with epilepsy had seizure remission, two (25.00%) patients had non-disabling seizures, and one had no change. Follow-up computed tomography (CT) scans showed variable change in the mass effect of IAC in 68 patients; cystic size was significantly reduced in 51 patients, no significant change in two patients of supratentorial arachnoid cysts. Cystic size was reduced in seven patients, but no significant change was observed in eight patients of infratentorial cysts. Three patients with enlarged head circumference had no further increase in the head circumference.

Adult patients with IAC symptoms should be treated efficiently. Surgical treatment is associated with significant improvement in the symptoms and signs [7)].

Data from 69 patients with cerebral arachnoid cysts treated in our institution between 1997 and 2007 were reviewed.Cysts were located infratentorially in 20% (n = 14) and supratentorially in 80% (n = 55); of these 73% (n = 40) were in the middle cranial fossa. Mean cyst size was 61 mm (range 15-100 mm). The most common symptoms were headache (51%), dizziness (26%), cranial nerve dysfunction (23%), seizure (22%), nausea and vomiting (18%), and hemiparesis (13%). Surgery was performed in 83% (n = 57). First-line treatments were microsurgical fenestration (n = 30), endoscopic fenestration (n = 15), and cystoperitoneal/ventriculoperitoneal shunting (n = 11). More than one intervention was needed in 42% (n = 24). A particularly high rate of relapse (73%) was observed after endoscopic fenestration, following which 11 patients were admitted for reoperation. By comparison, only eight patients (28%) managed with microsurgical fenestration and four (36%) in the shunted group needed a second surgical procedure. Mean follow-up was 30 months. In the surgical series 79% (n = 45) had a good outcome.We conclude that the surgical treatment of arachnoid cysts has an overall good outcome. In our institution the best results were obtained with microsurgical decompression through craniotomy [8)].

References

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