ORIGINAL ARTICLE

SuprasellarArachnoid Cyst as a Cause of Triventricular Hydrocephalus, Found Incidentally During Endoscopic Third Ventriculostomy

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ABSTRACT

Background: *Arachniod cyst is a rare congenital disorder of the brain accounting 1% of all intracranial masses. They may also be acquired following head trauma, meningitis, tumors or surgery. They may be the cause of triventricular hydrocephalus (TVH). It occupies the third ventricle so flow of CSF is obstructed at aqueduct of Sylvius. Per operatively, it differs from colloid cyst in consistency, its capsule is transparent and blood vessels are visible.*

Objectives: *To determine the frequency of suprasellar arachnoid cyst as cause of triventricular hydrocephalus and outcome of ventriculocystocisternotomy performed for these cysts at Lady Reading Hospital, Peshawar.*

Materials and Methods: *A retrospective study of 18 cases who undergone ETV for congenital TVH from January, 2013 to December 2015 at Neurosurgery department LRH was performed. On pre operative CT scan brain they were having triventricular hydrocephalus. Ventriculocysto-cisternotomy was performed in all these cases. Biopsy was taken in all cases.*

Results: *Out of these 18 cases, 11 (61%) were males. The presenting symptoms in our study were that infants presented with increased head circumference (n = 3) 16.6%. In pediatric and middle age group the symptoms were those of elevated ICP (n = 13) 72.22%. No endoscopic complication occurred during the procedure except for clinically non-significant bleeds. We followed all cases for a period of 6 months. Clinical and radiological improvement occurred in all cases.*

Conclusion: *Arachnoid cyst should also be considered as a differential for congenital TVH. Endoscopic Ventriculocystocisternotomy is the treatment option of choice forsuprasellararachnoid cyst.*

Keywords: *Suprasellar arachnoid cyst, Triventricular hydrocephalus, Ventriculocisto-cisternotomy.*

Abbreviations: *TVH: Triventricular Hydrocephalus. CSF: Cerebral Scleral Fluid. ICP: Intracranial Pressure. AC: Arachnoid Cyst. SSCs: Suprasellar arachnoid cysts. VC: Ventriculocystostomy. VCC: Ventriculocysto-cisternotomy. CT: Computer Tomography.*

INTRODUCTION

Arachnoid cyst (AC) is collection of fluid that develop within the arachnoid membrane because of splitting or duplication of the structure. The arachnoid cyst is found to be an incidental finding in children having head injury and/or in infants with enlarged head.[1] The ACs are rare, which is evident from the fact that its incidence is 5/1000 andencompasses about 1% of all intracranial lesions.[2] ACs are congenital in most of the cases, but secondary arachnoid cyst may occur due to accumulation of CSF in sub arachnoid space, as a result of inflammatory process in post head injury

Date of Submission: 15-07-2017
Date of Printing: 11-09-2017

patients, infection or an intracranial hemorrhage.[3] These cysts may sometimes become symptomatic due to enlargement in size and interference with adjacent neural structure or CSF circulation. Common clinical signs related with AC are increase in head circumference, seizures, hydrocephalus and psychomotor retardation.[4]

Suprasellar arachnoid cysts (SSCs) consist of about 9% of all arachnoid cysts.[5] These cysts gradually increase in sizefrom an abnormality in the Liliequest membrane or in the interpeduncular cistern.[6,7] Typically the suprasellar arachnoid cyst expand from prepontine cistern that displaces the floor of third ventricle in upward direction, the optic chiasm and pituitary stalk are displaced upward and forward. Mammillary bodies are displaced upwards and backwards. As the cyst enlarges it fills and occludes the third ventricle where it blocks the aqueduct resulting in hydrocephalus. There are two types of suprasellar arachnoid cysts, the one which is a communicating cyst with a valve at penetration of basilar artery through the prepontine arachnoid membrane or it may be a non communicating one.[8]

Shim et al in his paper on AC, presented the fact that the endoscopic treatment was far more excellent than any other surgical treatment, including craniotomy or shunt.[9] Endoscopic procedures is the primary treatment of choice in patients harboring supra sellar AC along with hydrocephalus. Having said that, the endoscopic treatment is not the choice of treatment in patients of AC with no hydrocephalus, rather the treatment options are less clear.

As mentioned that due to the rarity of supra sellar AC, less number of studies are available. As a matter of fact, the majority of the studies reported only few cases. Like, Crimmins et al published their study on 7 patients treated with ventriculocystostomy (VC) and 13 patients with ventriculocystocisternotomy (VCC).[10] They observed that the procedure of choice is VCC, because of it's superior success rate. The rationale behind conducting this research is that, as there is lack of data and studies in that aspect. There is controversy in some of the issues related with AC, which are; indications and type of surgical treatment (Ventriculo-cystostomy or Ventriculocysto-cisternotomy) and that need to be clear to some extent. Furthermore, this study is also done toreport the incidental finding of suprasellar arachnoid cyst in cases operated for triventricular hydrocephalus through ETV.

MATERIALS AND METHODS

A retrospective study was performed at Neurosurgery Department Lady Reading hospital, Peshawar from January 2013 to December 2015. The study included 18 consecutive cases who underwent endoscopic management of third ventricular arachnoid (suprasellar) cyst. All the surgeries were performed by a single skilled neurosurgeon. Information was obtained from patients' record which included age at presentation, signs and symptoms, previous history of shunting, peri-operative and post operative complications. Biopsy was taken in all cases and post op scans performed.

Inclusion criteria included all those cases who undergone ETV for third ventricular arachnoid cyst. Exclusion criteria comprised of all cases who undergone ETV for hydrocephalus due to other causes.

Endoscopic Technique

A standard procedure was adopted in all cases and ventriculo-cystocisternotomy was performed in all cases. After preparing the patient for surgery, patient was positioned and a small flap made and burr hole made at Kocher's point (3cm lateral to sagittal suture and 1cm anterior to coronal suture). A rigid scope was introduced and entered to the lateral ventricle and following the choroid plexus. The scope was advanced to the foramen of monro and a bluish colored cyst is found obstructing the foramen. A small hole is made in the cyst wall with the help of forceps. This made the cyst to open into the ventricles. The scope is advanced and hole is made in the lower part of cyst and then a hole is made in the floor of third ventricle which completes the procedure of ventriculo-cysto-cisternotomy. Free flow of CSF was noted and the stoma patency was noted. The pulsatile basilar artery was easily noted in the end of the procedure. Hemostasis secured by doing wash with normal saline through the scope. Biopsy was taken in all cases. The arachnoid cyst can be differentiated from colloid cyst by its transparent capsule and soft consistency.

RESULTS

Sex Incidence

Out of these 18 cases, 11 (61%) were males and 7 (39%) were females (Table 1).

Age Range

Three (16.6%) were infants, 13 (72.22%) were of

Table 1: *Sex Incidence.*

Sex	Number	Percentage
Male	11	61%
Female	7	39%
Total	18	100%

pediatric age group (age group less 1 – 14 years) and 02 (11.11%) of middle age (25 – 35 years) (Table 2).

Table 1: *Age Range.*

Age	Number	Percentage
1 – 12 Months	03	16.6%
1 – 14 Years	13	72.22%
More than 14 Years	02	11.11%

Clinical Presentation

The presenting symptoms in our study were that infants presented with increased head circumference (n = 3) 16.6%. In pediatric and middle age group (n = 13) 72.22%, the symptoms were vomiting, headache, drowsiness 10 (55.55%) cases, gaze disturbance 8 (44.44%) cases and seizures 10 (55.55%) cases. Three (16.66%) cases were those who undergone repeated shunt revisions due to shunt infections/blockage (Table 3). These two cases were viewed endoscopically and an arachnoid cyst was found. Ventriculocystocisternostomy (VCC) was performed and shunt removed then.

Postoperative Evaluation

All the cases were followed for a period of 6 months. Symptomatic improvement occurred in all cases with reduction in ventricular and cyst size on follow up CT. No significant post operative complications occurred and none of the patient died in our study. Histopathology report showed that cyst wall formed of delicate fibrous connective tissues lined by meningothelial cells (diffuse or focal).

DISCUSSION

We found in our study that main clinical symptoms in infants were that of increased head circumference due to hydrocephalus and upward gaze palsy. In pediatric and middle aged group the main symptoms were those of elevated ICP. One thing we found in our study that three of the cases presented with repeated shunt infections and endoscopically we found an arachnoid cyst. This age related symptoms are valuable in diagnosing suprasellar ventricular aracnhoid cysts. We found the majority of our patients were male (61%) which is consistent with the findings of Pierre-Kahn et al.[8]

Suprasellar arachnoid cyst usually presents as dilated third ventricle which can be misdiagnosed on CT brain as aqueductal stenosis. We did not perform pre op MRI in all cases so this problem can be overcome by the use of MRI. Wang et al found that these cysts have three characteristic features on MRI which are vertical displacement of chiasma, upward displacement of mamillary bodies and vertical displacement of pons. In aqueductal stenosis the mammillary bodies and third ventricle floor are displaced inferiorly.[12]

In our study all the patients were symptomatic so all the patients underwent surgical treatment. For patients with hydrocephalus secondary to arachnoid cyst, the treatment of choice is endoscopic ventriculo-cysto-cisternotomy.[11] The direct approach to the cyst for micro surgical excision or fenestration of the cyst has been performed by the subfrontal, pterional, transventricular and transcallosal routes.[13-15] This treatment is more invasive with postoperative complications due to location of these cyst.

Problems with shunt procedures are infection, blockage and shunt dependency, usually bilateral shunt procedures are adopted in such cases .[14] We also found in our study that two of the cases were those having undergone shunt procedure were subjected to endoscopic procedure and suprasellar ventricular arachnoid cyst was there. Advances in endoscopy has made the endoscopic fenestration of the cyst as the most suitable treatment for cyst with hydrocephalus and it is more effective and safe procedure.[10,12,13,17,18] Study of 23 reviewed cases from 1980 – 2007 showed good clinical and radiological improvement (90%) after endoscopic fenestration.[18] Yadev et al found good results with endoscopic treatment in series of 12 patients.[19] In our study we also found good results with endoscopic treatment. So it should be the first line treatment in third ventricular arachnoid cyst.

CONCLUSION

Arachnoid cyst is a common lesion in pediatric age group. Different age group of people presents with different clinical presentation, the majority of which is

elevated ICP. Suprasellar arachnoid cyst should also be considered as a differential for congenital triventricular hydrocephalus. Endoscopic Ventriculocystocisternotomy is the optimum treatment option for third ventricular arachnoid cyst.

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Date of Submission: 15-07-2017
Date of Printing: 11-09-2017
Peer Reviewed by Dr. Fauzia Sajjad, Dr. Babar Butt and Chief Editor Prof. Dr. Muhammad Anwar Chaudary and others.