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Endoscopic third ventriculostomy in tuberculous meningitis with hydrocephalus-An Indian experience

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Abstract

Introduction- Hydrocephalus is one of the commonest complications of tuberculous meningitis (TBM). Endoscopic third ventriculostomy (ETV) has evolved as an alternative to shunt surgeries for obstructive hydrocephalus in TBM. It offers the opportunity to keep the patient free of foreign material and its associated complications.

Methods- A retrospective study was carried out from July 2014 to June 2016 at Pt. B D Sharma PGIMS, Haryana, India. Fifteen patients with TBM induced hydrocephalus were included in this study.

Results- There were 11 males and 4 females. Eighty percent patients had a modified Vellore grade of 1 or 2. Improvement was seen in 53% patients post ETV. Six patients had to undergo ventriculo-peritoneal shunt surgery due to failure of ETV. There was no mortality in our study.

Conclusion- ETV is a reasonably successful intervention in patients with obstructive HCP due to TBM. In centers with the necessary expertise, ETV should be the choice over shunt surgery.

Introduction

Tuberculous meningitis (TBM) is a prevalent problem in India. Due to aggressive Government programs, the number of patients with TBM has declined, and the estimated India mortality due to TBM in India is approximately 1.5/100,000 population.[1] Hydrocephalus (HCP) is one of the most common complications of TBM.

The use of endoscopy in cranial pathologies has increased significantly over the past few decades.[2,3] HCP can be classified into obstructive, communicating, or a combination of both. ETV has established itself as a viable alternative to shunt surgery in TBM with obstructive HCP [4,5,6] ETV has a controversial role in communicating hydrocephalus and in acute phase of disease.

Risk of injury to the basilar artery and its branches is theoretically higher in patients with TBM due to the thickened and opaque third ventricular floor thereby making it a technically difficult procedure. ETV is also difficult in children less than 1 year of age due to the poorly developed cisternal spaces.

Obstructive hydrocephalus in TBM is the indication for ETV. Many surgeons prefer a ventriculo-peritoneal shunt in communicating HCP. Â Few groups do report the use of ETV in communicating HCP [7].

Materials and Methods

This is a retrospective study, which involved 15 patients of TBM with obstructive HCP treated at our center from July 2014 to June 2016. Patient data, history, neurological examination, surgical notes and outcomes were obtained from the patient files and follow-up OPDâ€™s. The mean follow-up period was 3 months. Patients with obstructive hydrocephalus and features of raised intra-cranial pressure were included. Pre-operative and post-operative CT scans were obtained in all the patients.Â

Procedure

A 3 cm linear incision was made 3 cm lateral to the sagittal suture on the coronal suture. A burr hole was made just anterior to the coronal suture and the dura was incised in a cruciate manner. On entering the third ventricle, the floor was identified and a stoma of 5 mm or more was made by blunt perforation with subsequent dilation by Fogartyâ€™s balloon. When technically safe, the membrane of Lilequist was also opened. To and fro flapping of the third ventricular floor suggested adequate size of the opening. A thick floor was noted in 13 patients.

Improvement in the clinical condition of the patient and a depressed anterior fontanelle in infants suggested a successful procedure. Failure of the procedure resulted in persistent or further dilation of the ventricles or in persistence of features of raised ICP. Â

A thick floor was defined as inability to see the basilar

artery or its branches. The floor was considered unidentifiable if both the mammillary bodies and infundibular recesses were not seen.

Results

Fifteen patients were included in this study. Patientâ€™s age ranged from 1 year to 36 years. There were 11 males. Fever and vomiting were common symptoms in all patients. The modified Vellore Grade was used for clinical assessment. The demographic and other assessment parameters are mentioned in Table 1.

Discussion

In our study clinical improvement was seen in 53% patients. As expected clinical improvement was significantly better in patients with better modified Vellore grades. ETV was technically easier in patients with identifiable and thin 3rd ventricular floor membranes. Good outcomes are associated with a thin ventricular floor.[8]Â There was no difference in outcome based on the age.

Singh *et al.*,[9] in their study found that 60% had early recovery and 17% had delayed recovery. Patients in the chronic phase of disease did better compared to those in the acute phase in our study as the membranes in the chronic phase tended to be thinner.

A higher risk of ETV failure has been noted in patients TBM induced HCP. This could be due to the high chance of presence ofÂ complex HCP and the presence of basal exudates.[10,11]

Endoscopic third ventriculostomy is technically difficult in post infective hydrocephalus. This study shows that ETV is safe and effective in majority patients with TBM and obstructive hydrocephalus and provides a viable alternative to shunts.

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Illustrations

Table 1: Patient demographics and findings

Patient factors	n (%)
Male:Female	11:4
Age	**Â**
Child	9(60)
Adult	6(40)
3rd Ventricular floor	**Â**
Thick	13(87)
Thin	2(13)

3rd Ventricular floor	**Â**
Identifiable	12(80)
Not identifiable	3(20)
Modified Vellore grading	**Â**
1	6(40)
2	6(40)
3	2(13)
4	1(7)

Â Of the 15 patients included in the study, there was no mortality upto the follow-up period. Eight patients improved clinically (Table 2). In one patient, there was a tear of a basilar artery perforator, which was managed with tamponade with the Fogarty balloon. Luckily this patient had no neurological deficits. Two patients who remained clinically same had to undergo ventriculo-peritoneal shunt surgery due to CSF leak from the skin incision site. All patients who deteriorated also underwent ventriculo-peritoneal shunt surgery.

Â Table 2: Outcomes following ETV

Outcome	**n (%)**
Death	0
Improved	8(53)
Same	3(20)
Deteriorated	4(27)
Modified Vellore grade	**Improved**
1(n=6)	5
2 (n=6)	2
3 (n=2)	1
4 (n=1)	0

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