



ROLE OF OMMAYA RESERVOIR IN CHILDHOOD TUBERCULAR MENINGITIS WITH HYDROCEPHALUS: A PRELIMINARY STUDY

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ABSTRACT Hydrocephalus is one of the commonest complications of tuberculous meningitis (TBM) occurring in up to 85% of children with the disease. It is more severe in children than in adults. It could be either of the communicating type or the obstructive type with the former being more frequently seen. In the present series, forty consecutive cases of tubercular meningitis with ventriculomegaly were taken for study from Neurology and Neurosurgery wards, G.R. Medical collage and J.A. group of hospitals, Gwalior (M.P.) from April 2016 to October 2017. All the patients were initially treated with Omaya reservoir with the repeated percutaneous puncture to drain CSF. At the same time, both lumbar and ventricular CSF studies were compared. After 3 months lumbar CSF became normal in 91.5% cases however ventricular CSF became normal only 66.5% cases. In the majority of the patient CSF culture was sterile (91.5%). In present series, 65.5% cases did not require V-P shunt, whereas in 34.4% cases V-P shunting was performed after removal of the reservoir.

KEYWORDS : Tubercular meningitis with Hydrocephalus, OMMAYA reservoir

INTRODUCTION:

Tuberculous Meningitis with ventriculomegaly constitutes an important cause of acquired neurodevelopment problems and handicaps in childhood in developing country. Neurotuberculosis is encountered in up to 10% of immunocompetent patients [1]. CNS tuberculosis may take several forms including tubercular meningitis (TBM), meningoencephalitis, tuberculoma, tubercular arachnoiditis [2]. Hydrocephalus is one of the most common complications of TBM. Interest in the evaluation and treatment has increased in recent past as the significant morbidity has become apparent in cases of meningitis with ventriculomegaly. Raised ICT in these patients with chronic meningitis due to hydrocephalus can lead to neurological & cognitive deterioration and permanent blindness. Therefore even when treated successfully chronic meningitis may leave a severely maimed or a blind patient. Shunt being often ineffective due to abnormal CSF biochemistry, OMMAYA is a safe and reliable alternative for these patients. We reported the prospective study of 40 patients with review of the literature.

MATERIAL & METHODS

The present study was a prospective study conducted at the department of neurosurgery, GR Medical College and JA group of hospitals (GRMC) over a period of 3 years from December 2014 to April 2017. GRMC is a tertiary care super specialty treatment Centre. Being the largest medical institutions in the region of Gwalior, it caters the health needs of the entire region as well as neighboring states. All patients with tubercular meningitis with hydrocephalus were included in the study. Patient age groups were range from one year to 14 years of age. Patients less than one year were treated with the repeated tapping of ventricle through open coronal sutures, were excluded from the study. In addition to CT finding, patient age, sex, and Glasgow coma scale (GCS) were also recorded at the time of admission. All patient included in the study were subjected to CT scan of the brain with finding consistent with ventriculomegaly causing raised pressure with meningitis. The criteria used for selection of cases were as follows:-(a) Clinical picture consistent with tuberculous meningitis. (b) C S F examination showing, Culture positive for mycobacteria and/or protein more than 200 mg& and/or, WBC more than 50/cumm. In this, OMMAYA reservoir uses a catheter which is placed in the ventricle of the brain and connected to a reservoir that fits in the burr hole usually frontal occasionally parietal region. The CSF tapping through reservoir was done on every alternate day for the week, concomitant lumbar puncture was also performed for comparative study. Before discharge of the patient or at the end of 3 weeks CSF study from both lumbar and the ventricular site was done. The CSF tapping through

reservoir was also done whenever clinically indicated. Regular followup was done at the on monthly basis or as and when required. On follow-up, the patients were carefully assessed.

Result:

The study includes 40 pediatric patients with tuberculous meningitis with hydrocephalus. 65 percent were males (n=26) and 35 percent (n=14) were female. Male to female ratio were 1.5:1. The age of the patients was divided into three groups (Table 1). The mean age of patients was 5.14 years (range, 2-14 years). Most of the patients were in age group 1 (45%) and the least number of patients were found in the age group 3 (25%). 95 % of patients were having GCS more than 8 as shown in table 1.

Table 1: Demographic profile of all patients included in the study

Age	No. Of patients	Percentage
1-5	18	45%
6-10	12	30%
11-14	10	25%
SEX Ratio		
Total No of case	Male	Female
40	26	14
Glasgow coma scale		
13-15	8	20%
9-12	6	15%
< 8	26	65%

In majority of cases, ventricular CSF picture remained same on discharge (Table 2).

Table No.-2: CSF EXAMINATION: COMPARATIVE STUDY OF LUMBAR AND VENTRICULAR CSF.

TEST FUNDING	VENTRICULAR CSF.		LUMBAR CSF	
	First day	On Discharge	First day	On Discharge
APPEARANCE				
Clear	11	11	15	28
Opalescent	9	9	7	6
Turbid	20	20	18	6
Total	40	40	40	40
CYTOLOGY				
50-100/cumm	13	14	16	22
100-200/cumm	15	17	13	9
>200/cumm	12	9	11	9
TOTAL	40	40	40	40

In our series, in all cases protein content of CSF was more than 200 mg% in ventricular CSF and lumbar CSF; similarly glucose content of CSF was below 40 mg% in ventricular and lumbar CSF.

Table No.-3: CSF EXAMINATION: COMPARATIVE STUDY OF LUMBAR AND VENTRICULAR CSF.

TEST FUNDING	VENTRICULAR CSF.		LUMBAR CSF	
	First day	On Discharge	First day	On Discharge
Protein				
200-300 mg%	13	17	15	3
300-400	16	13	14	1
>400	11	10	11	0
<200	0	0	0	36
Total	40	40	40	40
Glucose				
60-80 mg%	5	6	6	32
40-60	7	7	9	6
<40	28	27	25	2
TOTAL	40	40	40	40

In the present series, 32 (80.0%) patients improve whereas 8 (20.00%) patients did not show any change after 3 week at the time of discharge. No patient became worse. eight out of 40 cases who did not improve had GCS less than 8 (Table No. – 4).

Table No. – 4: OUTCOME ASSESSED BY GCS ON DISCHARGE

GCS	NO. OF CASES	IMPROVED	NO CHANGE	WORSE
13-15	8	8	0	0
9-12	6	5	1	0
< 8	26	19	7	0
TOTAL	40	32 (20.58)	8 (20.58)	0

In our series ventricular CSF became normal in 66.5% of the cases and lumbar CSF became normal in 91.5% cases after 3 months. In the majority of the cases, CSF culture was sterile which constituted 91.5% cases. Four cases were lost for follow up (Table 5).

Table No. – 5: SHOWING CSF FINDING AFTER FOLLOW UP

FOLLOWUP AT 3 MONTH			
CSF	NORMAL	ABNORMAL	TOTAL
LUMBAR CSF	33 (91.5%)	3 (8.5%)	36
VENTRICULAR	24 (66.5%)	12 (33.5%)	36
FOLLOW UP AT 6 MONTH			
LUMBAR CSF	36(100%)	0	36
VENTRICULAR	34 (94.5%)	2 (5.5%)	36

In the present series out of 35 cases, 23 (65.6%) patients did not require shunt (Table No. – 6).

Table No. – 6: CONVERSION OF RESERVOIR INTO V- P SHUNT

V-P SHUNT	NO. OF CASES	PERCENTAGE
Required	12	33.33%
Not required	24	66.66%
TOTAL	36	100%

DISCUSSION

Tuberculous meningitis (TBM) is still a very common problem in children and adults in India. Although there has been a reduction in the number of patients with TBM, it is estimated that in India the mortality due to TBM is approximately 1.5/100,000 population [3]. Hydrocephalus is one of the most common complications of TBM. It is almost always present in patients who have had the disease for four to six weeks [4]. All the early reports of shunt surgery for hydrocephalus associated with TBM report the poor outcome in a proportion of patients. Bhagwati [5] reported mortality in 3 of 7 patients undergoing shunt surgery. Only 4 of 9 patients treated with the Upadhyaya VA shunt improved following surgery [6]. The other 5 patients died at varying periods of time after the surgery. Palur *et al* [7] reported that of the 114 patients followed up for an average of 45.6 months following

shunt surgery for TBM and hydrocephalus, 48 (42.1%) died. 63 (55%) had a good outcome or moderate disability. There was enough evidence to support that use of ventriculoperitoneal shunt in tubercular meningitis with hydrocephalus was associated with high morbidity and shunt failure. Ommaya reservoir placement was found to be useful for control of raised intracranial pressure during initial stages of meningitis with raised CSF protein and cell count. In the present work ventricular and lumbar, CSF remained same on the first day and on the day of discharge (at 3 weeks) or minor variation was noted. Ventricular CSF remained abnormal in 33.5% cases, whereas lumbar CSF became normal in 91.5% cases after 3 months. Follow up after 6 months revealed ventricular CSF abnormal in 5.5% cases and lumbar CSF became normal in 100% cases. CSF culture was sterile in all cases at the end of the 6 months. These suggest that ventricular reservoir is not causing ventricular or foreign body reaction; certainly no more than when a shunt is put. These also proved that ventricular CSF is more accurate and reflects the correct picture of CSF in cases of meningitis as it always takes more time for CSF to become normal. This is probably due to partial obstruction of the flow of cranial CSF to spinal subarachnoid space because of basal arachnoiditis and exudates.

In our series majority of the patients showed symptomatic and neurological improvement on discharge as frequent CSF tapping reduces ICT and diverts the abnormal CSF. At the same time, it reduces the morbidity and mortality in cases of meningitis. Further, it facilitates intraventricular installation of chemotherapeutic agents.

The ventricular reservoir was removed when ventricular CSF become near normal range at end of six months. 33.33% patients deteriorated after reservoir removal due to raised ICT and the V-P shunt was performed. After VP shunt there was a significant improvement were noted in all cases. The greatest advantage of reservoir implantation was that patients had not required major surgery like VP shunt in 66.6% cases and hence complication of surgery or later several revision operations were avoided.

Conclusion:

Tubercular meningitis with hydrocephalus is a major cause of morbidity in developing countries like India, usually involves pediatric age group. Use of ventriculoperitoneal shunt in tubercular meningitis with hydrocephalus was associated with high morbidity and shunt failure. Ommaya reservoir placement was found to be useful for control of raised intracranial pressure during initial stages of meningitis with raised CSF protein and cell counts. In present series, 65.6% cases did not require V-P shunt after placement of ommaya reservoir. It obviates the need for shunting procedure; when ultimately shunt is required allows it to be placed in clear CSF with less risk of blockage.

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