

ORIGINAL ARTICLE

EFFICACY OF ENDOSCOPIC THIRD VENTRICULOSTOMY IN NON-COMMUNICATING HYDROCEPHALUS

Mian Iftikhar ul Haq, Shahbaz Ali Khan*, Riaz A Raja**, Ehtisham Ahmed*

Department of Neurosurgery, Hayatabad Medical Complex, Peshawar, *Ayub Teaching Hospital Abbottabad, **Liaquat University of Health Sciences, Jamshoro, Pakistan

Background: Hydrocephalus is common problem requiring either extra-cranial (shunts) or intra-cranial (ventriculostomy) diversion of cerebrospinal fluid. Endoscopic third ventriculostomy obviates all the complications of shunts and has been accepted as the procedure of choice for the treatment of obstructed hydrocephalus in adults and children because of the minimally invasive nature. This study was conducted to determine the efficacy of endoscopic third ventriculostomy in the treatment of non-communicating hydrocephalus. **Methods:** This cross sectional descriptive study was done in neurosurgery department of Hayatabad Medical Complex, Peshawar, from 2nd February 2011 to 1st march 2012. A total of 171 patients with non-communicating hydrocephalus, irrespective of gender discrimination and Glasgow coma scale score of 10 and above were included in this study. Patients below one year of age, with lesion in the floor of the third ventricle or near basilar artery, and hydrocephalus with infected CSF or haemorrhage were excluded. Hydrocephalus was diagnosed on CT-scan brain. All the patients were followed up till 72 hours post-operatively for the determination of effectiveness in terms of improvement in Glasgow coma scale by at least 2 points. All the above mentioned information including name, age, gender and address were recorded in a predesigned proforma. The data was analysed using SPSS-17. Frequency and percentage was calculated for categorical variables. Mean±SD was calculated for age. **Results:** A total of 171 patients with non-communicating hydrocephalus were included in the study. Out of 171 patients, there were 104 (60.8%) males and 67 (39.2%) females. Age ranged from 1–70 years with majority of the patients was below 10 years of age. Majority of the patients had hydrocephalus due to tuberculous meningitis 39.2% of the whole. In 134 (78.4%) patients the procedure was effective. Procedure was more effective in hydrocephalus due to space occupying lesion. **Conclusion:** Endoscopic third ventriculostomy is a very effective procedure for the treatment of non-communicating hydrocephalus.

Keywords: Endoscopic third ventriculostomy, non-communicating hydrocephalus, effectiveness, shunt

INTRODUCTION

Hydrocephalus is common problem with an estimated prevalence of 1–1.5%. The management of hydrocephalus needs diversion, either extra-cranial (shunts) or intra-cranial (ventriculostomy).^{1,2} Extra-cranial shunts are subject to complications such as blockage, infection, and over drainage, often necessitating repeated surgical revisions. Endoscopic third ventriculostomy obviates all these complications. Endoscopic third ventriculostomy has been accepted as the procedure of choice for the treatment of obstructed hydrocephalus in adults and children because of the minimally invasive nature.^{3,4}

Endoscopic third ventriculostomy is a surgical procedure that allows the cerebrospinal fluid flow directly from the third ventricle to the basal cistern and thus bypassing the aqueduct and the posterior fossa.^{5,6} The most common complications of endoscopic third ventriculostomy are fever and bleeding. The use of light source and monopolar coagulation in the confined volume of the third ventricle can increase cerebrospinal fluid temperatures to high levels, sometimes causing fever. Attempts to perforate the ventricular floor can lead to bleeding, as can damage to ventricular walls or

perforation of the basilar artery. Short-term memory loss is another potential complication of endoscopic third ventriculostomy, since the procedure may affect the hypothalamus and the areas of the mamillary body, which are responsible for memory. Diabetes insipidus is another transient complication.^{7,8} Efficacy of endoscopic third ventriculostomy ranges from 51% to 100%.^{9,10} The objective of this study was to analyze the efficacy of endoscopic third ventriculostomy in the treatment of non-communicating hydrocephalus.

MATERIAL AND METHODS

This cross sectional descriptive study was conducted in neurosurgery department of Hayatabad Medical Complex, Peshawar, from January 2011 to 1st march 2012. A total of 171 patients with non-communicating hydrocephalus, irrespective of gender discrimination and Glasgow coma scale score of 10 or above were included in this study. Patients below one year of age, with lesion in the floor of the third ventricle or near basilar artery, and hydrocephalus with infected CSF or haemorrhage were excluded. The sample technique was non-probable purposive. Hydrocephalus was diagnosed on CT scan brain. The study was conducted after approval from hospitals research and ethical

committee. The purpose and benefits of the study were explained to the patients and a written informed consent was obtained from patients or their guardians. All the patients were prepared for general anaesthesia and were operated on next operation theatre list. Post-operatively patients were followed up till 72 hours for the determination of effectiveness in terms of improvement in Glasgow coma scale by at least 2 points. All the above mentioned information including name, age, gender and address were recorded in a pre-designed proforma. The data was analysed using SPSS-17. Frequency and percentage was calculated for categorical variables like gender and effectiveness of operation.

RESULTS

Out of 171 non-communicating hydrocephalus operated for Endoscopic third ventriculostomy patients', 104 (60.8%) were males and 67 (39.2%) females. The age of patients ranged from 1–70 years with mean age of 23.1±7.3 years. The distribution of patients in different age groups is summarised in Table-1.

Table -1: Age distribution of the patients

Age Groups (yrs)	Patients	Percentage
1–10	91	53.21
11–20	15	15.8
21–30	21	12.3
31–40	11	6.4
41–50	9	5.3
51–60	7	4.1
61–70	5	2.9

In majority of the patients the cause of non-communicating hydrocephalus was tuberculous meningitis i.e. 67 (39.2%) followed by posterior fossa tumour 53 (30.9%). Out of total 171 patients, the procedure was effective in 134 (78.4%) patients as summarised in Table-2.

Table-2: Causes of non-communicating hydrocephalus and effectiveness of endoscopic third ventriculostomy

Cause	Patients	Efficacy of endoscopic third ventriculostomy
Tuberculous Meningitis	67 (39.2%)	49 (73.1%)
Posterior fossa Tumours	53 (30.9%)	46 (86.8%)
Aquiductal stenosis	41 (23.9%)	31 (75.6%)
C/P angle tumour	7 (4.1%)	6 (85.7%)
Brain stem glioma	3 (1.75%)	2 (66.6%)

DISCUSSION

Endoscopic third ventriculostomy has become the treatment of choice for the treatment of non-communicating hydrocephalus. It has changed neurosurgical treatment in many ways. Different opinions exist about the effectiveness of endoscopic third ventriculostomy. Most authors consider clinical improvement as criteria for obstructive hydrocephalus. In our study improvement in conscious level has been

considered as criteria for effectiveness of endoscopic third ventriculostomy.^{5,7,11}

Effectiveness of endoscopic third ventriculostomy ranges from 51% to 100%.^{9,10} In our study the overall effectiveness is 78.4%. Brohi SR showed 68% effectiveness which is slightly lower than our study but no statistically significant difference exist.¹² Long follow up period is probably the reason for slightly lower success rate in series of Brohi SR. Other studies like Sufianov AA reported 71.4% effectiveness which is much closer to overall effectiveness in our study.¹³

Buxton N¹⁴ and Gangemi M¹⁵ gave 80–90% success rate in their studies. While others like Hellwig D described 83% effectiveness however their studies contained only adults that is why has got slightly higher success rate than our studies.¹⁶

Effectiveness of endoscopic third ventriculostomy varies with the cause of hydrocephalus. In our study the effectiveness were more in space occupying lesions of the brain which is comparable with Jinkenson MD.¹⁷ It shows that endoscopic third ventriculostomy although has different effectiveness in different diseases but overall effective in obstructive hydrocephalus due to any cause. Among the space occupying lesion the best effectiveness were observed in patients with posterior fossa lesion (86.8%), followed by lesion cerebellopontine angle lesion (85.7%). The lowest success rate observed in our study was for brain stem lesion (66.6%). This is in contrast with the 85% success rate in the series of Sacko O.¹⁸

CONCLUSION

Endoscopic third ventriculostomy is a very effective procedure for treatment of obstructive hydrocephalus.

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Address of Correspondence:

Dr. Mian Iftikhar-ul-Haq, Department of Neurosurgery, PGMI, Hayatabad Medical Complex, Peshawar, Pakistan.

Cell: +92-321-9032948

Email: drmiulhaq@gmail.com