INTRODUCTION

Endoscopic Third Ventriculostomy (ETV) is a one-time procedure; an opening is created in the floor of the third ventricle using an endoscope placed within the ventricular system through a burr hole. This allows the movement of cerebrospinal fluid (CSF) out of the blocked ventricular system and into the interpeduncular cistern (a normal CSF space) thereby fore bypassing any obstruction. ETV is used to treat obstructive Hydrocephalus, such as aqueductal stenosis. The objective of this procedure is to normalise pressure on the brain without using a shunt. ETV is not a cure for Hydrocephalus, but rather an alternate treatment.1,2,3

Although open ventriculostomies were performed as early as 1922, they became a less common method of treating Hydrocephalus in the 1960s, with the advent of shunt systems. Despite recent advances in shunt technology and surgical techniques, however, shunts remain inadequate in many cases. Specifically, extracranial shunts are subject to complications such as blockage, infection, and over-drainage, often necessitating repeated surgical revisions.3,4,5

The ultimate goal of ETV is to render a shunt unnecessary. Although Endoscopic Third Ventriculostomy is ideally a onetime procedure, evidence suggests that some patients will require more than one surgery to maintain adequate opening and drainage.5,6,7 The purpose of this study was to know the surgical outcome of ETV in non-communicating Hydrocephalus.
patients with non-communicating hydrocephalus.

MATERIALS AND METHODS
This cross sectional descriptive study was done in neurosurgery department of Hayatabad Medical Complex, Peshawar, from 1st March 2010 to 1st March 2011. A total of 41 patients with non-communicating hydrocephalus, irrespective of gender discrimination were included in this study. Patients below two years of age and hydrocephalus with infected CSF or hemorrhage were excluded.

Hydrocephalus was diagnosed on CT scan brain. Aesculap endoscope of 0 and 30 degree with 6mm outer diameter were used. Aesculap 1-chip video camera system (DAVID PV 140/PV 142 Camera) was used. The system also consisted of light source, monitor and working elements. The procedure was done under general anesthesia. The patients were placed supine with the head elevated approximately 30° to minimize excessive CSF loss and pneumocephalus. A right pre-coronal incision was made 3cm from midline and 1cm medial to coronal suture. Eight mm burr hole was made. Endoscope was passed with free hand technique into the ventricle and irrigation was done with Ringer’s solution. Endoscope negotiated into the 3rd ventricle and the membrane bulging in front of mamillary bodies and behind the infundibular recess selected for making a hole. Fenestration in the roof of third ventricle was usually done with Fogarty catheter 6FR. Balloon inflated to widen fenestration (5mm to 8mm). Haemosatsis was preferably secured with continuous irrigation .Scalp was sutured in one layer. Clinical Outcome of ETV was evaluated by the time of discharge and on subsequent follow up visits. Base line CT brain was done to all patients post operatively. The treatment was recorded as a success or failure. Success of the ETV was defined as partial or complete relief of symptoms. Any patient who subsequently needed VP shunting after the ETV procedure was described as having treatment failure. The information regarding patient demographical details, causes of hydrocephalus and complications of procedure was documented in patient’s Performa. The data was analyzed by SPSS version 16. Frequency and percentage was calculated for categorical variables. Mean +- SD was calculated for age. Results were presented as tables.

RESULTS
We operated 41 patients during our study period. Age ranged from 2 years to 60 years with mean age 21 years. There were 26(63.41%) male and 15(36.58 %) female.

We operated only non-communicating hydrocephalus cases. Details of various etiological sources are highlighted in (Table-I).

<table>
<thead>
<tr>
<th>Cause</th>
<th>No. of patients</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculous meningitis</td>
<td>15</td>
<td>36.58%</td>
</tr>
<tr>
<td>4th ventricular tumors</td>
<td>10</td>
<td>24.39%</td>
</tr>
<tr>
<td>Aquiductal stenosis</td>
<td>09</td>
<td>21.95%</td>
</tr>
<tr>
<td>Brain stem tumor</td>
<td>05</td>
<td>12.19%</td>
</tr>
<tr>
<td>Cerebellar haemangioblastoma</td>
<td>02</td>
<td>4.87%</td>
</tr>
</tbody>
</table>

Table-I. Etiology of hydrocephalus

The procedure was successfully performed in 40(97.56%) patients. We converted only one case into ventriculo-peritoneal shunts due to altered anatomy. The complications of third ventriculostomy were noted in nine patients (Table-II).

<table>
<thead>
<tr>
<th>Complications</th>
<th>No. of patients</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF leak</td>
<td>04</td>
<td>9.75%</td>
</tr>
<tr>
<td>Pseudomeningocele</td>
<td>02</td>
<td>4.87%</td>
</tr>
<tr>
<td>Transient memory loss</td>
<td>01</td>
<td>2.43%</td>
</tr>
<tr>
<td>Pneumocephalus</td>
<td>02</td>
<td>4.87%</td>
</tr>
</tbody>
</table>

Table-II. Complications of ETV
DISCUSSION

Ventriculoscopy was introduced in the early 1900s. Walter E. Dandy used a primitive endoscope to perform choroid plexectomy in communicating hydrocephalus. Endoscopic management of hydrocephalus was attempted in 1910 when VL L'Espinasse, an urologist, used the cystoscope to cauterize the choroid plexus.

The first ETV was performed by William Mixter, an urologist, in 1923. In 1947, H. F. McNickle introduced a percutaneous method of performing third ventriculostomy that decreased the complication rate and improved the success rate. In the early 1970s, the leukotome was introduced to enlarge the perforation in third ventricle floor without an injury to the surrounding vascular structures. An improvement in the success of third ventriculostomy in recent time could be due to better patient selection; improvements in endoscope, better imaging, advanced surgical technique and instruments.

We operated 35 patients during our study period. Age ranged from 2 years to 60 years with mean age 21 years. Brohi SR also reported same results.

There were 26(63.41%) male and 15(36.58 %) female. Kulkami AV reported male dominancy in his study. Baldauf J also reported the same result in his study. In our study the commonest cause of non-communicating hydrocephalus was tuberculous meningitis i.e in 15(36.58%) patients. Brohi SR has reported almost the same sequence of causes for hydrocephalus.

Various studies suggests various ETV failure rates which ranges from 6% to 50%. In the present study, the procedure failed in one patient. However, we believe that conversion rate can further be decreased as the surgeons getting experienced and with improvement in endoscopic technology.

The incidence of complications with ETV has been reported ranging from 0 - 20%. In our study, the overall rate of complications encountered is 21.95%. However there has been no permanent disability or morbidity. The commonest complication in our cases is CSF leak which occurred in 4(9.75%) patients. Brohi SR also reported the same complications.

CONCLUSIONS

The complications of endoscopic third ventriculostomy are transient. Those patients who meet the criteria, endoscopic third ventriculostomy offers the possibility of freedom from shunt dependency.

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REFERENCES


PREVIOUS RELATED STUDY


“There can be no liberty unless there is economic liberty.”

Margaret Thatcher