Late Referral of Post Meningitic Hydrocephalus a Factor Responsible for Poor Outcome?

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SUMMARY

Hydrocephalus is a known complication of meningitis, both tuberculous and pyogenic. An analysis of the results of 18 postmeningitic patients with CSF diversion procedures at Shaikh Zayed Hospital was done to identify the factors responsible for a poor outcome in the surgical patients. It was concluded that an independent factor in poor prognosis was delayed diagnosis and late referral to a specialist facility by primary care physicians. Other factors thought to be responsible for a poor prognosis such as ventricular size and number of infarcts seen on CT Scan were not found to correlate well with outcome.

INTRODUCTION

The morbidity and mortality of hydrocephalus in our society is very high. While it is generally accepted that this is due to a delay in the presentation we analysed results of CSF diversion procedures in postmeningitic patients seeking to identify the factors responsible for the relatively poor prognosis.

MATERIALS AND METHODS

Initially all patients with hydrocephalus undergoing shunt procedures were studied but due to the widely varied pathology such as hydrocephalus following subarachnoid haemorrhage, congenital aqueduct stenosis, brainstem gliomas only patients with spontaneous meningitis and hydrocephalus were included in the study. Patients with either iatrogenic (post traumatic or post surgical) or meningitis ventriculitis following a ruptured myelomeningocele were excluded from the study.

As the lack of medical facilities and distances from medical facilities are quoted as being often responsible for the poor medical treatment and outcome only the patients from the Lahore region, the city and its immediate surrounds, were included in the study.

Age and sex of every patient were noted. The socioeconomic status was quantified. Patients who were in need for social security (Zakat) were taken as Group 1 while those with monthly incomes of 2000-4000 rupees were taken as Group 2, 4000 rupees to 6000 rupees as Group 3 and the well off were classified as Group 4. The date of initial symptoms of the meningitis, date of diagnosis of hydrocephalus, the date of referral to a neurosurgical facility, the type and date of the initial cerebrospinal fluid diversionary procedure and any subsequent procedures were noted. It was noted whether the patient had any recovery and if so whether it was immediate i.e. within one week of the diversionary procedure or delayed beyond one week. Outcome was also classified on a scale based on the Glasgow outcome scale (Table 1).

Table 1: Outcome Scale

<table>
<thead>
<tr>
<th>Description</th>
<th>Score</th>
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<tbody>
<tr>
<td>Died</td>
<td>0</td>
</tr>
<tr>
<td>severely disabled - completely dependent</td>
<td>1</td>
</tr>
<tr>
<td>moderate disability - disabled but able to perform daily functions</td>
<td>2</td>
</tr>
<tr>
<td>mild disability - disabled but able to support himself</td>
<td>3</td>
</tr>
<tr>
<td>no disability</td>
<td>4</td>
</tr>
</tbody>
</table>
All patients underwent diversionary procedures which were either external ventricular drainage or primary insertion of medium pressure Pudenz type Ventriculoperitoneal Shunts. To prevent any confusion as a result of blocked or malfunctioning shunts if the patient failed to improve after shunt insertion a shunt aspiration was done with manometry to check for proximal or distal shunt function.

The patients had radiological studies, the CT Scans were obtained. The anterior horn size, third ventricular size and the cortical mantle thickness were noted.

All patients without the above basic data were excluded from the study. Statistical Analysis was done using a standard package for statistical studies (SPSS) and the various results were correlated with each other using the Chi square test and significance using Spearman Correlation.

RESULTS

A total of eighteen patients met the criteria above. The age of the patients varied from 3 months to 60 years a mean of 30.1 years. There were 15 males and 3 females in the study (83.3% vs 16.7%). Most of the patients were in the lower socioeconomic strata with 61.1% percent being in Groups 1 and 2 (i.e. below an income of 4000 Rs or needing social security). The etiology of the hydrocephalus was tuberculous in 13 patients (72.2%) and pyogenic in the other 27.8%. Communicating hydrocephalus was seen in 14 patients (77.8%) and obstructive in the other 22.2%. Ventriculoperitoneal shunts were put in 13 patients (72.2%) and the other 5 had external ventricular drainage. Ten patients (55.6%) improved after surgery while the others did not. Out of the total of eighteen patients 7 (41.2%) died while 4 (23.5%) were severely disabled and only 5 (29.4%) were able to achieve normality. One patient was disabled but able to function independently in society.

The time intervals noted in the study are given in Table 2.

DISCUSSION

Hydrocephalus following meningitis is a factor which tends to make the prognosis grim in a rather grim disease. Whereas early ventriculoperitoneal shunt insertion has changed the prognosis in hydrocephalus of other aetiology such as in myelomegingocele related hydrocephalus with many patients achieving a reasonable performance and IQ score; it remains poor in the postmeningitic hydrocephalus. That Ventriculoperitoneal shunting improves some patients is not in doubt. However it is a common observation that the patients who present late to a neurosurgical department fare poorly. However whether this is a function of the disease process or whether avoidable factors are involved in the determination of the final outcome from meningitis is debatable. This has led to the assessment of innovative methods of prediction of outcome and evaluation so that the treatment of the hydrocephalus may be initiated early. It has also led to the evaluation of rather desperate attempts to resolve the meningitic adhesions such as with the instillation of hyaluronidase intrathecally. It was because of this that we decided analyse our records retrospectively.

Table 2:

<table>
<thead>
<tr>
<th>Interval</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>interval 1</td>
<td>38.28</td>
<td>83.95</td>
<td>0</td>
<td>365</td>
</tr>
<tr>
<td>interval 2</td>
<td>5.94</td>
<td>15.30</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>interval 3</td>
<td>1.72</td>
<td>4.16</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>interval 4</td>
<td>51.61</td>
<td>89.53</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
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interval 1 the time from symptoms to the diagnosis of hydrocephalus.
interval 2 the time from hydrocephalus diagnosis and referral to neurosurgeon.
interval 3 the time from symptoms to drainage.
interval 4 time from hydrocephalus diagnosis to diversion.

From the analysis of the Table 2 it was seen that the results were skewed because of one patient who was referred for neurosurgery nearly a year after the initial problem. So for the calculation of the significance this patient was excluded from the statistical evaluation.

The evaluation was also interesting. When the patients were taken overall and both the pyogenic and tuberculous patients were included there was no significance of the various intervals on the outcome of the patients. However when only the post tuberculous patients (n=13) were considered it was seen that both the interval 3, the time from
symptoms to drainage (p = 0.05) and the interval 4, the time from hydrocephalus diagnosis to the drainage procedure were significantly related to the outcome (p = 0.05). This may have been due to the slightly different pathology in the two conditions. Whereas pyogenic meningitis is a fulminant condition tuberculous meningitis may take a rather slower course thus leaving time for an analysis such as ours.

It has been noted that radiological abnormalities including the presence of basal meningitis does not correlate well with outcome. This was noted in our patients as well. However it must be remembered that both this study and the one reported by Kingsley et al have a small number of patients. However another study in a larger number of patients (sixty four) showed that the patients who had infarcts and massive hydrocephalus fared more poorly than those who do not. Meningeal enhancement described as basal meningitis in our study, the commonest finding was not related to the severity of disease at presentation or later. Other studies also support this observation.

CONCLUSION

The above study due to the rather small number of patients has failed to resolve the questions asked in the beginning fully. There has been shown a correlation with delay in referral to a neurosurgical centre and to the drainage procedure from the onset of symptoms. However our feeling that there are other factors such as the severity of the underlying pathology shown in infarcts and the ventricular size have not been answered fully. We have instituted a prospective trial for that purpose.

REFERENCES


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