SURGICAL OUTCOME OF VENTRICULOPERITONEAL SHUNT IN PEADRIATIC PATIENTS

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ABSTRACT

Objective: To study the outcome of shunt surgeries in children suffering from hydrocephalus.

Study Design: Retrospective descriptive type.

Methods and materials: A total number of 123patients in peadriatic age group with hydrocephalus were included in the study and were Ventriculoperitoneal shunted during oneyears in our unit and were followed. Medical charts, imaging studies and operation theater notes were also reviewed and analyzed.

Results: Total of 123 patients were included in the study. With an age range of 1 month to 10 years at the time of surgery. The male were 73 and female were 50.The overall shunt complications were 35 (28.4%); incidence of shunt infection was 7.3%, shuntobstruction was6.5%, shunt dislodgement was 5.6%,pseudocyst formation in abdomen4.8%, shunt extrusion was 2.4% and shunt over drainage was 1.6%. The number shunt revision due these complications were 15(12.1%) after three months and 20(16.2%)were after six months.The mortality rate was 4.8% (n=6)

Conclusion: The results of the above study show that there is a relationship between the etiology of hydrocephalus and incidence of shunt complications and revision.

Key words: Hydrocephalus, Ventriculoperitoneal shunt, Cerebrospinal fluid and Enlarge head.

INTRODUCTION

Hydrocephalus is one of the most commonly encountered clinical diagnosis in neurosurgical practice. It is the combination of two Greek words hydro (water) and kefale (head). Despite the great strides in the diagnosis and treatment of hydrocephalus, it remains a challenge to the neurosurgeons to treat it.[1]

In hydrocephalus there is accumulation of cerebrospinal fluid within the intraventricular compartment associated with raised intracranial pressure. Incidence of congential hydrocephalus is 4 to 6.99 per 1000 births[2]. It can be congential or acquired, communicating and non-communicating. Generally, communicating hydrocephalus refer to hydrocephalus when there is obstruction outside the ventricular system i.e. blockage at the level of sub-arachnoid space or arachnid villi. Non-communicating hydrocephalus refer to impedes of cerebrospinal fluid within the ventricular system, such as obstruction at aqueduct of sylvious or basal foramina of Lushka and Megendi.[2,3]

There are different etiologies of hydrocephalus in peadriatic age group according to the age of children. In infants it may be due to intraventricular hemorrhage, infection, congential anomalies in the ventricular system and tumours. In older children hydrocephalus occur secondary to neoplasm, infection and trauma. In infant's hydrocephalus can present with various symptoms and signs like enlargement of the head, sunsetting eyes, visible scalp veins and tense anterior fontanelle. While in children it presents with headache, vomiting, fits, visual deterioration, decrease sensorium and gait disturbances.[4,5]

The mainstay of surgical treatment involves the Ventriculo-peritoneal shunt. It is a very successful treatment but associated with many complications like obstruction of the shunt system, infection, dislodgement, shunt migration, skinerosion, sub-dural hematomas and intra peritoneal pseudocyst formation.[6,7,8]

METHODS AND MATERIALS

This is a retrospective, descriptive study of 123 peadriatic patients with age range of 1 month to 10 years. The duration of the study is one year from January 2017 to January 2018, the study was conducted in the department of Neurosurgery Hayatabad Medical Complex Peshawar. The data was collected from the Performa. Thecauses of the hydrocephalus, congential, infection, ventricular hemorrhage, post traumatic and brain tumors. Age, sex, address and telephone number were noted. Investigation, CT scan and M.R.I of the brain was done to determine the cause and severity of the hydrocephalus. The various causes of shunt malforma-

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tion and revision of the shunt were noted. The duration of follow up was 3 months and 6 months after shunting.

Inclusion Criteria

All children within the age range with hydrocephalus on CT and MRI were included in the study.

Exclusion Criteria

All children who were above the age range that is ten years were excluded from the study.

Surgical procedure

In all the patients medium pressure shunt was used and the surgery was performed under aseptic conditions according to standard protocols.

RESULTS

123 peadriatic patients were included in our study and were underwent Ventriculoperitoneal shunt for hydrocephalus. Among them 73 were male and 50 were female. The age range was1month to 10 years. 45 i.e.36 % patients were suffering from congenital hydrocephalus,35(28.4%) were post infectious due to post tubercular or septic meningitis hydrocephalus,20(16.2%) were those who developed hydrocephalus due to intraventricular hemorrhage,15(12.1%) were due to posterior fossa tumors and due to post traumatic were 8(6.5%)**Table 1**. Shunt revision done within the first 3 months were 15(12.1%) causes were due to obstruction 3(2.4%), infection 6(4.8%), extrusion of shunt 2(1.6%), pseudocyst formation in abdomen 2(1.6%), and over drainage 2(1.6%). Number of shunt revision after 6 months were 20(16.2%) causes were due to obstruction 5(4.6%), infection 3(2.4%), extrusion of shunt 1(0.8%), dislodgement of shunt 7(5.6%), and pseudocyst formation in abdomen 4(3. 2%)**Table 2**. Complication that do not require shunt revision were 25 patients were superficial wound infection 10 (8.1%), abdominal problems 7 (56%), seizures 5 (4%) and subdural collection 3(2.4%) **Table 3**. Out of 35 shunt revisions25 patients required only one shunt revision and 10 patients required second revision surgery. The most common complication was shunt infection9 (7.3%) followed byshunt obstruction 8(6.5%). In all 35 (28.4%) patients the entire shunt was revised. Extra ventricular drainage and delayed reshunting was done in 4 (3.2%) patients. Shunt was removed followed by delayed Ventriculoperitoneal shunt in 4 (3.2%) patients. Opposite side shunt was done in 2 (5.7%) patients. Finally, the mortality rate was 4.8% (n=6)

DISCUSSION

Hydrocephalus is one of the most common neurological disorder in the peadriatic age group. It can be classified as communicating and non-communicating. Various etiological factors responsible for this disorder are congenital, infection, trauma, intraventricular hemorrhages and tumors. In this study, 45 Patients i.e. 36% were suffering from congential hydrocephalus, 35 patients i.e. 28.4% were post infection either tuberculous or septic meningitis, 20 patients that is 16.2% were those who developed hydrocephalus due to intraventricular hemorrhage, 15 patients that is 12.1% due to tumors and 8 patients that is 6.5% due to trauma to the head.

Table 1: Etiology of Hydrocephalus

Etiology	Number of patients	Age range	Percentage
Congenital	45	1 months-2 years	36%
Post infectious	35	1month-10years	28.4%
Post intraventricular hemorrhage	20	1 month- 6 months	16.2%
Post traumatic	8	2 years-10 years	6.5%
Tumors	15	1 month-10 years	12.1%

Table 2: Causes of shunt revision

Causes of revision	3 months	6 months	Total
Infection	6 (4.8%)	3 (2.4%)	9
Obstruction	3 (2.4%)	5 (4.6%)	8
Dislodgement	0	7 (5.6%)	7
Pseudocyst formation in abdomen	2 (1.6%)	4 (3.2%)	6
Extrusion	2 (1.6%)	1 (0.8%)	3
Over drainage	2 (1.6%)	0	2

Table 3: Complications that did not required shunt revision

Complications	Number of cases
Superficial wound infection	10 (8.1%)
Abdominal problems	7 (5.6%)
seizures	5 (4 %)
Subdural collection	3 (2.4%)

In this study, the most common complication was C.S.F leakage and infection of the shunt. There were total of 9 patients in each cause. In the first 3 months after shunting there were 6 cases and after 6 months of shunting it was 3 patients while in infections after 3 months shunting there were 6 patients and after 6 months of shunting the number of patients were 3. The overall infection rate was 7.3%, which is comparable with international literature which is 5-8%.[9,10]

Other complications which was most common in this study was the shunt blockage the number of patients were 8. After 3 months there were 3 after 6 months there were 5 patients, there were various causes of obstruction like proximal and due to clogging of ventricular catheter due to brain matter and arachnid, increase protein content and attachment of the ventricular end with ventricular wall.While in the lower end of the ventricle, it was due to entanglement in the omentum and with guts. Other complications which occurred is the dislodgement of the upper end of the shunt due to head movement of the children. Pseudocyst formation occurred in 6 patients which is due to entrapment of the shunt in the abdomen, due to infection of the peritoneum.%). Minor complications (n-25) for which shunt was not revised and treated medically were superficial wound infection, seizures, abdominal problems and subdural collection, the results were similar to other studies.[6,7,8.]

In all 35 (28.4%) patients the entire shunt was revised. Extra ventricular drainage and delayed reshunting was done in 4 (3.2%) patients. Shunt was removed followed by delayed Ventriculoperitoneal shunt in 4 (3.2%) patients. Opposite side shunt was done in 2 (5.7%) patients. Finally, the mortality rate was 4.8% (n=6), comparable with similar studies.[8,9,10]

CONCLUSION

Hydrocephalus in pediatric population is one of the most common neurological disorder, which can be effectively treated with Ventriculoperitoneal shunt. Although this procedure is associated with significant morbidity and mortality but still it enables patients to live a normal life. The development of most of these complications is associated with the etiology of hydrocephalus.

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