

Outcome Analysis of Ventriculoperitoneal Shunt in Terms of Complications In Patients of Congenital Hydrocephalus

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ABSTRACT

Introduction: Ventriculo-peritoneal shunt is routinely performed in neurosurgery especially in Pediatric Neurosurgery. This study is a retrospective study to analyze the complications occurring in patients of congenital hydrocephalous who got operated at our centre.

Materials and Methods: This study was done by analyzing 90 cases referred to Department of Neuro Surgery, SSG Civil Hospital, Baroda Medical College, Baroda, Gujarat, India from November 2017 to April 2019. A minimum follow-up of 6 months was done. Hydrocephalus associated with Space occupying lesions, Intracranial hemorrhages, Neural tube defects were excluded.

Results: Total number of cases operated during this period was 90. 59(65.6%) were male, 31 (34.4%) were female. Complications were observed in 30/90 (33.3%) cases. Out of 30 cases shunt block 16 cases (53.4%) was a major cause of complication followed by Infection i.e. 6 cases (20%). There was no mortality observed in our cases.

Conclusion: This procedure has a high complication rate but now due to again popular endoscopic third ventriculostomy

which can be safely used in certain cases above a set age, has given us an option, but still in age group of 0-6 months ventriculo-peritoneal shunt is still a more popular and procedure of choice till any further alternative is available.

Keywords: Complications, Congenital Hydrocephalus, Outcome Analysis, Ventriculoperitoneal Shunt.

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INTRODUCTION

Disease of central nervous system can be very challenging and distressing, particularly in children. Hydrocephalous (congenital) is a commonly encountered neurological condition in Pediatric Neurosurgery and has estimated incidence of 1-2 per 1000 live births.^{1,2} Ventriculo-peritoneal shunt is a standard procedure done in these cases. This procedure has high complication rate.³ This is a retrospective study to analyze such complications of shunt surgeries, requiring shunt revisions, have been studied in literature.^{4,5} Shunt complications can be Mechanical (Block), Infection, Functional failure, Displacement etc. These complications may lead to intellectual impairment and sometimes death. It also causes emotional and financial burden.⁶

MATERIALS AND METHODS

This study was conducted from November 2017 to April 2019 in 90 patients referred to Department of Neuro Surgery, SSG Civil Hospital, Baroda Medical College, Baroda, Gujarat, India. All the

patients presented to us with symptoms and signs like Decrease intake of feeds, Vomiting, Increase in size of head, Altered Sensorium etc. Patients with Space occupying lesions, Intracranial hemorrhages, Neural tube defects were excluded. A minimum follow-up of 6 months was kept with each patient. All the patients underwent MRI Brain to rule out associated pathology. All routine blood investigations were done and standard protocol for operative fitness was followed. In each patient CHHABRA'S shunt, Medium pressure with a "Slit and Spring" valve was used. The ventricular end was placed through burr hole at Keen's point into ipsilateral lateral ventricle. The shunt tube was passed subcutaneously and placed in supra hepatic space through skin incision in Right upper quadrant. Blood loss was approximately 5-10 ml per case. Intravenous antibiotics were given for 3 days post operatively. Patient was discharged if there were no immediate complications and followed up in outdoor basis. The follow-up was taken on the basis of Relieve of symptoms, Decrease in head

size, Milestones, Seizures etc. Functionality of a VP shunt was checked by compressibility and rapid filling of shunt chamber. If there was non-improvement then only, repeat imaging was performed.

RESULTS

A total number of 90 cases were operated, Out of which 59 (65.6%) were male, 31 (34.4%) were female.

Out of 90 cases, 60 (66.7%) presented with aqueductal stenosis and 30 (33.3%) presented with Infections like Pyogenic Meningitis or Tubercular Meningitis.

30/90 cases had complications which is 33.3% Out of 30 cases, 18 (60%) were male and 12 (40%) were female.

Out of 30 complications;

1. Shunt Blockage: 16/30 cases (53.4%)
2. Infection: 6/30 cases (20%)
3. Chamber Migration: 2/30 cases (6.7%)
4. Malfunction: 2/30 cases (6.7%)
5. Tip displacement: 1/30 cases (3.3%)
6. Exposed Shunt: 1/30 cases (3.3%)
7. Seizure: 1/30 cases (3.3%)
8. CSF Varix: 1/30 cases (3.3%)

Table 1: Age wise distribution in Cases of Aqueductal Stenosis

Aqueductal Stenosis (60 cases)	Age		
	0-6 months	7-12 moths	>12 months
Male	26 (43.4%)	6 (10%)	5 (8.3%)
Female	14 (23.3%)	4 (6.7%)	5 (8.3%)

Table 2: Age wise distribution in Cases of Infections

Infections (30 cases)	Age		
	0-6 months	7-12 moths	>12 months
Male	15 (50%)	3 (10%)	4 (13.3%)
Female	5 (16.7%)	2 (6.7%)	1 (3.3%)

Table 3: Age wise distribution in Total cases: 90

Age Distribution	Male	Female
0-6 months	41 (45.5%)	19 (21.1%)
7-12 moths	9 (10%)	6 (6.7%)
>12 months	9 (10%)	6 (6.7%)
Total	59	31

Table 4: Complications: Total 30 cases

Age Distribution	Male	Female
0-6 months	13 (43.4%)	7 (23.3%)
7-12 moths	4 (13.3%)	3 (10%)
>12 months	1 (3.3%)	2 (6.7%)
Total	18	12



Fig 1: Pre-op Clinical Picture

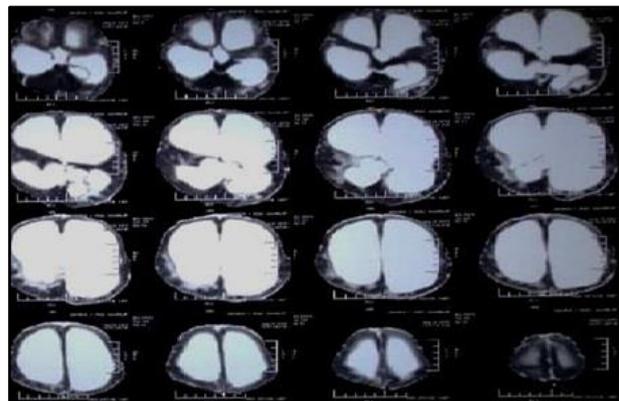


Fig 2: Pre-op MRI Brain T2w Image



Fig 3: Post-op Clinical Picture

DISCUSSION

Ventriculo-peritoneal shunt still remains the mainstay of treatment for pediatric hydrocephalus cases especially in age group 0-6 months. It has sometimes very high complication rate, ranging from immediate post-operative to years of follow-up.⁷ Nulsen and Spitz, in 1949 demonstrated the first feasible, implantable shunt.⁸ Out of our 90 patients operated, 30 had immediate and late complications i.e. 33.3%. A nationwide survey in Japan revealed a 54.2% complication rate following CSF shunt in patients with congenital hydrocephalus.⁹ In our study it is 33.3% but our data is much smaller as compared to it, our study is comparable to study done in USA which prospectively analyzed 1036 cases where shunt failure was 33.2%.¹⁰ In our study the most common cause of congenital hydrocephalus was aqueductal stenosis 66.7%, the

most common complication was Shunt blockage 53.4%, Shunt infection was 20%. Our Shunt blockage rate is quite high but infection rate is comparable to other studies.¹¹⁻¹⁵ In our study majority of the patients, presented within 1 year post surgery, which is comparable to Di Rocco et al¹⁶ and Piatt and Carlson.¹⁷ Our shunt migration was 6.7% which is an important cause of shunt failure. Our rate was less than Ahmed et al.¹⁸ This attributed to differential growth of thorax and neck in relation to head in infants. There was no mortality in our study because we think sample size is small and follow up period is limited hence as the follow up period increases, the rate of mortality and complications will go high as seen in different study.^{19,20}

CONCLUSION

Ventriculo-peritoneal shunt still remains the procedure of choice for the pediatric age group hydrocephalus, although endoscopic third ventriculostomy has started to challenge the result in higher age group. V-P shunt has sometimes high rate of complications. Aqueductal stenosis remains the highest cause of congenital hydrocephalus. Shunt blockage followed by Infection remains the main cause of complication.

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