Original Article

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FREQUENCY OF HYDROCEPHALUS IN POSTOPERATIVE CASES OF MYELOMENINGOCELE. NEED OF VENTRICULOPERITONEAL SHUNT?

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ABSTRACT

Objectives: To assess the frequency of hydrocephalus in postoperative cases of myelomeningocele and the need of ventriculoperitoneal shunt placement.

Study Design: Descriptive study

Place and Duration: CMH Rawalpindi from Sep 2008 to Nov 2009.

Subjects and Methods: Forty patients of either sex with myelomeningocele were included. These patients did not have hydrocephalus at the time of presentation. They were operated upon for myelomeningocele. Postoperative follow up was carried out at 1, 2 and 3 months to look for the development of hydrocephalus. Data was analyzed using SPSS version 17.

Results: Out of forty patients 22 (55%) were males and 18 (45%) were females. The age ranged from newborn to 10 months. Thirty five (87.5%) patients had lumbosacral myelomeningocele, 2 (5%) patients thoracic, 2(5%) patients cervical while one patient (2.5%) presented with both cervical and lumbosacral myelomeningocele. Postoperatively 21 (52.5%) patients developed hydrocephalus which were subsequently confirmed on CT scan head and were then subjected to ventriculoperitoneal shunting.

Conclusion: High frequency of hydrocephalus was observed in postoperative cases of myelomeningocele and patients presenting with one entity must be looked for the other. Postoperative cases of myelomeningocele should be regularly followed for the evidence of hydrocephalus.

Keywords: Hydrocephalus, Myelomeningocele.

INTRODUCTION

The goal in neurosurgery when treating children with predominantly myelomeningocele is to maintain stable neurological functioning throughout the life time of the affected patient. Unfortunately, few long-term outcome studies are available in this regard and often treatment relies more heavily upon the experience of senior practitioners[1]. Myelomeninocele is a complex congenital spinal anomaly that causes varying degrees of spinal cord malformation, or myelodysplasia. It is commonly referred to as spina bifida and is classified as a defect of the neural tube.

The majority of babies with operated myelomeningocele often have associated hydrocephalus. Management of the later can be one of the most trying problems in this patient population. Cerebrospinal fluid (CSF) diversion is required for the remainder of their lives. VP shunt is preferred over other methods because of the ease in diagnosing a subsequent malfunction compared with other traditional methods like third ventriculostomy[2].

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PATIENTS AND METHODS

This was a descriptive study carried out in the department of neurosurgery at Combined Military Hospital Rawalpindi from September 2008 to Nov 2009. Forty patients of either sex with myelomeningocele were recruited. The absence/ presence of hydrocephalus was confirmed by clinical evaluation. Neurological evaluation, head circumference measurement was performed prior to myelomeningocele surgery in all patients. Patients having symptoms and signs of raised intracranial pressure were excluded. The patients who did not have symptoms or signs of intracranial hypertension on presentation were subjected to myelomeningocele repair alone and were then followed up clinically with neurological evaluation and head size measurement at 4 weeks, 2 months and 3 months to look for the development of hydrocephalus. CT scan head

was done in those patients found to have signs and symptoms of raised intracranial pressure like vomiting, irritability, drowsiness, bulging fontanella, sunset sign, progressive enlarging head and bradycardia.

Inclusion criteria

- All patients presenting with myelomeningocele with no clinical and radiological evidence of hydrocephalus
- Age less than 10 months.

Exclusion criteria

- Patients with myelomeningocele having concomitant hydrocephalus
- Previously operated for myelomeningocele.
- Age more than 10 months.

Data analysis

All the data collected through the proforma was entered into the statistical package for social sciences (SPSS) version 17 and analyzed through its statistical package. Mean and standard deviation was used for quantitative data like age while frequency and percentage were calculated for qualitative data like gender and post op complications.

RESULTS

Out of forty patients, 22 (55 %) were males and 18 (45%) were females. The age ranged from newborn to 10 months. The mean age was 4.63 ± 2.547 months. Thirty five (87.5%) patients had lumbosacral myelomeningocele, two (5%) patients thoracic, two (5 %) patients cervical while one(2.5%) patient presented with both cervical and lumbosacral meningocele (Fig 2). Three (7.5%) patients had CSF leak postoperatively which were corrected by re- do surgery and closure of the leakage site.

Two (5%) patients developed post op superficial wound infection which settled down with intravenous antibiotics and repeated dressings (Table 1).

Patients were subjected to measurements of head circumference and evaluated for signs and symptoms of raised intracranial pressure like vomiting, drowsiness, bulging fontanella and sunset signs at one, two and three months post operatively. On confirmation of raised intra cranial pressure, they were subjected to ventriculoperitoneal shunting to relieve hydrocephalus. In our study, at 4 weeks, nine (22.5%) patients had increasing head circumference (OFC) above the normal range but only 5 patients developed hydrocephalus. At 2 months, OFC had increased in twenty three patients but only twelve patients were subjected to ventriculoperitoneal shunting. At 3 months, twelve patients had increasing head circumference but only four patients were operated for VP shunt. At the end of 3 months total of 21 patients underwent VP shunt, the frequency reaching 52.5% (Table 2). At the end of 4 weeks the frequency was 12.5%, at 2

Fig. 1: A patient with postoperative hydrocephalus

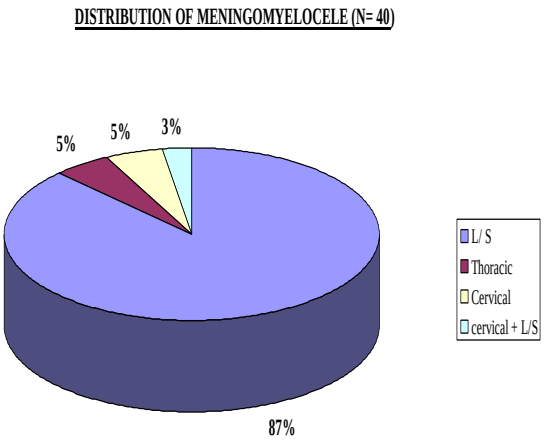

Fig. 2: Gender distribution (n=40)

Table 1: Complications of myelomeningocele repair.

Complications	No of Patients
CSF Leak	3 (7.5%)
Wound infection	2 (5%)

months it was 42.5% and at 3 months it was 52.5%. Postoperatively the development of intracranial hypertension was maximal between 4 weeks and 2 months. Hydrocephalus was noted more frequently and earlier in those cases found to have larger myelomeningocele(> 5cm diameter) and more rostral lesions(upper dorsal and cervical).

Table 2: Postoperative follow up of patients

Duration	Total no of patients	Normal	Increased OFC	
At 04 Weeks	40	31	9	
			5 (HCP)	4 (No HCP)
			VP Shunt	
At 02 Months	35 (Includes 4 from above with No HCP)	12	23	
			12 (HCP)	11 (No HCP)
			VP Shunt	
At 03 Months	23 (Includes 11 from above with No HCP)	11	12	
			4 (HCP)	8 (No HCP)
			VP Shunt	

DISCUSSION

Third world countries are facing many problems, socioeconomic, cultural, educational and nutritional that result in congenital anomalies of central nervous system like neural tube defects (NTD) more frequently than developed countries[3-7].

The rate of shunt placement in some of the largest series of in utero repair of myelomeningocele published in 2003-2004 was 54%, which is significantly lower than shunt placement rate in patients treated postnatally 63-91%[8]. A study carried out at Balabhai Nanavati hospital Mumbai India between 2000 and 2007 ended up with shunt insertion rate of 56.52% which is slightly more than our study of 52.5% because of the fact that we included only those patients who were not having hydrocephalus at the time of presentation.

A retrospective study carried out at the department of neurosurgery Jinnah postgraduate medical centre Karachi included 415 children presenting with myelomeningocele. In this study 88% children showed evidence of hydrocephalus at the time of presentation and all were treated with ventriculoperitoneal shunt insertion[3].

The prevelance of myelomeningocele is high in the third world countries while it has declined in the developed countries due to antenatal folate supplementation and pregnancy termination[9]. In most of the children with myelomeningocele, hydrocephalus is not present at birth but develops in early neonatal period[10]. In some studies the proportion of patients requiring VP shunt has reached 80 to 90%[11,13].

Hydrocephalus is present in 80% of children with myelomeningocele and relates to any of the described variants of the sylvian aqueduct as well as chiari malformation which itself is almost invariably present.The larger and more rostral the lesion, the greater the likelihood, and converse applies, so that an infant with small sacral lesions have a 50% risk. The myelomeningocele sac may act as a reservoir for the CSF, which then is ablated at the time of repair causing postoperative hydrocephalus[12].

The optimal treatment of children presenting with myelomeningocele require specialized care to prevent, monitor and treat a variety of potential complications that can affect function, quality of life and survival[13].

CONCLUSION

Hydrocephalus has emerged as a significant post operative sequel in operated patients of myelomeningocele. In any operated

patient with post surgical increase in occipitofrontal circumference, hydrocephalus manifests with vomiting, drowsiness, bulging fontanella and sunset signs. This necessitates the placement of a ventriculoperitoneal shunt.

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