

Determine the Prevalence of Early Post-Operative Complications in the Treatment of Meningomyelocele

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ABSTRACT

Objective: To examine the prevalence of early postoperative complications in patients who received surgical treatment for meningomyelocele.

Study Design: Descriptive study

Place & Duration: Department of Neurosurgery Unit-1, Sandeman Provincial Teaching Hospital Quetta from 1st January 2017 to 30th June 2017.

Materials and Methods: Total one hundred and thirty six patients of both genders presented with meningomyelocele were included in this study. Patient's ages were ranging from 5 to 120 days. All the patients were undergoing surgical treatment for meningomyelocele. Early post-operative complications were recorded after surgery

Results: There were 76 (55.88%) males and 60 (44.12%) females. Forty (29.41%) patients were ages <1 month, 59 (43.38%) patients were ages 1 to 2 months 37 (27.21%) were ages above 2 months. Majority of patients 70 (51.47%) had defect size <5 cm. Post-operative complications such as surgical site infection, pyrexia, hydrocephalus and cerebrospinal fluid leakage in 20 (14.71%), 115 (84.56%), 29 (21.32%) and 33 (24.26%) patients respectively.

Conclusion: Early and accurate diagnosis and better management may reduce the complications rate

Keywords: Prevalence, Complications, Meningomyelocele

INTRODUCTION

Human disabilities are one of the leading burdens of disease upon our society. According to the 'World Report on Disability', there are more than one billion persons with a variety of disabilities which amounts to above 15% of the world population.¹ Neural tube defects are one of the most common congenital birth defects resulting in a significant number of physical, mental and social disabilities in the earlier years of life. The incidence of these anomalies is very high in the developing world, while in the western countries it has reached a steady state where no decrease is noted despite significant research into its prevention.²⁻⁴

These anomalies are the most debilitating amongst all the structural malformations and have a grave impact upon the functioning of individuals, families and communities as a consequence.^{5,6} Amongst the affected are the families from lower socio-economic status and especially those with poor food quality and hygiene.⁷ Amongst the central nervous system anomalies which are reported in 31% of newborns with anomalies, myelomeningocele (MMC) is the most common of the central nervous system defects with upto 71% occurrence.⁸ The incidence is reported to range from 3 to 6 per 1000 live births.^{8,9}

The current surgical guidelines advise for early repair of the myelomeningocele defect, within 48 hours, and to shunt the hydrocephalus at right time if present concomitantly. Typically the myelomeningocele defect is repaired within 24 to 48 hours of birth and the infant is followed closely for development of signs of hydrocephalus. In more than 70% of infants however, hydrocephalus develops early post-operatively and ultimately require shunting of cerebrospinal fluid (CSF). Among the remaining patients, hydrocephalus may develop later at any time in life.¹⁰ A study into short term outcome of surgical

management of patients with spina bifida by Khan et al reported various complications. Almost all the patients experienced postoperative pyrexia, wound infection was estimated at 9%, 30% cases of cerebrospinal fluid leakage through the wound and 21.2% of patients developed hydrocephalous.

The present study was conducted to examine the occurrence of early post-operative complications in patients whom were undergoing surgical treatment for meningomyelocele and also aimed to provide better treatment and to reduce the complication rate.

MATERIALS AND METHODS

The descriptive study was conducted at Department of Neurosurgery Unit-1, Sandeman Provincial Teaching Hospital Quetta from 1st January 2017 to 30th June 2017. In this study total 135 patients of both genders whom were clinically diagnosed to have meningomyelocele were included. Patient's ages were ranging from 5 to 120 days. After taking informed consent from the patient's guardian or parents detailed medical history including age, sex and size of defect were examined. Patients with previous history of any surgery, other severe morbidities and those whom were not interested were excluded from this study. All the included patients were received surgical treatment for the meningomyelocele. All the surgeries were done by the well experienced surgeons. After surgery, post-operative complications such as surgical site infection, post-operative pyrexia, cerebrospinal fluid leakage and hydrocephalus were recorded.

All the data was analyzed using SPSS 19. Where p-value <0.05 was considered significant.

RESULTS

Out of 136 patients 76 (55.88%) patients were male while 44.12% patients were females. 40 (29.41%) patients were ages <1 month, 59 (43.38%) patients were ages 1 to 3 months 37 (27.21%) were ages above 3 months. Defect sizes were recorded as <5cm, 5 to 10cm and above 10cm in 70 (51.47%), 52 (38.24%) and 14 (10.29%) patients respectively (Table 1). Surgical site infections were noticed in 20 (14.71%) patients. Post-operative pyrexia was seen in 115 (84.56%) patients, postoperative hydrocephalus found in 29 (21.32%) patients and cerebrospinal fluid leakage was observed in 33 (24.26%) patients. Mean hospital stay was 10.2+4.35 days. According to the age the distribution of complications were examined, Patients with ages <1, 1 to 3 and above 3 month surgical site infection was found in 6, 10 and 4 patients, Post-operative pyrexia was found in 40, 65 and 10 patients, post-operative hydrocephalus in 10, 15 and 4 patients and CSF leakage found in 8, 22 and 3 patients respectively (Tables 2-3).

Table 1: Clinical findings of all the patients

Variable	No.	%
Gender		
Male	76	55.88
Female	60	44.12
Age (months)		
<1	40	29.41
1-3	59	43.38
>3	37	27.21
Trauma size (cm)		
< 5	70	51.47
5 – 10	52	38.24
> 10	14	10.29

Table 2: Early post-operative complications

Complications	No.	%
SSI	20	14.71
Pyrexia	115	84.56
Hydrocephalus	29	21.32
CSF Leakage	33	24.26%

Table 3: Distribution of complications according to age

Complications	<1 months	1-3 months	>3months
SSI (n=20)	6	10	4
Pyrexia (n=115)	40	65	10
Hydrocephalus (n=29)	10	15	4
CSF Leakage (n=33)	8	22	3

P value >0.05

DISCUSSION

Neural tube defects are one of the most common congenital birth defects resulting in a significant number of physical, mental and social disabilities in the earlier years of life. In the present study, 55.88% patients were males while 44.12% patients were females. A study conducted by Alamgir¹¹ reported 56.4% male and 43.6% were females. Some other studies shows similarity to our study in which male patients population was high as compared to females.^{12,13}

This study shows that majority of patients were age between 15 to 90 days 72.79%. These results shows similarity to other study conducted regarding

meningomyelocele repair, in which they reported that maximum number of patients were ages 5 to 90 days.¹⁴

In our study we found that 51.47% patients had meningomyelocele size was <5cm and 38.24% patients had size 5 to 10cm and 10.29% patients had sizes >10 cm. These results were similar to some other studies in which maximum patients had size of defect <5cm.¹⁵

In our study, early post operative complications were observed such as surgical site infection found in 20 (14.71%) patients. A study conducted in 2012 regarding meningomyelocele and reported wound infection 11.4%.¹⁶ Study conducted in 2015, following myelomeningocele closure, out of the 91 neonates, 18 (16.4%) developed meningitis/shunt infection and 12 (11%) developed surgical wound infection. Deep surgical wound infection was not associated with the operation time or wound surface area. However, there was an transitional yet vital positive association among meningitis and cerebrospinal fluid leakage, length of hospitalization, and flap transposition ($r = 0.377, 0.420, 0.357, \text{ and } 0.503$, individually; for all values, $p < 0.001$).¹⁷ In our study, we found that post-operative pyrexia in 115 (84.56%), postoperative hydrocephalus found in 29 (21.32%) patients and cerebrospinal fluid leakage was observed in 33 (24.26%) patients. Mean hospital stay was 10.2+4.35 days.¹⁸ Closure of a myelomeningocele is a simple operation; however, meticulous technique significantly reduces operative complications. Efforts should be coordinated toward preserving neurological capacity and improving the subsequent repair of a fastened spine whenever required later on. The timely management of related hydrocephalus will support to avoid cerebrospinal fluid leakage and wound infection/dehescence.¹⁹

Out of 190 patients who underwent surgery between 1979 and 1993, 82 (43.2%) were males and 108 (56.8%) were females. The lumbar spine was the most common site of myeloma in 113 patients (59.5%). Patients with cervical and sacral meningomyelocele had a higher rate of almost normal motor function than those with meningomyelocele at other levels ($P = 0.000$). Total of 166 patients, 36 (21.7%) had no hydrocephalus.²⁰ According to national wide inpatient sample database, 7.45 million patient's admission, 2000 was from retrospectively studied. Demographic data for patients, length of stay, immediate disposal at discharge time, hospital information, and hospitalization costs were determined. It is surprising that only 35% of those who needed ventriculoperitonea shunt placement while in the same hospital for developing hydrocephalus post operatively.

CONCLUSION

Early diagnosis and better surgical treatment may reduce the morbidity and mortality rate. Overall early post-operative complications rate was high but early and accurate diagnosis and management may helps to reduce the complication rate.

REFERENCES

1. World Health Organization (WHO), World Report on Disability: Summary, 2011, WHO/NMH/IP/11.01, available at: <http://www.refworld.org/docid/50854a322.htm>

2. Khattak ST, Khan M, Naheed T. Prevalence and management of anencephaly at Saidu Teaching Hospital, Swat. *J Ayub Med Coll Abbottabad* 2010; 22: 61-3.
3. Sibinski M, Synder M, Higgs ZC. Quality of life and functional disability in skeletally mature patients with myelomeningocele-related spinal deformity. *J Pediatr Orthop [B]* 2013; 22: 106-9.
4. Roach JW, Short BF, Saltzman HM. Adult consequences of spina bifida: a cohort study. *Clin Orthop Relat Res* 2011; 469: 1246-52.
5. Pruitt LJ. Living with spina bifida: a historical perspective. *Paediatrics* 2012; 130: 181-3.
6. Rathod KJ, Mahajan JK, Khan RA. Quality of life of very young spina bifida patients after initial surgical treatment. *Childs Nerv Syst* 2012; 28: 883-7.
7. Raza MZ, Sheikh A, Ahmed SS. Risk factors associated with birth defects at a tertiary care centre in Pakistan. *Itali J Pediatr* 2012; 38: 68.
8. Gilani S, Kazmi NHS, Najeeb S. Frequencies of congenital anomalies among newborns admitted in nursery of Ayub Teaching Hospital Abbottabad, Pakistan. *J Ayub Med Coll Abbottabad* 2011; 23: 114-6.
9. Raza M, Habib S. Frequency of prenatal central nervous system anomalies detected by ultrasound in a tertiary care hospital. *Pak J Med Res* 2013; 52: 19-21.
10. Khan MY, Khan K, Ahmed M. Short term outcome of surgical management of patients with neural tube defect (spina bifida). *JPMI* 2006;20(3):243-7.
11. McLone DG, Dias MS. Complications of myelomeningocele closure. *Pediatr Neurosurg* 1991-1992; 17: 267-73.
12. Mirzai H, Erşahin Y, Mutluer S, Kayahan A. Outcome of patients with meningomyelocele: the Ege University experience. *Childs Nerv Syst* 1998; 14: 120-3.
13. Sin AH, Rashidi M, Caldito G, Nanda A. Surgical treatment of myelomeningocele: year 2000 hospitalization, outcome, and cost analysis in the US. *Childs Nerv Syst* 2007; 23: 1125-7.
14. Kshetry VR, Kelly ML, Rosenbaum BP, Seicean A, Hwang L, Weil RJ. Myelomeningocele: surgical trends and predictors of outcome in the United States, 1988-2010. *J Neurosurg Pediatr* 2014; 13: 666-78.
15. Demir N, Peker E, Gülşen İ, Ağengin K, Tuncer O. Factors affecting infection development after meningomyelocele repair in newborns and the efficacy of antibiotic prophylaxis. *Childs Nerv Syst* 2015; 31: 1355-9.
16. Pang D. Surgical complications of open spinal dysraphism. *Neurosurg Clin N Am* 1995; 6: 243-57.
17. Klusmann A, Heinrich B, Stöpler H, et al. A decreasing rate of neural tube defects following the recommendations for periconceptional folic acid supplementation. *Acta Paediatr* 2005; 94: 1538.
18. Khan A. Outcome of myelomeningocele repair and early post-operative complications. *Pak J Neurol Surg* 2018; 22(4): 200-5.
19. Bartnicki B, Synder M, Kujawa J, Stańczak K, Sibiński M: Siting stability in skeletally mature patients with scoliosis and myelomeningocele. *Ortop Traumatol Rehabil* 2012; 14:383–9.
20. Hatlen T, Song K, Shurtleff D, Duguay S: Contributory factors to postoperative spinal fusion complications for children with myelomeningocele. *Spine* 2010; 35:1294–9.