**East African Scholars Journal of Medicine and Surgery**
*Abbreviated Key Title: EAS J Med Surg*
ISSN: 2663-1857 (Print) & ISSN: 2663-7332 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-6 | Issue-4 | Apr-2024 | DOI: 10.36349/easjms.2024.v06i04.004

**Original Research Article**

# Early Outcome after Surgical Repair of Postnatal Myelomeningocele

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**Article History**
**Received:** 20.02.2024
**Accepted:** 26.03.2024
**Published**: 22.04.2024

**Journal homepage:**
https://www.easpublisher.com

**Quick Response Code**

**Abstract:** ***Introduction*:** Myelomeningocele repair is a relatively uncommon procedure. Much of this has been attributed to improve nutrition and early detection. Our aim is to detect early (30 days) outcome of pediatrict patients undergoing postnatal myelomeningocele repair. ***Material and Methods*:** The prospective observational study was carried out on 68 patients presented with myelomeningocele who underwent surgery with age ranged from one (1) month to two (2) years got admitted in the department of neurosurgery, Bangabandhu Sheikh Mujib Medical University from January 2020 to May 2023. ***Results*:** Maximum age was found 1 month to 3 months, female baby were predominant which was 40(58.8%), majority 48(70.6%) were medium size, common location were Dorsal (14.7%), Lumbar (45.6%) and Dorsolumbar (33.8%). CSF leak found (8.8%), decreased power of limbs found (38.2%), wound infection was found (5.9%), hydrocephalus found (39.7%), New hydrocephalus (2.9%) and New neurological deficit (1.5%). The duration of hospital stay 4.1±0.8 days. ***Conclusion*:** Most complications occur within 30 days of myelomeningocele repair. Wound infection was found in 5.9%. Mostly occurs between 1 to 3 months of age. Early repair of myelomeningocele reduces neurological impairment significantly.

**Keywords:** Early detection, surgical repair, postnatal myelomeningocele.



## INTRODUCTION

Spina bifida is the second major cause of congenital disorders following congenital heart defects and the most common central nervous system malformation compatible with life [1].

The most significant type of Spina bifida is myelomeningocele (MMC; open spina bifida), in which the spinal neural tube fails to close properly during embryonic development [2].

Clinically most significant is myelomeningocele (MMC; open spina bifida) in which the spinal neural tube fails to close during embryonic development [3]. The exposed neural tissue degenerates *in utero*, resulting in neurological deficit that varies with level of the lesion. Occurring in around 1 per 1000 births worldwide, MMC is one of the commonest congenital malformations, yet its causation is largely unknown [3]. The genetic component of MMC is estimated at 60-70% but few genes have yet been identified, despite much information from mouse models [3]. Timely detection and complete correction can remarkably minimize the burden and neurological disability [4].

Myelomeningocele is a type of NTD that can carry a good prognosis if evaluated and operated upon early—either through fetal or prompt postnatal repair [5]. One study showed that approximately 75% of children born with spina bifida have no intellectual disability and live independently, attend higher education, and hold steady employment [6, 7]. Medical problems arise when these lesions become infected and may lead to neonatal meningitis, which has known association with worse neurocognitive outcomes [8].

For patients with concurrent hydrocephalus, the current surgical recommendations are that the

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myelomeningocele deficiency is repaired as soon as possible, ideally within 72 hours. To reduce the danger of infections, postnatal surgery is often performed within 24 to 48 hours following delivery or after two weeks [9]. Having a child with MMC has an impact not only on the patient's quality of life but also on the parents, siblings, and society.

Psychological and socioeconomic implications. Prevention is always the first step in controlling the incidence of the disease. However, early identification and meticulous repair may have a role in reducing the burden and neurological impairment significantly [10].

Therefore, the purpose of this study is to create awareness among the guardians and society so that the patients can lead healthy life physically and psychologically.

## MATERIAL AND METHODS

The prospective observational study was conducted on 68 patients presented with myelomeningocele who underwent surgery with age ranged from one (1) month to two (2) years got admitted in the department of neurosurgery, Bangabandhu Sheikh Mujib Medical University from January 2020 to May 2023. Patient with spina bifida occulta, recurrent myelomeningocele, concurrent congenital abnormality in the cardiovascular or renal system and those who refused to participate in this study were excluded. On admission myelomeningocele was first diagnosed by history and clinical examination then confirmed by MRI of the whole neuroaxis including brain. A data collection sheet was used to collect necessary information. Informed written consent was taken from the guardian. Patient demographics including age, gender, location and size of MMC were documented. Size of MMC was noted with < 3 cm being considered small, 3 to 6 cm medium and > 6 cm large. Power in the limbs was also measured by MRC grading preoperatively. All patients were checked and monitored for one month after surgery. A new lower limb weakness in a youngster with complete spontaneous movements preoperatively was regarded a worsening neurological impairment. Post-operative wound infection was defined as infection in the incision line within 30 days of surgery and was determined by the presence of any of the following clinical findings: Redness, swelling, pus in the wound, and purulent discharge from the wound. Postoperative development of hydrocephalus, wound infection and CSF leak were recorded in data collection sheet. After collection data was processed by utilizing SPSS statistical program (version26). Results were described in frequencies and percentage. Statistical analysis was done by using Chi – square test, p value < 0.05 was considered statistically significant. The 95% confidence interval was chosen, with an 8% margin of error.

## RESULT

**Table 1: Demographic data of patients with MMC (n=68)**

| Age | Frequency | Percentage |
|---|---|---|
| 1 month to 3 months | 25 | 36.76 |
| >3 months to 6 months | 20 | 29.41 |
| >6 to 9 months | 13 | 19.12 |
| >9 months to 12 months | 7 | 10.29 |
| >12 months | 03 | 4.41 |

**Table 1 B**

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 28 | 41.2 |
| Female | 40 | 58.8 |

**Table 1 C**

| Size of MMC | Frequency | Percentage |
|---|---|---|
| Small | 1 | 1.5 |
| Medium | 48 | 70.6 |
| Large | 19 | 27.9 |

**Table 1 D**

| Location of MMC | Frequency | Percentage |
|---|---|---|
| Cervical | 4 | 5.9 |
| Dorsal | 10 | 14.7 |
| Lumbar | 31 | 45.6 |
| Dorsolumbar | 23 | 33.8 |

**Table 2: Clinical data of patients with MMC (n=68)**

**Table 2 A**

| Power of limbs | Frequency | Percentage |
|---|---|---|
| Spontaneous | 8 | 11.8 |
| Decreased | 26 | 38.2 |
| Absent | 34 | 50.0 |

**Table 2 B**

| CSF leak | Frequency | Percentage |
|---|---|---|
| Present | 6 | 8.8 |
| Absent | 62 | 91.2 |

**Table 2 C**

| Wound infection | Frequency | Percentage |
|---|---|---|
| Present | 4 | 5.9 |
| Absent | 64 | 94.1 |

**Table 2 D**

| Hydrocephalus | Frequency | Percentage |
|---|---|---|
| Old Hydrocephalus | 27 | 39.7 |
| New Hydrocephalus | 2 | 2.9 |
| No Hydrocephalus | 39 | 57.3 |

**Table 2 E**

| New neurological deficit | Frequency | Percentage |
|---|---|---|
| Present | 1 | 1.5 |
| Absent | 67 | 98.5 |

**Table 3: Outcome variables**

| Outcome variables | Frequency | Percentage |
|---|---|---|
| Readmissions in 30 days | 4 | 5.9 |
| Re-surgery | 3 | 4.4 |
| Mortality | 0 | 0.0 |
| Duration of stay (days) | 4.1±0.8 | |

Maximum age was found 1 month to 3 months, female baby were predominant which was 40(58.8%), majority 48(70.6%) were medium size, common location were Dorsal (14.7%), Lumbar (45.6%) and Dorsolumbar (33.8%). CSF leak found (8.8%), decreased power of limbs found (38.2%), wound infection was found (5.9%), hydrocephalus found (39.7%), New hydrocephalus (2.9%) and New neurological deficit (1.5%). The duration of hospital stay 4.1±0.8.

**Table 4: Statistical stratification of pediatric patients (n=68)**

| | | **Wound infection** | | | **CSF leak** | | | **New hydrocephalus** | | | **New neurological deficit** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Total** | **Present (n=4)** | **Absent (n=64)** | **P value** | **Present (n=6)** | **Absent (n=62)** | **P value** | **Present (n=2)** | **Absent (n=66)** | **P value** | **Present (n=1)** | **Absent (n=67)** | **P value** |
| **Age** | | | | | | | | | | | | | |
| 1 - 3 months | **25** | 2 | 23 | 0.622 | 0 | 25 | 0.202 | 0 | 25 | 0.260 | 0 | 25 | 0.782 |
| >3 - 6 months | **20** | 1 | 19 | | 5 | 15 | | 1 | 19 | | 1 | 19 | |
| >6- 9 months | **13** | 1 | 12 | | 1 | 12 | | 1 | 12 | | 0 | 13 | |
| >9- 12 months | **7** | 0 | 7 | | 0 | 7 | | 0 | 7 | | 0 | 7 | |
| >12 months | **3** | 0 | 3 | | 0 | 03 | | 0 | 3 | | 0 | 3 | |
| **Gender** | | | | | | | | | | | | | |
| Male | **28** | 1 | 27 | 0.498 | 4 | 24 | 0.184 | 1 | 27 | 0.796 | 0 | 28 | 0.399 |
| Female | **40** | 3 | 37 | | 2 | 38 | | 1 | 39 | | 1 | 39 | |
| **Size of MMC** | | | | | | | | | | | | | |
| Small | **1** | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | |

| | Total | Wound infection | | | CSF leak | | | New hydrocephalus | | | New neurological deficit | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Present (n=4) | Absent (n=64) | P value | Present (n=6) | Absent (n=62) | P value | Present (n=2) | Absent (n=66) | P value | Present (n=1) | Absent (n=67) | P value |
| Medium | **48** | 4 | 44 | 0.412 | 5 | 43 | 0.865 | 1 | 47 | 0.773 | 1 | 47 | 0.809 |
| Large | **19** | 0 | 19 | | 1 | 18 | | 1 | 18 | | 0 | 19 | |
| **Location of MMC** | | | | | | | | | | | | | |
| Cervical | **4** | 0 | 4 | 0.879 | 0 | 4 | 0.573 | 0 | 4 | 0.898 | 0 | 4 | 0.575 |
| Dorsal | **10** | 1 | 9 | | 0 | 10 | | 0 | 10 | | 0 | 10 | |
| Lumbar | **31** | 2 | 29 | | 4 | 27 | | 1 | 30 | | 0 | 31 | |
| Dorsolumbar | **23** | 1 | 22 | | 2 | 21 | | 1 | 22 | | 1 | 22 | |

Table shows no significance was observed among the size of MMC, Age, and Location of MMC when cross-tabulated with wound infection, CSF Leak, New Hydrocephalus, and New Neurological Deficit.

## DISCUSSION

Present study observed maximum age was found between 1 month to 3 months, female baby were predominant which was 40(58.8%), majority 48(70.6%) were medium size, common location were Dorsal (14.7%), Lumbar (45.6%) and Dorsolumbar (33.8%). CSF leak found (8.8%), decreased power of limbs found (38.2%), wound infection was found (5.9%), hydrocephalus found (39.7%), New hydrocephalus (2.9%) and New neurological deficit (1.5%). The duration of hospital stay 4.1±0.8 days. Aftab *et al.,* [11] reported age of the MMC patients, the highest percentage of age group i.e. 36.8% in 1 to 3 months, > 3 to 6 months of age 29.1%, >6 to 9 months 19.1%, >9 to 12 months 10.3% and >12 months was 9.6% and all the patients who were marked above the age of 12 months were only 4.4% of the total sample size population. Aftab *et al.,* [11] reported medium size of MMC (71.3%) at the lumbar location (46.8%) was observed in higher frequency among the study sample. However, the large size of MMC was observed in 27.7% population. The anatomical position of myelomeningocele varies in literature however it has often present at 22.3% to 55.7% lumbosacral, cervical 1.8% to 5.6%, cervicothoracic 0.9%, thoracic 4.2%, lumbar 16.8% to 55.7%, sacral 16% to 34.5% and in 0.9% cervical, 5.6% thoracolumbar, and 16% sacral injuries were reported [12, 13].

Current study showed no significance was observed among the size of MMC, Age, and Location of MMC when cross-tabulated with wound infection, CSF Leak, New Hydrocephalus, and New Neurological Deficit. Aftab *et al.,* [11] reported age of pediatric patients was not statistically significant in our study which was found to be similar to the Lillegard J.B. *et al.,* [14].

## CONCLUSION

Most complications occur within 30 days of myelomeningocele repair. Wound infection more common between 1 to 3 months of age. Probably early repair of myelomeningocele reduces neurological impairment significantly.

**Limitation**

1. Sample size very small
2. Study conducted within short period

## RECOMMENDATION

1. Further study should be carried out incorporating large number of patients
2. Study should be done for longer period of time for better result.

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**Cite This Article:** K. M. Tarikul Islam, A. B. M. Manwar Hossain, Mohiuddin Sazal, Md. Rezaul Amin, Sukriti Das, Moududul Hoque (2024). Early Outcome after Surgical Repair of Postnatal Myelomeningocele. *East African Scholars J Med Surg, 6*(4), 137-141.