

## ORIGINAL ARTICLE

**Characteristics and Outcome of 588 Children with Myelomeningocele at a Tertiary Childcare Hospital of South Punjab, Pakistan**SHAKEEL AHMED<sup>1</sup>, SHOAIB SALEEM KHAN<sup>2</sup>, UBAID ULLAH<sup>3</sup>, WAQAS NOOR CHUGHTAI<sup>4</sup>, MALIK LIAQAT ALI JALAL<sup>5</sup>, KASHIF CHISHTI<sup>6</sup><sup>1</sup>Assistant Professor, Department of Pediatric Neurosurgery, The Children's Hospital and Institute of Child Health, Multan.<sup>2</sup>Assistant Professor, Department of Neurosurgery, Ibn e Sienna Hospital and Research Institute, Multan.<sup>3</sup>Assistant Professor, Department of Neurosurgery, Multan Medical and Dental College, Multan.<sup>4</sup>Assistant Professor, Department of Neurosurgery, Bakhtawar Amin Medical and Dental College, Multan.<sup>5</sup>Assistant Professor, Department of Neurosurgery, DG Khan Medical College, DG Khan.<sup>6</sup>Professor and Head of Pediatric Surgery Department, The Children's Hospital and Institute of Child Health, Multan.Correspondence to: Shakeel Ahmed, Email: [neuromashori@gmail.com](mailto:neuromashori@gmail.com), Cell: 03337161514**ABSTRACT****Objective:** To describe characteristics and outcome of children with myelomeningocele at a tertiary childcare hospital of South Punjab, Pakistan.**Study Design:** A retrospective study.**Place and Duration of the Study:** Department of Pediatric Neurosurgery, The Children's Hospital and Institute of Child Health, Multan Pakistan from January 2019 to December 2021.**Material and Methods:** Data of a total of 588 children of either gender aged up to 12 years undergoing myelomeningocele repair during the 3 year study period were analyzed. Gender, age and residential status of all children were recorded. Diagnosis of MMC was confirmed with the help of medical history, clinical findings and radiological investigations like magnetic resonance imaging (MRI). All patients underwent standard management protocols.**Results:** In a total of 588 children with MMC, 359 (61.1%) were boys and 229 (38.9%) girls. Overall, mean age was calculated to be 6.29±6.51 months ranging from 1 day to 7 years while 409 (69.6%) children were aged between 1 to 6 months. Residential status of 427 (72.6%) children was rural. Lumbosacral was the most commonly affected region noted in 440 (74.8%) children. No intra-operative or immediate post-operative mortality was noted among children with MMC.**Conclusion:** Most of the children with myelomeningocele were boys and aged between 1 to 6 months. Lumbosacral region was the most frequently affected region. Excellent intra-operative or immediate post-operative outcomes of MMC repair were reported.**Keywords:** Lumbosacral, myelomeningocele, outcome.**INTRODUCTION**

Myelomeningocele (MMC) is considered to be an important birth defect due to incomplete closure of the neural tube during the 4<sup>th</sup> weeks of gestation.<sup>1</sup> The involved spinal cord is thought to sustain intrauterine trauma that leaves the child with lifelong paralysis, incontinence as well as cognitive abnormalities.<sup>2</sup> Neural tube defects (NTDs) are known to be one of the commonest forms of congenital abnormalities.<sup>3</sup> NTDs are generally divided into cranial dysraphism with resultant anencephaly or spinal dysraphism with or without MMC.

MMC not only hampers the affected child but also has physical, psychological and financial impact on the families involved.<sup>4</sup> Data from the United States has shown MMC to inflict 13-times higher costs in comparison to healthy child.<sup>5,6</sup> The incidence of MMC varies in different regions of the world while the exact incidence of MMC in Pakistan is still unknown.<sup>7,8</sup> Among untreated cases of MMC, 65-70% die within 1<sup>st</sup> 6-months of life.<sup>9</sup>

Recent decades have seen lots of advancement regarding prenatal diagnosis, surgical methods and assistive techniques for MMC. Some initial studies conducted on pre-natal interventions for the treatment of MMC attained interest among the surgeons<sup>10,11</sup>, but in a developing and resource constrained country like Pakistan, we are still far away from ideal treatment and care of MMC due to unawareness and lack of healthcare seeking behaviors among families of children affected by MMC. In this study, we aimed to present our experience about the characteristics and outcome of children presenting to us for myelomeningocele repair during the 3 year stud period. The aim of this study was to describe characteristics and outcome of children with myelomeningocele at a tertiary childcare hospital of South Punjab, Pakistan.

**MATERIAL AND METHODS**

This retrospective study was conducted at the department of pediatric neurosurgery, The Children's Hospital and Institute of Child Health, Multan Pakistan from January 2019 to December 2021. Approval from "Institutional Ethical Committee" was

acquired. Informed written consents were sought from parents/caregivers/guardians of all children.

Data of a total of 588 children of either gender aged up to 12 years undergoing myelomeningocele repair during the 3 year study period were analyzed. Children with history of any kinds of surgery were excluded. All children with congenital heart diseases or having any kinds of chronic systemic illnesses were also not included. Gender, age and residential status of all children were recorded. Diagnosis of MMC was confirmed with the help of medical history, clinical findings and radiological investigations like magnetic resonance imaging (MRI). All patients underwent standard management protocols. A special format was designed to record all study data. For data analysis, SPSS version 26.0 was employed. For categorical variables, frequencies and percentages were calculated. Numeric data was shown as mean and standard deviation.

**RESULTS**

In a total of 588 children with MMC, 359 (61.1%) were boys and 229 (38.9%) girls. Overall, mean age was calculated to be 6.29±6.51 months ranging from 1 day to 7 years while 409 (69.6%) children were aged between 1 to 6 months. Residential status of 427 (72.6%) children was rural whereas remaining 161 (27.4%) children belonged to urban areas. Table-1 is representing details of characteristics of all children involved in this study.

Table-1: Characteristics of Children with Myelomeningocele (n=588)

Characteristics	Number (%)	
Gender	Boys	359 (61.1%)
	Girls	229 (38.9%)
Age in Months	<1	7 (1.1%)
	1-6	409 (69.6%)
	7-60	171 (29.1%)
	>60	1 (0.2%)
Residential Status	Rural	427 (72.6%)
	Urban	161 (27.4%)

Lumbosacral was the most commonly affected region noted in 440 (74.8%) children. Figure-1 is showing distribution of spinal location of MMC. All repairs were done according to standard protocols. No intra-operative or immediate post-operative mortality was noted.

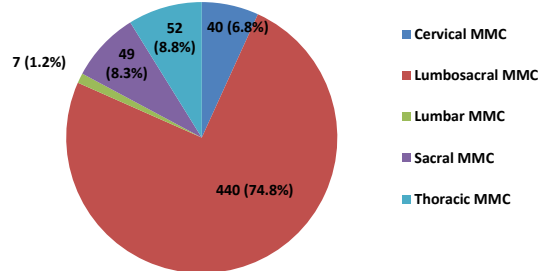


Figure-1: Spinal Local of Myelomeningocele among Children (n=588)

## DISCUSSION

The NTDs are known to be the 2<sup>nd</sup> most commonly occurring congenital abnormalities after cardiac anomalies while researchers have pointed towards deficiency of folic acid to be a well-established risk factor for NTDs.<sup>12</sup> The present study is one of the largest analyzing children undergoing MMC repair in Pakistan.

We found that 61.1% cases of MMC were boys. A local study from Karachi revealed 55.3% of children with MMC to be boys.<sup>13</sup> Our findings also correlate well with the findings of Alamgir K where 56.4% cases of MMC were male.<sup>14</sup> Overall, mean age was calculated to be 6.29±6.51 months ranging from 1 day to 7 years while 69.6% children were aged between 1 to 6 months. Another local study reported mean age of presentation of children with 2 ±1months.<sup>13</sup> Alamgir et al found mean age at the time of presentation of children with MMC to be 58.58 ± 26.01 days.<sup>14</sup> As we did not record age at the time of presentation of MMC, we only noted age at the time of MMC repair which could have been the reason why mean age in our group of children was higher to what has been reported by other researchers discussed here. Residential status of 72.6% children was rural whereas remaining 27.4% children belonged to urban areas. Similar findings are reported by studies in the developing world which found NTDs in low socioeconomic groups.<sup>15</sup>

Lumbosacral was the most commonly affected region noted in 74.8% children with MMC. The most common site of MMC to be lumbosacral area has also been reported by other researchers in the past as its frequencies ranges between 60-70% of all MMC cases.<sup>16</sup> Local data in the past found lumbosacral region to be involved in 55% of MMC cases.<sup>13</sup> Oncel who reported 46.6% of the defects were lumbosacral.<sup>17</sup> Khan HU et al shoed 87% of MMC cases to have involvement of lumbosacral region.<sup>18</sup>

Early surgical procedures have been linked to induce decline in rates of morbidity and mortality among cases accompanying myelomeningocele while surgical option adopted following birth has been portrayed to have low risk along with good outcomes in comparison to fetoscopic surgical options which are related to significantly increased chances of adverse outcomes in both mother and the fetus.<sup>19</sup> It is important to continue follow up of surgical corrected cases of MMC. Increasing general public knowledge as well as awareness about the possible preventive measure and antenatal surveillance for the time surgical interventions that can further ensure better prognosis. There is a need to form a national program for recording and evaluating of MMC cases in Pakistan so that guidelines regarding timely identification and management of these cases can be done in an appropriate way to reduce associated morbidity and mortality.

Being a retrospective study, we could not actively interact with children or their family/family/parents/guardians for the data collection. We were unable to collection information about the neurological examination and functional grading. We also could not details of clinical examination.

## CONCLUSION

Most of the children with myelomeningocele were boys and aged between 1 to 6 months. Lumbosacral region was the most frequently affected region. Excellent intra-operative or immediate post-operative outcomes of MMC repair were reported.

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