


Challenges of Myelomeningocele care in sub-Saharan Africa: A Nigerian centre experience

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Introduction: To study the challenges of myelomeningocele care in sub-Saharan Africa (a resource-poor setting). Reviewed the peculiarities of presentation and the management outcomes of patients with myelomeningocele in our setting.

Method: A 3-year retrospective review of all the myelomeningoceles that were managed in our centre from January 2021 to December 2023.
Results: A total of 53 patients were made up of 18 boys and 35 girls, with a male-to-female ratio of 1:2. Ages ranged from 1 hour to 16 years. Spinal levels were 1.9% cervical, 5.7% thoracic, 22.6% lumbar, and 37 (69.8%) in lumbosacral junctions. Circumferences ranged between 10.7 cm and 41 cm. All mothers knew about folic acid, but most (52, 98%) were postconceptional users. Associations include hydrocephalus (40, 75.5%), foot deformities (22.6%), and imperforate anus (1.9%). Surgeries were closure only (18.9%), flap closure (5.7%), closure with VP shunt in the same sitting (2 in 1) in 36 (67.9%), and post-excision VP shunt in 4 (7.5%). Postoperative complications (in 12 patients) were hydrocephalus (4, 33.3%), wound infection/dehiscence (5, 41.7%), and pseudomeningocele (3, 25%). Five (9.4%) patients were lost to follow-up. We had 2 mortalities (3.8%), and both were infection related.

Conclusion: Myelomeningocele is common among females, and many presentations are late (days to years). Mothers knew about folic acid but lacked basic knowledge about its importance and appropriate usage (timing). We advocate for further public awareness of its preventive measures.

Keywords: Myelomeningocele; Spina Bifida; Hydrocephalus; Sub-Saharan Africa; Folic Acid.

INTRODUCTION

Myelomeningocele (MMC) is a severe neural tube defect caused by failure of neural tube closure in early gestation, resulting in herniation of neural tissue, most commonly in the lumbosacral region [1]. Its true incidence in low- and middle-income countries (LMICs) is poorly defined, but available evidence indicates a higher burden in resource-poor settings, where nearly 300,000 infants are born annually with neural tube defects [2,3]. Prevalence varies widely and is strongly associated with inadequate folic acid supplementation, poor maternal nutrition, and limited prenatal care, with sub-Saharan Africa disproportionately affected [4,5].

Clinically, MMC often presents at birth with neurological deficits, hydrocephalus, and associated musculoskeletal anomalies [6-8]. Delayed diagnosis and limited access to prenatal screening and pediatric surgical services contribute to increased infectious complications and poor outcomes in low-resource settings [7,9,10]. The high cost of surgical and long-term care places substantial financial strain on families, increasing the risk of neglect and abandonment [11].

Postoperative outcomes are further compromised by

inadequate multidisciplinary care and limited access to rehabilitation services [12,13]. Although preconception folic acid supplementation significantly reduces the risk of neural tube defects, its utilization remains inconsistent across many African settings [14]. Despite ongoing improvements in awareness and training, late presentation, restricted surgical access, and high complication rates continue to challenge MMC management [13]. This study evaluates the pattern of presentation and treatment outcomes of MMC in a resource-poor setting to inform future care strategies.

Materials and Methods

A three-year retrospective review was conducted on all myelomeningocele cases managed at Modibbo Adama University Teaching Hospital, Yola, Northeastern Nigeria, between January 2021 and December 2023. Patient records were reviewed to obtain data on demographics, place of delivery, lesion characteristics, maternal folic acid knowledge, associated anomalies, neuroimaging availability, surgical management, and postoperative complications. Data were analyzed using SPSS version 22 and presented as descriptive statistics in proportions and percentages.



RESULTS

Fifty-three (53) myelomeningocele cases were reviewed, comprising 18 males and 35 females (male-to-female ratio 1:2). Ages at presentation ranged from less than one hour to 16 years, with a mean age of 2.0 ± 1.6 years and a modal age of 5 days. The relationship between their spinal levels to the patient's ages at presentation is shown below, in Table 1. Most patients were delivered at home (57.4%), while 31.5% and 11.1% were delivered in public and private health facilities, respectively. This is shown in figure 1 below.

PLACES OF DELIVERY

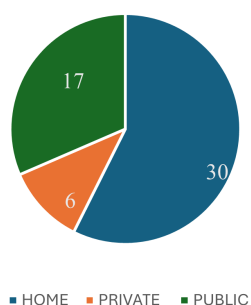


Figure 1: Pie chart showing their places of delivery: Home, private facility, and public facility

Lumbosacral lesions were the most common (69.8%), followed by lumbar (22.6%), thoracic (5.7%), and cervical (1.9%) lesions. Lesion sizes varied widely, with a mean diameter of 6.5 ± 3.1 cm; three lesions were classified as giant, having circumferences larger than the patients' head circumferences.

All mothers were aware of folic acid, but 98% used it after conception, predominantly in the third trimester. Hydrocephalus was the most frequent associated anomaly (75.5%), followed by foot deformities (22.6%), pressure injuries (7.5%), and imperforate anus (1.9%).

All patients underwent Transfontanelle ultrasound scanning, while spinal MRI was available in only 13.2%. Surgical procedures and complications varied, with both preoperative and postoperative complications recorded. Overall outcomes were favorable in 96.2% of patients, with two infection-related deaths (3.8%). Five patients (9.4%) were lost to follow-up. Some of the clinical findings are shown in Figure 2, below.

The types of surgeries (some had multiple) and the complications observed are shown in Table 2, below.

Some complications observed in the preoperative (at presentations) and in the postoperative periods are shown in Figure 3, below.

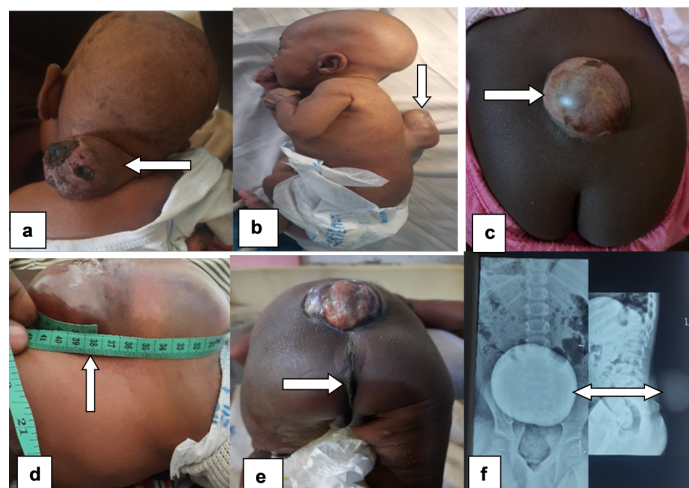


Figure 2: A Cervical MMC (a), A thoracic MMC (b), A Lumbosacral MMC (c), A Huge ('giant'), 38 cm circumference Lumbosacral MMC (d), An infant with Sacral MMC and a midline raphe (white arrowed) on the site of an imperforate anus (e), Lumbosacral Xray in Anteroposterior and Lateral view showing the findings (circumferential soft tissue shadow and absence of posterior elements) in a MMC (f)

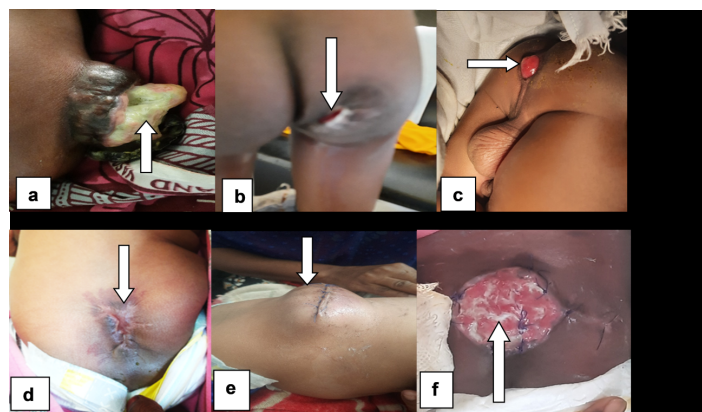


Figure 3: Infected lesion at presentation (a), Right gluteal pressure injury (ulcer) in a teenager with sacral MMC (b), An infant with anal prolapse (c), A spontaneously ruptured and subsequently healed sacral MMC (d), A postoperative pseudo meningocele (e), An infected, dehisced surgical site (f)

DISCUSSION

A total of 53 patients with myelomeningocele (MMC) were managed during the study period, with a female predominance, consistent with reports from other studies, although some authors have reported male dominance [15-17]. Infants constituted the largest group at presentation (38%), with 5 days being the most common age, reflecting early presentation compared with some studies that reported later surgical intervention [18,19]. Delays were attributed to home deliveries, sociocultural practices, security challenges, and financial constraints.

Home deliveries were more common than hospital deliveries, mirroring earlier findings from the same institution and underscoring poor antenatal care utilization [1,7]. Lumbosacral lesions were the most frequent (70%), similar to reports from Zambia and various regions of Nigeria

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Table 1: Showing patients' ages at presentation, spinal levels of the lesions in each age group, and their number. (N=53)

AGES	SPINAL LEVELS	NUMBER
< 1 year (infants)	Cervical	0 (0 %)
	Thoracic	1(1.9 %)
	Lumbar	6 (11.3 %)
	Lumbosacral	13 (24.5 %)
1– 5 years	Cervical	0 (0 %)
	Thoracic	0 (0 %)
	Lumbar	4 (7.5 %)
	Lumbosacral	9 (17 %)
6 – 10 years	Cervical	0 (0 %)
	Thoracic	0 (0 %)
	Lumbar	3 (5.7 %)
	Lumbosacral	10 (18.8 %)
11 – 15 years	Cervical	0 (0 %)
	Thoracic	0 (0 %)
	Lumbar	1 (1.9 %)
	Lumbosacral	3 (5.7 %)
≥ 16 years	Cervical	0 (0.0 %)
	Thoracic	0 (0.0 %)
	Lumbar	1 (1.9 %)
	Lumbosacral	2 (3.8 %)
TOTAL		53 (100 %)

Table 2: showing the type of primary surgery done and the postoperative complications observed

PARAMETERS	NUMBER (%)
Type of primary surgery (N= 53)	
Excision and closure only	10 (18.9 %)
Excision and flap closure	3 (5.7 %)
Excision and closure with VP Shunt (2 in 1)	36 (67.9 %)
post excision VP Shunt	4 (7.5 %)
Postoperative complications (N= 12)	
Post excision Hydrocephalus	4 (33.3 %)
Post-op wound infection / dehiscence	5 (41.7 %)
Post-Operative pseudo meningocoele	3 (25 %)

[21-23]. Older children more commonly presented with lumbosacral lesions, possibly due to milder neurological deficits and social motivations, particularly among female adolescents.

Three cases of giant myelomeningocoele were identified, a rare finding consistent with previous reports [20,24]. Hydrocephalus was the most common associated anomaly, followed by foot deformities, aligning with findings from Yola and North Central Nigeria, though lower associations have been reported elsewhere [19,25,26]. Transfontanelle ultrasound was used to diagnose post-excision hydrocephalus due to its availability and affordability, despite not being the gold standard [27].

Surgical management was mainly excision with closure (77%), with Limberg flap closure used in a minority. Ventriculoperitoneal (VP) shunting was performed in 75.5% of patients, mostly concurrently with lesion excision ("2-in-

1" surgery), similar to other reports [19]. Endoscopic third ventriculostomy was unavailable. All patients with hydrocephalus received VP shunts.

Although all mothers were aware of folic acid, nearly all used it post-conception, predominantly in the third trimester, consistent with earlier findings from the institution [28]. Complications included pressure injuries, anorectal prolapse, post-excision hydrocephalus, wound infection/dehiscence, and pseudomeningocoele. Pressure injuries were more common in older patients, supporting reports that risk increases with age, though rates were lower than those reported in high-income settings [29,30]. Post-excision hydrocephalus occurred in 7.5% of patients, lower than reports from Pakistan, possibly due to routine preoperative hydrocephalus assessment and simultaneous shunting [31].

CONCLUSION

The presentation of myelomeningocoele in a resource-poor setting like ours is often characterised by delayed presentations, some with complications, especially among the older patients. Our patients presented with mostly lumbosacral lesions, as probably the ones with cervical or thoracic lesions pass away earlier. Our outcome is good with few mortalities from infection-related complications. Maternal knowledge of the preventive role of folic acid is very poor, and therefore, we advocate proactive measures aimed at enlightening the populace towards this and the need for early referrals.

DISCLOSURES

Ethical approval

This study was performed in line with the principles of the Declaration of Helsinki.

Consent to participate

The patients gave consent to use their information and images for research purposes. *Consent for publication*

The patient gave consent to use his information and images for publication.

Conflict of interest

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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Artificial intelligence

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No artificial intelligence assistance were employed in the preparation of this manuscript.

CONTRIBUTIONS

-Babagana Usman: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

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