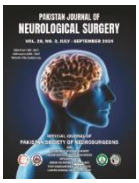

PAKISTAN JOURNAL OF NEUROLOGICAL SURGERY (QUARTERLY) – OFFICIAL JOURNAL OF PAKISTAN SOCIETY OF NEUROSURGEONS

Original Research

Frequency and Clinical Presentation of Spina Bifida at Liaquat University Hospital

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ABSTRACT

Objective: The study was conducted to observe the clinical presentation and variation of Spina Bifida in the study population.

Materials & Methods: This retrospective study analyzed the prevalence and clinical presentation of Spina Bifida among surgical patients, in which 172 cases admitted via OPD were included. Data collected covered demographics and clinical details, including age, gender, cousin marriage, region, type of Spina Bifida (meningocele or meningomyelocele), hydrocephalus association, and defect width were diagnosed by MRI lumber spine and CT scan brain which was done in all patients.

Results: Over three years, a total of 1,756 elective surgeries were performed, with 172 cases identified as Spina Bifida, representing approximately 9.8% of the total surgeries conducted. Sub-classification of Spina Bifida cases delineated 166 (96%) cases as Spina Aperta and 6 (4%). Predominantly featured myelomeningocele (MMCs), comprising approximately 81% of the aperta cases. Further stratification of MMCs based on size revealed varying proportions, with approximately 64 (37%) less than 3*3cm, 76 (44%) between 3*3cm and 5*5cm, and 32 (19%) exceeding 5*5cm, indicating a spectrum of severity within this subset of cases. Anatomical distribution delineated the majority of Spina Bifida cases (approximately 95.9%) located in the lumbar region, with fewer occurrences observed in the dorsal (2.9%) and cervical (1.2%) regions.

Conclusion: These findings underscore the multifaceted nature of Spina Bifida, encompassing diverse clinical presentations, anatomical variations, and associated anomalies, necessitating a comprehensive and multidisciplinary approach to management tailored to the individualized needs of patients.

Keywords: Spina Bifida, Occulta, Asperta, Myelomeningocele, Spinal Dysraphism, Hydrocephalus.

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Date of Submission: 12-06-2024
Date of Revision: 20-09-2024
Date of Acceptance: 29-09-2024

Date of Online Publishing: 30-9-2024
Date of Print: 30-9-2024

DOI: 10.36552/pjns.v28i3.927

INTRODUCTION

The congenital malformation of Spina Bifida can

result from the developmental issues of the neural tube. This term is frequently employed to denote any extent of neural tube closure defect. The condition can be categorized into Spina Bifida occulta and Spina Bifida Aperta. Spina Bifida occulta, otherwise called closed spinal dysraphism, addresses the most acute type of neural tube defects (NTDs) and is displayed by a concealed vertebral anomaly with some contribution of brain components. Spina Bifida Aperta, or open spinal dysraphism, incorporates defects where brain tissues are presented to the outside environment, including meningocele and myelomeningocele. The range of neurological results related to these circumstances varies as indicated by the degree of brain tissue exposure. Besides, Spina Bifida is frequently connected with multiple developmental anomalies, requiring an exhaustive multidisciplinary way to deal with treatment to upgrade endurance rates and improve patient results.[1-6] These spinal dysraphisms result from incomplete closure of the back spinal components and ordinarily, happen somewhere in the range of 17 and 30 days of fetal development. Neuralization happens in two phases: primary and secondary.[7] Closed Spina Bifida has an essential prognosis contrasted with its open forms, with numerous people remaining asymptomatic.[8-11] Research shows that around 1,300 solid children conceived every year would have had NTDs if the folic corrosive fortress was not brought into normal pre-birth practice.[12-13]

In Pakistan true authentic information isn't found to work out the commonness of NTDs,[14] ongoing Accessible information proposes a predominance of 12 to 14 cases for every 1,000 live births.[15,16] Or range between 38.6 to 124.1 per 10,000 live births,[3,21] a lot higher when compared with Western countries' NTDs rates. The rationale for this study was to understand the prevalence, clinical features, and management outcomes of Spina Bifida. By conducting a retrospective analysis, researchers can gather valuable insights into the frequency and presentation of this condition, which can inform clinical practices, resource allocation, and public health strategies. The significance lies in contributing to the body of knowledge on Spina Bifida epidemiology and healthcare delivery, potentially leading to improved patient care and outcomes. The rationale of this study was to observe the clinical presentation and variation of Spina Bifida in the study population.

PATIENTS AND METHODS

Study Design& Setting

This was cross cross-sectional observational study, which was conducted from 12th January 2021 to 30th December 2023 at Liaquat University Hospital Hyderabad, a tertiary care teaching hospital of Pakistan. A prior ethical approval was taken before study conduction.

Sampling

This study was a non-probability consecutive sampling method, among the pediatric population presented at the Liaquat University Hospital Hyderabad.

Inclusion Criteria

Young patients under 10 years old have neural tube abnormalities, spina bifida occulta, meningocele, or spinal dysraphism, with comprehensive medical records and pertinent clinical findings.

Exclusion Criteria

Age > 11 years, previously operated cases, multiple associated other issues. Medical records containing partial or missing data, patients who were diagnosed with illnesses other than spinal dysraphism, and cases where the diagnosis was questionable or not validated by clinical testing.

Ethical Approval

The ethical approval is provided as per requirement number: lumhs/Rec/362.

Data Collection

A non-probability consecutive method was used. Data collection was conducted using a pre-tested method. Microsoft Excel was used and subsequently analyzed with SPSS version 29 for Windows.

Data Analysis

Variables, just as cutaneous findings, gender, and clinical presentation, have been shown as frequencies and percentages.

Sampling

Since this type of study had not been conducted in the proposed population, we assumed a prevalence of 25% with a 5% margin of error, resulting in a sample size of 172 Spina Bifida cases. The sample size was calculated using Cochrane's formula.[17]

RESULTS

Over three years, a total of 1,756 elective surgeries were performed, encompassing a significant cohort for analysis, with 172 cases identified as Spina Bifida, representing approximately 9.8% of the total surgeries conducted, as seen in **Table 1.**

Table 1: Number of surgical cases performed, about spina bifida.

Variable	Number	Percentage
Total Elective Surgeries	1756	100%
Spina Bifida	172	9.8%

Age Distribution

Age distribution exhibited a notable concentration within the early developmental stages, with a preponderance of cases observed within the age range of 1 day to 1 year, constituting approximately 82.6% (142) of the total cases and 18 cases were between 2 to 3 years, so on the number of cases decreased. This trend suggests either early detection or a higher incidence of Spina Bifida in infancy, underscoring the importance of prenatal screening and early intervention strategies, as seen in **Figure 1.**

Sub-classification of Spina Bifida cases delineated 166 (96%) cases as Spina Aperta and 6

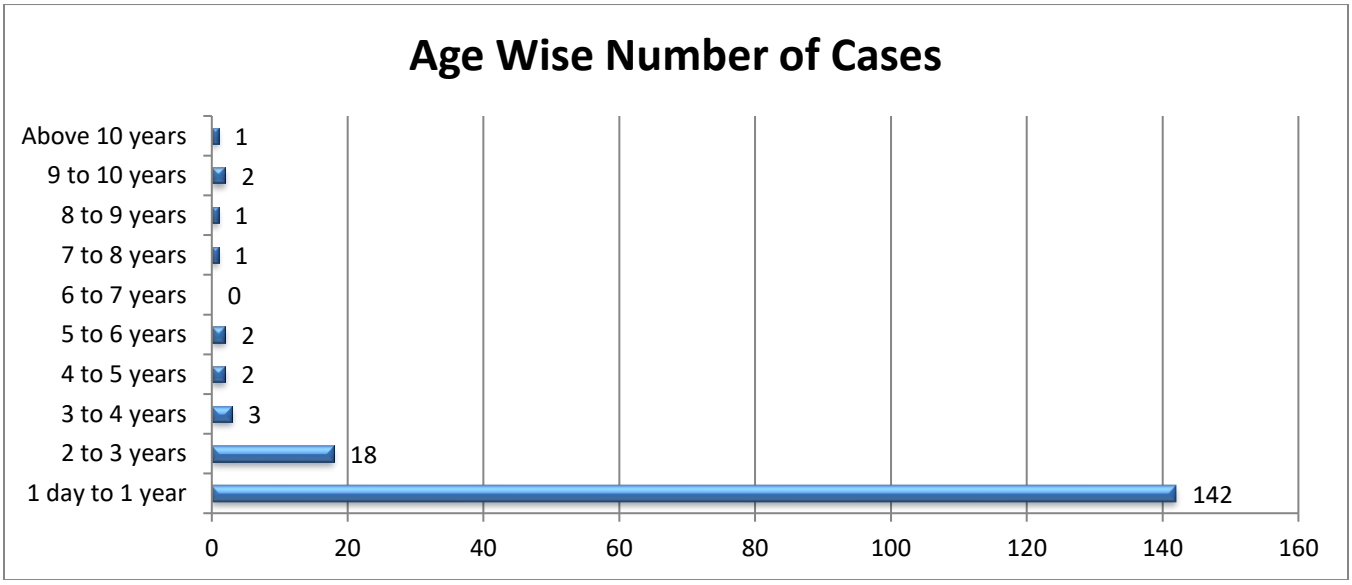

Figure 1: Number of cases presented following age.

(4%) as Spina Occulta, each presenting unique clinical manifestations and prognostic implications. Among the Occulta subgroup, diverse presentations were observed, including intradural lipoma, dermal sinus, diastematomyelia, and tethered cord, underscoring the heterogeneity within this ostensibly concealed variant of the condition.

Gender Distribution

Gender distribution revealed a near-equivalent split, with 88 cases among males and 84 among females, all originating from low socioeconomic backgrounds, emphasizing the potential impact of socioeconomic factors on disease prevalence and access to healthcare services.

In contrast, the Aperta category predominantly featured myelomeningocele (MMCs), comprising approximately 81% of the aperta cases, followed by meningocele (8%) and lipomyelomeningocele (11%). Further stratification of MMCs based on size revealed varying proportions, with approximately 64 (37%) less than 3*3cm, 76 (44%) between 3*3cm and 5*5cm, and 32 (19%) exceeding 5x5cm, indicating a spectrum of severity within this subset of cases.

Anatomical distribution delineated the majority of Spina Bifida cases (approximately 95.9%) located in the lumbar region, with fewer occurrences observed in the dorsal (2.9%) and cervical (1.2%) regions. Additionally, a spectrum of associated anomalies was identified, including hydrocephalus at presentation and post-surgery, Arnold Chiari malformation type II, kyphoscoliosis, clubfoot deformity, and cardiac anomalies, highlighting the multisystem involvement and complexity often associated with Spina Bifida. **Table 2** outlines all discussed variables.

Table 2: Different variables and associated anomalies with spina bifida.

Variable	Number	Percentage
Spina Bifida Types		
Aperta	166	96%
Occulta	6	4%
Aperta Categories		
MMC	134	81%
Meningocele	13	8%
Lipo MMC	19	11%
Occulta Categories		
Intradural Lipoma	1	17%
Dermal Sinus	2	33%
Diastematomyelia	1	17%
Tethered Cord	2	33%
Anatomical Distribution		
Lumbar	165	96%
Dorsal	5	3%
Cervical	2	1%
Spectrum of Associated Anomalies		
Hydrocephalus At Presentation	19	11%
Hydrocephalus Post MMC	46	27%
Arnold Chiari Malformation Type II	31	18%
Kyphoscoliosis	16	10%
Clubfoot Deformity	53	30%
Cardiac Anomalies	7	4%

MMC: Myelomeningocele
Lipo MMC: Lipomyelomeningocele

DISCUSSION

The findings of this study shed light on several key aspects of Spina Bifida within the context of elective surgeries. Firstly, the prevalence of Spina Bifida among the total surgeries performed, comprising approximately 9.8%, underscores its significance within the surgical landscape. Moreover, it is observed that middle and low-socioeconomic families face significant societal determinants impacting disease burden and healthcare access. This contrasts with a similar study conducted in Pakistan, where the prevalence was 34.5%.[18]

The age distribution, outstandingly packed in the earliest stages, features the requirement for early identification and intervention strategies. This underlines the critical role of pre-birth screening and early medical management in tending to Spina Bifida-related confusion, lining up with a comparative report led in 2017.[19]

The prognosis and management of Spina

Bifida cases, sorted into Spina Aperta and Spina Occulta, explain the clinical variety within the condition. This order features the differing seriousness and different introductions, especially inside the Occulta subgroup. Examination of MMCs in light of size features the range of seriousness inside this subset of cases, with suggestions for careful preparation and anticipation. This lines up with a comparable report directed in 2021.[20]

The implications of this research are significant, offering important experiences for clinical practice and public health policy. The findings highlight the significance of designated mediations for early discovery and the executives of Spina Bifida, particularly in babies. Carrying out pre-birth screening projects and bringing issues to light about the condition could further develop results and decrease grimness. The classification of Spina Bifida subtypes and recognizable proof of related inconsistencies furnish clinicians with significant data for guess and custom-fitted treatment arranging. Perceiving the different clinical presentations and anatomical variations permits medical care suppliers to take on a customized approach, upgrading patient results and personal satisfaction.

This study has a few impediments. Right off the bat, the information comes from a single-center retrospective analysis, which might restrict the generalizability of the findings to more extensive populations. In addition, depending on elective medical procedure information might present a determination predisposition, as people with extreme Spina Bifida requiring dire mediation may not be sufficiently addressed. Moreover, the review idea of as far as possible the capacity to lay out causal connections or decide fleeting patterns in sickness predominance. Moreover, the review doesn't catch longitudinal results or evaluate the viability of explicit mediations. Further exploration is expected to assess long-term clinical directions and mediation techniques. Despite these restrictions, this examination provides important experiences in the study of disease transmission and the clinical qualities of Spina Bifida. It provides opportunities for future research regarding patient care.

CONCLUSION

This research shows the important side of spina bifida, which provides the chance of clinical effects, physical issues, and all the related defects. They fill the place of requirements for a purpose, and interdisciplinary methodology is made to meet every patient's health needs.

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Additional Information

Disclosures: Authors report no conflict of interest.
Ethical Review Board Approval: The research was a retrospective study.
Human Subjects: Consent was obtained by all patients/participants in this study.
Conflicts of Interest:
In compliance with the ICMJE uniform disclosure form, all authors declare the following:
Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.
Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.
Data Availability Statement: For data sharing, interested researchers can contact the corresponding authors
Funding: None

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Mubarak Hussain Nohario	1. Study design and methodology.
2.	Abdul Rauf Memon	2. Paper writing.
3.	Aurangzeb Kalhoro	3. Data collection and calculations.
4.	Suhail Ahmed Aghani	4. Analysis of data and interpretation of results.
5.	Abdul Razzaque Nohri	5. Literature review and referencing.
6.	Sultan Ahmed Nohario	6. Editing and quality insurer.