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NEONATAL CERVICAL MYELOMENINGOCELE: SURGICAL MANAGEMENT AND EARLY OUTCOMES – A CASE REPORT

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Abstract

Background: Cervical myelomeningocele is a rare form of spinal dysraphism, constituting only 1–5% of all neural tube defects. It presents unique challenges in neonatal management due to its association with hydrocephalus, Chiari malformation, and potential neurological deficits.

Case Presentation: We report a case of a male neonate born at 37 weeks via LSCS due to a non-reactive NST, diagnosed in antenatal period with cervical myelomeningocele, mother received antenatal counselling regarding the prognosis and need for neurosurgical intervention. MRI confirmed an open myelomeningocele through cervical spinal dysraphism with associated mild colpocephaly and syrinx of the cervical spine. The baby underwent surgical repair on day 6 of life under intraoperative neuro monitoring. Postoperatively, he required invasive ventilation for 16 hours, followed by weaning to room air by day 9. CSF culture revealed *Acinetobacter baumannii*, necessitating a 10-day course of intravenous Meropenem and a total of 21 days of oral Ciprofloxacin. At discharge on day 21, the baby was stable, feeding well, and gaining weight appropriately, with normal oxygen saturation and hearing assessments.

Conclusion: This case highlights the importance of early diagnosis, timely surgical intervention, and vigilant post-operative management in cervical myelomeningocele. Despite the complexity of the condition, successful outcomes can be achieved with a multidisciplinary approach, emphasizing infection control, respiratory support, and nutritional optimization. Regular follow-up is crucial to monitor neurological development and associated anomalies.

Keywords

Cervical myelomeningocele, Spinal dysraphism, Neural tube defect, Neonatal neurosurgery, Congenital spinal anomaly, Myelomeningocele repair, Neonatal sepsis, Postoperative care, Neurosurgical intervention, Infant neurological development.

INTRODUCTION

Cervical myelomeningocele is a rare congenital neural tube defect, accounting for only 1–5% of all spinal dysraphism cases. Unlike lumbosacral myelomeningocele, cervical involvement poses distinct challenges due to its potential association with Chiari malformation, hydrocephalus, and other neurological and orthopedic anomalies. Early diagnosis through antenatal ultrasonography and postnatal imaging is crucial for timely intervention. Surgical repair remains the mainstay of treatment, aiming to prevent infection, preserve neurological

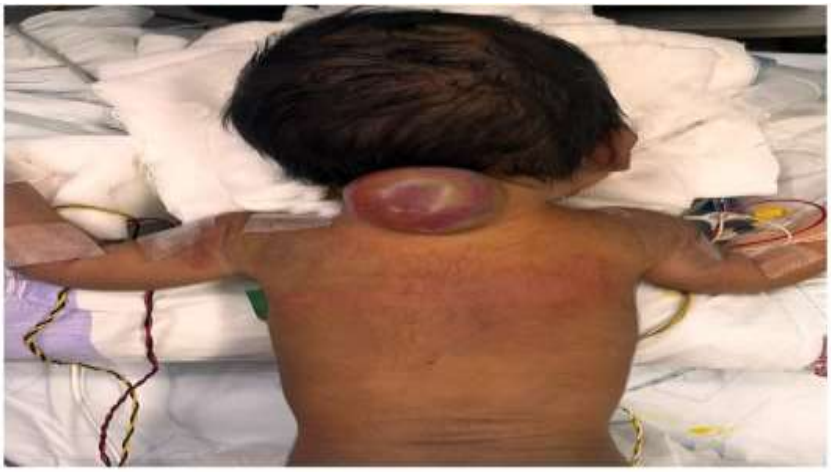
function, and minimize complications. However, postoperative care, including infection control, respiratory management, and nutritional support, is equally critical for optimal outcomes. This case report highlights the successful surgical and medical management of a neonate with cervical myelomeningocele, emphasizing the importance of a multidisciplinary approach in improving prognosis and long-term quality of life.

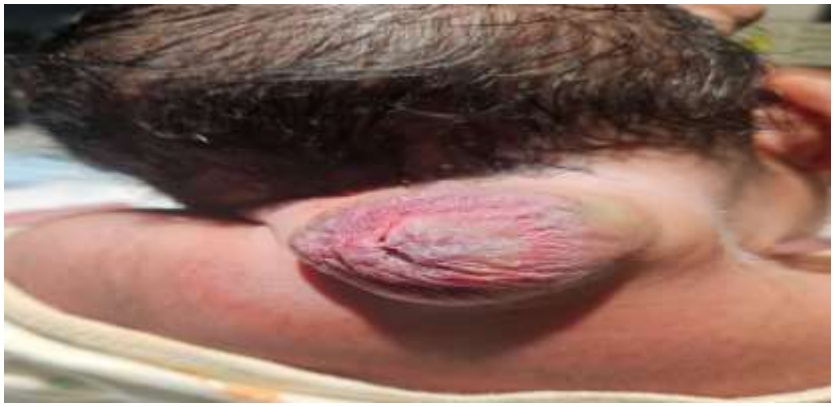
CASE PRESENTION

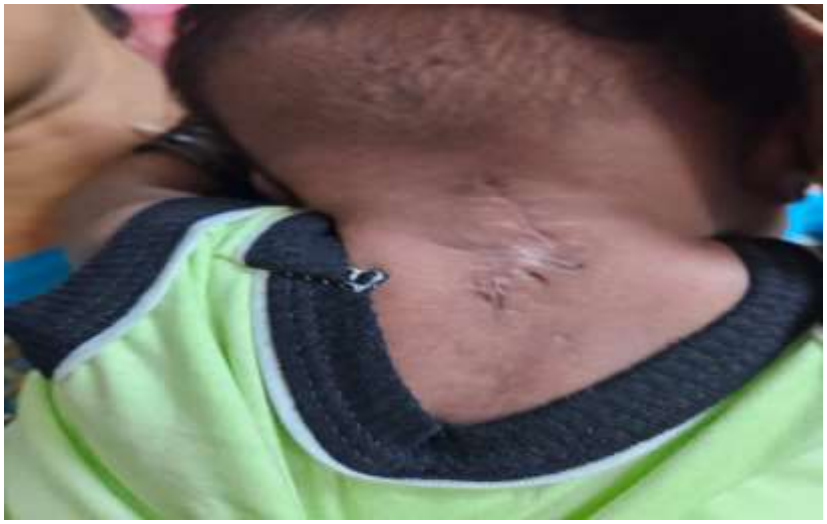
A male neonate, was born via LSCS at 37 weeks of gestation due to a non-reactive NST. The birth weight was 2.760 kg, with an Apgar score of 8/10 at 1 minute and 9/10 at 5 minutes. The baby cried immediately after birth, requiring only routine resuscitation. Antenatally , the baby was diagnosed with cervical myelomeningocele (Aperta), confirmed by MRI, which revealed an open myelomeningocele through cervical spinal dysraphism with associated mild colpocephaly and syrinx of the cervical spine. USG findings showed ventriculomegaly with bilateral lateral ventricle dilation.

The baby was admitted to the NICU and underwent surgical repair of myelomeningocele on day 6 of life under intraoperative neuro monitoring. Postoperatively, the baby required invasive ventilation for 16 hours, followed by weaning to NIV on day 7 and room air by day 9. Feeding was initiated through an orogastric tube and gradually progressed to direct breastfeeding. Serial head circumference monitoring was performed, with the last recorded measurement at 36 cm. During the hospital stay, CSF culture revealed *Acinetobacter baumannii*, prompting a course of Inj. Meropenem for 10 days along with oral Ciprofloxacin for a total of 21 days.

At discharge on day 21 of life ,the baby was stable, feeding well, and gaining weight, with a recorded weight of 3.190 kg, length of 48 cm, and head circumference of 36.5 cm. Oxygen saturation in all four limbs ranged from 96–97%. Hearing assessments (OAE and BERA) were normal. The discharge plan included keeping the baby warm, exclusive breastfeeding for six months, immunization as per schedule, and regular neonatal and neurosurgery follow-up and CDC follow up for neurodevelopmental assessment.







DISCUSSION

Several studies have analyzed the characteristics and outcomes of cervical spinal dysraphism, highlighting variations in presentation and associated anomalies.

Andronikou et al. reported five cases, with a majority having myelocystocele or meningocele, and a high incidence (80%) of Chiari type II malformation.

Habibi et al. studied 16 patients, predominantly presenting with stalk-type lesions, with 25% showing Chiari malformation and 50% developing hydrocephalus. Huang et al. examined 10 cases of myelocystocele, with lower rates of Chiari malformation (10%) and hydrocephalus (10%), but 90% of patients had normal neurological function.

Kasliwal et al. reported 10 cases, mostly myelomeningoceles, with 20% presenting Chiari malformation and 50% hydrocephalus, yet all patients retained normal neurological function. Pang and Dias observed nine cases, including myelocystocele and limited dorsal myeloschisis, with moderate rates of Chiari malformation (44.4%) and hydrocephalus (33%). Sun et al. studied eight cases, evenly split between myelocystocele and meningocele, with a higher prevalence of Chiari malformation (62%) and hydrocephalus (62%), though only 75% maintained normal neurological function.

Kıymaz et al . reported seven patients (one male, six female) showed a similar distribution of myelomeningocele and meningocele, with 43% having Chiari malformation and 42% hydrocephalus, while 86% retained normal neurological function. These findings reinforce the variability in presentation and prognosis, emphasizing the importance of early diagnosis and individualized management.

Meyer –Heim et al reported the clinical features and course of five patients with myelomeningocele (MMC) or myelocele (MC) at various cervical levels. All underwent surgical resection, with some requiring untethering or ventriculoperitoneal shunting (VPS). Associated pathologies included Chiari II malformation, hydrocephalus, periventricular heterotopias, and tonsillar ectopia. Neurological outcomes ranged from normal function to incomplete hemiparesis and sensorimotor deficits. Orthopedic issues included scoliosis, pes equinus, and pes equinovarus. Urological assessments showed varying degrees of continence, with one patient experiencing vesicoureteral reflux (VUR). Cognitive and behavioral outcomes varied, with some exhibiting mild mental impairment or ADHD, while others had normal development.

Valeur et al. Imaging plays a central role in the evaluation ofcervicothoracic cystic dysraphism. Such lesions may be detected on prenatal imaging and should not be confused with myelomeningoceles as prognosis and prenatal counseling differ. In addition, meningocele with stalk and myelocystocele must be distinguished from simple meningoceles that may be treated with a limited surgical approach. Initial neurological exams are often normal, but later neurological decline can occur in the setting of incomplete resection, unrecognized associated spinal anomalies and intracranial abnormalities. Knowledge that dysraphism in this location is likely to contain tethering septa and may be associated with other anomalies like Chiari malformation and diastematomyelia necessitates a thorough preoperative evaluation of the brain and whole spine, ideally with MRI, to achieve the best long-term prognosis and avoid late complications.

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