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CASE REPORT

Anesthesia Management in a Pediatric Patient with Diastematomyelia

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ABSTRACT

Diastematomyelia, a congenital spinal anomaly characterized by a longitudinal split of the spinal cord into two hemicords, poses significant clinical and surgical challenges. This condition, often associated with scoliosis and other neural tube defects, necessitates careful diagnostic and therapeutic approaches to prevent neurological deterioration and improve patient outcomes. Understanding the embryological development and manifestations of diastematomyelia is crucial for timely diagnosis and management. We report on an 11-month-old female patient with no history of systemic diseases, presenting with significant scoliosis but no neurological deficits. Diagnostic imaging, including computerized tomography, revealed no thoracic involvement but confirmed the presence of Type 1 diastematomyelia, characterized by two dural sacs separated by a bony septum. Anesthetic management was tailored to address the complexities of the condition, involving inhalation anesthesia with sevoflurane, followed by remifentanil and propofol for neuromonitoring. Surgical intervention focused on the unification of the separated dural sacs, with careful intraoperative monitoring to avoid neurological complications. The patient's postoperative course was uneventful, and she was transferred to the pediatric intensive care unit for recovery. The management of diastematomyelia, particularly in pediatric patients, requires a multidisciplinary approach, encompassing accurate diagnostic imaging, specialized anesthetic management, and surgical precision. The case further illustrates the necessity of a detailed examination and a comprehensive management strategy, advocating for early intervention and tailored care to optimize patient outcomes in the context of this complex congenital condition.

Keywords: Anesthesia, diastematomyelia, general anesthesia, neurosurgery, pediatric anesthesia

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INTRODUCTION

Diastematomyelia, also known as split spinal cord, is a developmental midline defect occurring during the embryological period, generally characterized by the division of the spinal cord at the level of the upper lumbar vertebrae. The underlying cause of this disorder involves the presence of fibrous, bony, or cartilaginous tissue in the central part of the spinal cord, leading to a sagittal separation within the spinal cord.[1] This condition is considered under the spectrum of tethered cord syndrome and presents in two types. In Type 1, each cord possesses its own dural sacs and bony septa. In Type 2, both cords are contained within a single dural sac. Patients with this condition may experience a decrease in bowel and bladder function over time, often accompanied by sensory and motor loss in the lower extremities. Notably, scoliosis frequently co-occurs, especially in later years.[2]

CASE REPORT

An 11-month-old female patient, weighing 7.5 kg, with no known history of systemic diseases. A pediatric examination revealed no abnormal findings. As our hospital does not have a pediatric pulmonology department, consultation was not possible. Inspection and auscultation did not reveal any anomalies other than significant scoliosis (Fig. 1). The patient exhibited no neurological symptoms. Both

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feet were mobile in the preoperative period. Computerized tomography images showed no involvement in the thorax (Fig. 2). The patient was administered inhalation anesthesia with sevoflurane, and a venous line was established. Dosages included 0.01 mg/kg midazolam, 1 mcg/kg fentanyl, and 0.8 mg/kg rocuronium. The patient was intubated with a 3.5 ID endotracheal tube, without any difficulty encountered during airway management or intubation. A 2F arterial catheter was placed. Due to plans for neuromonitoring in the perioperative period, sevoflurane was discontinued. Infusions of remifentanil and propofol were initiated. For the patient with Type 1 diastematomyelia, the separated duras were unified (Fig. 3). A total of 100 ml of erythrocyte suspension was replaced. The patient, having encountered no issues in arterial blood gas monitoring, was extubated and transferred to the pediatric intensive care unit.

DISCUSSION

Diastematomyelia, though a rare condition, is a pathology frequently accompanied by scoliosis. In the anesthetic approach, attention must be paid to bleeding due to the extensive vertebroplasties associated with scoliosis and its complications. Moreover, it is beneficial to know that spinal anesthesia is not recommended in these patients.

A comprehensive case report emphasized the complexity of managing type I diastematomyelia, particularly when accompanied by additional anomalies such as ectopic breast and clubfoot. This case illustrated the insidious nature of diastematomyelia, which often progresses slowly and can be easily missed or misdiagnosed. The report underlined the importance of suspecting diastematomyelia in patients presenting with lumbar discomfort, scoliosis, and lower limb abnormalities. It also shed light on the embryological aspects and suggested that surgical intervention, despite not improving preoperative neurological impairments, could prevent further neurological deterioration. The intricate relationship between spinal cord development and anomalies like clubfoot was highlighted, emphasizing the need for a detailed examination of the spinal cord in such patients.[3]

Another case detailed the surgical correction of congenital kyphoscoliosis associated with diastematomyelia, underscoring the varied surgical approaches and the debate between one-stage versus two-stage surgeries. This case illustrated a successful simultaneous surgery approach, where diastematomyelia was addressed alongside the correction of scoliosis, highlighting the advantages of reduced operation

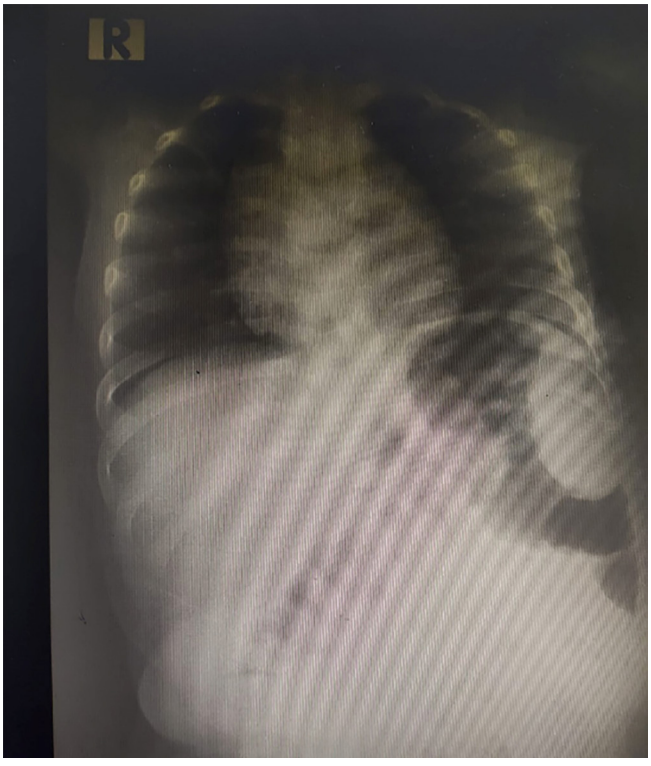

Figure 1. Scolisosis of the patient.

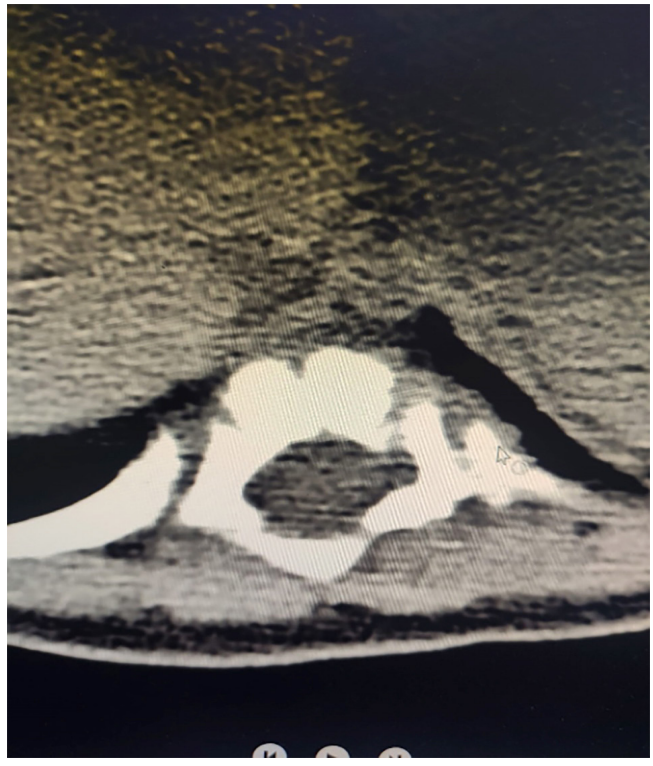

Figure 2. Computarized tomography of vertebrae.

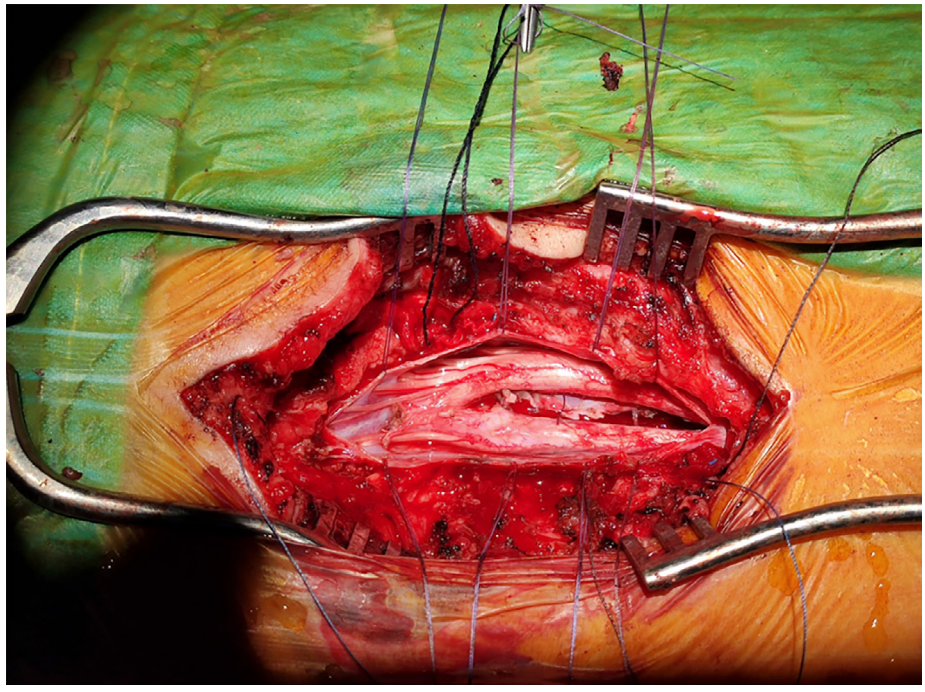

Figure 3. Image of Split cord.

time and blood loss. The patient's postoperative recovery, with significant pain reduction and no neurological complications over a two-year follow-up, was noteworthy. This case contributes to the argument for early surgical intervention in spinal deformities associated with diastematomyelia to minimize complications and improve patient outcomes.[4]

These cases collectively underscore the critical role of multidisciplinary collaboration in the management of diastematomyelia, emphasizing the importance of advanced imaging techniques for accurate diagnosis and the careful consideration of surgical strategies to optimize patient outcomes. Anesthetic management in such cases requires a nuanced understanding of the patient's unique anatomical and physiological challenges, necessitating individualized planning and close intraoperative monitoring to mitigate risks and support recovery.

Disclosures

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