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Professional paper

MASSIVE BILATERAL PNEUMOTHORAX WITH CARDIOPULMONARY ARREST DURING INTUBATION IN A NEONATE WITH MYELOMENINGOCELE: A CASE REPORT

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Abstract

Myelomeningocele is presumed to be an acute neural tube malformation that is constantly related to hydrocephalus and other anomalies of the central nervous system. Airway management in neonatal patients, precisely during problematic intubation, may be associated with potentially fatal complications.
This article points out a patient of a 2-day-old neonate, born at term via cesarean section (38 weeks, 3560 g, APGAR 7/8), with lumbosacral myelomeningocele, hydrocephalus, and Dandy-Walker syndrome. It also presents repeated attempts before surgery, which was done during intubation, the patient developed a massive bilateral pneumothorax, leading to cardiopulmonary arrest. Extended resuscitation and emergency dual chest drainage were achieved, accomplishing stabilization of the patient.
Regardless of the initial critical condition and adverse effects during the intensive care stay, the patient improved without radiological evidence of ischemic brain trauma. On the side, a progress of operative closure of myelomeningocele is elaborated, albeit placement of a ventriculoperitoneal diversion was deferred due to the risk of infection.
There is a situation of bilateral pneumothorax during airway management in neonates, despite being rare, may quickly result in cardiopulmonary arrest and need prompt recognition and urgent intervention.

Keywords: Myelomeningocele; Neonatal pneumothorax; Difficult intubation; Neonatal airway management.

1. Introduction

Myelomeningocele is a serious neural tube defect that needs early surgical intervention to avoid infection and neurological deterioration. In the majority of situations, it is linked to hydrocephalus and other anomalies of the central nervous system, as well as Dandy-Walker syndrome[5,6].
Pneumothorax during neonatal intubation, even though rare, is a noted complication that may result in rapid respiratory decompensation[1,3].
Airway control in neonates denotes exact challenges due to anatomical characteristics and restricted physiological reserves[7,10]. Bilateral pneumothorax in this setting is particularly dangerous and involves immediate intervention.

2. Case Presentation

There was a 2-day-old male neonate, born at term via cesarean section (38+ weeks of gestation), with a birth weight of 3560 g and APGAR score of 7/8, reported with an open lumbosacral myelomeningocele with cerebrospinal fluid leakage. The individual was also identified with hydrocephalus and Dandy-Walker syndrome.
A sign for early surgical treatment was recognized. The patient was relocated to the operating room, where endotracheal intubation was attempted during induction of anesthesia. As a result of technical issues, numerous unsuccessful attempts were made to insert the tube. Moreover,

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multiple (approximately 4-5) attempts at endotracheal intubation were performed using direct laryngoscopy. Through these attempts, progressive oxygen desaturation was monitored, with a rapid regress in SpO_2 in spite of manual ventilation efforts.
The patient developed deterioration, desaturation, and marked cyanosis during this time. Moreover, skin alterations suggestive of subcutaneous emphysema were observed. The status worsened to cardiopulmonary arrest, and resuscitation was commenced and prolonged for approximately 20 minutes.
A massive bilateral pneumothorax was presumed and clinically confirmed. Critical bilateral chest drainage was conducted by the thoracic surgery team. Subsequent to decompression, proper tube placement was achieved; the patient was under ventilatory support after hemodynamic stabilization and transferred to the neonatal intensive care unit.
Chest drains were preserved for around one week. During the rigorous care stay, the patient developed complications, comprising a septic condition, which were managed adequately. Brain MRI depicted dilation of the ventricular system consistent with hydrocephalus (Figure 1), without indication of ischemic injury.

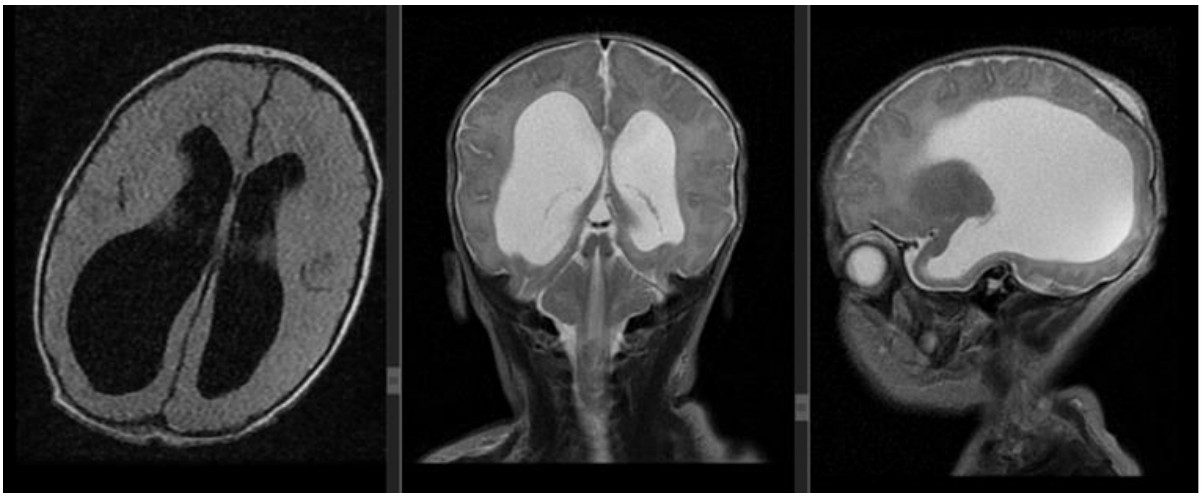


Figure 1. Brain MRI demonstrating marked dilation of the lateral ventricles consistent with hydrocephalus.

Once the general condition was stable, wound closure of the myelomeningocele (excisio et reparatio myelomeningoceles) was successfully completed (Figure 2).VP shunt implantation was not performed at this phase due to the preceding cerebrospinal fluid leakage and increased risk of infection. In addition, management of hydrocephalus was scheduled for a later stage.
A ventriculoperitoneal shunt (right lateral ventricle) was successfully placed due to a stable rise of intracranial pressure and bulging fontanelles, without perioperative adverse events. This occurred a week right after surgical closure of the myelomeningocele.



Figure 2. Postoperative appearance following surgical repair of lumbosacral myelomeningocele.

3. Discussion

Airway management in neonates signifies a considerable clinical challenge, mainly in the presence of complicated congenital pathologies. Neonatal pneumothorax is a recognized complication, most commonly associated with mechanical ventilation, with reported incidence rates ranging from approximately 1–2% in term neonates and higher in those requiring respiratory support[1,3,9]. The impaired airway anatomy and decreased pulmonary reserves increase the risk of complications during airway securing and positive pressure ventilation[7]. However, its occurrence during airway management, especially in the setting of difficult intubation, is less frequently described [10,11].

Neonatal pneumothorax is an identified complication, most frequently associated with mechanical ventilation, but it may also occur during airway management, notably in circumstances of difficult intubation and repetitive attempts. Additionally, difficulties of intubation, including barotrauma and alveolar injury, have been documented predominantly in neonates with difficult ventilation[4,11].

In situations of challenging neonatal airway management, alternative approaches such as video laryngoscopy, laryngeal mask airway, or prompt consideration of a surgical airway should be assessed to decrease repeated efforts and related complications.

It is obviously shown that in this patient, the repeated attempts at neonatal airway intubation may lead to severe problems such as bilateral pneumothorax, especially under circumstances of ineffective ventilation.

Pneumothorax tends to be an alternative but perhaps critical condition, as it, in a short time, results in breathing and hemodynamic compromise, with potential for cardiac arrest. Additionally, based on medical findings such as unexpected desaturation, cyanosis, and subcutaneous emphysema, prompt involvement should be encouraged.

In the given case, the evolution of a massive bilateral pneumothorax after repeated attempts at intubation is consistent with possible barotrauma, which immediately deteriorated ventilation and oxygenation. Hence, urgent placement of chest drainage was vital for the patient's existence. In serious situations, this interference should not be postponed for radiological validation.

Despite a lengthy cardiopulmonary arrest, the shortage of ischemic brain injury on MRI suggests that the intervention was completed promptly. This prognosis emphasizes the significance of rapid reaction and synchronization between clinical teams[3,9,10].
Furthermore, from a neurosurgical viewpoint, myelomeningocele is repeatedly linked to hydrocephalus and other central nervous system defects, including Dandy-Walker syndrome. Besides, management requires vigilant planning, particularly in the occurrence of cerebrospinal fluid leakage. An immediate placement of a ventriculoperitoneal shunt in these situations may elevate the risk of infection; therefore, deterrence of the procedure is considered a clinically appropriate approach[5,6].
In the occurrence of massive bilateral pneumothorax, cardiopulmonary arrest, and positive neurological clinical improvement in a neonate with complex congenital pathology, this patient varies which is rarely shown in the literature.
Hence, in a clinical situations, such cases alert us of the importance of early recognition of complications during neonatal intubation and the necessity to adapt therapeutic strategies in patients with complicated pathologies.

4. Conclusions

The presented clinical case demonstrates an occasional but possibly fatal complication during attempted airway insertion in a newborn with complex inborn pathology. So, enormous medical procedures may lead to rapid breathing deterioration and cardiorespiratory arrest if not identified and treated in time.
The above-mentioned cases reveal that repeated attempts at intubation without confirming adequate ventilation markedly elevate the risk of serious complications and should be reduced. In clinical scenarios of arduous neonatal intubation, early onset consideration of alternative airway management approaches is vital to minimize complications secondary to barotrauma. In the case of an abrupt clinical decline, suspicion of pneumothorax should be immediate and monitored by emergency intervention.
This case report draws attention to the importance of rapid response, actual medical decision-making, and successful coordination between multidisciplinary teams to advance outcomes in serious neonatal situations.

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