

Lateral Thoracic Meningocele : Anaesthetic Implications

Nazeer Ahmed K^{1*}, Minaj Ahmed¹, Suryakanth Mendolkar² and Abdul Majeed G.Mahaldar³

¹Department of Anaesthesiology and Critical Care, Al Ameen Medical College Hospital, Bijapur – 586108, Karnataka, India, ²Sri B.M.Patil Medical College, Bijapur-586103, Karnataka, India and ³.Mahaladar Children's Hospital, Bijapur-586101, Karnataka, India

Abstract: Meningomyelocele is a broad term representing herniation of extracranial contents through a congenital defect in the vertebral column. If only cerebrospinal fluid (CSF) and meninges herniate, it is termed as a meningocele. A meningoencephalocele is herniation of neural elements along with meninges. Anaesthetic challenges in management of thoracic meningocele include securing the airway with intubation in lateral or supine position, intraoperative prone position with its associated complications and accurate assessment of blood loss and prevention of hypothermia. We report a case of a thoracic meningocele posted for resection and discuss its anaesthetic implications.

Case History

A 7 days-old male baby with a body weight of 3000 gms presented with a large cystic swelling at the back of the upper thorax and was posted for surgical excision. Baby was delivered vaginally at term by a 25 year mother with an unremarkable prenatal history. Physical examination revealed a ulcerated mass of 10 x 11 cm with full thickness skin in the posterior part of the upper thorax. Fig 1. The neonate was active with no neurologic deficits and there was no other associated congenital anomalies found. CT Scan of head revealed no hydrocephalus or Arnold Chiari malformation. CT scan of thoracic spine revealed defects in posterior elements with dorsal protrusion of meninges with CSF at T1-3 level with no evidence of neural tissue component suggestive of lateral thoracic meningocele. On examination cardiovascular and respiratory systems were normal and all investigations including Hb%, CBC, renal function tests and chest X ray were within normal limits. The neonate was premedicated with intramuscular atropine. After attaching pre cardiac stethoscope, ECG, NIBP and pulse oxymeter, the neonate was induced with i.v. ketamine in supine position with a doughnut shaped support kept under upper thorax. Fig 2. After confirming adequate mask ventilation, muscle relaxation was achieved with succinylcholine 2 mg/kg and the neonate was intubated by experienced anesthesiologist in supine position. After confirming endotracheal placement and proper fixation of ET tube, the baby was placed in prone position with extreme care being taken to prevent the accidental extubation of the tube. Anaesthesia was maintained with N₂O:O₂ 50:50, halothane 0.5-1.0 MAC, atracurium 0.5 mg/kg and fentanyl 2 micrograms/kg and intermittent positive pressure ventilation (IPPV) using Jackson Ree's Circuit. Surgical resection included

much of the skin and meninges and lasted for 90 minutes. Isolyte-P fluid 4ml/kg wt. was used as maintenance fluid. Total blood loss was calculated by weighing sponges and measuring blood collected in suction bottles, which was approximately 40 cc and was replaced with same amount of blood. Body temperature was maintained by keeping O.T. temperature around 23-25 degree celcius and use of warmed i.v.fluids. The neuromuscular blockade was reversed with i.v.neostigmine and atropine and extubated when baby was fully awake. Postoperatively, baby was monitored in NICU for 48 hours. Post operative pain was treated with i.v. tramadol hcl 2mg/kg 8th hourly. Post operative period was uneventful with no neurological deficits. The child discharged on 8th day.



Fig.1



Fig.2

Discussion

Meningomyelocele is hernial protrusion of part of meninges and neural elements in a sac [1]. Reported incidence is 1 in 5000 live births [2]. Most commonly occur in the lumbosacral region, but they can occur at any level in the neuraxis. Children with meningoencephalocele [3] are likely to have varying degrees of sensory and motor deficits. Associated congenital defects [2] includes club foot, hydrocephalus, extrophy of bladder, prolapsed uterus, Klippel-Feil syndrome and congenital cardiac defects. Major anaesthetic challenges [4,5] in the management of lateral thoracic meningomyelocele is airway management, positioning and protection of neuroplaque, assessment of volume status and prevention of hypothermia. Awake tracheal intubation [2] in lateral position may be performed in these patients to avoid pressure on the sac. As in the present case anaesthesia can also be induced in supine position with sac protected by elevating it on a doughnut-shaped support. Although long acting non-depolarizing muscle relaxants may be used to facilitate tracheal intubation, these are usually avoided to facilitate use of a nerve stimulator to identify functional neural elements. Finding no difficulty in mask ventilation, succinylcholine was given and child was intubated by senior anesthesiologist in supine position only. As nerve stimulation was not sought by the surgeon, relaxation was maintained with atracurium throughout the surgery. Although meningomyelocele can be associated with both upper and lower motor neuron dysfunction, succinylcholine does not elicit a hyperkalemic response [6]. These neonates however may have an abnormal ventilatory response to hypoxia and hypercarbia. Children with meningomyelocele

have an increased incidence of latex allergy [7] which can manifest as intraoperative cardiovascular collapse and bronchospasm. Attention has to be given to monitoring of vitals, blood loss, maintenance of body temperature, prone position and its associated complications and careful securing of the endotracheal tube [8]. The persistence of fetal circulation increases [9] the blood loss, so intensive monitoring is required to estimate the blood loss and replace it adequately. Due to risk of apnea after anaesthesia, supplemental oxygen is given post operatively. The neurological prognosis in such children depends on the amount of neural tissue that has herniated through the sac. In current case it was a meningocele, so the prognosis was good. The decision regarding surgery is dependent on various factors including the amount of neural tissue in the sac, associated congenital anomalies, etc. The decision must involve the family and other medical personnel.

Conclusion: Managing a case of lateral thoracic meningomyelocele includes detailed pre anesthetic evaluation, to look for other congenital abnormalities, optimization of intravascular volume status, expertise in handling airway, and intraoperative care mainly involving proper positioning and blood loss replacement.

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*All correspondences to: Dr. Nazeer Ahmed K, Associate Professor, Department of Anesthesiology & Critical care, Al Ameen Medical College Hospital, Bijapur-586108, Karnataka, India. Email: nazeer8@yahoo.co.in