Case report

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Airtraq - A rescue intubation device in huge neonatal occipital encephalocoele in lateral position

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ABSTRACT

Encephalocoele consists of herniation of Cerebrospinal Fluid (CSF), meninges and brain tissue through a congenital bony defect in the cranium. Anaesthetic challenges associated with a huge occipital encephalocoele include difficult airway, prone positioning and its complications, and accurate assessment of CSF and blood loss. We describe a case of a 5-day male, first child from a non-consanguineous marriage who was admitted with a huge occipital encephalocoele with micrognathia. In view of anticipated difficult intubation, the baby was induced with sevoflurane and intubated in spontaneously breathing with the help of infant size 0 Airtraq optical laryngoscope device in lateral position after one failed intubation attempt with direct laryngoscopy in supine. The intra-operative course remained uneventful. Recovery from anaesthesia was satisfactory and postoperative course was uneventful. After monitoring in the Intensive Care Unit for a day, the patient was shifted to the ward and discharged on the 10th post-operative day with advice for regular follow up.

Key words: Amniotic band syndrome, High arched palate, Syndactyly

INTRODUCTION

Encephalocoele consists of herniation of Cerebrospinal Fluid (CSF), meninges and brain tissue through a congenital bony defect in the cranium. Occipital encephalocele as the name suggest occur through a bony defect in the occipital bone but may extend into the foramen magnum and at times involve the posterior arch of Atlas. Occipital encephalocele represents approximately 85% of lesions[1]. Southeast Asia has the highest incidence (1:6000 live births) with a female preponderance of about 70%[2]. Ultrasonography, Maternal Serum Alfa-Fetoprotein (MSAFP) and amniocentesis help in the prenatal diagnosis of these neural tube defects[3–5]. Associated micrognathia makes airway management of the neonate arduous. The diagnosis in the fetus can be successfully made with ultrasound using jaw index[6]. There are several associated syndromes like Pierre Robin syndrome, Seckel syndrome, and progeria[7], or like our patient It can even be nonsyndromic. Anaesthetic challenges in the management of occipital encephalocele includethe challenges due to the age of the patient, positioning before intubation, prevention of rupture of the sac, securing the difficult airway, intraoperative prone position, accurate assessment of CSF and blood loss and hypothermia. We present a case of 5 days old male with huge encephalocoele posted for excision under general anaesthesia and Management of intubation difficulty.

CASE REPORT

A 3.1kg, 5-day old male, first child from a non-consanguineous marriage, presented to our institute with a huge swelling in the occipital region. In pre anaesthetic check up mother had irregular prenatal care period. He was delivered full term by lower section caesarean section. The child moved all four limbs equally, was accepting feeds, had a small jaw with no breathing difficulty and there was no other obvious congenital anomaly. Family history was insignificant. On examination the circumference of the swelling was 10x10cm,

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the overlying skin was intact with small superficial erosions. Evaluation of Respiratory, CVS, Neurological system revealed no abnormality. The haematological and biochemical profile was normal. USG abdomen and pelvis did not show any abnormality. CT scan head showed midline occipital defect with CSF filled sac and part of brain parenchyma herniating through it. MRI brain revealed a bony defect in squamous part of the occipital bone in the midline with herniation of meninges and post part of occipital lobe through it forming a large CSF filled sac (6.1 × 11.3 × 10.3 cm). The neonate was taken up for excision and repair under general anaesthesia after obtaining an informed written consent from his parent and 4 hrs nil per oral advice before surgery.

ANAESTHETIC TECHNIQUE

The largeoccipital encephalocele made the supine position of the head impossible so the patient was placed in the lateral position to prevent rupture of the swelling. Monitors (oxygen saturation, electrocardiogram, non invasive blood pressure, temperature probe and precordial stethoscope) were connected; baseline vitals were stable and were noted. The baby was premedicated intravenously with Glycopyrrolate 0.01mg/kg and Fentanyl 2mcg/kg. Mask induction maintaining spontaneous ventilation was done in Lateral position with Sevoflurane 8% with 50:50 (O_2:N_2O).Adequacy of mask ventilation was checked and the baby was then turned supine on the table over a pile of drapes so as to elevate the whole body and the head was positioned straight supported underneath by sterile gauze bandages in a padded doughnut. The first attempt was with conventional miller's straight blade size 0 and it revealed a Cormack-Lehane grade 3a. Infant size 0 Airtraq was immediately used which showed CL 2b. Patients saturation dropped to 88% so was put in lateral position and ventilated with 100 % O_2 as it was difficult to bag mask in supine position. Intubation was attempted in the lateral position with Size 0 Airtraq and Size 3 portexuncuffed ETT was passed and correct placement was confirmed with ETCO2 and auscultation. Throat was packed for additional stability of tube in prone position. After ensuring proper placement and securing of the tube, the patient was turned to a prone position for surgery. It was ensured that there was no pressure on the abdomen due to bolsters and all pressure points were adequately padded. ECG electrodes, temperature probe and NIBP monitoring were attached. Anaesthesia was maintained with N_2O:O_2-50:50 and sevoflurane 1-2%. Intermittent intravenous boluses of injection Atracurium were used to provide muscle relaxation. Body temperature was maintained by covering rest of the body with a warm blanket, infusion of warm i.v. fluid and keeping the OT temperature between 23-25 degree. The sac was excised completely and dura was closed after excision of herniated brain tissue. The intra-operative course remained uneventful with vital parameters being within normal limits. At the end of surgery, the residual neuromuscular block was reversed with a calculated dose of Neostigmine and Atropine and the trachea was extubated when the patient fully awake, with the returnof spontaneous respiration, gag reflex and adequate limb movements. The patient was then shifted to ICU. The postoperative course remained uneventful and she was discharged after 10 days with advice for regular follow up.

DISCUSSION

Encephalocele is a neural tube defect, occurring in 1 in 6,000 births all over the world. Up to 60% of cases are associated with other congenital anomalies such as hydrocephalus, microcephaly, micrognathia, Chiari malformation, pulmonary hypoplasia, and renal agenesis. Early excision of the sac is recommended to prevent rupture and infection.The prime anaesthetic challenge in the management of occipital encephalocele is securing the airway[8–9]. Other important concerns are prone positioning, protection of neural placode, assessment of volume status and prevention of hypothermia. Mask ventilation and Intubation can be done awake in thelateral or supine position by placing the neural placode in doughnut-shapedsupport[10,11]. Other method is placing the head at the edge of the table, supported by one person and elevating the body off the table while supporting the pelvis by other[12–14]. Another method was described by Mowaffi is placing the baby supine on a platform made by silicon supports kept one above other till the height matches with encephalocele sac and the headwas supported in hollow cushion protecting sac[15]. We made the baby supine on a pile of drapes. We also protected neural placode in doughnut-shaped support prepared with sterile towel cloth, the height of which was also matching the height of sac. So the baby was now supine like routine supine position. One of the challenges due to their young age includes a low functional reserve volume, and failure to intubate the trachea or bag-mask may result in hypoxaemia, bradycardia and even cardiac arrest. Improper positioning and limited neck extension can make endotracheal intubation difficult or impossible. Therefore, an alternative airway management plan should be ready. In view ofthe anticipated difficult airway (micrognathia, limited neck extension, big swelling, prone to rupture) the baby was intubated awake and positioned supine. The difficult airway management plans in our patient were as follows:-

- Plan A was DL or Airtraq
- Plan B was a paediatricFOB with guidewire through the working channel since we did not havethe neonatal FOB.
- Plan C was cannula ready for CT and tracheostomy

Supine position is the optimum position for laryngoscopy and intubation but sometimes lateral decubitus position intubation may be necessary. The availability of Airtraq laryngoscope in our institution prompted us to utilize it to our advantage in a patient were bag-mask ventilation and intubation both

were difficult in the supine position. The awake fibreoptic intubation remains the gold standard for anticipated difficult intubation. Use of flexible stylet with direct laryngoscopy[16] intubating Laryngeal Mass Airway (LMA)[17] lightwand[18] and GlideScope[19], has been described in the literature to secure the airway in the lateral decubitus position. In pediatric patients, videolaryngoscopes are promising like CMAC even in lateral position[20]. Airtraq desirable features include the low cost, rapid learning curve, it obviates the need to align the axis and can be easily manoeuvred[21]. The infant size version of the Airtraq accommodates endotracheal tubes from 2.5 to 3.5 mm ID. Vlatten et al., reported a case where they successfully intubated a 5-month-old infant with Pierre-Robin sequence using Airtraq[22]. Similarly, a 3-month-old child with difficult airway due to Apert syndrome was intubated with Airtraq[23]. Pean et al., demonstrated a case of difficult airway because of Treacher Collins syndrome. In this case, the authors intubated the 10-year-old child with a 5.5 ID armoured tracheal tube using a size 2 Airtraq[24]. Airtraq has been used in occipital meningocele but in the supine position[25]. Till date, there is no paediatric airway case report which describes the use of Airtraq in occipital meningocele inthe lateral position.

CONCLUSION

Anaesthetic management of occipital encephalocele is challenging due to the presence of difficult airway, prone positioning for surgery, associated with neonatal anatomy, physiology and pharmacology. Vigilant evaluation with careful management results in safe and successful results. Airtraq having preformed curve obviates the need for alignment of the axis, it is a device which is cheap, disposable with the short learning curve and can be an important assist/rescue device in difficult airway situations in lateral positions where maintaining the airway in the supine position is demanding.

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