Airway management of meningomyelocoele - a case report

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To the Editor:

The anaesthesiologist who is faced with anomalies of the face is confronted with the problem of safely securing the airway. Light sedation and the fibre-optic bronchoscopic technique might be useful in the facilitation of tracheal intubation in these patients. In children with an abnormal airway anatomy, the use of a laryngeal mask airway (LMA) has been advocated to secure the airway. In our institution, however, we do not have an LMA or other advanced airway devices. In this article, we report the airway management of a child with an encephalocoele at the root of the nose who presented for surgical correction of the lesion.

Myelodysplasia is an abnormality in the fusion of the embryologic neural groove during the first month of gestation. Failure of neural-tube closure results in a sac-like herniation of meninges (meningocoele) or herniation of neural elements (myelomeningocoele). Myelomeningoceles most commonly occurs in the lumbosacral region but can occur at any level in the neuraxis, including occipital/suboccipital areas or nasally (encephalocoele). Most children have an associated Arnold-Chiari type II malformation and hydrocephaly. Myelodysplasia causes the exposure of central nervous system tissue and places the patient at risk of infection and death. The lesion should therefore be repaired at the earliest opportunity. Furthermore, delay in the closure of the defect increases the likelihood of progressive neurological damage and decreased motor function. Anaesthetic considerations include airway management (especially in lesions of the head), coexisting disease (such as Arnold-Chiari and hydrocephalus), age-related pathophysiology, positioning, the protection of the neuroplaque from rupture, volume status (high third-space losses from the skin defect) and potential for hypothermia due to the exposure of a large body surface area.1

Case report

A three-year-old child weighing 11 kg with a large meningomyelocoele at the root of the nose was posted for the...
surgical excision of the tumour. On examination, it was found that the swelling was large, encroaching on the medial canthi of the eyes bilaterally and engulfing the nose entirely (refer to Figure 1 and Figure 2). The child had minimal upper-limb paresis. No other neurological or developmental deficits were observed. A computed tomography (CT) scan of the head showed features of hydrocephalus involving the lateral and third ventricles.

No sedative premedication was administered. Intravenous access was secured under local anaesthesia in the presence of the parents. The child was sedated with 1 mg of midazolam. Routine monitoring including electrocardiogram, pulse oximetry and non-invasive blood pressure were employed. Anaesthesia was induced with halothane in oxygen. A Randall Baker Soucek (RBS) mask was rotated through 180° and applied over the mouth to give a satisfactory seal. The nostrils were blocked with a gauze piece to prevent air leak. Spontaneous ventilation was preserved throughout. Anaesthesia was deepened with 10 mg of propofol and an oropharyngeal airway was inserted. Mask ventilation was possible. Slight cephalad traction on the swelling and a roll under the shoulder were applied. Laryngoscopy was done with a Miller number-1 blade. Only the arytenoids were visible. Endotracheal intubation was possible at the second attempt after the application of external laryngeal pressure. After confirmation of the correct placement of the endotracheal tube with end-tidal CO2 tracings, a neuromuscular blocking agent was administered. Temperature monitoring was instituted. Anaesthesia proceeded uneventfully through the four-hour surgical procedure. No perioperative complications were encountered.

Discussion

An awake-approach would be the primary management strategy for an anticipated difficult airway. However, the clinician who is caring for a child is often restricted because of difficulty with patient cooperation. An asleep-technique with the preservation of spontaneous ventilation is the safest and is preferred. Inhalational induction preserves spontaneous ventilation, halothane and sevoflurane being the preferred agents. Additional depth of anaesthesia required during laryngoscopy to prevent patient movement, laryngospasm and rise in pressures can be achieved through topical anaesthesia, through intravenous propofol or simply through the increase of inhaled anaesthetic concentration.

In this child, we anticipated difficulty in mask ventilation and laryngoscopy. In addition, manipulations of the airway had to be done in such a way as not to increase intracranial pressure. Flexible fibre-optic bronchoscopic intubation or an LMA as a conduit for intubation in the asleep-child would have been ideal in this patient. Carenzi et al, for example, have described the insertion of an LMA under local anaesthesia in an infant with Tessier facial anomaly. Our institution, however, lacked the necessary apparatus. The RBS mask was therefore rotated through 180° so that the part resting on the nose was over the chin to give a good seal. The absence of the nasal bridge on which the mask could be stabilised meant that two people were required for mask ventilation: one person used both hands to hold the rotated RBS mask and the other person compressed the ventilation bag. Since inhalational induction increases intracranial pressure, we used propofol to deepen the plane of anaesthesia to mitigate this effect and the child was hyperventilated after the airway was secured.

Another difficulty was obtaining a good line of vision during the laryngoscopy, since the large size of the swelling was physically obstructing proper vision of the larynx. This was overcome with mild traction on the lesion and with the placement of a roll under the shoulder.

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