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Anaesthetic considerations in an infant with large cystic hygroma

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Key points

We hereby describe the anaesthetic management of a one and a half month old baby presenting with large cystic hygroma on the left side of neck. This mass was large enough to disturb swallowing and breathing. Lymphangiomas of head and neck region frequently present challenges to the anaesthesiologists due to extension in the neck, difficult airway and postoperative complications.

Abstract

Cystic hygroma (CH) is a benign tumour composed of large lymph containing cysts. Lymphangiomas of head and neck region frequently present challenges to the anaesthesiologists due to extension in the neck, difficult airway and postoperative complications. We hereby describe the anaesthetic management of a one and a half month old baby presenting with large cystic hygroma on the left side of neck. This mass was large enough to disturb swallowing and breathing. Therefore, it was decided to excise it surgically. Difficult intubation was anticipated and inhalational induction with intubation in a spontaneously breathing child was planned. The child was successfully extubated without any postoperative complication.

Keywords: cystic hygroma, difficult airway, infant, intubation, extubation

Introduction

Cystic hygroma is a transilluminating, painless, soft and benign tumor composed of various sizes of cystic lumps. It was first described in 1828 by Radenbacher. It results from obstruction between the lymphatic and venous pathways, commonly, in the fetal neck, which leads to lymph accumulation in the jugular lymphatic sacs in the nuchal region. Incidence of cystic hygroma is 1/6000 live births.[1-3]

Possible etiologies implicated in the occurrence of CH are altered dermal collagen composition (e.g., Down syndrome); abnormal nuchal lymphogenesis (e.g., Turner syndrome); hemodynamic alterations and cardiac dysfunction (e.g., heart defects); abnormal endothelial cell differentiation, etc.[4]

These cases present various challenges to us mainly in terms of airway management. They are at risk of sudden airway occlusion, obstruction depending on degree of invasion to tongue, oral cavity, hypopharynx and thorasic extension. Further compounding factors are associated congenital anomalies like downs syndrome, turner syndrome, heart defects, etc.[5]

Even without any evidence of anatomical pathology, paediatric airway is considered to be difficult; in these cases tracheal deviation, inability to give jaw thrust, di-

stortion of glottic view and sharing of surgical field adds to the challenge.

Case report

A one and a half month female child weighing 3 kg. was posted for excision of large CH on the left side (Fig. 1). The swelling was present since birth, progressively increased in size, but sudden increase was noticed in the past one week. It was associated with difficulty in swallowing, regurgitation, difficulty in breathing and snoring during sleep. The swelling was 15x20 cm in size and covered the anterior and lateral neck. It extended from tragus of ear superiorly to clavicles inferiorly and from midline of neck anteriorly to the nape of neck posteriorly (Fig. 2).

Fig. 1. One and a half month baby with huge cystic hygroma

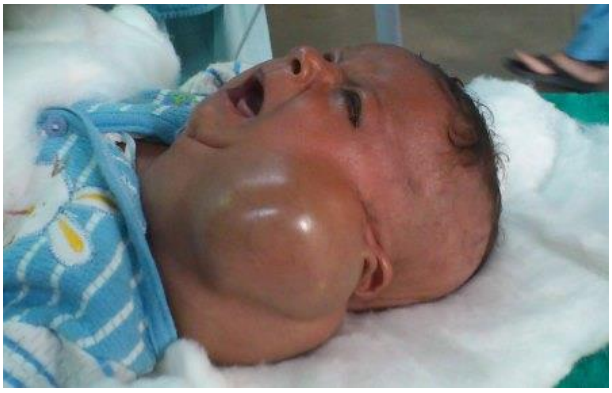

Fig. 2. Cystic hygroma extending from tragus to clavicles

Head of the baby was tilted towards right side. Chest radiograph showed deviation of trachea to the right side because of large mass on the left side. Vitals were stable and routine investigations were within normal limits. Computerized tomography (CT) of the head and neck revealed multiple fluid-filled loculi that circled the neck with mild compression and deviation of the trachea to the right.

In anticipation of rupture of the swelling, aspiration of its contents and airway obstruction, it was decided to operate upon the child. In view of difficult airway, high risk consent, consent for tracheostomy and postoperative ventilation was taken.

A difficult airway cart was kept ready. Monitoring including electrocardiography (ECG), noninvasive blood pressure (NIBP) and pulse oximetry (SpO_2) and end tidal carbon-di-oxide (Et CO_2) was applied. The child was premedicated with intravenous (IV) inj. glycopyrrolate 0.02 mg. A shoulder roll was used to keep the child at optimal laryngoscopic position as the child had a large occiput. We planned an inhalational induction with sevoflurane (1-6%). A rescue tracheostomy by the surgeon was available as a standby during induction. Aspiration of contents to decrease the size, in case there is difficulty in securing the airway, was kept as an option in the plan.

After induction, intravenous line was secured with 24G cannula. Mask ventilation was checked and check laryngoscopy done. The glottis though deviated, could be seen. It being satisfactory, inj. succinylcholine 5mg was given intravenously. The child was ventilated with bag and mask for one minute and then direct laryngoscopy using curved blade was done. Glottis was visible (Cormack and Lehane grade 1) with slight external laryngeal manipulation. Trachea was successfully intubated with uncuffed endotracheal tube (ETT) size 3.0 mm. Inj. atracurium 1.5mg was administered. Anaesthesia was maintained with 50 % nitrous oxide, 50% oxygen and 2% sevoflurane with controlled ventilation with Jackson Rees modification of Ayre's T piece. Inj. Atracurium 0.5mg was administered as and when required for maintenance of neuromuscular blockade. The multiloculated cysts were excised completely. Blood loss throughout the surgery was estimated to be about 100 ml and was replaced. Child was stable throughout the intra-

operative period. At the end of surgery, the child was reversed with inj. neostigmine 0.15 mg and inj. glycopyrrolate 0.05 mg. Extubation was done when the baby was conscious and respiration was spontaneous, regular and adequate. She was shifted to recovery room and observed there for 2 hours. After that, she was shifted to the ward.

Discussion

CH, also called cystic lymphangioma, is a histologically benign congenital tumour of lymphatic origin. Endothelial membranes sprouting embryonically sequestered lymph vessels form fimbrillae that penetrate into surrounding normal tissues, canalizing and producing large multiloculated cysts filled with serous secretions.[6] CH presents in neonate and early infancy, and may present with obstructed labour.[7]

Indications for surgery, the ultimate treatment method in pediatric cases include significant cosmetic deformity, obstructive symptoms, bleeding and recurrent infections. Other treatment modalities include continued observation, repetitive aspiration, injection of curing agent into the lump, radiation therapy and radiofrequency therapy.[8]

For an infant needing removal of CH, it is most important for the anaesthetist to understand the range of invasion into the respiratory tract by the cyst and prepare for airway management. Moreover, significant differences exist between airways of the neonate and the adult.

The hypotonous upper airway along with the weight of the large mass might collapse after induction, hence maintainance of spontaeneous respiration is essential. The visualisation of glottis is difficult and different. External laryngeal manipulations, pulling of mass manually (like in thyroid swelling in adults), bougies and mccoy laryngoscope can help.

Not only the intubation is difficult, maintaining it intraoperatively is difficult due to vigorous surgical retractions and small margin of safety in this age group. Endobronchial intubation as well as accidental extubations are highly probable.

Post surgical resection, the decision of extubation is crucial. The thorasic cage structure, muscle composition, functional residual capacity and oxygen consumption of the small infant must be considered. Post operative respiratory obstruction can occur due to supraglottic edema, tongue edema, hematoma formation and inflammation. Elective ventilation might be required in some cases.[9]

It is not uncommon for infants to develop neural paresis or paraylsis after excision of massive cervical lymphangiomas. The congenital abnormalities such as this tend to distort normal anatomy. They may surround or displace neurovascular structures making their identification quite challenging intraoperatively. Paralysis of 7th, 11th, 12th cranial nerves have been reported.[10]

Conclusion

CH due to mass effect can present as an airway challenge to the anaesthetist. The anaesthetist needs to consider not only induction and endobronchial intubation but also intra-operative management of the endobronchial intubation, accidental extubation and anticipation of possible post-operative complications. A team of experienced surgeons from varying fields including Otolaryngology, Cardiothoracic and Pediatric Surgery will help to ensure a successful surgical outcome.

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