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Navigating airway challenges in cystic hygroma: I-gel as a vital tool

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Abstract
Cystic hygroma, sometimes also known as cavernous hemangioma, is a benign congenital tumour that develops during nine and sixteen weeks of pregnancy. It is caused by an obstruction in the lymphatic system and manifests as a cyst or soft sac filled with fluid. The airway of neonates and young infants with cystic hygroma can be very challenging for any anaesthetist, as airway obstruction, hypoventilation, hypoxemia, and sudden collapse are very common due to the extension of tumour in the neck, airway, and thorax. These patients can present as being asymptomatic to having stridor. We share one such case of a young child with cystic hygroma, successfully managed with I-Gel without any complication in a NORA (Non-Operating Room Anesthesia) setting suggesting that, SADs can be used electively as the primary device for airway management in the challenging airways after proper patient evaluation.

Keywords: Cystic hygroma, congenital tumor, cavernous hemangioma

Introduction
Cystic hygroma, sometimes also known as cavernous hemangioma, is a benign congenital tumour that develops during nine and sixteen weeks of pregnancy. It is caused by an obstruction in the lymphatic system and manifests as a cyst or soft sac filled with fluid [1]. It most commonly occurs in the neck area (cervical) but can also be found in other regions such as the armpit (axillary) or groin (inguinal) with sizes ranging from very small to extremely that grow over time [2].

The airway of neonates and young infants with cystic hygroma can be very challenging for any anaesthetist, as airway obstruction, hypoventilation, hypoxemia, and sudden collapse are very common due to extension of tumour in the neck, airway, and thorax [2]. These patients can present as being asymptomatic to having stridor [3]. These patients can be posted elective resection of cyst, for semi-emergency or emergency cyst aspiration, bleomycin sclerotherapy. Upper airway findings in these patients substantially keep on changing from pre-operative to post-operative once the size of the swelling reduces after aspiration of cystic fluid. We share one such case of a young child with cystic hygroma, successfully managed with I-Gel without any complication in a NORA (Non-Operating Room Anesthesia) setting suggesting that, SADs can be used electively as the primary device for airway management in the challenging airways after proper patient evaluation.

Case report
Our case was a 7-week-old male child with the diagnosis of cystic hygroma in the neck, posted for USG-guided aspiration under general anaesthesia in the radiology department (NORA). The patient was diagnosed with cystic hygroma prenatally and was delivered through LSCS. Post delivery, the patient was intubated uneventfully for general anaesthesia for draining of hygroma (4*5) cm and discharged after 1 week. 4 weeks later, the child again presented to Pediatric-OPD with a complaint of recurrence at the same site with a size of approximately 15X15cm, hanging on the left side of the jaw and neck, extending from the symphysis menti to the ear lobe, inferiorly going till the clavicle occupying all the front and left lateral aspect of the neck. The tumour also bulged in the floor of the mouth, pushing the tongue postero-superiorly (Figure 1 and 2).

A few days back patient had been posted for USG-guided aspiration in the pediatric OT under general anaesthesia with a plan for awake fibreoptic intubation supplemented with injection dexmedetomidine (1 mcg/kg) sedation. However, after three unsuccessful attempts of fiberscope, the procedure was abandoned as the child started desaturating (sPO2 fell below 70%). Classic LMA (size #1) was possible as a rescue for ventilation, and the patient was shifted to the NICU with cLMA insitu which was removed when the patient was fully awake. The patient was discharged from NICU after 3 days.

A week after discharge, the patient was reposted for cyst aspiration under USG guidance in the Radiology department in NORA settings. The patient was reviewed the day before the procedure, Focussed airway history revealed that the child was able to accept breastfeeding without any stridor. Previous anaesthesia records showed successful ventilation with cLMA. A glove was gently inserted in the infant's mouth to assess the mouth opening. The width of the finger was measured to be (1.5* 1cm). General and systemic examination ruled out any congenital cardiac defects and no appreciable increase in the size of the swelling. MRI study showed normal oropharynx, nasopharynx and laryngopharynx indicating good space behind the swelling and clear airway. High-risk consent was taken from the parents given the anticipated difficulty airway and the possible need for post-procedure mechanical ventilation.

In the operating room, standard ASA monitors were applied and pre-procedure vitals were noted as HR=170bpm, SpO2=98-100%, RR=35 per min. The patient was preoxygenated with 100% O2 for 2-3 minutes (EtO2 >90%) and induced with sevoflurane in oxygen with fiO2 of 1.0, titrated to keep spontaneous breathing intact at all times. Injection fentanyl 5mcg was supplemented followed by insertion of I-GELsize#1(Figure 3). Bilateral chest rise and consecutive square wave capnograph were observed. The ventilator was switched to PCV mode with RR=22/min, Pinsp- 12cmH2O, PEEP=3cm H2O. Anaesthesia was maintained with sevoflurane (1.5-2%) with oxygen in the air at 70:30, MAC of 0.7-0.8. The patient was handed over to the radiology team for cystic fluid aspiration under USG guidance and around 110ml of fluid was aspirated uneventfully. Sevoflurane was turned off, and iGEL was removed after achieving adequate emergence when the patient was fully awake. During and post-procedure respiratory and hemodynamic parameters remained stable. The patient was shifted to the recovery room for monitoring with O2 via a facemask with fiO2 of 0.5.

Discussion

The invention and evolution of the Supraglottic airway device is considered a boon to anesthesiologists for the management of difficult airways. In situations where awake fibreoptic bronchoscopy is challenging/impossible, for instance, in pediatric age group or uncooperative patients [4], supraglottic airway devices have proved to be extremely useful as they can be inserted in the lower depth of anaesthesia with preservation of spontaneous breathing and thus better control of airway at all points of time [1, 3, 5]. If needed they can be used as conduits for intubation as well. Besides, multiple studies have shown a similar risk of aspiration of both an ETT (Endotracheal tube) or SAD(Supraglottic Airway Device) and therefore SADs may be used as a definitive airway in similar comparable situations. We chose the I-GEL as the primary device in our case for securing the airway as the placement was possible without loss of airway control since a careful airway assessment had revealed that the patient had an estimated mouth opening of approximately 1.5*1cm, sufficient to introduce size#1 I-GEL, history of successful ventillation via classic LMA besides being supported by radiological evidence that there was sufficient space behind the swelling through which a SAD could be negotiated. Intubation was a possibility through I-GEL in case there was a need and the airway was shared by the anesthesiologists and the surgeon. Since the previous anaesthesia records showed that the patient was previously successfully intubated within a few days of birth, we kept intubation with the help of a video laryngoscope as a rescue plan/plan B [4, 5].

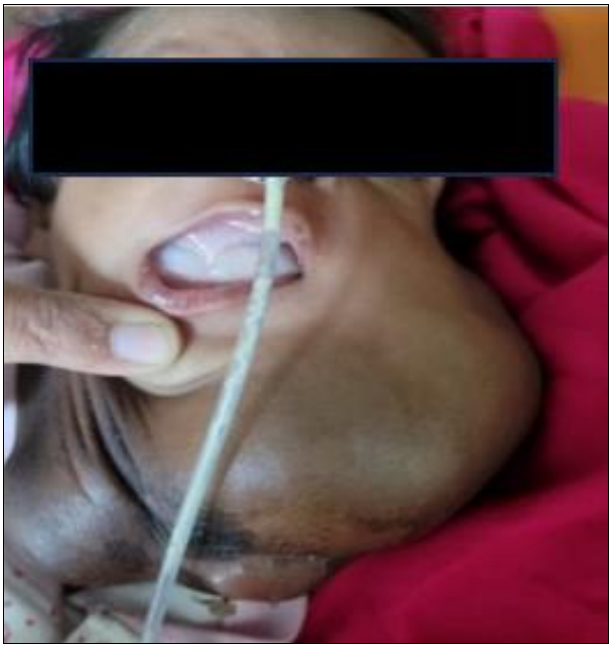

Fig 1: Tumor measures approximately 15X15cm, hanging on the left side of the jaw and neck, extending from the symphysis menti to the ear lobe, inferiorly going till the clavicle occupying all the front and left lateral aspect of neck

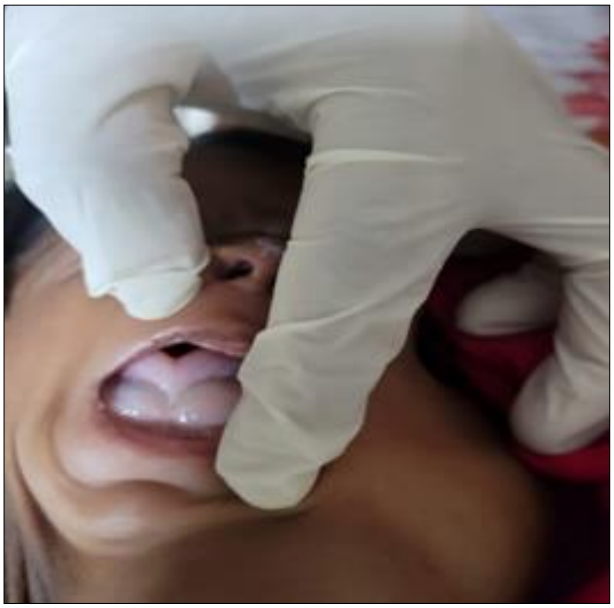

Fig 2: The tumor also bulged in the floor of the mouth, pushing the tongue postero-superiorly

Fig 3: Insertion of I-GELsize#1.

Conclusion

We conclude that SADs can be used safely to secure the airway as the primary definitive airway device if planned judiciously. A thorough and meticulous Airway assessment paves the way to many options in otherwise seemingly Difficult Airways.

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