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Anaesthetic Management of a Paediatric Patient with Cervical Cystic Hygroma Posted for MRI Brain: A Case Report

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KEYWORDS

Anaesthetic Management, Paediatric Patient, Cervical Cystic Hygroma

ABSTRACT:

Background: Cystic hygroma is a congenital lymphatic malformation that can cause significant airway distortion, making anaesthetic management challenging. We present the case of a 5-year-old male child with a large cervical swelling and recent history of seizure, posted for MRI brain. The case highlights considerations in paediatric airway management, importance of planning for difficult airway, and successful use of videolaryngoscopy for intubation.

INTRODUCTION

Cystic hygromas are benign congenital malformations of the lymphatic system, often presenting as large, compressible, and progressively enlarging cervical masses in children. These swellings may cause airway distortion, dysphagia, and cosmetic deformity, posing unique challenges for anaesthesiologists. Securing the airway remains the most critical step in management. The presence of comorbidities such as recent seizures adds further complexity. We report the anaesthetic management of a paediatric patient with cervical cystic hygroma undergoing MRI brain, with emphasis on strategies to manage anticipated difficult airway.

CASE REPORT

A 5-year-old male child weighing 15 kg, a known case of cyatic hygroma of neck from birth presented with gradually progressive increase in size of the swelling over the right side of the neck for the past two months. patient had an episode of generalised tonic–clonic seizure associated with uprolling of eyes and loss of consciousness for 5 minutes, with spontaneous recovery and no postictal complications.

On examination, the child had a large soft cystic swelling involving the cervical region (Figure 1 & 2). Airway examination revealed limited mandibular space with anticipated difficulty in intubation due to external compression and distortion. Systemic examination was otherwise unremarkable. Baseline investigations were within normal limits.

The child was kept nil per oral (NPO) as per standard fasting guidelines. Difficult airway cart, supraglottic devices, fibreoptic bronchoscope, and tracheostomy set were kept ready.

In the MRI suite, standard monitors were applied. After preoxygenation, induction was performed using intravenous agents and muscle relaxant (atracurium). Anticipating difficult airway, intubation was attempted using a C-MAC videolaryngoscope. A 4.5 mm cuffed endotracheal tube was successfully placed (Figure 3). Correct tube placement was confirmed with end-tidal CO_2 and bilateral chest auscultation. Anaesthesia was maintained with oxygen, air, and sevoflurane (MAC 1) along with atracurium infusion for muscle relaxation. Intraoperative course was uneventful. At the end of procedure, neuromuscular blockade was reversed with neostigmine and glycopyrrolate, and the child was extubated after ensuring adequate spontaneous efforts and eye opening. Post-anaesthesia recovery was smooth.

Figure 1: Child with large cervical swelling (frontal view).

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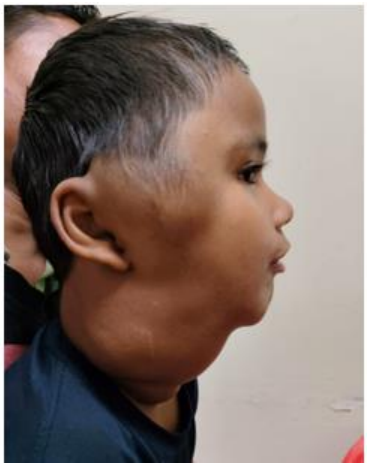

Figure 2: Child with cervical swelling (lateral view).

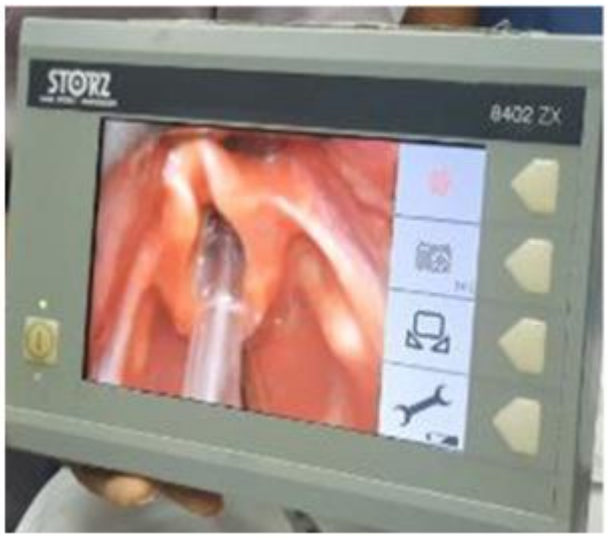

Figure 3: C-MAC videolaryngoscope view during intubation.

DISCUSSION

Cystic hygroma, a congenital lymphatic malformation, poses major anaesthetic concerns primarily due to its anatomical location and mass effect. The cervical location, as in our case, is particularly challenging because the swelling may compress or distort the upper airway, displace the larynx, and reduce available mandibular space, leading to difficulty with both mask ventilation and tracheal intubation. Moreover, dynamic airway collapse may occur after induction of anaesthesia when muscle tone is lost, precipitating complete obstruction[1,2].

Difficult Airway Considerations:

The most significant perioperative concern in children with cystic hygroma is airway management. Direct laryngoscopy may be hampered by altered anatomy, limited oral opening, or displacement of the larynx. Preoperative imaging such as ultrasound, CT, or MRI may help delineate airway involvement, but the actual difficulty is often greater than anticipated clinically. The Difficult Airway Society (DAS) and Paediatric Difficult Intubation Registry highlight the importance of preparing a stepwise algorithm in such scenarios [3]. Key points include:

- Anticipation and preparation: A difficult airway cart with various sizes of endotracheal tubes, supraglottic airway devices, videolaryngoscopes, fibreoptic bronchoscopes, and emergency surgical airway equipment should always be available.
- Maintenance of spontaneous ventilation: In some cases, inhalational induction while maintaining spontaneous breathing is advocated to avoid loss of airway patency. However, in our patient, recent seizure history and aspiration risk warranted a rapid sequence induction.
- Role of videolaryngoscopy: Devices such as C-MAC and GlideScope improve the laryngeal view, reduce the force required for intubation, and minimise airway trauma[4]. They are increasingly recommended as first-line tools for anticipated difficult airway in paediatric patients.
- Fibreoptic bronchoscopy: Considered the gold standard, especially when significant supraglottic or glottic distortion is suspected[5]. However, it requires expertise, may be limited in small children, and is less feasible in remote settings such as MRI suites.
- Extubation strategy: Post-procedure, the airway remains vulnerable to obstruction due to oedema, residual distortion, or haemodynamic instability. Extubation should be performed only when the child is fully awake, with airway adjuncts and reintubation equipment immediately available[6].

Our use of videolaryngoscopy with a C-MAC facilitated safe intubation without desaturation, highlighting its utility in such high-risk cases.

Seizure Considerations:

The presence of a recent generalised tonic–clonic seizure added another layer of complexity. Perioperative seizures may be triggered by metabolic disturbances (hypoglycaemia, electrolyte imbalance), hypoxia,

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hypercarbia, or anaesthetic drugs that reduce seizure threshold [7].

- Choice of agents: Sevoflurane, though widely used in paediatric anaesthesia, has been associated with epileptiform EEG changes at high concentrations. It is generally considered safe at 1 MAC, as used in our case, but should be titrated cautiously [8]. Propofol and benzodiazepines provide additional anticonvulsant properties and are often preferred in patients with recent seizures.
- Avoidance of triggers: Hyperventilation, rapid fluctuations in $PaCO_2$, and abrupt withdrawal of antiepileptic drugs should be avoided. Maintenance of normoglycaemia, normocarbia, and stable haemodynamics is critical.
- Postoperative vigilance: Children with a seizure history should be monitored closely in the recovery area for recurrence, especially during emergence when anaesthetic depth changes may lower seizure threshold.

In our patient, adequate seizure prophylaxis, avoidance of hypoxia and hypocarbia, and careful titration of sevoflurane ensured an uneventful perioperative course.

MRI-Specific Challenges:

Anaesthetising in the MRI suite adds unique difficulties:

- Remote location limits immediate access to advanced airway tools.
- Only MRI-compatible equipment can be used.
- The anaesthesiologist may have restricted access to the patient during scanning.

Hence, securing the airway beforehand with reliable intubation, as we achieved, is a safer approach than relying on supraglottic devices in such settings.

CONCLUSION

Children with cervical cystic hygroma represent a 'perfect storm' for anaesthesiologists as in our case due to the intersection of a difficult paediatric airway and recent seizure history. Meticulous preparation, use of advanced airway technology like videolaryngoscopy, seizure prophylaxis, and MRI-specific safety measures are crucial. Our successful outcome reinforces the value of structured planning and modern airway tools in managing such high-risk paediatric cases.

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