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Case Report

Anaesthestic and airway management challenges in pediatric sclerothearpy for upper airway vascular malformation: A case report

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ABSTRACT

Anaesthetic management of pediatric patient with facial and upper airway vascular malformation (VM) is extremely challenging and it multiplies further if sclerothearpy is planned on the airway especially outside the operation theatre. It encompasses a broad spectrum of issues like sharing of airway, risk of laryngospasm, aspiration of blood, severe torrential uncontrolled bleeding leading to loss of airway, and airway edema post sclerothearpy. Here we discuss anaesthetic management of a seven year old girl with VM over entire tongue, lower lip, right lower cheek and neck posted for ultrasound guided sclerothearpy of tongue in radiology suite.

1. Introduction

Vascular malformations (VMs) are low-flow, soft, compressible bluish lesions of the vascular or lymphatic system with a predilection for the head and neck region.[1] VMs can be present anywhere from the upper aerodigestive tract to the subglottic region and have a predisposition to increase in size with valsalva manoeuvre, supine position, infection, trauma, hormonal changes, or as a result of the treatment itself.[2] VMs of the airway can cause dysphagia, dysphonia, stridor,and airway obstruction. Huge vascular malformations, particularly on the lips and tongue, make airway management very challenging, as they are prone to frequent trauma and bleeding during airway manipulation, and the challenges multiply further if the procedure is required to be done in the airway, especially on a paediatric patient.[3] Surgical excision,laser ablation, and sclerothearpy are various treatment modalities available for VMs. Sclerothearpy includes injection of a sclerosing agent into the vascular lesions, which initially causes inflammation and an increase in the size of the lesions, and finally causes vascular sclerosis, occlusion, and regression of the lesions.[4]

Here, we present our experience of anaesthestic management of a paediatric patient scheduled for sclerothearpy of a huge lingual VM in an interventional radiology suite.

2. Case Presentation

A seven-year-old girl weighing 25 kg presented to us for ultrasound-guided sclerothearpy of the huge venous malformation of the tongue in the interventional radiology suite.

On examination, bluish colour and compressible swellings were present on the right jaw, right side of the lower lip, neck, and intraorally on the right half of the mucosa and entire tongue (Figure 1). Venous malformation has been present since birth, and she has undergone sclerothearpy in the past five times under general anaesthesia (GA) using AMBU® LMA® (Ambu Aura40, ALMA, Ballerup, Denmark) for the treatment of the lesions present on the cheek.

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Magnetic resonance imaging (MRI) demonstrated a heterogeneously T2 hyperintense lesion epicentred in the right tongue, right jaw, and lip, showing extension into the ipsilateral masticator muscles laterally into the right submandibular space, right parotid space, and inferiorly extending into the floor of the mouth with few phleboloiths (Figure 2).

The baseline haematological and biochemical reports were normal. Since the patient had undergone sclerothearpy earlier under GA using ALMA uneventfully, our plan A was to use ALMA for securing the airway under GA, plan B was to use a C-MAC videolaryngoscope with an endotracheal tube, and plan C was a tracheostomy in case there was any uncontrolled torrential bleeding occur from the airway during the procedure.

High-risk parental informed consent was obtained. An otorhinologist surgeon was kept stand by with a tracheostomy set and a paediatric difficult airway cart was kept ready.

Inhalational induction was performed with sevoflurane, in oxygen, and nitrous oxide. Twenty-two gauze intravenous line was secured in the right dorsum of the hand. Injection fentanyl (20 micrograms), ketamine (15 mg), and propfol (20 mg) were given intravenously (IV). When the jaw tone was relaxed, an ALMA of size 2.5 was inserted. Anaesthesia was maintained with oxygen, sevoflurane, and nitrous oxide, and pressure support ventilation was started with a pressure support of 10, positive end expiratory pressure of 5, respiratory rate of 14/minute, and fractional inspired oxygen concentration of 50%. An ultrasound-guided polidocanol injection was injected on the right side of the tongue. During the procedure, ALMA got displaced towards the left side, but it did not cause any difficulty in ventilation. At the end of the procedure, ALMA was removed when the patient was fully awake. But suddenly bleeding started from the injection site of the tongue, and the oxygen saturation of the patient dropped to 85%. Mask ventilation became difficult because of the bleeding and increased tongue swelling after sclerothearpy. We immediately injected propofol 50 mg IV, inserted ALMA again, and controlled the bleeding with pressure applied through a dry gauze piece. Patient kept on assisted spontaneous ventilation, and after 10 minutes of applying pressure, bleeding was controlled and ALMA was removed carefully when patient was fully awake and breathing spontaneously.

We observed the child for half an hour and shifted her to the intensive care unit for further observation.

Few hours later, the tongue swelled dramatically and filled the entire oral cavity (Figure 3), but there was no breathing difficulty.

After 48 hours, the tongue swelling began to subside and the patient continued to receive intravenous fluids and no oral medications till then.

Her rest of the hospital course was uneventful and she was discharged safely with regular follow-up.

Figure 1: Venous malformation present on entire tongue, lower lip and right side of cheek

Figure 2: Sagittal midline neck T2 weighted image showing hyperintense lesion involving base of the tongue with maintained oropharyngeal airway. Part of the vascular malformation is extending into laryngopharynx with narrowing of airway

Figure 3: Tongue swelling after sclerothearpy

3. Discussion

Vascular lesions, especially in the upper aerodigestive tract, can pose a difficult situation for the anesthesiologist and require careful assessment and planning of airway management.[5] It is very important to know the nature and extent of the pathology and the factors that increase the size of the swelling. Imaging helps in determining the extent of the lesion to make a safe airway management plan. MRI, computed tomography, and doppler ultrasound can evaluate the extent and depth of VM.[6] In our case, the MRI did not show any involvement of the oropharynx, nasopharynx supraglottic, or subglottic areas, and the patient had a history of sclerothearpy under GA with ALMA five times in the past. This led us to choose ALMA to secure the airway, but since this time it was the sclerothearpy of the tongue, the airway concerns were slightly different from the previous procedures. There was risk of uncontrolled bleeding, which could have led to aspiration of blood, loss of airway, laryngospasm because of the trickling of blood into the larynx, and severe swelling of the tongue at the end of the procedure, which could have led to complete airway obstruction. Our apprehensions were real, and the patient had bleeding, laryngospasm, and difficulty in mask ventilation because of the increase in size of the tongue swelling after sclerothearpy. Again, ALMA proved life-saving and helped to ventilate the patient through the obstructed airway.

ALMA has a smooth surface, a preformed curve, and internal ribs built into this curve, which provide flexibility. These properties allow ALMA to safely negotiate the oropharyngeal curve without any trauma.[7]

Our plan B was endotracheal intubation with a C-MAC laryngoscope, but the concern with laryngoscopy was the pressure on the tongue by the laryngoscope, which may exacerbate swelling or bleeding. Fibreotic bronchoscopy (FOB) was not in our plan, as we presumed FOB may lead to bleeding if it inadvertently touches the vascular malformation. Our plan C was a tracheostomy in case of torrential bleeding and loss of airway from above. Gandhe et al. planned an awake surgical tracheostomy to secure the airway in a patient posted for embolisation of the VM of the airway, which was extending into the pharynx and larynx, but because of severe and uncontrolled bleeding, an emergency percutaneous tracheostomy was performed.

The risk is not limited to the procedure, but it continues a few hours beyond the procedure as sclerothearpy triggers intravascular thrombosis and induces an intense inflammatory response in the treated tissue, which leads to increase in swelling.[8] We shifted the child to the ICU for monitoring as we observed immediate swelling of the tongue post-sclerothearpy, which, after a few hours, occupied the entire buccal cavity and lasted for forty-eight hours.

4. Conclusion

A comprehensive strategy is required in the anaesthetic management of paediatric patients with vascular lesions in the head and neck region. It encompasses multiple concerns like sharing of the procedural and anaesthetic fields, the risk of bleeding in the airway, aspiration, and post-sclerotherapy airway edema. A multidisciplinary team approach with a well-equipped anaesthesia team and sufficient knowledge about the type of lesion and its expected behaviour is the key to sail safely in such difficult scenarios.

5. Source of Funding

None.

6. Conflict of Interest

None.

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