

Anesthetic management of excision of laryngocele – role of transtracheal jet ventilation

We report the case of a 7-year-old 22-kg female child with normal milestones who came with the complaints of snoring and stertorous breathing for a few years, with on and off fever for the past 2 weeks. There was a history of voice change with an abnormal cry since 2–3 years. There was a history of recurrent respiratory infections with episodes of sore throat and dysphagia. There was no history of daytime sleepiness with neither previous surgeries nor admissions. On examination, she was an active looking young child with normal vitals. She had an inspiratory stridor that was mistaken for bilateral wheeze. It was treated with nebulized levosalbutamol and budesonide. Neurological examination and cardiovascular system were normal. She had adequate mouth opening and normal head and neck movements, with a Mallampatti classification I. On indirect laryngoscopy, a smooth mass possibly arising from aryepiglottic fold and right piriform fossa causing glottic obstruction was visualized. The left cord could be partially seen [Figure 1]. Routine blood and urine investigations were normal. Computed tomography (CT) scan of the neck showed a well-defined cystic lesion filled with air and fluid measuring approximately 2 × 2 cm in the larynx on the right side involving the glottic-supraglottic levels compromising the airway. The naso/oropharyngeal airway, parapharyngeal fat plane, epiglottis, and vallecula were normal. Post-cricoid region was also normal. Her preoperative saturation was 94–96% in room air. The plan was to establish transtracheal jet ventilation (TTJV) under total intravenous anesthesia (TIVA). She was premedicated with intravenous glycopyrrolate 0.1 mg, dexamethasone 4 mg, and fentanyl 25 µg. All emergency

airway equipments for a tracheotomy and cricothyroidomy, which included a 5-size tracheostomy tube and the conventional needle-syringe barrel-endotracheal tube adapter assembly, were kept ready. The Medysis system 1 ventilator with jet attachment was completely checked for pressures and tidal volume with test lung. It is driven by an oxygen source. There are three control knobs – inspiratory pressure, inspiratory time, and expiratory time. The flow is continuous and arbitrary adjustments were done with the three knobs so that chest expansion was satisfactory. The volume delivered and rate was monitored clinically by looking at the chest. After adjusting the three knobs, the size of the needle and the relative position of the tip of the needle with regard to lumen of the airway are modified for an adequate tidal volume. Natural airway is the way of expiration, and hence, it is relatively contraindicated in complete obstruction. As soon as the equipment was ready, oxygen by facemask was given. She was started on infusion of propofol 100 mcg/kg/min for 3 min. Satisfied with the maintenance of oxygenation and the head and neck in extended position, sterile preparation of the front of neck was done. The space between first and second tracheal rings was identified and transtracheal local anesthetic injection of 2 ml of 2% lignocaine was carried out. As the child coughed, anesthesia was deepened with a bolus of 20 mg of propofol and a 16-G venflon was introduced into the trachea facing caudad. After confirming correct tracheal placement of the cannula by free aspiration of air, the child was paralyzed with 2.5 mg vecuronium and jet ventilation was instituted through the cannula. As there was confirmed airway control, we resorted to vecuronium instead of succinyl choline. After stabilizing the child, laryngoscopy with Macintosh blade was done that revealed a mass completely obstructing the glottic opening. Pushing the mass with Magill forceps revealed a minimal gap in the glottic opening. To prevent upper airway obstruction and aspiration of blood during surgery with TTJV, a 5-mm cuffed RAE south facing endotracheal tube was successfully inserted into the trachea after manipulation of



Figure 1: The laryngocele mass

the cyst using the tube. The entire process took approximately 4 min and the child was completely uncompromised. Anesthesia was continued with 65% nitrous oxide and 35% oxygen and 1.5% sevoflurane and hand ventilated withholding transtracheal ventilation. The laryngocele arising from the right ventricle was completely removed without any complication in approximately 50 minutes. The neuromuscular block was reversed and the child was extubated at the end of the surgery. The transtracheal cannula was removed 2 hours later after satisfying airway competency. There were no perioperative complications. The histopathological report was conclusive for laryngocele. Usually laryngoceles are reported in adult males but we had an odd case. Usually, they present with hoarseness, sore throat, and obstruction, which were present in our case.^[1] The swelling may be associated with obstructive lung disease, emphysema, laryngeal carcinoma, and ankylosing spondylitis, which were absent in our case.^[2] Benumof *et al.*^[3] in his extensive review established the role of percutaneous jet ventilation as a simple technique for effective oxygenation without gadgets in compromised airways. Their experiments included glottic and supraglottic tumors. Medysis system 1 is small fluid, logic controlled device (Premier Medical Systems & Devices Private Limited), which allows control of inspiratory and expiratory time as well as pressure. This makes jet ventilation safer with less fear of barotrauma. It is mandatory to have unobstructed upper airway to allow expiration, failing which there is a possibility of increased intrapulmonary pressure leading to barotrauma. In children, it is possible to deliver acceptable, even though suboptimal tidal volume, without entrainment but some patency in airway is necessary for carbon dioxide removal. As soon as the surgery begins with manipulation of the swelling, opening the previously obstructed airway may predispose to an unexpected entrainment with large tidal volumes and complications, which should be vigilantly watched for in such cases. Establishment of airway with either a surgical or a percutaneous cricothyrotomy was yet another option in our case. We opted out due to the lack of such equipment and the ease of insertion and establishment of

TTJV. To conclude, percutaneous transtracheal jet ventilation is a possible airway option before orotracheal intubation to anesthetize children with airway swellings and compromised airways than resorting to needless tracheostomy. Usually, restricted entrainment is adequate in children. Intraoperative relief of obstruction may entrain large volumes which may be detrimental and watched for.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Access this article online	
Quick Response Code:	Website: www.joacp.org
	DOI: 10.4103/joacp.JOACP_143_15

How to cite this article: Parthasarathy S, Nag K, Sivashanmugham T, Karthikeyan P, Ravishankar M. Anesthetic management of excision of laryngocele—role of transtracheal jet ventilation. *J Anaesthesiol Clin Pharmacol* 2018;34:124-5.

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