Giant vallecular cyst excision in infant: Should we proceed without a definite airway?

Sir,

Anesthetic management of vallecular cyst excision is one of the most challenging procedures encountered in anesthetic practice. Vallecular cyst, though a rare entity, can lead to airway obstruction as a result of mass effect in the hypopharynx and by posterior and inferior displacement of the epiglottis. They are usually associated with laryngomalacia where there may be flaccid epiglottis, poorly supported arytenoids, or short epiglottic folds.[1] The airway collapse occurs during inspiration leads to inspiratory stridor and also accompanied with feeding difficulties, apnea, cyanosis, and failure to thrive. Here, we discuss the successful management of a case of vallecular cyst posted for excision and marsupialization.

A 3-month-old male infant weighing 3 kg presented with noisy breathing and respiratory distress for the past 1 month following an episode of upper respiratory tract infection. The child was treated as pneumonia based on chest X-ray findings in primary centers before presenting to our hospital. On examination, the child had intercostal retraction and inspiratory stridor. A differential diagnosis of laryngotracheobronchitis, laryngomalacia, vocal cord palsy, and aspiration pneumonia was made. The computed tomography report showed the presence of vallecular cyst at the base of the tongue extending into the left tonsillar fossa. The patient was posted for endoscopic assessment followed by cyst excision. On preanesthetic checkup, the child was term baby born by normal vaginal delivery. On examination, the respiratory rate was 50/min, and intercostal recession and inspiratory stridor were present. Oxygen saturation on nasal prongs with oxygen therapy was 96%. His preoperative blood investigations were within normal limits except for serum potassium levels which were persistently between 5.5 and 6.0 meq/dl. The infant was shifted to the operation theater with oxygen support. The patency of 24-G intravenous cannula was confirmed. Electrocardiography, pulse oximetry, and noninvasive blood pressure monitoring were started. Premedication with atropine was avoided as the initial heart rate was between 140 and 160 beats/min. Plan was to check for mask ventilation after intravenous anesthesia induction, and if it was adequate, a check laryngoscopy followed by endotracheal intubation was planned in deeper plane. Surgeons were asked to be standby for emergency tracheostomy, considering the high risk of losing the airway and nonavailability of a neonatal fiber-optic bronchoscope. The child was induced with injection fentanyl 1 μg/kg and ketamine 1 mg/kg. After checking the adequacy of mask ventilation, the infant was maintained on 100% oxygen with sevoflurane titrated from 1% to 8%. Succinylcholine was avoided willfully in view of raised potassium. Once the minimum alveolar concentration reached around 3.0, a check laryngoscopy was done using a video laryngoscope. There was complete obstruction of the glottis with a thin-walled cyst with impending rupture. No attempt was made for intubation. Since the surgeon was confident in ablating the cyst in <1 min, the plan was modified to intermittent apneic oxygenation. After mask ventilating the patient with 100% oxygen and sevoflurane 6%–8% for 3 min, the patient was handed over to the surgeon for procedure. Coblation of the cyst was done, and the cyst contents were aspirated leading to reduction in the size of the cyst [Figure 1].

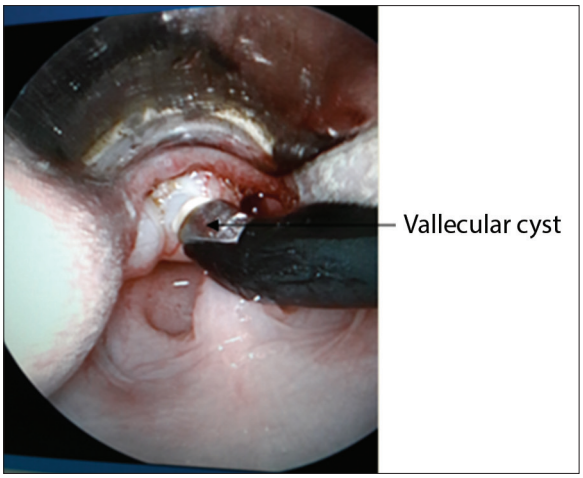

Figure 1: Direct laryngoscopic view of vallecular cyst

Continuous suctioning was done to prevent aspiration. Once the cyst was ablated, epiglottis was clearly visible. This whole procedure took 60–80 s. There was no episode of desaturation and bradycardia in the child. Following this, the child was intubated with a 3.0-sized uncuffed tube using video laryngoscope to give the surgeons' adequate time to remove the cyst in total. Complete excision of the cyst wall was done from the base of the tongue and from the lingual surface of the epiglottis. As no relaxant was used, there was a return of spontaneous respiration postprocedure and the child was extubated. The inspiratory stridor and tachypnea persisted for 2 postoperative days. Adrenaline nebulization was continued in the postoperative ward. Gradually, the inspiratory stridor and tachypnea subsided and the child had decrease in oxygen requirement and discharged home after a week of hospital stay.

Vallecular cyst, a mucus retention cyst, results from retention of mucus within an obstructed duct of a submucosal gland. These cysts are superficial and can occur in any part of the laryngopharynx with exception of the free edge of the vocal fold. The base of the tongue and lingual surface of the epiglottis are the most common sites of the cyst.[1] Depending on the size of the vallecular cyst, difficult airway is a possibility in these patients. There were a few methods in current literature reviews for intubation options in a patient presenting with vallecular cyst. The most common is normal rapid sequence induction with cricoid pressure followed by oral intubation with the help of styletted endotracheal tube.[2,3] This is feasible if the size is small and there is no obstruction of view of the vocal cord. Another option is through transnasal fiber-optic intubation or flexible fiber-optic nasolaryngoscopy. This can be used if the normal common endotracheal intubation fails.[3] The trachea can also be intubated through a rigid laryngoscope by the otolaryngologist, which can be used to displace the cyst to view the vocal cord as the rigid laryngoscope is longer than the anesthetic laryngoscope.[4] The last option is usually tracheostomy if all other methods fail.[5]

Our patient presented with a history of respiratory distress and recurrent upper respiratory tract infections. On examination, the child had inspiratory stridor and computed tomography scan showed a midline cystic lesion at the base of the tongue. Our initial plan was to carry out intravenous induction using fentanyl and ketamine and to perform check laryngoscopy under deep plane of anesthesia. If glottis was visible, endotracheal intubation using 3.5 mm cuffed endotracheal tube would be inserted. However, during check laryngoscopy, we could not visualize the glottic opening and any further attempt to push aside the cyst was not done due to chances of cyst rupture. The mask ventilation was resumed, and decision was taken to hand over the patient to surgeon for cyst aspiration. Once the cyst was punctured and aspirated by the surgeon, we could see the epiglottis and endotracheal intubation was attempted. After intubation, surgeons removed the cyst and thereafter the child was extubated after return of adequate motor tone. We would like to highlight few important aspects of our case history here. On initial check laryngoscopy, only a giant cyst was seen lying on the base of tongue and endotracheal intubation looked impossible in this situation. Since the surgeons were confident enough to puncture and aspirate the cyst in less than a minute, this made us to think for apneic oxygenation. The experience and technique of surgeons in quickly aspirating the cyst made epiglottis visible and endotracheal intubation possible. Second, since the cyst lay on the base of the tongue totally hiding the epiglottis, there were chances that mask ventilation may not be possible once the child has loss of spontaneous breathing leading to cannot ventilate cannot intubate (CVCI) situation. The ASA Difficult Airway Algorithm[6-8] lists Laryngeal Mask Airway (The Laryngeal Mask Airway Co., Nicosia, Cyprus), esophageal-tracheal Combitube, and transtracheal jet ventilation (TTJV) as appropriate nonsurgical solutions for a CVCI situation. In the case of a laryngeal cyst, however, the first two options may fail to solve the problem since both provide supraglottic ventilator mechanisms. Moreover, as these devices are inserted blindly into the airway, they might traumatize the cyst, causing rupture of the cyst or its blood vessels, with resultant bleeding and aspiration. The solution, therefore, should be to advance the ventilatory mechanism below the lesion by either TTJV or surgical airway. Batra *et al*. reported a case of vallecular cyst in a 3-month-old infant, in which the airway could not be secured by any of the conventional techniques described for such cases, thus necessitating tracheostomy.[9] Therefore, the role of check laryngoscopy in deeper plane

while the patient is spontaneously breathing greatly helped in determining the further management plan. Our patient also had higher serum potassium levels, so administration of succinylcholine was willfully avoided.

In another case report, successful tracheal intubation has been carried out using paraglossal straight blade laryngoscopy technique.[10] Namshikar *et al*. described a similar case, in which they intubated the child after applying cricoid pressure and extubated the child on the 2nd postoperative day.[11] In a case report by Rivo and Matot, they detected vallecular cyst incidentally during direct laryngoscopy for intubating the patient who was posted for appendectomy. They used fiber-optic bronchoscope to intubate the patient once the patient recovered from general anesthesia.[12] However, the use of fiber-optic bronchoscope in pediatric patients can encounter hurdles due to cyst location and distortion of laryngeal anatomy.[13] A large bore needle with attached syringe should be available if emergency cyst aspiration is needed.[14]

In conclusion, airway management of pediatric patients with vallecular cyst is challenging, with a high risk of total airway obstruction. We propose that initial check laryngoscopy done in deeper plane of anesthesia greatly helps in determining the further management plan. These cases require an individualized approach, a careful preoperative assessment, and a well-thought-out plan, which includes airway crisis management, backup options, and a surgeon on standby. It is hoped that our experience will assist others in the management of such patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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