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Case Report

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Lessons Learned from A Case of Functional Total Laryngeal Obstruction Under Anaesthesia by Vocal Cord Polyp Managed by Vortex Approach

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Abstract

Dynamic airway obstruction is a terrifying situation. Most of the time, the obstruction is intermittent. The situation becomes horrifying and panicky when this intermittent dynamic airway obstruction turns into a total laryngeal obstruction under anaesthesia. Herein, we present a case of a 56-year-old male with vocal cord polyp, who was posted for excision. The difficult airway was anticipated in view of a thick neck. He was also hypertensive and a suggestive case of obstructive sleep apnoea. The patient went to the cannot ventilate, cannot intubate, cannot oxygenate situation because of the polyp taking position between the vocal cords and completely obstructing the central airway gateway. The case was successfully managed by emergency cricothyroidotomy by following the Vortex approach but taught us a few lessons. The case shows us the relevance of clinical findings and the importance of vocal polyp as a cause of inducible laryngeal obstruction and highlights the consequences of intuition and minor lacuna in airway management.

Keywords: Airway management, cricoid cartilage, hypoxia, intubation, larynx, polyps

Introduction

Inducible laryngeal obstruction (ILO) can happen because of the pathology in and around the larynx. Both the anaesthesiologist and the laryngologist have an important and contributory role in the perioperative management of such patients. ILO is dynamic; most patients have inspiratory difficulty, but the expiratory difficulty can also be a presentation (1). Acute intermittent laryngeal obstruction by vocal cord lipoma (2) and the challenges faced by the anaesthesiologists for near-complete laryngeal obstruction by vocal cord papillomatosis have been described (3). However, a functional total laryngeal obstruction caused by vocal cord polyp has been rarely described. Herein, we present such a case, which shows us the relevance of clinical findings and the importance of vocal polyp as a cause of ILO under sedation and anaesthesia and highlights the consequences of intuition and minor lacuna in airway management.

Case Presentation

A 56-year-old male, who had a body mass index of 32.2 kg m^{-2} and was a recently diagnosed hypertensive and a smoker (20 pack-year), presented with voice change over the past 4 years, noisy breathing, and choking during sleep. A subglottic pedunculated polyp was diagnosed and planned for excision. On airway examination, neck circumference of 46 cm, protruding upper incisor, and retrognathia were present. However, mouth opening, neck and jaw movement, and thyromental distance were adequate. He fulfilled 7 out of 8 criteria of STOP-BANG scoring for obstructive sleep apnoea (OSA).

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Awake videobronchoscopic intubation was planned; possible difficult airway management was explained, and informed consent was obtained. On the day of surgery, the video bronchoscope was found to be not functional. Traditional laryngoscopy under anaesthesia was decided while following the Vortex approach to difficult airway management. Difficult intubation trolley and ear, nose, and throat (ENT) team were readied. The patient was placed in a ramped position and preoxygenated. Intravenous propofol 140 mg was administered, and the bag-mask ventilation (BMV) was found to be possible with nasopharyngeal airway in situ. Then, injection of succinylcholine 100 mg was administered. On laryngoscopy, a Cormack-Lehane grade III with the best possible manipulation was obtained, but a caudie-tip bougie insertion was unsuccessful. Immediately, further help was sought, and the ENT team was asked to proceed for emergency tracheostomy. A decision of awakening back the patient from anaesthesia was made, but, at the time, BMV was found to be impossible.

Meanwhile, saturation started falling and reached below 80% within 2 minutes. Therefore, emergency cannula cricothyroidotomy was performed using 16G venecath and was connected with a 15-L min^{-1} oxygen supply and disconnected intermittently. By the time the saturation reached 30%, and within the next 20-30 seconds, it reverted to 80% and sustained there. Spontaneous breathing effort was back within the next 2-3 minutes, and BMV was possible again. The procedure was postponed for a day.

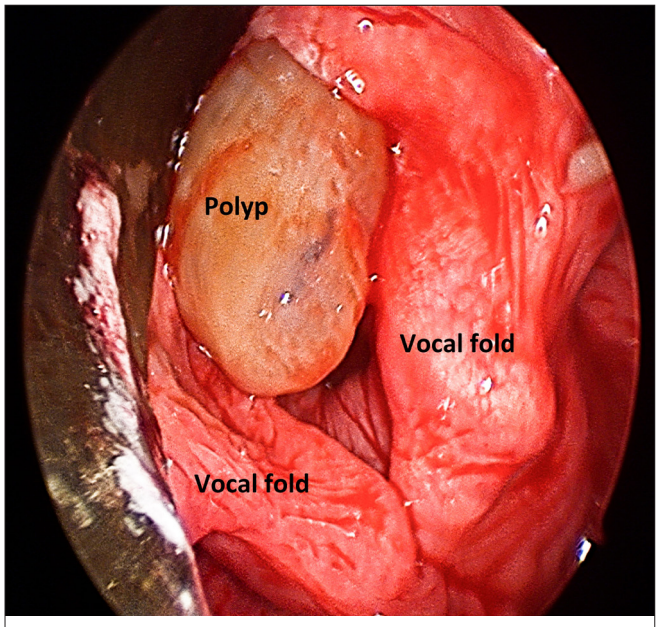

Figure 1. Laryngeal inlet viewed through rigid bronchoscope; the polyp is completely blocking the inlet

Main Points:

- The present case highlights a functional total laryngeal obstruction caused by a vocal cord polyp.
- Pedunculated laryngeal polyp can lead to inducible laryngeal obstruction and cannot ventilate and cannot oxygenate situation.
- When associated with obstructive sleep apnoea and thick short neck, Vortex approach of difficult airway management in such situation might play a crucial role.

The case was taken up next week. Elective awake tracheostomy was performed and induced with tracheostomy in situ. Examination under a rigid bronchoscope with preserved respiration revealed a pedunculated polyp attached to the anterior one-third of the left vocal cord. The polyp was creating a ball-valve effect, and after muscle relaxant, the polyp occupied the entire glottic opening, resulting in total airway occlusion (Figure 1).

Discussion

Airway management of a patient with a glottic lesion producing dynamic total airway occlusion requires a specialised plan (4). Mobile glottic lesion causing ball-valve effect has its unique challenges in anaesthetic considerations. Loss of hypopharyngeal tone, the termination of spontaneous breathing, and positive pressure ventilation can result in the inability to ventilate and/or intubate. Therefore, tracheal intubation in patients with periglottic mass is better performed in awake or minimally sedated patients with awake fiberoptic method (5,6). However, tracheal intubation under topicalised anaesthesia using C-MAC (Karl-Storz SE & Co KG, Tuttlingen, Germany) has been described (7).

It is always better to learn from our mistakes, and there is nothing better if others could learn from our mistake. The case was successfully managed but taught us a few lessons. A partial obstruction was anticipated in our case. Despite the presence of a few factors for anticipated difficult airway, adequate mouth opening, thyromental distance, and neck and jaw movements gave us a perception of feasible conventional laryngoscopy and intubation. Although our perception was not entirely wrong, as evidenced by C&L grade 3 view, and intubation using aids like bougie is often possible even with this view, the ILO caused by the polyp lead to intubation failure and endangered the patient's life. Although we were keeping obesity and OSA in the back of our minds, the impacts of these factors on preoxygenation and lung capacities were probably underweighted. The patient did not give even a few minutes and rapidly desaturated.

Furthermore, clinical findings and history are essential. The patient gave a history of noisy breathing and chocking. Although these can happen in OSA, it can also be caused by a pedunculated vocal polyp, large enough in size to cause the

ball-valve effect. Therefore, an awake office-based indirect laryngoscopy and the findings are essential to be critically reviewed. Interdisciplinary communication is quintessential for managing such cases. For some reason, if the gold standard techniques are not available, an elective case may even be postponed, or an alternate safer approach may be adopted. Finally, although emergency surgical tracheostomy can be done for saving a life in the cannot ventilate, cannot intubate, cannot oxygenate situation, it is relatively a time-consuming procedure, especially when the patient has a thick and short neck.

Performance during emergency airway management depends on the preparation and implementation, and the Vortex approach to airway management can be a promising strategy (8). We continued the effort to provide BMV and relieve upper airway obstruction and simultaneously approached for the front of neck access. Needle cricothyrotomy and ventilation using low-pressure oxygen have limitations (9). Moreover, a 14G cannula is advised for the purpose. Although we were unable to achieve adequate oxygenation and a proper needle cricothyrotomy was not available, the 16G venecath assembly in the emergency was able to save the patient's life by buying time.

Conclusion

It is critical to be suspicious of ILO and total functional laryngeal obstruction under anaesthesia in patients with vocal polyps presenting with noisy breathing, difficulty in breathing, and chocking. Even if there is minimal anticipation of difficulty, the Vortex airway management approach with awake tracheal intubation plan can be 'the option'.

Informed Consent: Written informed consent was obtained from the patient who participated in this case.

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