

CASE REPORT

AIRWAY MANAGEMENT

Complete airway obstruction relieved with bilateral chest compression in a morbidly obese patient with undiagnosed hypertrophic mucosa and severe edema of arytenoids

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Abstract

We describe a case of 62 y old obese lady, with undiagnosed hypertrophic mucosa and severe edema of the arytenoid cartilages. This swollen mucosal fold got pushed into the laryngeal inlet after insertion of laryngeal mask airway (LMA), causing complete airway obstruction and eventually a 'can't intubate, can't ventilate' (CICV) crisis situation. We describe how we did succeed to restore patient's ventilation, in a CICV scenario with an unconventional way using chest compression avoiding the use of ultimate surgical airway. This is the first reported case of a chest compression maneuver being used as a rescue technique in a CICV scenario.

Abbreviation: BMI - body mass index; LMA - Laryngeal mask airway; CICV - Can't intubate, can't ventilate; DM - Diabetes mellitus; BA - bronchial asthma; GD - Graves 'disease; GERD - Gastro-esophageal reflux disease; OSA - Obstructive sleep apnea; BMV - Bag-mask ventilation; DMV - Difficult mask ventilation; TV - tidal volume

Key words: Morbid obesity; Cardiopulmonary Resuscitation / methods; Chest Compression; Airway Obstruction / etiology; Humans; Treatment Outcome

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1. Introduction

A 'cannot intubate, cannot ventilate' (CICV) is a rare potential airway catastrophe that an anesthetist may not experience during his career. In order to recognize

patients who might be at risk of difficult airway management several airway evaluation methods have been suggested.¹ However, not all cases can be identified before anesthesia. Despite the meticulous preoperative

evaluation of patients' airway some of them with difficult airway will remain undiscovered until induction of anesthesia.

Several cases of airway obstruction due to mucosal swelling of both aryepiglottic fold and arytenoid cartilage as well as prolapse of epiglottis had been reported in elderly patients with or without clear predisposing etiology.^{2, 3} Chest compression has been used successfully in the treatment of severe bronchial asthma,⁴ and we have used it effectively in one of our previous studies for the management of extubation laryngeal spasm.⁵

The clinical objective of presenting this case report is to emphasize the possible efficacy of bilateral chest compression as a rescue in cases of CICV before the decision of surgical airway.

2. Case report

A 62 y old morbidly obese woman, with body mass index (BMI) of 45.8 kg/m², was scheduled for elective wide excision of a right breast mass. She was a known case of diabetes mellitus (DM), bronchial asthma, Graves' disease, and gastro-esophageal reflux disease. She had no symptoms of obstructive sleep apnea. She complained of persistent cough and dyspnea which improved with administration of steroids and antibiotics. She had normal mouth opening, neutral jaw excursion, a limited neck extension and a grade 3 Mallampati score. Her tongue was large, while her thyromental distance was normal. Other examinations and investigations were within normal limits. The patient was put in ramp position. After preoxygenation, anesthesia was induced with 150 µg of fentanyl and 250 mg of propofol. After induction, we noticed difficulty with mask ventilation even with oropharyngeal airway and two-person technique (Grade 3 difficult mask ventilation as described by Han et al.).⁶ A size 3 LMA was inserted and BMV was reattempted, but this proved to be impossible with the absence of EtCO₂ tracing (Grade 4 DMV).⁶ So propofol 50 mg IV was given to exclude possible light anesthesia or laryngeal spasm, but with no success. LMA was removed and laryngoscopic view was noted to be grade 4 according to Cormack and Lehane classification. SpO₂ started to drop below 90%. A Glidescope (Saturn Biomedical Systems Inc, British Columbia), was used; however, no laryngeal structures could be visualized, and the endotracheal tube was unable to be passed (N3 Glidescope score according to Framantle score)⁷ and SpO₂ dropped to 65%. Glidescope was removed, BMV still too difficult with no convincing EtCO₂ trace could be detected. At this point, the CICV crisis was declared. Meanwhile, the anesthesia technician sped out to fetch the surgical airway cart, the anesthetic team decided to try bilateral chest compression as a rescue technique, which had been succeeded several times in cases of

extubation laryngeal spasm in children.⁵ Within few seconds EtCO₂ tracing started to appear and BMV became less difficult. Chest compression stopped. After about 2 min the patient started attempts of spontaneous breathing with a gradual increase in the tidal volume (TV) accompanied by a decrease in EtCO₂ and an increase in SpO₂. Both anesthetic and surgical teams decided to wake up the patient and postpone the surgery. A few minutes later, the patient started to open her eyes, and 5 min after, she became fully awake with normal breath and without any complaints. Surgery was postponed for one month, with a plan of awake fiberoptic intubation. In the second session, fiberoptic intubation was successfully done, and was a surprise when we found a large mucosal soft tissue swelling extended over the arytenoid cartilage, aryepiglottic fold, and the inter arytenoid region but with normal mobility of the vocal cord and without laryngeal collapse (Figures 1 & 2). The patient had uneventful surgery, extubation, and postoperative recovery. She was referred to the ENT clinician who confirmed our findings and preferred conservative treatment with follow up in the ENT clinics.

3. Discussion

Ours is the first case report in the literature in which bilateral chest compression has been successfully restored ventilation in a patient who could neither be ventilated nor intubated. As defined by the American Society of Anesthesiologists a difficult airway refers to the existence of clinical factors that complicate both, BMV and intubation performed by a skilled person.⁸ However, our case was unusual as the condition went unrecognized with no signs or symptoms suggesting the presence of an airway swelling. The condition remained unsuspected by two anesthetists who reviewed the patient preoperatively, as well as by the treating physician. Any suspicious signs had been masked by the symptoms of asthma and GERD. Several investigators have reported redundancy of the mucosa of arytenoids and aryepiglottic folds in old age patients, which caused laryngeal collapse with well-known, or unknown etiological factors.^{2,3} We assumed the possible predisposing cause of hypertrophy of the arytenoids mucosa in our patient to be uncontrolled GERD as suggested by Orenstein and Orenstein.⁹ In the first session, we suspected Grade 3 DMV was due to light anesthesia and/or the airway features due to morbid obesity of the patient, and/or LMA induced laryngeal spasm. The loss of upper airway tone, in combination with increased supraglottic folds of tissue, may result in a decreased space for the LMA, thus causing potential folding of its tip onto itself with epiglottic down folding.

We have used chest compression as a rescue in this CICV crisis based on our previous study,⁵ where we proved a good chance of success in relieving extubation laryngeal spasm with a lot of different proposed mechanisms.^{5,10}

Nonetheless, in our case, we could claim that bilateral compression of the chest will force the air in upward direction and split up the area just above the vocal cords away from each other, with upward repositioning of the engaged arytenoid mucosa, thus opening the laryngeal inlet.

4. Conclusion

This case demonstrates the possible use of bilateral chest compression in the CICV scenario, as a noninvasive, simple technique, with a greater level of safety, and with minimal or no complications, before the decision of surgical airway.

5. Conflict of interest

Authors declare no conflict of interest, nor any internal or external source of financial support in this work.

6. Authors' contribution

All authors participated in searching literature, writing, and reviewing the manuscript in order to appropriately present this case report.

7. References

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