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Airway management in difficult mask ventilation with difficult intubation – A case report

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Abstract : *Airway management difficulties continue to be problematic to the anaesthesiologists as it is the major cause for anaesthesia related morbidity and mortality. Difficult airway includes difficult intubation (DI), difficult mask ventilation (DMV) or both. Most of the anaesthesiologists concentrate on predicting difficult intubation, but give very little attention to difficult mask ventilation. Unpredicted difficult mask ventilation can be life threatening to a patient with difficult intubation as it may result into can't ventilate – can't intubate scenario. To secure the airway in predicted difficult mask ventilation with difficult intubation, use of surgical airway can be minimized by implementing the skillful use of alternative airway device – the fiberoptic technique.*
Keywords : *airway management, difficult intubation, difficult mask ventilation*

I. Introduction

Difficulty or failure in managing the airway may result into dental injury, airway trauma, hypoxic brain damage or death. Inadequate ventilation and difficult tracheal intubation constituted the main mechanisms of injury for major adverse respiratory outcomes associated with anaesthesia.[1,2] When compared with difficult intubation, research and data on the prediction of difficult mask ventilation is limited.[3] Though impossible mask ventilation (IMV) is an infrequent event associated with difficult intubation; it may result into life threatening can't ventilate – can't intubate condition.[4] In can't ventilate – can't intubate situation surgical airway access is recommended. Anaesthesiologists have little experience and are uncomfortable with open surgical infraglottic airways. Hence, skillful use of alternative airway devices may alleviate the need of surgical airway.[5,6] Here we report airway management of a case having difficult mask ventilation with difficult intubation.

II. Case Report

A 65 year male was presented with history of swelling in right side of oral cavity since one year. He also had difficulty in opening the mouth since 3 months. For the treatment of spontaneous bleeding from the lesion site, patient was hospitalized 4 months back and received packed cell volume and whole blood transfusions. Patient had received 17 cycles of radiotherapy; the last one, one and half months prior to surgery. Due to his inability to open the mouth, he was on liquid diet since last three months and became debilitated due to disease, anaemia and undernutrition. Prior to illness, his exercise tolerance was good. He was chronic tobacco chewer and had left tobacco chewing since last one year. His past history revealed right eye cataract surgery 2 years back and an episode of right sided hemiparesis with facial deviation one year back.

On examination, patient was in squatting position due to general debility and pain. He had flexed his head and saliva was dribbling out. Patient had perioral, nasal and periorbital oedema and airway rent in the floor of mouth. He was clinically pale. His vital parameters and systemic examination were normal. Oral cavity and neck examination revealed bad oral hygiene, restricted mouth opening (<1 finger), loose and missing teeth, restricted neck movements, deviation of trachea to right side and necrotic area over right cheek and right side of the neck. Laboratory investigations revealed low haemoglobin level (8.4 gm%) and low albumin level (2.5gm%) while rest of the investigations were within normal range. Electrocardiogram and chest X-ray showed no abnormality. X-ray neck detected deviation of trachea to right side without any compression.


Fig.1 Perioral, nasal, Periorbital oedema


Fig.2 Airway rent - 2nd to radiation

Patient was diagnosed as a case of Carcinoma buccal mucosa right side with radiation necrosis of neck tissue and he was posted for right Hemimandibulectomy with wide local excision of buccal growth with right sternocleidomastoid flap surgery under anaesthesia. Preoperative preparation included Betadine gargles for oral hygiene, blood transfusion, parenteral amino acids transfusion and adequate hydration. A day before surgery patient had received 5% albumin intravenously. Adequate blood was reserved for intraoperative period. Considering the difficult mask ventilation and difficult tracheal intubation, awake fiberoptic technique was planned to secure airway for giving general anaesthesia. Procedure of the technique was explained to the patient and his relatives and high risk consent for anaesthesia and surgery was obtained from them. Patient was starved for night before surgery.

On the day of surgery, difficult airway trolley and standby arrangement for emergency tracheostomy was kept ready. Monitors like pulse oximeter, NIBP, ECG, ETCO2, temperature were applied. Patient was catheterized with Foley's catheter no. 16. An intravenous line was secured with 18G intracath. Patient was premedicated with ondansetron (4mg), glycopyrrolate (0.2mg), midazolam (1mg) and fentanyl (40µg). Injection fentanyl had relieved patient's pain and made it possible for him to be in supine position. For nasal decongestion and anaesthesia, Xylometazoline 0.05% nasal drops (3-4 drops) were instilled in left nostril and then after 15 min, left nasal cavity was packed for 10 min with gauze pieces soaked in 2% Lignocaine with adrenaline. To anaesthetize pharyngeal mucosa 2% Lignocaine Viscous gargles were given. To eliminate tracheobroncheal reflexes, 1ml 4% Lignocaine spray given transtracheally. Oxygen supplementation was provided through nasal catheter (2 L/min) via right nostril. Left nasal passage was lubricated with lubricant jelly and fiberoptic bronchoscope passed through it. After manipulation, glottis visualized and larynx was sprayed by injecting 1ml of 4% Lignocaine through the injection port of bronchoscope. Awake, nasal fiberoptic endotracheal intubation was done successfully, by guiding cuffed endotracheal tube no. 8.0 over fiberoptic bronchoscope.

Patient was induced with propofol (100mg) and anaesthesia was maintained on oxygen, nitrous oxide, sevoflurane and vecuronium. Intraoperative period was uneventful. Surgery lasted for two and half hours. At the end of surgery neuromuscular blockade was reversed with neostigmine (2.0mg) and glycopyrolate (0.4mg). Endotracheal tube was kept in situ for 24 hours for the possibility of airway oedema and risk of difficult reintubation. He was continued on spontaneous respiration with ETT in situ with oxygen supplementation through T-piece. Patient was observed in post-anaesthesia care unit. Next day, with the help of ventilating bougie, patient was extubated uneventfully.

Fig.3 Fiberoptic intubation

Fig.4 Patient in PACU

III. Discussion

ASA Task Force on Management of the Difficult Airway (2003) defined Difficult Airway as the clinical situation in which a conventionally trained anaesthesiologist experiences difficulty with face mask ventilation of the upper airway, difficulty with tracheal intubation, or both.[7] Practice guidelines for difficult airway also provided descriptions for difficult mask ventilation and difficult intubation. Difficult mask ventilation is a situation in which it is not possible for the anaesthesiologist to provide adequate face mask ventilation due to inadequate mask seal, excessive gas leak, or excessive resistance to the ingress or egress of gas. When multiple attempts are required for tracheal intubation it is labeled as difficult intubation.

Difficult airway assessment needs comprehensive history, physical examination and specific tests.[8] In general adult population, incidence of difficult mask ventilation is 5%. Old age, obesity, presence of beard, lack of teeth, history of snoring, Mallampati classification III and IV, thyomental diastance <6cm, severely limited jaw protrusion test are different predictors of difficult mask ventilation. Neck radiation is an important predictor of impossible mask ventilation.[4,9,10] Grading scale for mask ventilation describes 4 grades (grades 1 – 4) with or without use of oral airway, adjuvant, muscle relaxant or requiring two providers. Grade 3 and grade 4 are DMV and IMV respectively. IMV and DMV combined with DI are two rare yet clinical worrisome situations.[10,11]

In our case, perioral, nasal and periorbital oedema and airway rent in the floor of mouth would have caused inadequate mask seal and excessive gas leak. Other predictors of difficult mask ventilation in this case

were old age, missing and loose teeth, and restricted jaw movements. An important predictor of mask ventilation grade 4 or IMV was neck radiation. Restricted mouth opening and restricted neck movements, deviated trachea were the predictors for difficult intubation.

Difficult Airway Algorithm by American Society of Anaesthesiologists have included use of different laryngoscope blades, intubating stylet or tube changer, light wand, LMA, fiberoptic intubation, retrograde intubation, blind oral or nasal intubation as an alternative non-invasive approaches to difficult intubation. Options for non-invasive airway ventilation include use of rigid bronchoscope, oesophageal-tracheal combitube ventilation, or transtracheal jet ventilation. Invasive airway access includes surgical or percutaneous tracheostomy or cricothyrotomy.[7] Results of Canadian National Survey have shown that in cannot intubate-cannot ventilate situations, preferred infraglottic airways were cricothyroidotomy by IV catheter (51%), percutaneous cricothyroidotomy (28%), and tracheostomy by surgeon (14%). Practice on mannequins was associated with improved comfort in using infraglottic airways in patients.[5] A study using simulation with a manikin allowing difficult airway showed that the decision making process for cricothyrotomy is too often delayed as soon as ventilation became impossible and oxygenation compromized.[12]

In our case, mouth opening <1finger prevented use of oral alternative airway devices for intubation and ventilation. Neck radiation had disturbed the neck anatomy which caused deviation of the trachea from its normal site and surgeons also had planned for sternocleidomastoid flap which would have obscured the anterior aspect of the neck making retrograde intubation and invasive airway access relatively contraindicated. In this difficult mask ventilation with difficult intubation situation, to preserve spontaneous ventilation and hence oxygenation, nasal endotracheal intubation by using awake fiberoptic technique remained the only better option.

Though endotracheal intubation is often called the 'gold standard' for airway management, knowledge and availability of alternative procedures are also essential for anaesthesiologists.[13] Though DMV with DI is a rare occurrence, it needs production and introduction of well planned, methodological airway governance algorithm and airway skills training programme and evaluation of both the procedural skills and equipment provision.[14]

In conclusion, highest risk of hypoxia related morbidity and mortality lies in patients who are predicted to have both DMV and DI. Whenever DMV with DI is anticipated, for endotracheal intubation awake fiberoptic technique should be used as first line technique and not as a backup or reserve technique to be used only after conventional ways have failed.

References

[1]. Caplan RA, Posner KL, Ward RJ, Cheney FW. Adverse respiratory events in anesthesia: a closed claims analysis. Anesthesiology 72(5);1990 May:828-33

[2]. Domino KB, Posner KL, Caplan RA, Cheney FW. Airway injury during anaesthesia: a closed claims analysis. Anesthesiology 91;1999:1703-11

[3]. Adnet F. Difficult mask ventilation: an underestimated aspect of the problem of the difficult airway? Anesthesiology 92;2000:1217-18

[4]. Kheterpal S, Martin L, Shanks AM, Tremper KK. Prediction and outcomes of impossible mask ventilation: a review of 50,000 anesthetics. Anesthesiology 110;2009:891-7

[5]. Wong DT, Lai K, Chung FF, HO RY. Cannot intubate – cannot ventilate and difficult intubation strategies: result of a Canadian national survey. Anesth Analg 100;2005:1439-46

[6]. Fisherr QA. The ultimate difficult airway: minimizing emergency surgical access. Anesth Analg 109(6);2009Dec:1723-25

[7]. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on management of the difficult airway. Anesthesiology 98;2003:1269-77

[8]. Gupta S, Sharma R, Jain D. Airway assessment: prediction of difficult airway. Indian J Anaesth 49(4);2005:257-262

[9]. Langeron O, Masso E, Huraux C, Guggiari M, Bianchi A, Coriat P, Riou B. Prediction of difficult mask ventilation. Anestesiology 92;2000:1229-36

[10]. Kheterpal S, Han R, Tremper KK, Shanks A, Tait AR, O'Reilly M, Ludwig TA. Incidence and predictors of difficult and impossible mask ventilation. Anesthesiology 105;2006:885-91

[11]. Han R, Tremper KK, Kheterpal S, O'Reilly M. Grading scale for mask ventilation. Anesthesiology 101;2004:267

[12]. Combes X, Jabre P, Amathieu R, Abdi W, Luis D, Sebbah JL, Leroux B, Dhonneur G. Cricothyrotomy in emergency context: assessment of a cannot intubate cannot ventilate scenario. Ann Fr Anesth Reanim 30(2);2001 Feb:113-6

[13]. Dorges V. Airway management in emergency situations. Best Pract Res Clin Anaesthesiol 19(4);2005 Dec:699-715

[14]. Heard AMB, Green RJ, Eakins P. The formulation and introduction of a 'can't intubate, can't ventilate' algorithm into clinical practice. Anaesthesia 64;2009:601-608.