

Emergency Tracheotomy in Morbid Obesity

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Abstract

Background: Difficult Intubation (DI) may require Emergency Tracheotomy (ET) to save patient's life is a rare complication in the Morbidly Obese (MO). Probably it occurs more often than published.

Methods: We are reporting three patients who required ET for DI among 1497 patients.

Results: In the three MO the ET was conducted without any technical incident and surgery continued in all of them.

Conclusion: DI should be suspected in the patients before it may occur and endoscopic fiber-optic endoscopic intubation carried out, but if the ET is necessary, surgeons and instruments should be prepared to solve this vital problem.

Keywords: Difficult intubation; Obesity emergency tracheotomy; Impossible intubation; Impossible airway

Introduction

Anesthesiology accidents can occur more frequently among Morbidly Obese (MO) patients than normal counterpart. Difficult Intubation (DI) is a rare complication rarely reported in the bariatric literature but frequently in Anesthesiology because it is a peculiar complication of this specialty. However, a patient with DI patient may need an Emergency Tracheotomy (ET) at the beginning of the surgical procedure to save his own life.

Materials and Methods

From May 1977 to February 2013, 3 patients required an ET among 1497 patients operated for MO, and they are the object of this report.

Case 1

A 44 years-old male patient had a BMI-35 Kg/m² with hypertension. Waist/Hip Ratio (WHR)-1.05. After several repeated attempts of intubation by two cooperating anesthetists, the SO₂ stayed under 55%. ET was done by 3 expert senior surgeons and an immediate satisfactory ventilation recovery obtained. We then continued with the planned Sleeve-Forming Laparoscopic Vertical Gastrectomy (SFLVG) without incident. Extubation was done on the 3rd postoperative day. The ET wound closed but re-opened on 10th post-operative day (POD) and a second closure was needed. 30 months later, his BMI being 26 Kg/m², ExBMI (expected BMI) -26, %ExBMI-102%, % Excess Weight Loss (EWL) 84% and % Excess BMI Loss (EBMIL) 90% (Figure 1).

Case 2

A 39 years-old male patient, BMI-47 Kg/m² had hypertension, diabetes (Serum Glucose -165 mg/dL) and Gallbladder stones. After more than 10 intubation attempts by two anesthesiologists and inability to oxygenate, the SO₂ dropped to 15%. After emergency ET (by 3 surgeons), oxygenation was restored quickly. Cholecystectomy and SFLVG were performed. Post-op course was normal. The tracheal tube removed successfully on the 2nd

POD. BMI was 26 Kg/m², at 26 months, EBMI-31% and %EWL-87% and %BMIL-98%. He is now completely asymptomatic with hypertension and diabetes under control (Figure 2).

Case 3

A 37 years-old male BMI-44 Kg/m² had a previous total thyroidectomy and under thyroxin supplementation. He had also diabetes, treated with Metformin and insulin, hypertension and Chronic Obstructive Pulmonary Disease (COPD) under CPAP management. After repeated intubation attempts an ET was done above the previous thyroidectomy scar. The planned surgery was SFLVG, was done without any complications and three months later his BMI was 31 Kg/m² and he required no insulin (Figure 3).

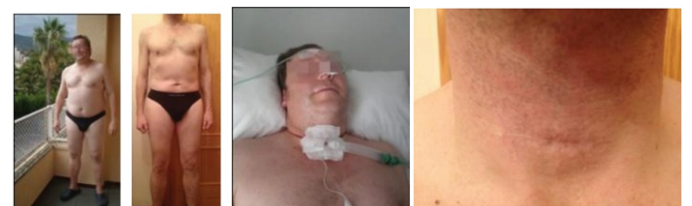


Figure 1: Full body and tracheotomy wound.



Figure 2: Full body and tracheotomy wound.



Figure 3: Full body, thyroid & tracheotomy wound.

Discussion

Difficult intubation (DI) is more frequent among MO patients (8%) when compared with normal weight subjects [1]. In the NAP4 report of United Kingdom 77 obese patients had DI and 19 of them suffered death or brain damage due to the event including extubation at the ICU. Fifty-three events were reported among MO patients during anesthesia, with four deaths and one persistent brain damage. It is estimated that more than 600 deaths per year occur because intubation failure [2].

The incidence of DI has been reported to occur between 12 to 20% in MO patients compared with 1-8% of non-obese patients [3-5]. In the series of 912 MO patients reported by Sheff [6] 25 (2.7%) required fiber-optic intubation (FOI), 830 (91%) had successful and uneventful intubation, while DI occurred in 57 (6.3%). The incidence of DI was even more prevalent in men and it was not associated with higher BMI, previous apnea or reflux (GERD). The incidence of DI was related to a Mallampati class 4, abnormally restricted jaw motility (mental) and history of a prior DI.

MO patients may have also obstructive sleep apnea syndrome (OSAS), short neck with large circumference. MO reduces lung compliance and raises the diaphragm leading to a decrease the functional residual capacity and therefore oxygen reserve. In addition, the supply of oxygen decreases more rapidly at intubation of obese compared to in non-obese patients.

It is essential to pre-operatively detect those cases with a high potential risk of DI, in order to choose the most appropriate anesthetic strategy. To reduce the probability and consequences of aspiration, rapid sequence induction along with gastric evacuation (NG tube) and anti-acid drugs must be considered. In addition, direct laryngoscopy is easier by placing the patient on "ramp position" (Figure 1), as an alternative to the traditional position. Once intubation is done the position should be maintained during and after surgery, thus facilitating reversal or re-intubation if necessary [7] (Figure 4).

Careful pre-operative evaluation considering possible failures in regional anesthesia, oro-tracheal intubation and rescue techniques of airway management, must be kept in mind in order to prevent DI and ET. All these critical issues emphasize the variable characteristics present in this group of patients. One of the major faults is failing to recognize obese patients as a high risk group, who needs proper adjustment of the anesthetic technical approach.

Preoperative evaluation

Preoperative evaluation is the key to a safe orotracheal intubation since it allows anticipating possible problems. Planning should always include alternative strategy in the event of failure of the primary plan. This prior assessment should evaluate co-morbidities influencing airway management, such as ischemic heart disease, diabetes mellitus, asthma and particularly OSAS. Options should be discussed and explained to patients. This cannot be done in haste. It would be extremely inappropriate

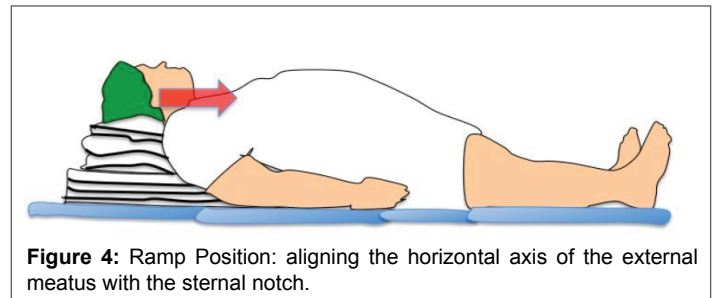


Figure 4: Ramp Position: aligning the horizontal axis of the external meatus with the sternal notch.

to admit these patients the day of surgery without a prior assessment. Obesity should be considered a high risk condition even when the surgical procedure is expected to be short.

As a rule, patients with BMI>40 or those BMI>35 with co-morbidities should have a thorough preoperative assessment.

Steps to avoid extreme situations, such as the DI and ET, are:

1. Awake intubation with laryngeal local block for pain.
2. An extra anesthetist in case of difficulties, if possible.
3. Use of the Ramp position.
4. No deep relaxation to perform intubation.
5. Ask the patient to lose weight pre-operated to correct co morbidities [8].

When DI is suspected, the steps to avoid an ET are:

- Routine FOI
- Laryngeal Mask Ventilation (availability and expertise)
- Laryngeal Mask Fastrack
- Cricothyroidotomy cannula with plug
- Retrograde intubation [2]

All these recommendations should be given according to the latest guidelines [9]. Anyway, once the patient is fully relaxed and SO_2 is poor or very poor, the alternative to ET is a cricothyroid cannula percutaneous or open, or retrograde intubation. The disadvantage of these techniques is the need of standardized protocol, well-trained physicians and all instrumentation available in the operating room.

Surgical crico-thyroidectomy is the simplest one because it is easy to extend it to a full ET. Retrograde intubation takes longer, but it has to take into account that DI can happen.

In our experience with more than 1400, ET was unexpected since these patients looked apparently "easy" to be intubated. Although the operating room should be always ready for a ET (tracheotomy cannula, instruments, etc.), the most important factor is the surgical team. All members of a surgical department should be trained to do tracheotomy. The ET is not for beginners without previous experience. The technique is plane, except that due to the particular conditions of obese patients (very thick neck and deeper trachea) it can be very difficult and has a higher risk. In these cases an additional surgeon (three surgeons) may be worth of.

We did a survey on this topic and 53 surgeons responded. 80% of them had at least a case of DI, 10 of them had one case of impossible intubation and resuscitation and ICU care without surgery, while only 3 cases required of ET. One patient suffered cardiac arrest and required trans-diaphragmatic manual resuscitation. A patient with BMI-57 died due to impossible intubation. In several countries and especially among young surgeons they do not feel qualified to carry out an ET. In many countries young surgeons neither have been properly trained during

their residency years nor have almost ever seen an ET, because this task is usually delegated to ENT or ICU teams. For a correct training all elective tracheotomy in ICU should be done with a surgical resident as the first assistant otherwise “The road to hell is paved of good intentions”.

Conclusion

Should the bariatric procedure be aborted whenever either DI or ET occurs? In our patients we estimated that the ET took less than 5 minutes and SO_2 and vital signs became normal right after intubation.

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