

Research Article

Emergency Tracheotomy in Morbid Obesity

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Abstract

Introduction: 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 is published.

Methods: Three patients in a series of 1497 patients required ET and they belong to the latter part of our series.

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 (FEOI) 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

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

Materials and Methods

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

Case 1: 1309

A 44 years-old male patient had a BMI-35 with hypertension. Waist/Hip Ratio (WHR)-1.05. After several repeated attempts at intubation by two cooperating anesthetists, the O₂ saturation stayed under 55. ET by 3 expert senior surgeons was done and a satisfactory ventilation recovery obtained. We proceed with the planned Sleeve-Forming Laparoscopic Vertical Gastrectomy (SFLVG) without incident. Extubation was done on the 3rd DPO. The ET wound closed but re-opened on 10 DPO and second repair was needed. 30 months

later his BMI is 26, EBMI (expected BMI) -26, %EBMI-102%, %EWL 84% and %EBMIL 90% (Figure 1).

Case 2: 1423

A 39 years-old male patient has BMI-47 & WHI-1.1. He also had Hypertension, diabetes (Glucose 165), Gallbladder stones. After more than 10 intubation attempts by two anesthesiologists and inability to oxygenate, the SO₂ dropped to 10-15. After a proper ET (carry out by 3 surgeons) oxygenation was restored quickly. Cholecystectomy and SFLVG were performed. Post-op was normal. The tracheal tube removed successfully on the 2^{POD}. He has a BMI-26 at 26 months, EBMI-31% and % EBMI-131%, % EWL-87% and % BMIL-98%. He is completely asymptomatic and hypertension and diabetes are under control (Figure 2).

Case 3: 1458

A 37 years-old male BMI-44 had a previous total thyroidectomy and become hypothyroid. Diabetes was being treated with Metformin and insulin. He was hypertensive. His Chronic Obstructive Pulmonary Disease (COPD) treated with CPAP. After repeated intubation attempt an ET was done above the previous thyroidectomy scar. The planned surgery was SFLVG was done without any incident. He stayed in ICU two days with subcutaneous emphysema on face



Figure 1: Pre and pos. Full body and tracheotomy wound.



Figure 2: Pre and pos. Full body and tracheotomy wound.



Figure 3: Pre and pos. Full body, thyroid & tracheotomy wound.

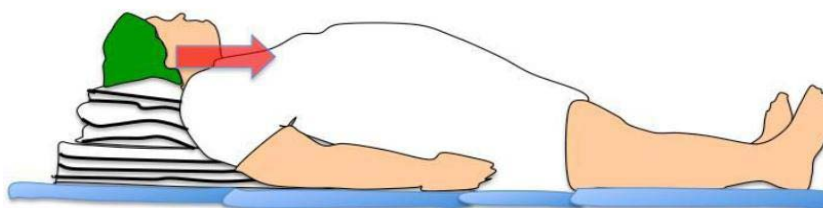


Figure 4: Ramp Position: aligning the horizontal axis of the ear canal with the sternal notch.

and neck. Discharged on 11 POD, 3 months later he is BMI-31 and is asymptomatic and needs no insulin (Figure 3).

In a survey 53 surgeons responded. 80% of them had at least a case of DI, and 10 of them had one case of impossible intubation and resuscitation and ICU care without surgery, and only 3 cases required of ET. One patient had a cardiac arrest and required trans-diaphragmatic manual resuscitation. A patient with BMI-57 died without being able due to impossible intubation. In several countries and especially among young surgeons they did not feel qualified to make conduct an ET.

Discussion

Difficult intubation among patients with MO, is more frequent (8%) than in 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. Of the 53 events in MO during anesthesia were 4 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 from 12 to 20% in MO patients compared with 1-8% of non-obese patients [3-

5], and Sheff [6], in 912 obese patients, 25 (2.7%) required fibro-optic intubation (IFO), 830 (91%) intubation without problems, and in 57 (6.3%) ID occurred. The incidence of ID was even more prevalent in men and it was not associated with higher BMI, previous apnea or reflux (GERD). The incidence of was related to a Mallampati class 4, abnormally restricted mental jaw motility and history of a prior DI.

MO patients may have also sleep apnea syndrome (SAS), short necks and a larger neck 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 intubation.

It is essential, to detect those cases where a potential risk of DI exist to choose the most appropriate anesthetic strategy. To reduce the probability and consequences of aspiration then rapid sequence induction must be considered and the use of drugs that reduce the volume and pH of gastric contents. 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 surgery unless it interferes with ventilation, and then facilitate facial mask ventilation or re intubation

if necessary after the procedure [7] (Figure 4).

The anesthetic care of problems in obese patients include poor preoperative evaluation, failures in regional anesthesia, intubation failures and failures in rescue techniques airway. These faults serve to emphasize the variable characteristics present in this group of patients. One of the major faults is the failure to recognize obese patients as a high risk group, in order to properly adjust the anesthetic technique.

Preoperative evaluation

Preoperative evaluation is the key to a safe anesthetic intubation since it allows anticipating possible problems and handling them. Planning should always include a bailout in the event of failure of the primary plan.

This prior assessment should evaluate co morbidities that may influence airway management including ischemic heart disease, diabetes mellitus, asthma and especially the SAS. The options for anesthesia should be discussed and explained, to patients need extra time.

This cannot be done in haste. It would be inappropriate to admit these patients the day of surgery without a prior assessment.

Obesity should be considered a high risk event, even when the surgical procedure is a short one. As a rule, patients with BMI>40 or those BMI>35 with co morbidities should have formally preoperative assessment. Steps to avoid extreme situations, such as the DI and ET, are:

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

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

- Routine IFE
- Classic Laryngeal Mask / Pro-Seal / Flexible
- Laryngeal Mask Fastrach
- Cricothyroidotomy cannula with plug
- Retrograde intubation [2]

Anyway, once the patient is fully relaxed and SO₂ is poor or very poor, the alternative to ET is a cricothyroid cannula percutaneous or open, retrograde intubation. The disadvantage that these techniques are that it requires and standardized protocol, well-trained physicians

and all instruments in the operating room.

Surgical crico-thyroidotomy is the simplest one because it is easy to extend it to a full ET. Retrograde intubation takes longer. To do this we must take into account that this DI can happens. In our case with >1300 previous cases it was unexpected since these patients looked apparently “easy” to be intubated.

The operating room should be ready should the need for an ER occurs (tracheotomy cannula, instrumental, etc.). But 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 with no previous experience. The technique is the usual one, except that due to the conditions of the obese (very thick neck and trachea at greater depth) it can be difficult and high risk. In these case one additional surgeon (three surgeons) are better than two.

But in many countries young surgeons have not been trained during their residence years or have almost never seen one ET, because this task has delegated to ENT or the ICU teams. To avoid what we believe should be a correct training, *all elective tracheotomy in ICU should be done* (independent of what service is responsible surgery, OTL or ICU) with a surgical resident as the first assistant otherwise “The road to hell is paved of good intentions”.

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