
Association between Obesity and Difficult Intubation

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Abstract:

Background: More than 15% of general population meets criteria of obesity. The aim of this study was to compare non-obese, obese, and morbidly obese patients regarding their intubational conditions.

Patients and methods: This prospective study was performed on 45 patients ASA I and II scheduled for surgery under general anaesthesia that needed tracheal intubation. The patients were considered as non-obese (Group 1, n = 15) with body mass index (BMI) < 28, obese (Group 2, n = 15) with BMI > 28 and < 35, and morbidly obese with BMI > 35. All patients were induced in to general anaesthesia using the same standard protocol (thiopentone 5mg / kg, fentanyl 1.5mcg/kg, and suxamethonium 1mg / kg) then the intubation was performed by the same operator. Intubational conditions were scored according to the following criteria : vocal cord visualization , application of external pressure , supportive techniques used , time of intubation , number of attempts , and were assessed as excellent (score 5-7), good (score 7-10), and poor (score 10-13). Chi-square testing was used for statistical analysis.

Results: Statistically significant differences were found in the intubational conditions among non-obese, obese and morbidly obese groups of patients with increasing number of poor conditions for intubation and decreasing number of excellent conditions respectively.

Conclusion: Intubational conditions were demonstrated to be worse in obese patients in comparison with none obese with tendency to deteriorate in accordance to degree of obesity.

Key Words: Body mass index (BMI), Obesity, Morbid obesity, Tracheal intubation.

Introduction:

Obesity is a common disease; more than 15 % of the population meets the criteria of obesity.¹ An estimated 13% of morbidly obese patients pose difficulty for tracheal intubation.² Obesity produces a number of anatomical changes that can affect the airway by decreasing the cervical spine flexibility, restricting the mouth opening, large tongue, over growing of pharyngeal and supra-laryngeal soft tissue³ some have tried to predict difficult laryngoscopy in obese by ultrasound of the neck soft tissue.⁸ Several studies have been published stating have difficulty in airway management of obese patients is not associated with obesity itself but with coexisting endocrine abnormalities.^{4,5} The goal of the present prospective study was to evaluate the incidence of difficult tracheal intubation in obese and morbidly obese patients with no endocrine disease in comparison to non-obese patients.

Patients And Methods:

The study population included 45 patients, 30 obese and 15 non obese, aged 35-55 years ASA I and II physical status with no endocrine disease, who underwent elective surgery under general anaesthesia with endotracheal

intubation. According to the body mass index (BMI), calculated by dividing body weight in kilogram per square height in meter, the patients were distributed into three groups. The patients were regarded as morbidly obese if BMI > 35 (Group MOB, n = 15), obese if BMI > 28 and < 35 (Group OB, n = 15), and non-obese if BMI < 28 (Group NOB, n = 15) the control group. The study protocol was approved by the hospital administration and written informed consent was obtained from each patient. Anaesthesia in all the patients was induced using the same standard protocol including fentanyl 1 mcg/kg, thiopentone 5mg /kg and the tracheal intubation was facilitated by suxamethonium 1mg/kg. Sixty seconds after suxamethonium administration the intubation was attempted by the same operator in all patients using laryngoscope with Macintosh- type blade. The intubation conditions were scored according to the criteria shown in (Table 1). If three attempts to intubate lead to no success or help of another anaesthetist is needed, the patient was excluded from the study. In each patient the intubational conditions were classified as excellent, good or poor according to the score value.

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Table 1: Criteria for evaluation of the intubational conditions.

Criteria	Score (1)	Score (2)	Score (3)
Duration of intubation (Sec)	< 30	30-60	> 60
Number of attempts	1	2	3
Vocal cord visualization	Full	Partial	No
Application of external pressure on larynx	No	Yes	
Supportive techniques Stylet, Magill forceps Different laryngoscope blade	No		Yes

Table 2: Classification of intubational conditions.

Intubational conditions	Score
Excellent	5 or less
Good	6-7
Poor	8 or more

Results:

The age, weight, height, BMI and ASA physical state of the patients are shown in Table (3) with no statistically significant difference, however weight, height, and BMI are different statistically. No failed intubation was registered in all of the 45 studied patients. Excellent intubational conditions were found in 20%, 53.3%, and 73.3% of the intubated patients in groups MOB, OB and NOB respectively. Good intubational conditions were registered in 46.6%, 33.3%, and 26.7% of the intubated patients in group MOB, OB, and NOB respectively. Poor intubational conditions were registered in 33.4%, 13.3%

and, 0 % in groups MOB, OB, and NOB respectively (Table 4 and figure 1). Among non obese patient only two of them showed partial visualization of vocal cords, all patients were intubated from the first attempt with no supportive technique. In the group of morbidly obese patients only three of them showed excellent conditions for intubation, in five patients' intubations were difficult, three of them were intubated from the third attempt with help of supportive techniques. Statistical analysis of data showed significant difference in the intubational conditions between the groups ($P < 0.05$).

Table 3: The patients distribution according to weight, height, BMI, sex, and ASA class (mean and SD)

	Group MOB	Group OB	Group NOB
Age(Y)	49.3(+3.1)	47.2(+ 5.8)	46.1(+ 3.2)
Weight (kg)	98.6(+9.2)	87.5(+3.1)	71.2(+4.5)
Height (M)	1.61(+0.07)	1.64(+0.06)	1.66(+0.06)
BMI	37.9(+1.7)	32.2(+1.8)	25.9(+1.9)
Sex F/M	9/6	10/5	8/7
ASA I/II	6/9	7/8	8/7

Table 4: Intubational conditions in studied patients.

Intubational condition	Group MOB	Group OB	Group NOB
Excellent	20%	53.3%	73.3%
Good	46.6%	33.3%	26.7%
Poor	33.4%	13.3%	0

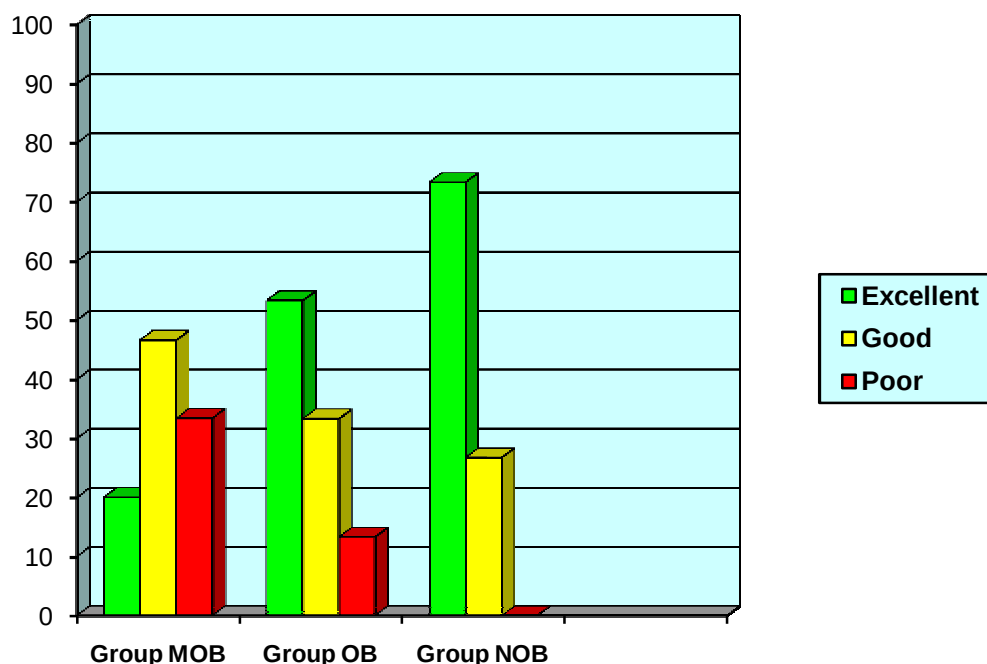


Figure 1: Intubational conditions in studied patients.

Discussion:

Recommended numerical score seems to be helpful in comparative evaluation of intubational conditions if the procedure is performed by the same operator. It has been demonstrated by the present study that incidence of unfavorable conditions for tracheal intubation increases with increasing the degree of obesity in intubated patients with no coexisting endocrine disease. In the light of our study the statement^{4,5} that difficult airway is not associated with obesity itself, but a coexisting endocrine disorder seem to be quite contradictory. The major concern is with those patients who are morbidly obese with BMI >35, they show very high incidence of poor

conditions for tracheal intubation. Flexion of the cervical spine is restricted by fleshy cheeks and flaps of palatal soft tissue make the airway narrow. Moreover, the chest wall fat and breast fat often restrict movement of laryngoscope handle.

Conclusion:

Our study demonstrates that recommended score could be used for objective evaluation of intubational conditions. The incidence of poor intubational conditions is significantly increased in obese and morbidly obese patients without endocrine abnormalities comparative to non obese patients.

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