

DIFFICULT INTUBATION : A PROSPECTIVE STUDY

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ABSTRACT

Difficult intubation has been much discussed in the anaesthetic literature. The incidence of difficult intubation (11:560) was higher in obstetric patients (6:277) as compared to gynaecological patients (5:283) in our hospital.

We tested the Mallampati's classification as a predictor of difficult intubation in 277 obstetric and 283 gynaecological patients. We recommend that Mallampati's classification can be used reliably ($p < 0.05$) to predict difficult intubation in obstetric but not in gynaecological patients.

Keywords: Difficult Intubation, Obstetrics, Gynaecology

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INTRODUCTION

The anaesthetic literature abounds with discussion on the recognition and management of the difficult airway.

Difficult endotracheal intubation is fortunately rare. If all the difficult airways could be predicted confidently preoperatively, then the best possible route of tracheal intubation could be planned, hence obviating the possible dire consequences of failed intubation.

The aims of our study are firstly, to find out the incidence of difficult intubation in our local population; secondly, to look for predictive factors; and thirdly, to re-evaluate the correlation between Mallampati and Lehane's grading in obstetric as opposed to gynaecological patients.

METHODOLOGY

All patients scheduled for operation from February to May 1991 needing endotracheal intubation were included in this study. These patients were assessed preoperatively to determine the Mallampati score by the individual anaesthetists scheduled to administer anaesthesia. The patients sat upright with the head in the neutral position, mouth open and the tongue protruded maximally. Using a pen torch, the pharyngeal structures were then examined and the airway classified according to the structures seen.

[Class I: soft palate, fauces, uvula, pillars; Class II: soft palate, fauces, uvula; Class III: soft palate, base of uvula; Class IV: soft palate not visible at all.]

The patient was allowed to rest for one minute and the test repeated to confirm the classification.

In addition, features like mobility of the neck, mouth opening ability, loose teeth, prominent canines, high arch palate, large tongue, abnormal facies and receding chin were noted.

The hyomental and mental angle to angle of jaw distances were also measured. The weight and race of the patients were also recorded.

At induction, all patients were given thiopentone 4 mg/kg intravenously, followed by suxamethonium 1.5 mg/kg. The view obtained at laryngoscopy was graded according to the description of Cormack and Lehane: Grade I, full view of glottis; Grade II, only posterior commissure visible; Grade III, only tip of epiglottis visible; Grade IV, no glottic structure visible.

If the anaesthetist had any difficulty at laryngoscopy, the registrar, senior registrar or consultant would take over and it is the latter's scoring that was recorded.

The data was analysed using Fisher's exact test and statistical significance was taken as $p < 0.05$.

RESULTS

During the period investigated from February to May 1991, 283 gynaecological patients and 277 obstetric patients were studied. Gynaecological operations included laparoscopy, abdominal hysterectomy, ectopic pregnancies, microsurgical procedures of the reproductive system, Werthiem's operation and pelvic floor repair. Obstetric patients came for elective and emergency Caesarean section, manual removal of the retained placenta and postpartum sterilization. The patients' age varied from 20 to 69 (mean 36.3) years for gynaecological patients and 15 to 44 (mean 30.7) years for obstetric patients.

The overall incidence of difficult intubation was 11:560. The incidence was 5:283 in gynaecological patients compared to 6:277 in obstetric patients.

Table I shows the distribution of the cases by race. Tables II and III show the relationship between Lehane grading and Mallampati's classification for obstetric and gynaecological patients respectively. The predictability of Mallampati's classification for difficult intubation is not statistically significant ($p > 0.05$) in gynaecological patients as compared to obstetric patients ($p < 0.05$) as shown in Tables IV and V. Mallampati's classification can be used to predict difficult intubation in obstetric patients.

Table I - Distribution of Cases by Race

Race	Obstetric Patients	Gynaecological Patients
Chinese	145	187
Malay	103	66
Indians	27	16
Others	2	14
Total	277	283

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Table II - Preclinical Assessment and Laryngoscopic Findings in Obstetric Patients

		Lehane Grade			
		I	II	III	IV
Mallampati Class	1	164	19	1	0
	2	63	14	3	0
	3	8	3	2	0
	4	0	0	0	0

Table III - Preclinical Assessment and Laryngoscopic Findings in Gynaecological Patients

		Lehane Grade			
		I	II	III	IV
Mallampati Class	1	170	28	0	0
	2	44	22	3	1
	3	6	7	0	1
	4	1	0	0	0

Table IV - Predictability of Difficult Intubation for Obstetric Patients

		Lehane Grade	
		I & II	III & IV
Mallampati Class	1 & 2	260	4
	3 & 4	11	2

$p < 0.05$
 OR = 13 (odds Ratio)
 95% CI = 1.75 to 100.05

Table V - Predictability of Difficult Intubation for Gynaecological Patients

		Lehane Grade	
		I & II	III & IV
Mallampati Class	1 & 2	264	4
	3 & 4	14	1

$p = 0.2398$

Table VI shows the relationship of the hyomental distance and the Lehane grading. This was found to be not statistically significant.

DISCUSSION

Difficult intubation may be defined as inadequate visualisation of the glottis. However, certain conditions must be fulfilled for successful intubation under direct laryngoscopy. These include adequate flexion of the lower cervical vertebrae, extension of the neck at the atlanto-occipital joint which brings the oropharyngeal cavity in line with the pharyngeal-laryngeal cavity. It is also essential that the patient is able to open the mouth

Table VI - Relationship Between Lehane Grading and Hyomental Distance

a) Gynaecological Patients

	< 4.5 cm	≥ 4.5 cm
	I&II	194
III&IV	5	0

$p = 0.169$

b) Obstetric Patients

	< 4.5 cm	≥ 4.5 cm
	I&II	166
III&IV	5	1

$p = 0.258$

for passage of the laryngoscope as well as an adequate pharyngeal cavity to facilitate laryngoscopic view.

It must be appreciated that for a safe intubation, the endotracheal tube must be seen to pass between the cords. Therefore, in essence, Grades III and IV laryngoscopies are blind procedures with a theoretical risk of 50% esophageal intubation. This complication remains high on the list as a main cause of maternal mortality^(1,2).

In our hospital set up where there is an average delivery of 15,000 live births per year and 2,000 to 3,000 Caesarean sections per year, we have to rely on trainees to administer general anaesthesia especially on emergency cases as most patients generally prefer general anaesthesia. This is the reason why we need to study the pattern of difficult intubation and to come up with predictors of difficult intubation.

Difficult intubation is fortunately rare. In Samsoun and Young's retrospective study⁽³⁾, the incidence of difficult intubation is 1:280 in obstetric compared with 1:2,230 in non-obstetric patients. This suggests that the incidence of difficult intubation is higher in obstetric patients. A prospective study with 1,387 cases⁽⁴⁾ confirms Samsoun and Young's findings. In our study, the incidence of difficult intubation was also higher in the obstetric patients 6:277 compared to gynaecological patients 5:283.

Many features that are believed to indicate difficult intubation⁽⁵⁻⁹⁾ have been described but none have been formulated and evaluated to be useful in routine clinical practice. This difficulty is further complicated by the anaesthetist's skill and perseverance. White and Kander⁽¹⁰⁾ in 1975 reported that the anatomical ratio of mandibular length to posterior depth of less than 3.6 is associated with difficult intubation. Bellhouse and Doré in 1988⁽¹¹⁾ reviewed predictors of difficult intubation. They recommended radiological assessment of cervical and facial parameters and the magnitude of atlanto-occipital extension, chin protrusion and tongue size as reliable bedside predictors of difficult intubation. Mallampati^(12,13) in 1985 proposed that if the uvula can be visualized in the oropharyngeal examination, difficult intubation is highly unlikely. In our study, we correlated Mallampati's classification and Lehane's grading⁽¹⁴⁾. It was shown that this correlation is significant only for the obstetric group. Other features in these patients were also studied, namely loose teeth, prominent canines, high arch palate, abnormal facies but the correlation were unremarkable. The age, weight, race and hyomental distance were also recorded but found to be not statistically significant between those who had difficult intubation (Lehane III and IV) and those who were easy to intubate (Lehane I and II) in both the

obstetric and gynaecological groups.

There is no simple test to predict difficulty in tracheal intubation. Most patients who are difficult to intubate, more often than not, have unremarkable features. The anaesthetic literature abounds with reports on how to deal with difficult intubation⁽¹⁵⁻¹⁷⁾ including blind nasal intubation, retrograde cannulation but these have no place in emergency obstetric situations. From our study, Mallampati's classification can be used to identify the obstetric population at risk of difficult intubation.

Many anaesthetists have blamed the higher incidence of difficult intubation in obstetric patients on the breast size, edema of pharyngeal tissues etc. In Dublin's National Maternity and Mater Misericordiae Hospitals⁽⁶⁾, from 1970 to 1980, the incidence of failed intubation was 2:3,800. This rate is comparable with Samsoun and Young's for general surgery. In this survey, all the anaesthetics were administered by consultants. Experience is, therefore, the key factor. Grade IV patients usually have obvious anatomical neck pathology, so one is prepared for difficult intubation in these patients. It is the Grade III patients that pose a problem. Because of its rarity, many trainees (and some consultants) would have no experience when they start to administer anaesthesia for emergency cases on their own. In our hospital, tradition dictates that a new trainee should have performed at least 100 Caesarean sections under supervision before he is allowed to do emergency cases. In the literature reviews and from our study, this is highly misleading. Performing 100 Caesarean sections by no means serve as any form of indication that the trainee is competent to handle a difficult intubation, as the incidence of difficult intubation is extremely low, (6:277) in our study. Perhaps it is time to re-vamp this tradition. The drill of daily simulation of Grade III and IV types of laryngoscopies in patients who are not at risk of regurgitation is the best way of training the anaesthetist to handle the emergency situation when it arises⁽¹⁷⁾. It has also

been suggested that a senior anaesthetist should be present in all obstetric cases. This has been the practice in our hospital.

CONCLUSION

Difficult intubation, though rare, can be potentially fatal. All anaesthetists should be trained to handle the failed intubation drill as there are currently no definite features to reliably predict difficult intubation. The Mallampati's classification can be used to identify the difficult intubation in obstetric but not gynaecological patients.

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