

To Determine the Incidence of Difficult Intubation

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Abstract

Introduction: To determine the incidence of difficult intubation among patients scheduled for surgery under general anesthesia. **Subjects and Methods:** Prospective Observational study conducted on 410 patients. Anesthesia induced & laryngoscopy performed. Difficulty in intubation graded according to Intubation Difficulty Scale (IDS). **Results:** Based on IDS score, the incidence of difficult intubation found to be 22.5%. A slight difficulty in 22% (IDS = 1-5) & moderate to major difficulty (IDS >5) in 0.5% cases. Intubation done successfully in all patients. **Conclusion:** The incidence of difficult intubation among patients scheduled for surgery under general anesthesia observed to be 22.5%

Keywords: Difficult Intubation, Intubation Difficulty Scale

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Introduction

Successful tracheal intubation during induction of anaesthesia would prevent morbidity and mortality and also, avoid the serious consequences of failure to establish the airway.^[1-4] Failure to maintain a patent airway for more than a few minutes results in brain damage, ultimately leading to death. The most important cause of failure to establish the airway is a difficult laryngoscopy, which is synonymous with difficult intubation in most patients.^[5] The incidence of difficult intubation has been reported to be 1.5%–13% in literature.^[6-16]

Aim

To determine the incidence of difficult intubation among patients scheduled for surgery under general anesthesia.

Subjects and Methods

We conducted a Prospective Observational study on 410 patients during a 5 month period (November 2019 - March 2020) at a tertiary care hospital after approval from the Institutional Review Board. All adult patients scheduled for surgery under general anesthesia were included in the study and informed consent taken. On the day of surgery, after securing intravenous access, standard monitors, according to ASA guidelines, were connected to patients. Premedication

given to all patients was intravenous Glycopyrrolate & Midazolam. After pre-oxygenation for 3 minutes, anesthesia was induced with Fentanyl (1.5 µg/kg) & Propofol (1.5 mg/kg) intravenously. Patient's head was positioned on a 10-cm pillow, with head extended on flexed neck. Trachea was intubated after complete neuromuscular blockade was achieved using Neuro-muscular monitor. Laryngoscopy was done using MacIntosh # 3 laryngoscope, by an experienced anesthesiologist. Glottis was visualized and assessed using modified Cormack and Lehane classification.^[17] Also recorded were, the number of attempts taken to intubate, number of operators, number of alternative techniques used, lifting force and external laryngeal pressure if required, and vocal cord mobility on visualization.

Intubation Difficulty Scale (IDS) score, a function of seven parameters, resulting in a progressive, quantitative determination of intubation complexity, was used. This score was calculated by the operator immediately after intubation.^[18]

Intubation difficulty, defined as a measure of the degree of divergence from a predefined "ideal" intubation, i.e., one performed without effort, on first attempt, practiced by one operator, using one technique, with full visualization of laryngeal aperture and vocal cords abducted. Such an intubation is accorded an IDS value of 0. Each variation

from this defined "ideal" intubation increases the degree of difficulty, overall score being the sum of all variations from this definition. Impossible intubation is defined by infinity ($IDS = \infty$). The seven variables are as follows:

N_1 -The number of supplementary attempts; an attempt defined as one advancement of tube in the direction of glottis during direct laryngoscopy or one like advancement of tube in case of a blind intubation trial.

N_2 -The number of supplementary operators; N_2 represents the number of additional persons directly attempting (i.e., not assisting) intubation.

N_3 -The number of alternative techniques used. For example, changing from an oral intubation to blind nasotracheal intubation or from a curved blade to straight blade increases N_3 by 1 point. The various techniques used should be noted in chronological order, so that subsequent identification of techniques ineffective in a particular case (or series) may be undertaken.

N_4 -Glottic exposure as defined by the Cormack grade minus one; grade I ($N_4 = 0$) on this scale corresponds to complete visualization of vocal cords, grade II ($N_4 = 1$) to visualization of inferior portion of glottis, grade III ($N_4 = 2$) to visualization of only the epiglottis, and grade IV ($N_4 = 3$) to a nonvisualized epiglottis. Glottic exposure is evaluated during the first attempt by the first operator. In case of successful intubation after blind nasotracheal intubation, $N_4 = 0$. If the blind attempt(s) fail, glottic exposure is evaluated during the first subsequent alternative visualized laryngoscopic attempt.

N_5 -The lifting force applied during laryngoscopy; $N_5 = 0$ if little effort is necessary, and $N_5 = 1$ if subjectively increased lifting force is necessary. This notion is based on operator's impression that an abnormal amount of force was used compared with routine practice.

N_6 -The necessity of applied external laryngeal pressure for optimized the glottic exposure; $N_6 = 0$ if no external pressure is applied. $N_6 = 1$ if external laryngeal pressure is necessary. Application of the Sellick Maneuver is intended to inhibit aspiration of gastric contents and does not alter the score.^[19]

N_7 -Position of vocal cords; $N_7 = 0$ if vocal cords are in abduction. $N_7 = 1$ if the vocal cords are in abduction, presenting an impediment to tube passage. If the vocal cords are not visualized, $N_7 = 0$ by default.

Results

The total number patients enrolled in our study were 410.

Difficult Intubation (Intubation Difficulty Scale - IDS score > 0) in this population was observed to be 22.5%. This included 22% incidence for slight difficulty (IDS = 1-5) & 0.5% for moderate-to-major difficulty (IDS > 5). Intubation

was possible in all the patients with no case of failure to intubate.

Incidence of Difficult Intubation:

The incidence of Difficult Intubation is depicted in a bar diagram below:

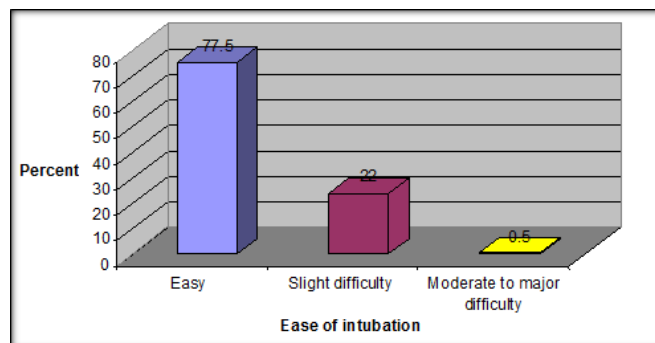


Figure 1: Incidence of Difficult Intubation

A moderate-to-major difficulty (IDS > 5) in intubation was noted in 0.5% ($n = 2$) patients.

Discussion

Our study was a prospective, observational study done on 410 patients during the period of November 2019 - March 2020. The incidence of Difficult Intubation (Intubation Difficulty Score or IDS > 0) in this study group was observed to be 22.5%. It includes an incidence of 22% for slight difficulty (IDS = 1-5) & 0.5% for moderate-to-major difficulty (IDS > 5).

Adnet et al in their study (1997) done on 315 patients for intubation in Operating Room observed that intubation was easy in 53% cases (IDS = 0) and there was a moderate-to-major difficulty in 6.3% cases (IDS > 5).^[18]

In 1998, Crosby et al,^[20] reviewed the literature and observed that there was a small but constant number of unanticipated difficult airway cases in anesthesia. This incidence of difficult laryngoscopy and intubation was seen to be between 1.5% and 8.5%, and failure to intubate was seen in 0.13-0.3% cases.

Keyvan Karkouti and colleagues conducted the study - Predicting difficult intubation: a multivariable analysis in the year 2000.^[21] Of the 461 patients included in the analysis, 38 were reclassified as difficult to intubate.

Shiga Toshiya and colleagues conducted a meta-analysis that included thirty-five studies (50,760 patients) and found the incidence of difficult intubation to be 5.8%.^[22]

Adnet et al,^[23] conducted another study in 2001 on 1171 patients for observing the degree of difficulty in Operating Room tracheal intubations. They observed that intubation was

easy in 55% cases (IDS = 0), with an incidence of 37% for minor difficulties (IDS = 1-5) and major difficulty in 8% cases (IDS > 5). Our incidence of 22 % for slight difficulty in intubation is consistent with this study.

All of these studies except those by Adnet et al provide an incidence of difficult intubation but no information on the degree of difficulty. In our study, the difficulty in intubation was graded using the IDS score and hence, the high incidence can be attributed to inclusion of slight difficulty, in addition to moderate to major difficulty in intubation.

Conclusion

The incidence of difficult intubation among patients scheduled for surgery under general anesthesia observed to be 22.5%.

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