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# A COMPARATIVE EVALUATION OF TIME TAKEN AND EASE OF INTUBATION USING AIRTRAQ AND MCCOY LARYNGOSCOPE

Anaesthesiology

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## ABSTRACT

Difficult tracheal intubation is a major cause of severe perioperative morbidity and mortality related to anaesthesia. The McCoy [MC] laryngoscope, which was used more commonly, was compared with the Airtraq [AT] laryngoscope, which has been developed for use in patients with normal or difficult airways. The study aimed at comparing and evaluating the time taken and ease of intubation by using both. Using a cross-sectional study design, the study was carried out in Jawaharlal Nehru Medical College and Hospital, under the Aligarh Muslim University in Aligarh from January to March 2012; on a sample of 50 patients, randomly divided into two groups of 25 patients each using chit-in-a-box technique. The male: female ratio was 0.8:1. The mean ± SD age in the AT group was 36.76 ± 9.09 years and in the MC group was 38.48+15.19 years. In group AT 32% patients were (Mallampati score grade I) MPI as compared to group MC in which 48% patients were MPI. In group AT 44% patients were MPII, 16% MPIII; as compared to group MC in which 40% patients were MPII and 4% MPIII. In both group AT and group MC 8% patients were MPIV. 72% of patients in Group AT were intubated between 1 -10 secs as compared to Group MC in which 60% of the patients were intubated between 11-20secs.The mean time of laryngeal intubation in the MC group was 22.08 ± 5.78 and AT group was 9.76 ± 2.60. This was found to be statistically significant. Our study revealed that Airtraq was a better interventional technique than the McCoy laryngoscope and provided better intubation conditions with greater ease of intubation.

## KEYWORDS

Airtraq, McCoy, Macintosh, airway, laryngoscope, intubation

## INTRODUCTION

The major responsibility of the anaesthesiologist towards the patient is the provision of a patent airway, the most vital element being providing an intact functional respiration. Various means of establishing an intact airway include: oral and nasal airways, face masks, laryngeal masks and various endotracheal intubation devices. Endotracheal intubation comprises a part of the general anaesthetic technique in most of the cases. Intubation is not a risk-free procedure, however not all patients receiving general anaesthesia require it. In general, intubation is indicated for patients for those undergoing surgical procedures involving body cavities, head and neck in order to prevent aspiration. The Macintosh laryngoscope is considered to be the "gold standard" for endotracheal intubation and it is against this device that the various airway devices are evaluated. Now a days a newer device i.e. the Airtraq laryngoscope which is a video laryngoscope has been developed for use in patients with normal or difficult airways (Bhandari, Shahi, Asad, & Bhakuni, 2017). Difficult airway is not recognized until the induction of anesthesia as there is no single factor to predict the existence of a difficult airway. Difficult tracheal intubation may be a major cause of severe perioperative morbidity and mortality related to anaesthesia, so one or more patient-related factors which may identify those at risk for difficult tracheal intubation can be evaluated by the Mallampati score (Lundstrøm, Møller, Charuluxananan, & Hermite, 2011). This study aimed at evaluating the time taken and ease of intubation by using both the devices i.e. Airtraq and McCoy laryngoscope.

## OBJECTIVES

1. To record the laryngoscopy & intubation time using Airtraq(AT) & McCoy(MC) laryngoscopes.
2. To compare the success of laryngoscopy & intubation in both the groups using various classes of Mallampati grading.

## MATERIALS AND METHODS

### Type of study

This cross-sectional study was undertaken in a teaching hospital in Aligarh.

### Study area

The study was carried out in Jawaharlal Nehru Medical College and Hospital, under the Aligarh Muslim University in Aligarh.

### Study period

The study was taken up for a period of three months i.e. from January to March 2012.

### Sampling technique

A total of 50 patients were included in the study. The study participants were randomly divided into two groups of 25 patients each using Chit-in-a-box technique (Singh, n.d.). A semi-structured, pre-tested questionnaire was used to collect relevant socio- demographic details of the study participants. Group A Patients were intubated using Airtraq [AT] whereas patients in group B were intubated using McCoy [MC] laryngoscope. Blinding of the attending laryngoscopist was not possible as the two laryngoscopes were conspicuously different.

### Inclusion criteria

1. Patients of either sex [age range 20-60 years]
2. Patients undergoing general anaesthesia for elective surgery [non-malignant, non-head & neck surgery]

### Exclusion criteria

1. Patients with predicted difficult laryngoscopy & intubation [except all ranges of Mallampati grading]
2. Morbidly obese (BMI >40)
3. Patients more than 60 years and younger than 20 years.
4. Patients planned for head and neck surgery or with malignancies.

Anesthetic technique comprised of a uniform premedication with injection midazolam 0.025 mg/kg, ondansetron 4.0 mg, and tramadol 2.0 mg/kg. All drugs were administered intravenously 15 minutes prior to induction of anaesthesia. Heart rate was recorded from the pulse oximeter while blood pressure (BP) was recorded using non-invasive manual blood pressure measuring instrument.

Anaesthesia was induced with 2 mg/kg of propofol. After adequate muscle relaxation with succinylcholine 1 mg/kg, all laryngoscopies and intubations were carried out by an anesthetist well versed with use of McCoy laryngoscope and an experience of more than 25 intubations with Airtraq laryngoscope. Laryngoscopy time was calculated from introduction to the removal of laryngoscope blade [AT and MC] from the mouth. The time was measured in seconds by an assistant using a stop watch.

The initial Mallampati grading (Anaesth, Gupta, Sharma, & Dimpel, 2005) was recorded during pre-anaesthetic assessment.

The ease of intubation was graded:

Grade I: No extrinsic manipulation of the larynx is required.
Grade II: External manipulation of the larynx is necessary to intubate.
Grade III: Intubation possible only when aided by a stylet.
Grade IV: Failed intubation.

Laryngeal mask airway (LMA) of appropriate size was kept ready in cases of failed intubation.

Following successful intubation, breathing circuit was attached and an infusion of Propofol [6 mg/kg/h] started while the patient received 60% $N_2O$ in Oxygen.

**Ethical consideration**

Following approval by the Board of Studies and ethical committee of Department of Anesthesiology, 50 ASA I & II, a written informed consent was obtained from all the study participants prior to the collection of data. Outmost care was taken for maintaining privacy of the collected data.

## RESULTS

In this cross-sectional study among 50 participants (25 patients intubated with AT and 25 patients intubated with MC) the male: female ratio was found to be 0.8: 1.

The mean ± SD age in the AT group (Group A) was 36.76 ± 9.093 years and in the MC (Group B) was 38.48+15.191 years. The socio-demographic details of the study participants are depicted in Table 1.

**Table 1: Socio-demographic details of the study participants**

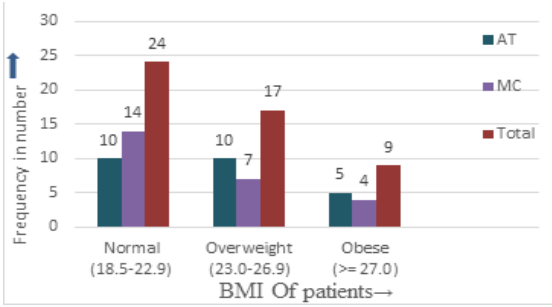
| Socio demographic variable | AT [Group A] (n=25) No. (%) | MC [Group B] (n=25) No. (%) |
|---|---|---|
| Age group (In years) | | |
| <30 | 4(16.0%) | 8(32.0%) |
| 30-39 | 10(40%) | 6(24.0%) |
| 40-49 | 8(32.0%) | 4(16.0%) |
| >50 | 3(12.0%) | 7(28.0%) |
| Sex | | |
| Female | 15(60.0%) | 13(52.0%) |
| Male | 10(40.0%) | 12(48.0%) |

The largest number of patients in Group A were in between 30 -39 years followed by 40-49 years. In Group B largest number of patients were less 30 years of age and around 28.0 % were in the age group of more than 50 years.

As obesity is a risk factor of difficult intubation (B.T. Finucane et al., Principles of Airway Management; 2011, 31) the BMI of the study participants was calculated and the mean BMI of AT was 24.12 ± 2.43 and that of MC was 23.57±2.96.

Around 48% of the study participants had normal BMI (18.5-22.9) followed by 34% of overweight patients.

**Figure1. Distribution of patients according to BMI**




In Group AT 32% patients were (Mallampati score grade I) MPI as compared to Group MC in which 48% patients were MPI. In Group AT 44% patients were MPII as compared to Group MC in which 40% patients were MPII. In Group AT 16% patients were MPIII as compared to Group MC in which 4% patients were MPIII.

In both Group AT and Group MC 8% patients were MPIV respectively. There was no statistical difference in MP grading of patients in both the groups (p >0.05)

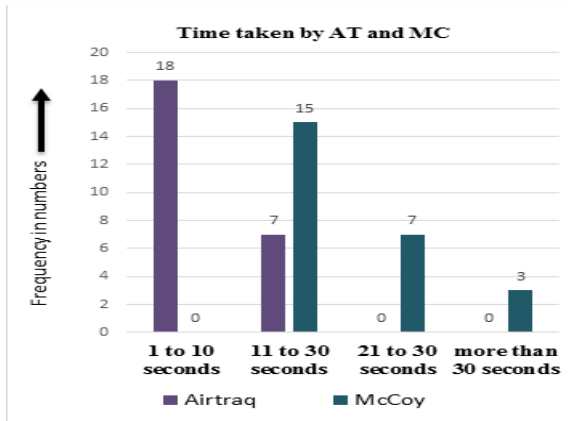
Table 2 shows the Mallampati Grading of patients in the both groups.

**Table 2: Mallampati Grading of patients in the both groups**

| | | | Group | | Total |
|---|---|---|---|---|---|
| | | | AT | MC | |
| MP GRADING | 1 | Count | 8 | 12 | 20 |
| | | % within group | 32.0% | 48.0% | 40.0% |
| | 2 | Count | 11 | 10 | 21 |
| | | % within group | 48.0% | 40.0% | 42.0% |
| | 3 | Count | 4 | 1 | 5 |
| | | % within group | 16.0% | 4.0% | 10.0% |
| | 4 | Count | 2 | 2 | 4 |
| | | % within group | 8.0% | 8.0% | 8.0% |
| Total | | Count | 25 | 25 | 50 |
| | | % within group | 100.0% | 100.0% | 100.0% |

The mean time of laryngeal intubation in the MC group was 22.08 ± 5.78 and the mean time of intubation for the AT group was 9.76 ± 2.60. This was found to be statistically significant with a p value of < 0.001. (Figure 2)

**Figure 2: Time taken for intubation in AT and MC group**




## DISCUSSION

In this study, done among patients undergoing surgery under general anaesthesia at Jawaharlal Nehru College and Hospital, the demographic profile in both the groups were similar.

The sex distribution was identical in both the groups. In group AT there were 60% female patients and 40% male patients. In group MC female and male patients were 52% and 48% respectively. The difference was statistically insignificant as the p value > 0.05.

Most of the patients in Group AT were intubated between 1 -10 secs as compared to Group MC in which most of the patients were intubated between 11-20secs.

The mean time for laryngeal intubation was significantly less in Group AT (9.76 sec) as compared to Group MC (22.08sec) and p < 0.05 which was also found to be statistically significant. These findings were similar to a study by Maharaja CH which showed the mean time for laryngeal intubation was significantly less in Group AT (10.5 sec) as compared to Group MC (13 secs)(Maharaj, Mcdonnell, Harte, & Laffey, 2007). Another study revealed the mean time for intubation by Airtraq laryngoscope was 11.23 ± 2.90 and that with Macintosh was 9.46 ± 2.70 seconds(Kemal T. Saracoglu & Gogus, 2014). which is similar to findings of our study. In another study among children below 6yrs, similar finding has been reported wherein the time of intubation was 22.8±6.1 seconds in the Airtraq group compared with 51.6±26.7 seconds in the Macintosh Group(Riad W, Moussa A, 2017).

In our study, around 48% of the study participants had normal BMI (18.5-22.9) followed by 34% of overweight patients.

In our study only 8% of the patients were MP IV but in a study by

Gustavo Henrique S. Wanderley in Brazil reported that 35.8% of their study subjects were in MP III/ IV(Wanderley et al., 2013). which is considerably more than the present study. This could be explained that we have excluded morbidly obese patients in our study.

Our study revealed that Airtraq was a better interventional technique than the Macintosh laryngoscope which was also supported by findings of Hosalli et al which reported that optical Airtraq TM laryngoscope provided better intubation conditions with greater ease of intubation, better glottic view during laryngoscopy as compared to and Macintosh laryngoscope (Vinod Hosalli, BK Arjun, Uday Ambi, Shivanand HulakundArticle, 2017).

## LIMITATIONS

The total number of patients in the sample was small, so this may have been responsible for the lack of statistical significance in some of our results.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest

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