

## Endotracheal Intubations in Emergency Department: A Clinical Audit at a Tertiary Health Centre in South India

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### Abstract

**Background:** Endotracheal intubation in the emergency department is challenging. Hence, regular audits can help us improve our critical airway management skills. Our study aimed to evaluate the practice of endotracheal intubations performed in the emergency department.

**Materials and Methods:** A retrospective cross-sectional study was conducted among the patients intubated in our teaching hospital's emergency department. The study period was from November 1, 2019, to August 31, 2020. We analyzed first attempt success rates, drug use, indication, and complications.

**Results:** We analysed 90 endotracheal intubations, out of which 70(77.8%) were performed by emergency physicians and 20(22.2%) by anaesthetists. The first attempt success rate was 81.11% (n=73) and had significant differences between the both departments. (p value= 0.003,  $\chi^2= 7.48$ ). More patients had medical indications compared to trauma for intubation (n=88 vs n=32) among which respiratory failure (n=25, 27.78%) was the most common indication. Rapid Sequence Intubation( RSI) adherence was 82.22% (n=74). Lignocaine (n=16, 19.75%), etomidate (n=35, 43.2%) and succinylcholine (n=65, 80.25%) were the commonly used drugs for premedication, induction and as relaxants respectively. 17(18.89%) out of 90 intubation had complications. Desaturation (n=10, 11.11%), bradycardia (n=1, 1.11%), hypotension (n=4, 44%), dental trauma (n=5, 5.55%) and oesophageal intubation (n=3, 3.33%) were observed in our study.

**Conclusion:** Our study is the first from India which describes the characteristics of endotracheal intubations done in the Emergency Department along with data on RSI adherence. The first attempt success rate, indications, and complications were comparable with other studies in the literature. We recommend future prospective studies to analyze success rates between different specialties and resident doctors to improve the airway management skills in the Department

**Keywords:** Critical airway management, Residency training, Academic emergency department, Emergency physician, anesthetist.

### Introduction

Endotracheal intubation has become the gold standard technique in airway management of critically ill patients [1]. A doctor working in the emergency department should

manage the airway of the critically ill patient for the first 30 minutes [2]. In this regard, endotracheal intubation is recognized as a core skill required for any doctor who manages the emergency department. The Government of India had accepted emergency medicine as a separate specialty by 2009 and started the first residency program in 2010 [3]. Because of this fact, the workforce of Emergency Departments across India comprises doctors from diverse specialties like emergency medicine, anesthesia, general medicine, and general surgery. Endotracheal intubation in the emergency department is generally performed by either an emergency physician or an anesthesiologist [4,5]. In the emergency department of our institution, the emergency physician performs intubation during the day shift (09:00 to 21:00), and the anesthetist performs during the night shift (21:00 to 09:00). Endotracheal intubation performed in the

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who received lignocaine 20% + fentanyl, were intubated by emergency physicians, and glycopyrrolate (n=2, 10%) was used exclusively by the anesthetists. Among relaxants, all eight patients (9.88%) who received rocuronium were intubated by emergency physicians.

Both the specialties used LEON criteria to predict difficult intubation. We observed a statistically significant association between anticipated difficult intubation and bougie use ( $\chi^2=6.09$ ,  $p=0.006$ ). Anesthetists expected 14(70%) intubations to be difficult. 13(65%) patients required bougie for intubation. However, emergency physicians predicted 17(24.28%) intubations to be difficult, among which bougie was used in 13 (18.57%) patients.

In our emergency department, the first attempt success rate was 81.11% (n=73), with a significant difference between both departments. ( $p$  value= 0.003,  $\chi^2= 7.48$ ). There was a significant association between the number of attempts and an increasing number of complications (Pearson's correlation= 0.055). We also found a significant difference in RSI (n=74/90) performed between the emergency physicians 59(79.73%) and anesthetists 15(20.27%) (Yates corrected chi square= 6.46;  $p=0.0013$ ). Only 17 (18.89%) patients in our study group developed complications. There was a significant difference between the two specialties ( $\chi^2= 16.04$ ,  $p<0.001$ ). Among the complication, we observed desaturation ( $\chi^2= 5.02$ ;  $p= 0.012$ ), bradycardia ( $\chi^2= 3.53$ ;  $p=0.029$ ) and dental trauma ( $\chi^2=6.992$ ,  $p= 0.004$ ,  $p= 0.004$ ) had statistically significant difference between the two specialties while hypotension was comparable across the specialties. Our data was comparable to Stevenson et al. <sup>1</sup> from Scotland, who observed that desaturation was more for anesthetists who performed intubations while hypotension was comparable across the emergency physicians and anesthetists.

The indications (medical versus traumatic), first-pass success rates, complications which we obtained are compared with similar studies done in the western countries (Table 4). We achieved first attempt success rates comparable to the western studies. Though the overall complication rates were higher, we observed similar rates of hypotension and esophageal intubation among the study patients in our study.

Perhaps, one of the main limitations of our study was that the number of intubations performed by emergency physicians and anesthetists was not comparable. Thus, the findings comparing the two specialties should be interpreted with caution. Lesser first attempt success rate and high prevalence of complications among the anesthetists might be due to multiple reasons. RSI was performed significantly more by emergency physicians. A higher percentage of patients intubated by anesthetists had recorded CL grades of more than 2. Furthermore, the emergency physicians intubated all nine patients who had a cardiac arrest (both trauma and medical). These would have influenced the first attempt success rates and complications in our study.

## Conclusions:

Our study demonstrated high first attempt success rates, which were comparable to other studies in the literature. Though the overall complication rates were higher, complications like hypotension and oesophageal intubation were similar to other studies. Ideally, a prospective study would have been better to compare the efficiency between the emergency physicians and anesthetists. Finally, we recommend that future prospective studies be conducted, including resident performed intubations to evaluate the airway managerial skills and training of emergency medicine residents to identify any lacunae in the same and ensure that no one dies in the emergency department for want of effective airway management.

**COI Statement:** This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

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Table 4. comparing indication, first attempt success rates, and complications with other studies.

	Indications (Medical/ Trauma)	First Pass Success Rate	Complications (Overall)	Hypotension	Desaturation	Oesophageal Intubation	RSI. Adherence
<b>Current study</b>	<b>88/32</b>	<b>81.1</b>	<b>18.9</b>	<b>4.4</b>	<b>11</b>	<b>3.3</b>	<b>82.2</b>
Kerslake et al (2015).[13]	77/23	85	8	4.5	1.7	2.7	74
Stevenson et al (2011)[1]	62/38	87	21	12	11	3	85
Walls et al (2011).[12]	67/26	95	12	1	NR	3	69
Fogg et al (2012).[13]	69.5/30.5	83.4	28.5	4	15.7	4	NR
Fadhilillah[14] et al (2020)	NR	32.9	8.5	3.2	2.1	NR	NR

(NR = Not Reported)

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