Research Article

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Clinical Profile of Patients Requiring Definitive Airway in the Emergency Department

Ankur Anand

Department of Emergency Medicine, Santosh Medical College and Hospital, Ghaziabad, NCR Delhi, India

Corresponding author
Ankur Anand, Department of Emergency Medicine, Santosh Medical College and Hospital, Ghaziabad, NCR Delhi, India.

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ABSTRACT

Background: Definitive airway management is a cornerstone of emergency medicine, yet there is limited data from India on this critical intervention. This study aimed to characterize the clinical profile, airway management techniques, and immediate complications for patients requiring a definitive airway in a tertiary care emergency department (ED).

Methods: We conducted a prospective, observational study of 139 patients aged 14 years and older requiring definitive airway management. Data on patient demographics, clinical indications, procedural details (including methods, medications, and laryngoscopy findings), and complications within one hour were collected using a standardized proforma.

Results: The mean patient age was 49.8 years, with a male predominance (66.9%). The primary indications for intubation were medical, with Type 2 respiratory failure (17.3%), hepatic encephalopathy (12.9%), and cerebrovascular accident (12.2%) being the most common. Rapid Sequence Intubation (RSI) was the most utilized method (79.9%). Etomidate (63.3%) and rocuronium (77.7%) were the preferred induction and paralytic agents. A bougie was used in 56.8% of cases. Most patients had a Cormack-Lehane Grade I (68.3%) or II (25.2%) view. The overall complication rate within the first hour was 24.5%, with hypotension (affecting 9.4% of all patients) being the most frequent adverse event.

Conclusion: This study provides critical insights into emergency airway management in an Indian ED, highlighting the prevalence of RSI for medical emergencies. While procedural success is high, the significant rate of hemodynamic complications underscores the need for enhanced protocols, focused training on peri-intubation resuscitation, and continuous quality improvement to improve patient safety.

Introduction

The establishment of a definitive airway is a critical, life-saving intervention in emergency medicine for patients presenting with conditions such as severe respiratory distress, compromised oxygenation, or altered mental status. While endotracheal intubation remains the gold standard, the procedure is not without risks, carrying the potential for significant morbidity and mortality if not performed correctly.

Rapid Sequence Intubation (RSI), involving the administration of an induction agent and a neuromuscular blocking agent to facilitate rapid tracheal access, is the preferred method in most emergency settings to minimize aspiration risk. Other techniques, such as Delayed Sequence Intubation (DSI), may be employed to optimize preoxygenation in agitated patients.

Despite the high volume of critically ill patients in India, there is a notable scarcity of prospective data on the practice patterns and outcomes of emergency airway management. This study aims to fill this knowledge gap by providing a comprehensive analysis of the clinical profile, indications, techniques, and immediate complications of patients requiring definitive airway management at a tertiary care center in India. The findings are intended to inform local guidelines, enhance training, and ultimately improve patient safety in Indian emergency medicine.

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Methods

Study Design and Setting

A hospital-based observational study was conducted in the Department of Emergency Medicine at Santosh Medical College and Hospital in Ghaziabad, NCR Delhi, India.

Study Population

The study included 139 patients aged 14 years and older who required definitive airway intervention in the ED. Patients who were intubated before arrival, transferred to another facility, or whose guardians refused consent were excluded. The study received ethical clearance from the Institutional Ethics Committee (Ref. No. SU/R/2023/2489[71]), and written informed consent was obtained for all participants.

Data Collection

A structured clinical proforma, adapted from the National Emergency Airway Registry (NEAR), was used for standardized data collection. Data points included patient demographics, indication for airway intervention, method of management (RSI, DSI, etc.), medications, preoxygenation method, laryngoscope type, Cormack-Lehane grade, use of airway adjuncts like a bougie, and any complications occurring within one hour of the procedure.

Statistical Analysis

Data were compiled and analyzed using Stata MP-17. Descriptive statistics were used to summarize the data, and a p-value of less than 0.05 was considered statistically significant.

Results

Patient Characteristics

A total of 139 patients were enrolled. The demographic profile is detailed in Table 1. The study population was predominantly male (66.9%), with a mean age of 49.8 years.

Table 1: Patient Demographics and Baseline Characteristics (n=139)

Parameter	Value
Mean Age (SD)	49.8 years
Gender Distribution	
Male	93 (66.9%)
Female	46 (33.1%)
Age Stratification	
14-18 years	4 (2.9%)
19-64 years	108 (77.7%)
≥ 65 years	27 (19.4%)
Case Type	
Medical	123 (88.5%)
Trauma	16 (11.5%)

Indications for Airway Management

The indications were overwhelmingly medical. As shown in Table 2, Type 2 respiratory failure was the most common single indication (17.3%), followed by altered mental status from various causes, including hepatic encephalopathy (12.9%) and cerebrovascular accidents (12.2%).

Table 2: Primary Indications for Definitive Airway Management (n=139)

Indication	Frequency (%)
Type 2 Respiratory Failure	24 (17.3%)
Hepatic Encephalopathy	18 (12.9%)
Cerebrovascular Accident (CVA)	17 (12.2%)
Traumatic Head Injury	16 (11.5%)
Meningitis	11 (7.9%)
Type 1 Respiratory Failure	10 (7.2%)
High Anion Gap Metabolic Acidosis	10 (7.2%)
Uremic Encephalopathy	9 (6.5%)
Seizures	8 (5.8%)
Upper Gastrointestinal Bleeding	6 (4.3%)
Poisoning	6 (4.3%)
Hanging	3 (2.2%)
Acute Coronary Syndrome (ACS)	1 (0.7%)

Airway Management Techniques and Pharmacotherapy

Procedural details are summarized in Table 3. RSI was the method of choice in 79.9% of cases. Etomidate (63.3%) and rocuronium (77.7%) were the most common induction and paralytic agents, respectively. Notably, 8.6% of patients were intubated without medication due to being deeply comatose with no airway reflexes. A bougie was used in 56.8% of intubations, and a Macintosh blade was used in 97.8% of cases. The vast majority of views were Cormack-Lehane Grade I (68.3%) or II (25.2%).

Table 3: Procedural Details of Airway Management (n=139)

Parameter	Details	Frequency (%)
Primary Method		
	Rapid Sequence Intubation (RSI)	111 (79.9%)
	Delayed Sequence Intubation (DSI)	16 (11.5%)
	Intubation without Medication	12 (8.6%)
Induction Agent		
	Etomidate	88 (63.3%)
	Midazolam	19 (13.7%)
	Propofol	13 (9.4%)
	Fentanyl	7 (5.0%)
Paralytic Agent		
	Rocuronium	108 (77.7%)
	Succinylcholine	11 (7.9%)
	Other (Atracurium, Vecuronium)	8 (5.8%)
Adjunct Use	Bougie Assisted	79 (56.8%)
Laryngoscopy View		
(Cormack-Lehane)	Grade I	95 (68.3%)
	Grade II	35 (25.2%)
	Grade III	6 (4.3%)
	Grade IV	3 (2.2%)

Complications

At least one complication was recorded in 24.5% of patients within the first hour post-intubation (Table 4). Hemodynamic complications were most common, with hypotension occurring in 9.4% of all patients, followed by post-intubation cardiac arrest (5.8%) and bradycardia (5.0%).

Table 4: Complications Within 1 Hour of Airway Intervention (n=34 Patients with Complications)

Complication	N	% of Complicated Cases (n=34)	% of Total Cases (N=139)
Hypotension	13	38.2%	9.4%
Post-intubation Cardiac Arrest	8	23.5%	5.8%
Bradycardia	7	20.6%	5.0%
Desaturation	3	8.8%	2.2%
Laryngospasm	1	2.9%	0.7%
Airway Trauma	1	2.9%	0.7%
Right Mainstem Intubation	1	2.9%	0.7%
Total Patients with any complication	34	100%	24.5%

Discussion

This study provides a contemporary snapshot of emergency airway management in an Indian tertiary care center. Our findings indicate that the patient population is primarily middle-aged males presenting with acute medical conditions, which aligns with multicenter studies from other regions. The predominance of RSI (79.9%) as the intubation method of choice is consistent with its status as the global standard of care, facilitating controlled and rapid airway access.

The selection of etomidate and rocuronium as the most frequent sedative and paralytic agents reflects current best practices, prioritizing hemodynamic stability in critically ill patients. A significant finding is the high rate of bougie use (56.8%), which suggests a proactive strategy to maximize first-pass success, a key determinant of patient safety. This aligns with evidence supporting bougie use, especially in difficult airways.

The overall complication rate of 24.5% is a critical finding that warrants attention. Hypotension was the most common adverse event, likely reflecting the interaction between sedative-induced vasodilation and the patient's underlying critical illness. The incidence of post-intubation cardiac arrest (5.8%) is concerning and highlights the extreme physiological stress of the procedure in this vulnerable population. These findings emphasize the necessity of robust pre-intubation resuscitation and careful patient selection for pharmacologic agents.

Limitations

This study is subject to several limitations. As a single-center study, its findings may not be broadly generalizable. The observational design prevents the determination of causality. Furthermore, we did not track long-term outcomes such as in-hospital mortality or the experience level of the proceduralist, which are known confounders.

Conclusion

Definitive airway management in our emergency department is primarily driven by medical emergencies, with RSI being the predominant technique. While procedural success appears high, significant hemodynamic complications are common and represent a major area for improvement. We recommend the implementation of standardized airway protocols, enhanced training with a focus on peri-intubation optimization, and the development of an institutional airway registry to facilitate continuous quality improvement and enhance patient safety [1-13].

References

1. Shavit I, Levit B, Ben Basat N, Lait D, Somri M, et al. Establishing a definitive airway in the trauma patient by novice intubators: A randomised crossover simulation study. Anaesth Intensive Care. 2016.
2. Walls RM, Brown CA 3rd, Bair AE, Pallin DJ. NEAR II Investigators. Emergency airway management: a multi-center report of 8937 emergency department intubations. J Emerg Med. 2011 .41: 347-354.
3. Jishnu M, Bhoi S, Sahu AK, Suresh S, Aggarwal P. Airway management practices among emergency physicians: An observational study. Turk J Emerg Med. 2022. 22: 186-191.
4. Okubo M, Gibo K, Hagiwara Y, Nakayama Y, Hasegawa K. Japanese Emergency Medicine Network Investigators. The effectiveness of rapid sequence intubation (RSI) versus non-RSI in the emergency department: an analysis of multicenter prospective observational study. Int J Emerg Med. 2017. 10: 1.
5. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. Gastroenterol Hepatol Bed Bench. 2013. 6: 14-17.
6. Imamura T, Brown CA, Ofuchi H, Yamagami H, Branch J, et al. Emergency airway management in geriatric and younger patients: analysis of a multicenter prospective observational study. Am J Emerg Med. 2013. 31: 190-196.
7. Brown CA, Bair AE, Pallin DJ, Walls RM. NEAR III Investigators. Techniques, success, and adverse events of emergency department adult intubations. Ann Emerg Med. 2015. 65: 363-370.
8. Jaber S, Amraoui J, Lefrant JY , Arich C, et al. Clinical practice and risk factors for immediate complications of endotracheal intubation in the intensive care unit: A prospective, multiple-center study. Crit Care Med. 2006. 34: 2355-2361.
9. Bonnette AJ, Aufderheide TP, Jarvis JL, Lesnick JA, Nichol G, et al. Bougie-assisted endotracheal intubation in the pragmatic airway resuscitation trial. Resuscitation. 2021. 158: 215-219.
10. Arulkumaran N, Lowe J, Ions R, Mendoza M, Bennett V, et al. Videolaryngoscopy versus direct laryngoscopy for emergency orotracheal intubation outside the operating room: a systematic review and meta-analysis. Br J Anaesth. 2018. 120: 712-724.
11. Zeidan A, Bamadhaj M, Al-Faraidy M, Ali M. Videolaryngoscopy Intubation in Patients with COVID-19: How to Minimize Risk of Aerosolization? Anesthesiology. 2020. 133: 481-483.

12. Alkhouri H, Vassiliadis J, Murray M, Mackenzie J, Tzannes A, et al. Emergency airway management in Australian and New Zealand emergency departments: A multicentre descriptive study of 3710 emergency intubations. Emerg Med Australas. 2017. 29: 499-508.
13. Girrbach FF, Hilbig F, Michael M, Bernhard M. Systematische Analyse von Atemwegs Register in der Notfallmedizin Anaesthesist. 2018. 67: 664-673.