ORIGINAL RESEARCH PAPER

Emergency Medicine

OBSERVATIONAL STUDY OF ENDOTRACHEAL INTUBATION IN EMERGENCY DEPARTMENT

KEY WORDS: Endotracheal Intubation,crash Airway,difficult Intubation,capnography

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ABSTRACT

Objective: To identify the factors associated with the failed endotracheal intubation in 1st attempt & to study the parameter involved in endotracheal intubation in emergency department & to confirm of position endotracheal tube. **METHODS:** Prospective study conducted on adult patients who underwent emergency intubation coming to emergency department, DY Patil Hospital, Navi Mumbai. **Results:** study was conducted in 120 patients out of which 58 (48.3%) of the participants had normal Airway.(Cormack lehaneclassif).7 (5.8%) of the participants had difficult Airway. 55 (45.8%) of the participants had crash Airway.11 (9.2%) of the participants had oesophageal intubation. 109 (90.8%) of the participants had tracheal intubation in first attempt. **CONCLUSIONS:** In our study the factors associated with failed intubation in 1st attempt were difficult intubation like short neck, facial trauma, anaphylaxis etc. , no adequate training, fault in instruments, untrained nursing staff..Failed endotracheal intubation in 1st attempt observed in 11 participants. Out of all intubations performed 9 patients had difficult intubation, 2 participants had crash airway . In our study best method for confirmation of endotracheal tube placement is capnography.

INTRODUCTION

Securing the airway by endotracheal intubation is a fundamental skill in emergency medicine for definitive airway management.Unrecognised intubation of the oesophagus is a significant source of morbidity and mortality.

Direct visualisation of the endotracheal tube passing through the vocalcords is not always possible due to unfavourable anatomy, trauma,edema,blood, vomitus and secretions.

Many traditional methods can be employed to confirm endotracheal tube placement including direct visualisation of the vocal cords, observation of chest movements, chest and gastric auscultation, chest radiography, pulse oximetry etc.

AIMS AND OBJECTIVES:

1. To identify the factors associated with the failed endotracheal intubation in 1st attempt.
2. To study the parameter involved in endotracheal intubation in emergency department like medications and to confirm of position endotracheal intubation.

Inclusion And Exclusion Criteria

Inclusion Criteria : All patients who require endotracheal intubation in emergency department.

Exclusion Criteria : Patients who were intubated elsewhere, age<12years.

MATERIALS AND METHODS

Study Design : Prospective observational study

Study Site: Study conducted in the department of Emergency medicine, DY Patil hospital ,Navi Mumbai.

Study Population: Patients who underwent Endotracheal intubation in the emeregency department.

Study Duration: 1 year

Sample Size: 120

RESULTS

Data collection was done in 120 patients 63 (52.5%) of the participants had Elective intubation. 57 (47.5%) of the participants had RSI.

58 (48.3%) of the participants had normal Airway where presented to ED. 7 (5.8%) of the participants had difficult Airway. 55 (45.8%) of the participants had crash Airway.

Etomidate is used in 66 (55.0%) of the participants as inducing agent.

Propofol + Succinylcholine are used in 32 (26.7%) of the participants as Inducing Agents.

Etomidate + Succinylcholine are used as in 17 (14.2%) of the participants as Inducing Agents

No inducing agents used in 5 (4.2%) 9 (7.5%) had Difficult Intubation. 111 (92.5%) of the participants had normal airway. 11 (9.2%) of the participants had oesophageal intubation. 109 (90.8%) of the participants had tracheal intubation in first attempt. 109 (90.8%) of the participants were checked by Five Point Auscultation & capnography and tube was in trachea in first attempt. 11 (9.2%) of the participants checked by Five Point Auscultation and tube was not in trachea.

11 (100.0%) of the participants checked by Five Point Auscultation in later attempts where tube was in trachea..11 (9.2%) of the participants checked by Pulse Oximetry in first attempt which is not Recordable. 109 (90.8%) of the participants checked by Pulse Oximetry which is Recordable. 11 (100.0%) of the participants checked by Pulse Oximetry later attempts which isRecordable.120 (100.0%) of the participants had Location of Tube in trachea confirmed by chest x-ray.

9 (7.5%) of the participants had etCO2 is Not Recordable in first attempt. 111 (92.5%) of the participants had etCO2 is Recordable in first attempt.

9 (100.0%) of the participants had etCO2 Recordable In later attempt.

61 (50.8%) of the participants were intubated during 1st year.

46 (38.3%) of the participants were intubated during 2nd year.
13 (10.8%) of the participants were intubated during 3rd year.

DISCUSSION

Table 1: All Parameters MEAN±SD ||Median (IQR) ||MIN-MAX||Frequency(%)

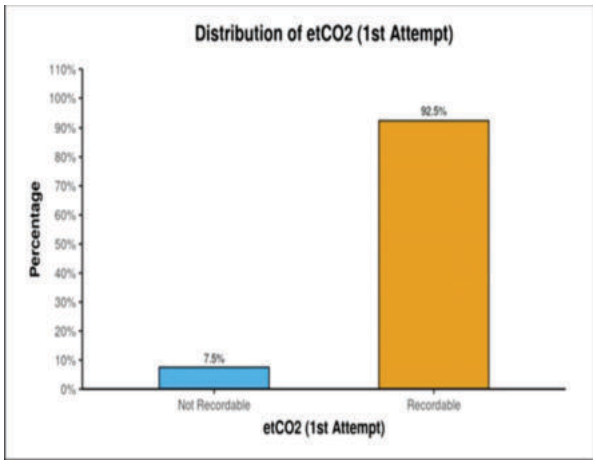
All Parameters	Mean ± SD || Median (IQR) || Min-Max || Frequency (%)
Age (Years)	46.50 ± 19.93 || 45.00 (28.00-63.25) || 13.00 - 86.00
Age	
≤20 Years	8 (6.7%)
21-30 Years	26 (21.7%)
31-40 Years	14 (11.7%)
41-50 Years	24 (20.0%)
51-60 Years	13 (10.8%)
61-70 Years	15 (12.5%)
71-80 Years	14 (11.7%)
81-90 Years	6 (5.0%)
Gender	
Male	80 (66.7%)
Female	40 (33.3%)
Pulse Rate (BPM)	116.42 ± 27.09 || 120.50 (102.00-134.00) || 34.00 - 178.00
Pulse Rate	
WNL	16 (13.3%)
Bradycardia	6 (5.0%)
Tachycardia	84 (70.0%)
Systolic BP (mmHg)	126.80 ± 45.27 || 120.00 (90.00-150.00) || 70.00 - 260.00
Systolic BP	
<90 mmHg	14 (11.7%)
90-120 mmHg	44 (36.7%)
120-140 mmHg	15 (12.5%)
>140 mmHg	30 (25.0%)
Diastolic BP (mmHg)	73.11 ± 24.17 || 70.00 (60.00-90.00) || 40.00 - 160
Diastolic BP	
<60 mmHg	20 (16.7%)
60-90 mmHg	70 (58.3%)
>90 mmHg	13 (10.8%)
SpO2 (%)	78.43 ± 16.92 || 82.00 (66.00-94.00) || 28.00 - 100.00
SpO2	
<90%	69 (57.5%)
≥90%	39 (32.5%)
Respiratory Rate (CPM)	40.09 ± 12.48 || 38.00 (30.50-51.50) || 18.00 - 66.00
Respiratory Rate	
≤20 CPM	5 (4.2%)
20-40 CPM	53 (44.2%)
>40 CPM	48 (40.0%)
RBS (mg/dL)	193.68 ± 84.85 || 177.50 (141.50-216.25) || 22.00 - 552.00
RBS	
<100 mg/dL	2 (1.7%)
100-200 mg/dL	74 (61.7%)
200-500 mg/dL	41 (34.2%)
>500 mg/dL	3 (2.5%)
ECG	
NSR	27 (22.5%)
Sinus Tachycardia	56 (46.7%)
Asystole	9 (7.5%)
LBBB	8 (6.7%)
MI	7 (5.8%)
PEA	5 (4.2%)
RBBB	3 (2.5%)
S1Q3T3	2 (1.7%)
Sinus Bradycardia	2 (1.7%)
Ventricular Tachycardia	1 (0.8%)
GCS	9.17 ± 4.65 || 8.00 (5.50-15.00) || 3.00 - 15.00
GCS Category	
≤7	42 (35.0%)
>7	78 (65.0%)
Provisional Diagnosis	
CARDIAC ARREST	17 (14.2%)
INTRACRANIAL BLEED	16 (13.3%)
ACUTE RESPIRATORY DISTRESS SYNDROME	9 (7.5%)
EXTRADURAL HAEMORRAGE	8 (6.7%)
DIABETIC KETOACIDOSIS WITH SEPSIS	5 (4.2%)
PARTIAL HANGING	5 (4.2%)
SUBDURAL HAEMORRHAGE	5 (4.2%)
POLYTRAUMA	4 (3.3%)
STATUS EPILECTICUS	4 (3.3%)
3RD DEGREE BURNS	3 (2.5%)
ACUTE EXABERATION OF COPD	3 (2.5%)
DIABETIC KETOACIDOSIS	3 (2.5%)
INFERIOR WALL MI	3 (2.5%)
SEPTIC SHOCK	3 (2.5%)
SUBARACHNOID HAEMORRHAGE	3 (2.5%)
ACID CONSUMPTION	2 (1.7%)
ANAPHYLAXIS	2 (1.7%)
ANTERIOR SEPTAL WALL MI	2 (1.7%)
ORGANOPHOSPOROUS POISOINING	2 (1.7%)
PONTINE BLEED	2 (1.7%)
PULMONARY EMBOLISM	2 (1.7%)
RECURRENT HYPOGLYCEMIA	2 (1.7%)
SEPSIS WITH SEVERE METABOLIC ACIDOSIS	2 (1.7%)
SEPTIC SHOCK WITH SEVERE METABOLLIC ACIDOSIS	2 (1.7%)
BENZODIAZEPINE POISOINING	1 (0.8%)
COMPLETE BURNS	1 (0.8%)
COMPLETE HANGING	1 (0.8%)
DIABETIC KETOACIDOSIS WITH HYPERKALEMIA	1 (0.8%)
LOWER RESPIRATORY TRACT INFECTION	1 (0.8%)
MENINGITIS	1 (0.8%)
MULTI DRUG POISOINING	1 (0.8%)
POOR GCS? ASPIRATION	1 (0.8%)
SEVERE METABOLIC ACIDOSIS WITH HYPERKALEMIA	1 (0.8%)
SEVERE METABOLLIC ACIDOSIS	1 (0.8%)
TYPE 2 RESPIRATORY FAILURE	1 (0.8%)
Indication For Intubation	
To Secure Airway	34 (28.3%)
Poor GCS	33 (27.5%)
Severe Tachpnea	29 (24.2%)
Aspiration	18 (15.0%)
Cardiac Arrest	5 (4.2%)
Hypercapnoea	1 (0.8%)
Adjuncts	
None	112 (93.3%)
Bougie	7 (5.8%)
Videolaryngoscopy	1 (0.8%)
Status Of Intubator	
1st Year Resident	61 (50.8%)
2nd Year Resident	46 (38.3%)

All Parameters	Mean ± SD || Median (IQR) || Min-Max || Frequency (%)
3rd Year Resident	13 (10.8%)
Number Of Attempts	1.12 ± 0.41 || 1.00 (1.00-1.00) || 1.00 - 4.00
Number Of Successful Attempts	1.00 ± 0.00 || 1.00 (1.00-1.00) || 1.00 - 1.00
Number Of Failed Attempts	0.12 ± 0.41 || 0.00 (0.00-0.00) || 0.00 - 3.00
method of intubation	
Elective	63 (52.5%)
RSI	57 (47.5%)
Airway in Patients With Emergency Presentation	
Normal Airway	58 (48.3%)
Dificult Airway	7 (5.8%)
Crash Airway	55 (45.8%)
Inducing Agents	
Etomidate	66 (55.0%)
Propofol + Succinylcholine	32 (26.7%)
Etomidate + Succinylcholine	17 (14.2%)
None	5 (4.2%)
Difficult Intubation (Yes)	9 (7.5%)
Location of Tube in First Attempt	
Esophageal	11 (9.2%)
Tracheal	109 (90.8%)
Five Point Auscultation (1st Attempt)	
Tube In	109 (90.8%)
Tube Out	11 (9.2%)
Five Point Auscultation (Later Attempts) (Tube In)	11 (100.0%)
Pulse Oximetry|(1st Attempt)	
Not Recordable	11 (9.2%)
Recordable	109 (90.8%)

All Parameters	Mean ± SD || Median (IQR) || Min-Max || Frequency (%)
Pulse Oximetry (Later Attempts) (Recordable)	11 (100.0%)
Location of Tube (Chest X-Ray) (tracheal)	120 (100.0%)
etCO2 (1st Attempt)	
Not Recordable	9 (7.5%)
Recordable	111 (92.5%)
etCO2 (Later Attempts) (Recordable)	9 (100.0%)

Table 2: Distribution Of The Participants In Terms Of Etco2 (1st Attempt) (n = 120)

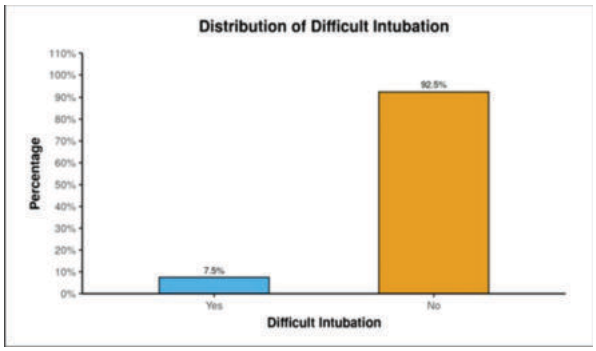
etCO2 (1st Attempt)	Frequency	Percentage
Not Recordable	9	7.5%
Recordable	111	92.5%
Total	120	100.0%



Graph 1

Table 3: Distribution Of The Participants In Terms Of Difficult Intubation (n = 120)

Difficult Intubation	Frequency	Percentage
Yes	9	7.5%
No	111	92.5%
Total	120	100.0%



Graph 3

CONCLUSIONS

Critically ill patients frequently require airway management in the field or in the Emergency Department (ED). Several investigations have shown that emergency airway management in the field and in the ED is associated with adverse events and complications (e.g., hypoxemia, oesophageal intubation, hypotension). However, inadequate oxygenation and ventilation will lead to worst outcome and therefore emergency airway management is of priority in resuscitation of critically ill patients.

In our present study 34 (28.3%) of the participants were intubated to secure Airway. 33 (27.5%) of the participants were intubated due to poor GCS. 29 (24.2%) of the participants were intubated due to severe Tachypnoea. 18 (15.0%) of the participants were intubated due to Aspiration. 5 (4.2%) of the participants were intubated due to Cardiac Arrest. 1 (0.8%) of the participants had were intubated due to Hypercapnia.

58 (48.3%) of the participants had normal Airway where presented to ED. 7 (5.8%) of the participants had difficult Airway. 55 (45.8%) of the participants had crash Airway.

We conclude that in our study the factors associated with failed intubation in 1st attempt were difficult intubation like short neck, facial trauma, anaphylaxis etc. , no adequate training, fault in instruments, untrained nursing staff.

Failed endotracheal intubation in 1st attempt observed in 11 participants. Out of all intubations performed 9 patients had difficult intubation, 2 participants had crash airway .

Out of which 3 participants intubated by 1st year resident, 5 participants by 2 year resident, 3 participants by 3 year resident.

Best method for confirmation of E.T tube placement is capnography.

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