

Out of Intensive Care and Operating Theatre Intubations: Prospective Observational Study

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Tracheal intubations are not infrequent out of ICUs and operating theatres and carry a substantial risk of adverse events. Our objective was to study the current practices of tracheal intubations in medical wards of the national hospital of Sri Lanka (NHSL). A prospective observational study was performed among all adult patients who had an endotracheal intubation in a medical ward of NHSL over a 6-month period. There were 47 intubations. Majority, 29 (61.7%) of intubations occurred during out of hours (after 4pm) and 23 (48.9%) of them were emergency intubations. Most common reason for intubation was respiratory distress 26 (55.3%). Other indications were cardiac arrest 11 (23.4%), Low GCS 7 (14.9%) and shock 2 (4.3%). Capnography and 2 laryngoscopes were not available during any of the intubations. Bougie was available only in 23 (48.9%) cases and alternative airway equipment were available only in 9 (19.1) cases. Midazolam was the most common induction agent 34 (72.3%). Majority 27(57.4%) of the intubators had less than 6 months of experience in anaesthesia. Most of the intubations 32 (68.1%) were done by a registrar and 6 (12.8%) were done by an intern medical officer. There were 39 adverse events during all intubations and hypotension 14(29.8%) was the most frequent adverse event. Therefore, we conclude that intubations in medical wards are done by less experienced doctors with lack of facilities and has high incidence of adverse events.

Keywords: Endotracheal intubation, Intubation out of ICU, rapid sequence induction

Introduction

Tracheal intubation is a lifesaving procedure in critically ill patients. Tracheal intubations frequently occur in intensive care units (ICU) and operating theatres (OT) which provide a safe environment. However, emergency tracheal intubations are not infrequent out of these environments. Adding to the gravity of the issue, these situations occur un-expectedly, and performed by junior medical officers who are

inexperienced in tracheal intubation. Intubations in the OT usually occur in a physiologically stable patient, whereas intubations in ICU usually occur in an unstable patient. However, there are experienced operators who can handle intubations and the place is well-equipped in both places.

Even in secure settings such as in an ICU, major complications like severe hypotension, severe hypoxaemia and cardiac arrest occur in up to 40% of cases¹⁻³ Equipment for difficult airway, capnography, bougies are important for an intubation. Absence of capnography has been found as a major factor in airway mortality and morbidity outside OT⁴. Therefore, according to guidelines from the Intensive Care society (ICS), capnography is recommended during tracheal intubation in ICUs and general wards⁵. It's well documented that safety interventions will reduce the number of adverse events⁶. There are no published data on ward intubations in Sri Lanka.

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Received: 04/12/2022

Accepted: 24/02/2022

DOI: <http://doi.org/10.4038/slja.v30i1.8725>



Materials and Methods

A prospective observational study was performed among all consecutive patients who were more than 18 years old and had an endotracheal intubation in a medical ward (including the casualty medical ward) of national hospital of Sri Lanka (NHSL). Data were taken using a standardized questionnaire. The questionnaire was filled by the intubators with the help of the researcher. Ethical approval was granted from the ethical review committee of NHSL. Details of intubation procedure, intubators, drugs used, and the adverse events were collected over a 6-month period.

Daytime was defined as the time between 08:00 and 16:00 hours. Urgency was defined as immediate (immediate intubation required), urgent (intubation required within an hour), or semi elective (intubation could wait for more than an hour). An experienced intubator was defined as one with 6 months or more of experience in anaesthesiology. The specialty of the primary intubator was defined as the base specialty of the team member who had the first attempt at tracheal intubation. Significant hypotension was defined as systolic arterial pressure \leq 80 mm Hg at any time or a systolic arterial pressure persistently below 90mmHg despite fluid challenge or requirement for initiation of vasoactive support. Significant hypoxaemia was defined as a decrease in SpO₂ to lower than 80%.

Results

There were 47 Intubations during the study period. Majority were males 27 (57.4%) and the mean age was 55.45 (SD 15.65). Out of all intubations, 29 (61.7%) intubations occurred during out of hours (after 4pm) and 23 (48.9%) of them were emergency intubations. Most common reason for intubation was respiratory distress which was present in 26 (55.3%) patients (Table 1). Capnography and 2 laryngoscopes/blades were not available during any of the intubations. Bougie was available only in 23 (48.9%) cases (table 2). Alternative airway equipment was available only in 9 (19.1%) cases. Only 14 (19.8%) cases were

Table 1: Indication, urgency, and time of intubation

Parameter	n= 47 (100%)
Main Indication for intubation	
Respiratory failure	26 (55.3)
Shock	2 (4.3)
Coma/Low GCS	7 (14.9)
Cardiac arrest	11 (23.4)
Accidental extubation	0 (0)
Agitation	0(0)
Other	1 (2.1)
Urgency	
Emergency	23 (48.9)
Urgent	17 (36.1)
Semi-elective	7 (14.9)
Out of hour intubations (After 16.00 h)	29 (61.7)

Table 2: Pre intubation, monitoring and equipment available for intubation

Pre-intubation	n=47 (100%)
Rapid sequence of Intubation used	24 (51.1)
Difficult air way was assessed	20 (42.6)
Pre-oxygenation	36 (76.6)
Cricoid pressure applied	25 (53.2)
Patients position optimized	7 (14.9)
Fluid pre-loading given	12 (25.5)
Available monitoring	
ECG	46 (97.9)
SpO ₂ probe	47 (100)
Blood pressure	44 (93.6)
Capnography	0
Available equipment	
Self-inflating bag	44 (93.6)
Suction	46 (97.9)
2 ET tubes	47 (100)
2 laryngoscopes/blades	0 (0)
Bougie	23 (48.9)
Oro pharyngeal airway	43 (91.5)
Alternative airway	9 (19.1)

performed by and experienced intubators. And a second intubator was available only during 6 (12.8%) cases (table 3). Interestingly 6 (12.8%) 1st intubators were intern medical officers. There were 39 adverse events during all intubations and hypotension, 14(29.8%) was the most frequent adverse event (Fig 2).

Table 3: Details of the intubator

	1 st Intubator, n =47	2 nd Intubator, n=47
>= 6 months of training in Anesthesia	14 (19.8)	2 (4.3)
Speciality		
Internal medicine	35 (74.5)	6 (12.8)
Emergency medicine	2 (21.3)	
Anaesthesia	10 (4.3)	
Grade		
Consultant	1 (2.1)	
Senior registrar	5 (10.6)	
Registrar	32 (68.1)	3 (6.4)
Senior house officer/resident	3 (6.4)	1 (2.1)
Intern medical officer	6 (12.8)	2 (4.3)

Table 4: Assistance was available during the procedure

Category	n= 47 (100%)
Medical officer	12 (25.5)
Nurse	38 (80.9)
Any other team (arrest team/ outreach team)	4 (8.5)

Figure 1: Drugs used during intubations

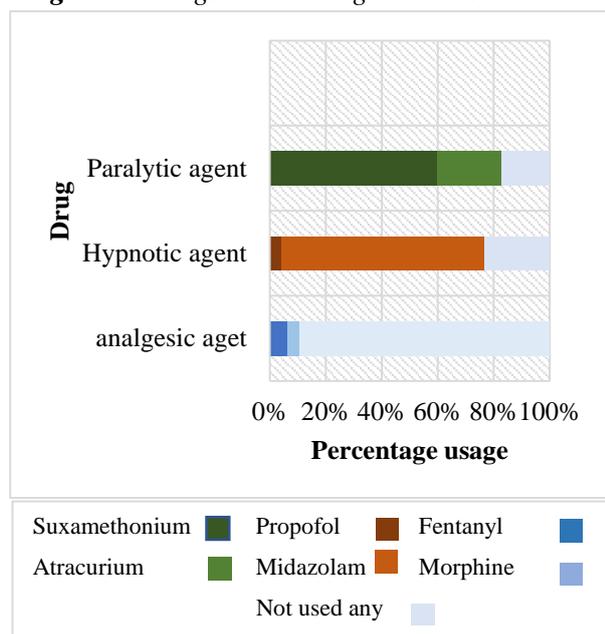
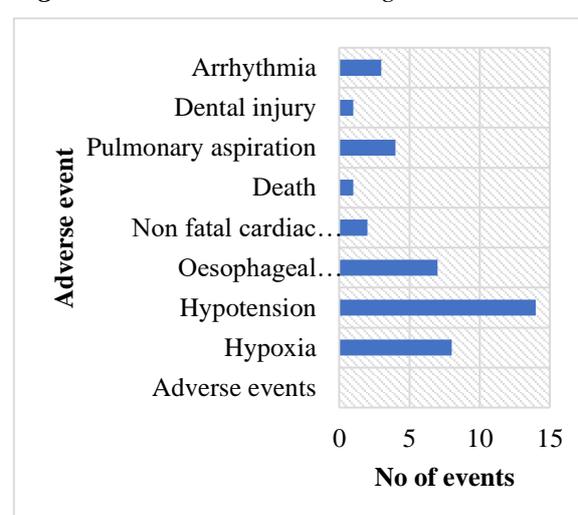


Figure 2: Adverse events during intubations



Discussion

NHSL is the main tertiary care centre and the final referral centre in Sri Lanka. The medical complex of NHSL caters treatment for more than 1000 patients per day. The burden of critically ill medical patients also remains high at this complex. In our study considerable number of intubations occurred after 16.00 hours (out of hours). Even though this number is comparable to other studies, the definition of ‘out hour’ was not similar.^{7,8} Furthermore, high number of intubations 23(48.9%) were emergency intubations. Only 14 doctors (19.8%) as the 1st intubator and 2 doctors as the 2nd intubator had experience in anaesthesia for =>6 months. This illustrates majority of the intubations in the medical wards were done by inexperience persons. Furthermore, significant number 8(17%) of intubators were intern medical

officers. When compared to other studies our study shows significant deficiency or awareness of adequacy of trained persons during intubations at this setting.⁸

Assessment of difficult airway 20(42.5%) and optimisation of patient position 7(14.8%) prior to intubation was significantly inadequate compared to previous studies^{8,9}. This is probably due to the lack of experience among the intubators who handled the airway. Furthermore, adding to these deficiencies capnography and 2 laryngoscopes/blades were not available during any of the intubations and bougie was available only in 23(48.9%) cases. Alternative airways such as laryngeal masks were available only during 9(19.1%) intubations. These factors are major concerns as it would lead to a high rate of adverse events and even may risk the patient's lives.

Analgesic drugs were not used in 42 (89.4%) of the intubations. Midazolam was the most frequently 34(72.3%) used hypnotic agent. Neuromuscular blockade was used in 39 (82.9%) and suxamethonium in 28 (59.6%) of cases. The literature shows wide variation in usage of these drugs worldwide. Study in UK showed almost half of the rapid inductions were done using Propofol⁹. However, study done in USA showed the main drug used for induction was etomidate¹⁰. In our study it may be because intubators were more comfortable with midazolam. Furthermore, the availability and the knowledge of using other anaesthetic drugs would have implicated in the results. There were total of 39 adverse events during intubations. Hypotension was the most frequent adverse event. There were 8 cases of significant hypoxaemia and 7 cases of oesophageal intubations. The reasons for higher number of adverse events would have been multifactorial. Unfortunately, there are no local studies to compare our results.

Limitations

Same intubator would have performed more than one intubation. Therefore, it may have changed the practice in subsequent intubations as they were not blinded. We have not collected

patients' clinical parameters prior to intubation. Therefore, some of the adverse events such as hypoxemia and hypotension would have been already existed or may have worsened during the procedure. Furthermore, we have not questioned or assessed whether the intubation was difficult or not.

Conclusion

Our study demonstrates that intubations in medical wards are done by less experienced doctors with lack of facilities and has high incidence of adverse events. It's clear that training and establishment of local guidelines are needed to improve intubation practices in this setting.

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