

## A survey of practice among doctors in India belonging to different specialities towards peripheral tracheal intubation calls

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### Abstract

**Introduction:** Airway management in critically ill patients in emergency room and periphery wards is an essential component of resuscitation and is considered a high-risk procedure with one or more complications occurring in 22–54% of all intubations performed. As there are few hospitals in India with dedicated emergency physician available, the airway management in emergencies and peripheral wards is done by residents pooled from various specialities. This survey was conducted with objective to assess the challenges encountered during tracheal intubation in emergency settings outside the controlled environment of operation theatre and to know the complications occurring during airway management in these scenarios. Further assessment was conducted with objectives to assess the challenges and dilemma faced by them and to know complications and outcomes associated airway management in these cases.

**Materials and Methods:** An anonymous 30 questions survey was sent online to 500 doctors from different branches in India as online google forms via email. Data pertaining to respondent demographics, practice characteristics (including availability of resources, medications and equipment's) were collected and analysed descriptively using different frequencies and percentages and Fisher's exact tests followed by post hoc multiple comparisons.

**Results:** 248 residents filled up the questionnaire, 78% were anaesthesiologists, and rest were from different medical branches. Ninety-seven percentage felt the need for display of protocol regarding the guidelines for intubation and cardiopulmonary resuscitation in emergency and periphery locations. All participants felt the need for teaching residents from all specialities to manage peripheral intubation calls.

**Conclusions:** Airway management at periphery locations is challenging and needs the implementation of algorithms including the new airway devices. Finally, the standard airway guidelines for difficult airway management remain the cornerstone of managing and securing airway at periphery for obvious reasons, although some specific aspects can be adapted in specific scenarios.

### Introduction

In emergency room (ER) and peripheral wards, securing the airway by tracheal intubation is an essential component of resuscitation in sick patients. Compared to elective intubation in operating theatre (OT), this procedure poses unique problems as the patients, indications and degree of urgency is remarkably different. As a result, the incidence of failed intubation in these locations is much higher.<sup>1</sup> The incidence of failed intubation among anaesthetists in United States in controlled environment of OT is 0.05-0.35%, whereas in emergency setting the incidence is 1-2% with repeated attempts in laryngoscopy being required in 5-20%.<sup>1</sup> There is paucity of such data from studies in Indian scenario. In western countries, emergency medicine is a well-developed medical speciality and airway management in the peripheral locations is mostly undertaken by physicians trained in Emergency Medicine (EM) department. The scenario in India

and other low and middle-income countries is different where EM is still a nascent speciality.<sup>2</sup> All India Difficult Airway Association previously laid down guideline on airway management of intensive care unit (ICU) patients and recently Difficult Airway Society from United Kingdom published guidelines for intubation in critically ill patients.<sup>3,4</sup> We feel that airway management in non-OT and non-ICU locations is far more challenging especially in developing countries like India as it is done frequently by residents of various specialities and anaesthesiologists are called upon as specialist in these cases. With non-existence dedicated EM team in most hospitals and scarcity of teaching and training in managing these cases in anaesthesia curriculum, the challenge of tracheal intubation in these locations is increased manifold.

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## Materials and Methods

**Participants-** This survey was conducted with objectives to assess the challenges encountered during tracheal intubation in emergency settings outside the controlled environment of OT and to know the complications occurring during airway management in these scenarios. The survey was targeted to residents and doctors of various specialities who have been participating in airway management outside OT.

### Survey Development and Content

Literature search revealed that potential challenges in airway management in non- OT environment arises due to environmental and patient's factors. The questions were formulated keeping in mind these factors. The questionnaire was pretested by 25 residents from different specialities before acceptance. The 30 questions survey pertained to participant's demographics (type of medical setup, experience of intubation calls, department etc) and practice patterns. Practice patterns identified the availability of technician, nursing staff, availability of airway gadgets, medications, their usage, comfort of practising residents, and challenges they face in attending periphery intubation calls. The final version of the survey is available as google form: Annexure 1.

### Survey Testing

The full pilot survey was pretested and circulated to 25 local anaesthesiologists of the department as a preliminary review of content comprehensiveness and intelligibility. Modified survey was made based of feedback received from experts.

**Survey administration-** The questions for survey were generated online in Google forms and were circulated electronically through social media groups of residents and doctors of different hospitals. A message of intent, which described the objectives of survey and ensured anonymity and confidentiality of all responses was sent to all participants. To enhance the response rate to survey, they were assured of confidentiality and multiple follow up reminders were used. Participants were made aware that it was voluntary participation and no incentives was offered for successful completion. The online questionnaires were circulated from January to March 2018. The survey link was closed on 29<sup>th</sup> March 2018.

### Sample Size and Data Analysis

As the investigation was purely descriptive, without a pre-specified hypothesis, sample size based upon primary outcome measures were not undertaken. Descriptive statistical testing was done using software package SSPS 17 using appropriate tests. Data pertaining to respondent demographics, practice characteristics, medications and equipment's practices were collected and analysed descriptively using different frequencies and percentages and Fisher's exact tests followed by post hoc multiple comparisons.

## Results

The survey questions consisting of 30 questions (Annexure 1) were sent online to 500 doctors in India from different branches, out of which 248 residents filled up the questionnaire. 78.1% of the participants were

anaesthesiologists, rest were from different medical branches such as emergency medicine, surgeons, orthopedicians and obstetricians etc. 74.2 % belonged to government setup and rest were from private setup. Around 80% of participants are residents and 81.3% said they attend peripheral intubation calls routinely.

### Availability of Airway Devices, Equipment's and Staffs

Majority of participants (69.1%) suggested difficulty in attending peripheral intubation calls [Fig. 1]. Only 34% of participants said they have availability of airway gadgets in periphery and laryngoscope and endotracheal tube were the most commonly available gadget (88%), oropharyngeal airways in 48.9%, bougie in 34.8%, supraglottic devices in 23.4% of respondents and rest were less than 5%. Suction apparatus was reported to be available by 59% of participants only, rest of the time, either it was unavailable (19.6%) or not functional (12.4%). Technician was not available as responded by 59.8%. Only 26 % of participants confirmed working monitors. 50% participants suggested that they monitor their patients both clinically and, on a monitor, however 36.8% were monitored only clinically.

### Availability and use of Anaesthetic Agents

42.3% participants were comfortable with sedatives only and 36.5% preferred induction agents for intubation. The most comfortable induction agent for usage was reported to be propofol by 40% of respondents [Fig. 2]. Only 33.3% used muscle relaxants in periphery for intubation with succinylcholine being the most comfortable agent (63.9%). 54.2% didn't prefer to use opioids in periphery and only 20.4% found comfortable to use opioids judiciously.

### Complications

In situations where the participants were unable to intubate, 38.5% suggested that they would call for help, and 34.1% said they would keep ventilating the patient. 50% said they never used supraglottic device in periphery and 35.4% have used it sometimes. 35.4% said that they never encountered can't intubate cant ventilate (CICV) situation, however 68.1% suggested they did encounter CICV situation sometimes. When asked the participants, if they had done cricothyrotomy in difficult airway cases, 42.1% participants said that they don't know the technique, and 43.2% said they know about the technique but have not done in periphery. Only 4% said they never encountered cardiac arrest scenario in periphery however 96% have encountered cardiac arrest in periphery intubation scenario. 97.5% felt the need for display of protocol locations about the guidelines for intubation and cardiopulmonary resuscitation in periphery. 93.8% participants felt the need for teaching residents from all specialities to manage peripheral intubation calls. When asked about the challenges faced in attending calls for tracheal intubation in peripheral locations; participants reported delay in receiving the calls, delay while waiting for staff to arrange for drugs and equipment, lack of training of helping staff, lack of coordination between staffs, unavailability of dedicated airway cart, monitors, rescue airway devices, suction apparatus, inappropriate positioning of patients as some of the factors.

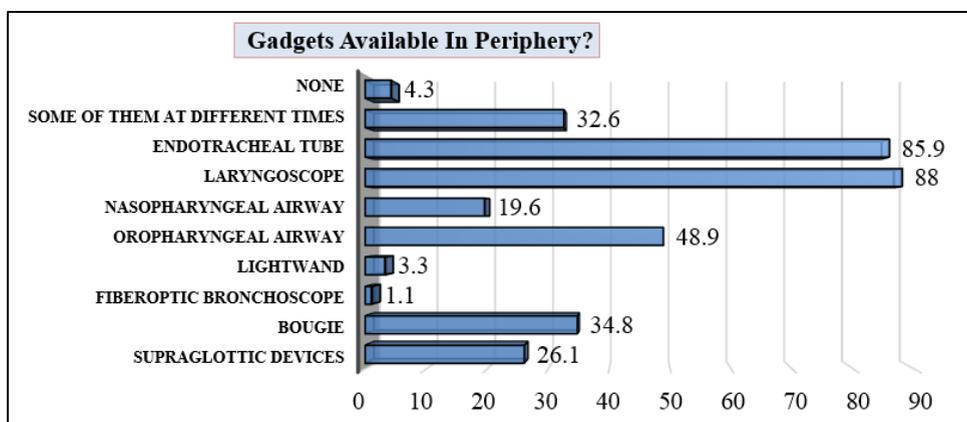


Fig. 1: Availability of different airway devices for tracheal intubation in periphery

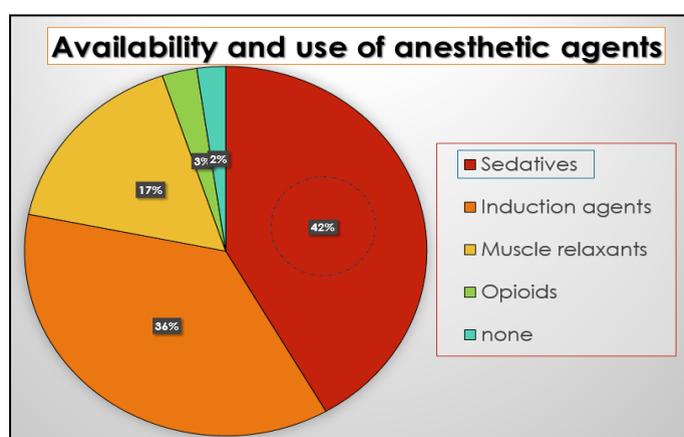


Fig. 2: Most comfortable induction agent for usage in periphery

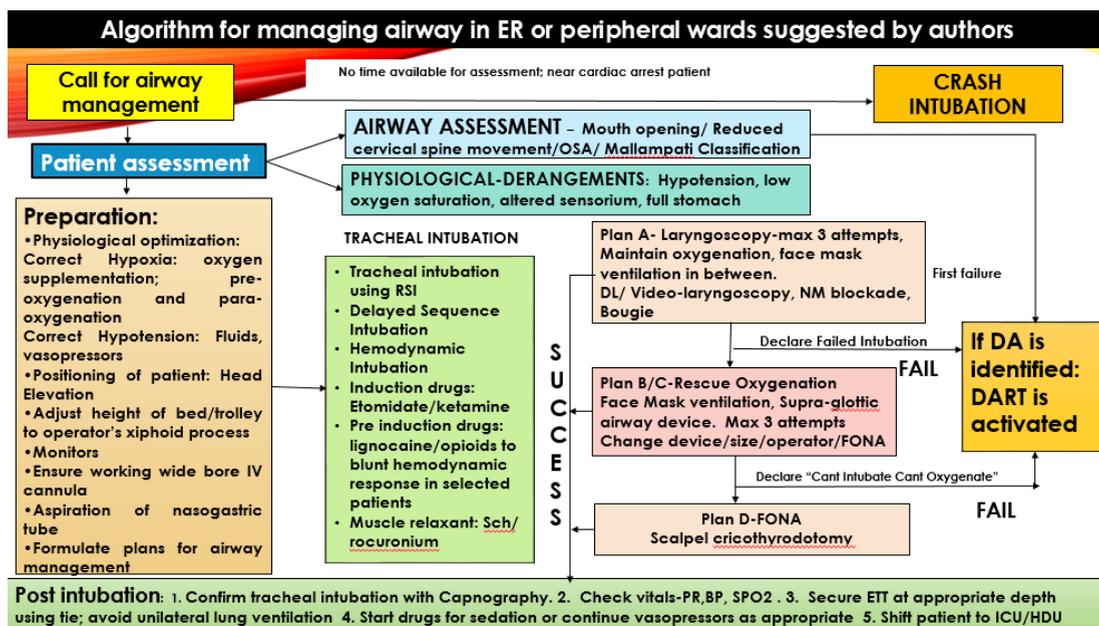


Fig. 3: Algorithm for managing airway in Emergency or periphery ward as suggested by authors

**Discussion**

Tracheal intubation in non-operation room locations such as ER and peripheral wards is associated with higher

complication rates compared to operation theatre.<sup>5</sup> The patients requiring tracheal intubation in these locations have compromised physiology and are often full stomach. Airway

managements is further complicated by various human and environmental factors with relatively less experienced doctors undertaking these procedures and limited availability of optimal drugs and airway gadgets. We performed survey to assess the challenges encountered during tracheal intubation in emergency settings outside the controlled environment of OT and to know complications occurring during airway management in these scenarios.

In the absence of a dedicated emergency medicine speciality, the doctors, pooled from various specialities are often the first one to face with need to secure airway in a sick patient. We also found majority of respondents performing tracheal intubation in peripheral locations to be anaesthesiologists and predominately residents (80%), usually first year post graduates, of various specialities. Studies have detected no difference in rates of complications during airway management for anaesthesiologists compared with experienced intensivists.<sup>6,7</sup> The experience of doctor in performing tracheal intubation seems important to consider. Evidence suggests that more than 50 intubations are required to achieve 90% success rate of intubating normal airway and true competence is achieved much later.<sup>8</sup> Anaesthesiologists perform direct laryngoscopy and tracheal intubation daily, whereas residents of other speciality may not reach the target number during their training periods. Despite this disparity in experience, complication rates do not differ between anaesthesiologist and non-anaesthesiologists. This may be due to extreme physiological alterations such as hypotension, hypoxemia encountered in critically ill patients; they are at immediate life threatening complications. Lack of availability of skilled assistance and experienced seniors is another reason for challenging scenario. Around 60% in our survey reported non-availability of skilled technician for assistance in airway management. Similar to Code blue response system of in hospital cardiac arrest scenario Mark et al described implementation of Difficult airway response team (DART) to improve quality of emergency airway management outside OT.<sup>9</sup> The principle of DART includes identifying designated airway experts from various specialities who are available round the clock and formulating a standardized and universal notification system so that all team members can be made aware of an event. The team also consists of other individuals for ancillary tasks such as equipment delivery and setup, medication preparation and administration and event recording.

There is no recommendation regarding availability of basic and alternative devices of ventilation and intubation in ER. We found that only 34% respondents reported availability of airway gadgets in periphery and in most of the time, only laryngoscopes and endotracheal tubes were available in periphery. Other useful aids for achieving tracheal intubation such as oropharyngeal airways, gum elastic bougie, functional suction machines were reported to be available by very less respondents. This is far below western countries where 100% of ER has availability of laryngoscopes and bougie. As an alternative device of ventilation supraglottic devices was available in only 23.4%; in contrast to 65% as reported by Morton et al.<sup>10</sup> Also, only

25% of participants confirmed availability of working monitors, rendering difficult task for them.

As a way of combating such issues, adoption of checklists, guidelines and standard practice have been suggested. Intubation bundles for intubation in ICU patients have been shown to decrease immediate life threatening complications.<sup>11,12</sup> There is minimum level of equipment and standard of monitoring required for all emergent intubation. For emergency intubation in critically ill patients, Sherren et al have devised standard of operating procedure consisting of standardised equipment preparations and checklists to improve patient safety and team communication and to limit human error.<sup>13</sup> Adoption of such standardised approach for tracheal intubation in critically ill patients having evidence-based components may reduce adverse events and improve patient safety.

Rapid sequence intubation (RSI) is the most common method employed for airway management in critically ill patients unless contraindicated. There has been significant change in drugs used for RSI after the published national survey in 2001.<sup>14</sup> In our survey majority of participants reported sedatives only for performing tracheal intubation. This could be due to fact that majority of respondents were less experienced or scared to use induction agents in sick patients and because of unavailability of other drugs in emergency and peripheral settings. We found 36.5% respondents using various anaesthetic induction agents for intubation. Propofol is the most preferred induction agent in our survey. This may be attributed to its availability and familiarity among users as propofol is also commonly used for induction of general anaesthesia and for sedation in critically ill patients. Disadvantage of propofol is significant hypotension after its administration. A meta-analysis regarding propofol use in ED reported that in addition to rapidly providing adequate intubation conditions and causing frequent hypotension, subjects receiving propofol frequently became apnoeic (23% in propofol Vs 28% thiopental and 7% etomidate). Therefore, its administration in emergency intubation can be avoided in hypovolemic patients.<sup>16</sup>

Single dose of etomidate provides rapid and effective sedation with minimal haemodynamic effect. This makes etomidate an attractive option for RSI. There is however continued debate regarding its use for RSI in patients with sepsis as it has potential to cause adrenal suppression. A recent metanalysis by Gu et al concluded that while one-time administration likely induces adrenal insufficiency, this effect is not associated with increased mortality.<sup>17</sup> Ketamine is another attractive drug for RSI, as it maintains haemodynamic due to sympathomimetic effects, has analgesic and amnestic properties and maintains spontaneous ventilation. Recent data has shown that it does not increase intracranial pressure in brain injured patients.<sup>18</sup> Upchurch et al recently demonstrated that patient outcomes are similar for etomidate and ketamine as RSI induction agents in adult trauma patients.<sup>19</sup>

Traditionally the teaching has been that "A patient barely breathing is better than one who is not"; so, one should not administer muscle relaxant to patient for airway management

unless it is certain that positive pressure ventilation will be successful. Studies however have reported increased frequency and severity of complications in patients receiving sedation alone for intubation compared to those who have also received muscle relaxants.<sup>20</sup> There is growing body of evidence which demonstrates that facemask ventilation remains unchanged or improve but does not deteriorate in normal or difficult cases with the usage of muscle relaxants.<sup>21</sup> So, there are suggestions to use neuromuscular blocking agents early even before checking facemask ventilation. However even in the light of above evidences, Okubo et al in a multicentre prospective observational study found only 32% of patients underwent intubation in emergency department with RSI.<sup>22</sup> We also found 33.3% of respondents reporting use of muscle relaxant for intubation. Owing to rapid onset and short duration of action, succinylcholine was the favoured muscle relaxant for emergency intubation in our survey. One however should be aware of the conditions in which administration of succinylcholine is not advisable such as in hyperkalemia, as seen in patients with burns or crush injury. Rocuronium is however, an attractive alternative in such cases. In many countries where sugammadex is approved, it can be used to shorten the duration of rocuronium and enhance its safety and utility in RSI.

Cardiac arrest was seen to be more common in patient experiencing pre-intubation hypotension (12% Vs 3%,  $p < 0.002$ ). Pre-intubation hemodynamic and pulse oximetry variables were found to be associated with cardiac arrest in patients undergoing emergency intubation.<sup>23</sup> This mandates optimization of oxygen reserve and haemodynamic of patients before contemplating tracheal intubation. Preoxygenation or administration of high flow high fraction of inspired oxygen prior to intubation to extend duration of safe apnea and to prevent desaturation during apnoeic phase is a component of traditional RSI. Placing patients in Back up Head Elevated (BUHE) compared with supine position for preoxygenation during emergency tracheal intubation is associated with reduced airway related complications.<sup>24</sup> Preoxygenation becomes challenging in patients with altered mental status in peripheral locations. Modification of RSI is referred as "Delayed sequence intubation" which temporally separates administration of the induction agent (ketamine) from the administration of muscle relaxant to allow adequate pre-oxygenation can be employed for such patients.<sup>25</sup> Haemodynamic resuscitation for hypotension utilizing a bundle of therapy including fluid loading, selection of appropriate drugs and early use of vasopressors have shown 50% reduction in incidence of cardiovascular collapse.<sup>26</sup>

In this survey majority of respondents reported to call for expert help and to continue ventilating the patient with bag and mask when one is unable to perform tracheal intubation. A very small proportion of respondents preferred to use supraglottic devices in this scenario. Therefore, supraglottic devices are under used as a rescue ventilation device; most likely due to their limited availability.

In our survey, there was high proportion (68%) of encountering CICV situation in periphery. Cook et al. had also reported a higher rate of CICV who required surgical

airway in ER as 1 in 200 compared to 1 in 50000 in the elective settings.<sup>27</sup> They identified gaps such as poor identification of at risk patients, poor or incomplete planning, inadequate provision of skilled staff and equipment to manage complications, repeated attempts at laryngoscopy in difficult airway. Around 43% of respondent denied knowledge of technique of emergency Front of neck access (FONA) in CICV situation. A similar percentage acknowledged that they have never performed FONA. The 2015 Difficult Airway Society has recommended scalpel-bougie FONA procedure for CICV.<sup>28</sup> However, the rarity of CICV in an anaesthesiologist's lifetime, deterioration of performance during stressful CICV situation and unfamiliarity with equipment and technique further complicates situation in CICV. Handling CICV situation requires identification of at risk patients, preparation for failure in event of failed tracheal intubation, avoiding multiple attempts at laryngoscopy and resorting to alternative strategy such as videolaryngoscope, supraglottic device or waking up patients. The skill of FONA techniques whether scalpel or cannula needs to be maintained by practising in simulators and must also be taught to non-anaesthetist doctors. A majority of respondents also reported feel for display of protocols in peripheral locations in handling such situations.

The present survey has few limitations. Although the questionnaires were sent to doctors of all specialities, anaesthesiologists and residents were the majority to respond. This may be due to fact that airway management in peripheral locations is still seen as a domain belonging to anaesthesiologist. As survey was targeted to doctors of various specialities, during pretesting of questionnaire to ascertain comprehensibility we found that most of non-anaesthesiologist participants are not aware of concept of airway assessment and RSI; hence questions pertaining to them were omitted. As non-anaesthesia doctors with limited experience in tracheal intubation run ER and peripheral wards, it is important to identify patients with potential difficult airway so that preparation in advance can be made to avoid catastrophic complications. However, the traditional airway assessment tools based on anatomic features have been found not very reliable in these scenarios.<sup>4</sup> The complications of airway managements apart from technical difficulty in inserting tracheal tube have been found to be dependent on physiological derangements such as hypoxemia, hypotension, severe metabolic acidosis and right ventricular failure.<sup>29</sup> Airway assessment tools incorporating these parameters such as MACOCHA which is validated for ICU intubations need to be devised.<sup>30</sup> Since there was a gross lack of basic airway devices in many set ups, asking for video laryngoscope and difficult airway trolley was out of question, and that was the reason we had omitted this question in survey.

### Conclusion

We conclude from our survey that there are many challenges faced by residents during periphery tracheal intubation calls and it is associated with more complications as compared to

operation theatre. The challenges and complications are because of multitude of factors which include lack of appropriate drugs, equipment's, trained staff and call for help is mostly delayed. Standard difficult airway guidelines remain same for managing and securing airway in periphery, although some specific aspects should be adapted in specific scenarios. Strategies for physiological optimization and suitable airway assessment tools such as MACOCHA score must be incorporated in algorithms of airway management in these locations (Annexure 2). Anaesthetic management regimes must be considered carefully on an individual basis by use of sedatives, short acting opioids, induction agents and muscle relaxants, as they might change the scenario of intubation conditions.

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## References

- Carley SD, Gwinnutt C, Butler J, Sammy I, Driscoll P. Rapid sequence induction in the emergency department: a strategy for failure. *Emerg Med J* 2002;19:109-13.
- Jain M, Batra B, Clark EG, Kole T. Development of post graduate program in emergency medicine in India: current status, scope and career pathways. *Astrocyte* 2014;1:218-21.
- Myatra SN, Ahmed SM, Kundra P, Garg R, Ramkumar V, Patwa A et al. The All India Difficult Airway Association 2016 guidelines for tracheal intubation in the Intensive Care Unit. *Indian J Anaesth* 2016;60(12):922-30.
- Higgs A, McGrath BA, Goddard C, Rangasami J, Suntharalingam G, Gale R et al. Guidelines for management of tracheal intubation in critically ill adults. *Br J Anaesth* 2018;118:323-52.
- Mort TC. The incidence and risk factors for cardiac arrest during emergency tracheal intubation: a justification for incorporating the ASA guidelines in the remote location. *J Clin Anesth* 2004;16:508-16.
- Leibowitz AB. Tracheal intubation in the intensive care unit: extremely hazardous even in the best of hands. *Crit Care Med* 2006;34:2497-8.
- Schmidt UH, Kumwilaisak K, Bittner E, George E, Hess D. Effects of supervision by attending anesthesiologists on complications of emergency tracheal intubation. *Anesthesiol* 2008;109:973-7.
- Mulcaster JT, Mills J, Hung OR. Laryngoscopic intubation: learning and performance. *Anesthesiol* 2003;98:23-7.
- Mark LJ, Herzer KR, Cover R, Pandian V, Bhatti NI, Berkow LC et al. Difficult airway response team: A novel quality improvement program for managing hospital-wide airway emergencies. *Anesth Analg* 2015;121:127-39.
- Morton T, Brady S, Clancy M. Difficult airway equipment in English emergency departments. *Anaesth* 2001;55:5.
- Woodall N, Frerk C, Cook TM. Can we make airway management (even) safer? --lessons from national audit. *Anaesth* 2011;66:27-33.
- De Jong A, Jung B, Jaber S. Intubation in the ICU: we could improve our practice. *Crit Care* 2014;18:209.
- Sherren PB, Tricklebank S, Glover G. Development of standard operating procedure and checklist for rapid sequence induction in critically ill. *Scand J Trauma Resusc Emerg Med* 2014;22:41.
- Morris J, Cook TM. Rapid sequence induction: a national survey of practice. *Anaesth* 2001;56:1090-7.
- Groth CM, A cquisto NM, Khadem T. Current practice and medication use during rapid sequence intubation. *J Crit Care* 2018;45:65-70.
- Wilbur K, Zed PJ. Is propofol optimal agent for optimal agent for procedural sedation and rapid sequence intubation in emergency department? *CJEM* 2001;3(4):302-10.
- Gu WJ, Wang F, Tang L, Liu JC. Single dose etomidate does not increase mortality in patients with sepsis: a systematic review and meta-analysis of randomized controlled trials and observational studies. *Chest* 2015;147:335-46.
- Zeiler FA, Teitelbaum J, West M, Gillman LM. The ketamine effect on ICP in traumatic brain injury. *Neurocrit Care* 2014;21(1):163-73.
- Upchurch CP, Grijalva CG, Russ S, Collins SP, Semler MW, Rice TW et al. Comparison of Etomidate and Ketamine for Induction During Rapid Sequence Intubation of Adult Trauma Patients. *Ann Emerg Med* 2017;69(1):24-33.
- Li J, Murphy-Lavoie H, Bugas C, Martinez J, Pretson C. Complications of emergency intubation with or without paralysis. *Am J Emerg Med* 1999;17(2):141-3.
- Sachdeva R, Kannan TR, Mendoca C, Patteril M. Evaluation of changes of tidal volume during mask ventilation following administration of neuromuscular blocking drugs. *Anaesth* 2014;69:826-32.
- Okubo M, Gibo K, Hagiwara Y, Nakayama Y, Hasegawa K. The effectiveness of rapid sequence intubation (RSI) versus non-RSI in emergency department: an analysis of multicentric prospective observational study. *Int J Emerg Med* 2017;10:1.
- Heffner AC, Swords DS, Neale MN. Incidence and factors associated arrest complicating emergency airway management. *Resusc* 2013;84:1500-4.
- Khandelwal N, Khorsand S, Mitchell SH, Joffe AM. Head-Elevated Patient Positioning Decreases Complications of Emergent Tracheal Intubation in the Ward and Intensive Care Unit. *Anesth Analg* 2016;122(4):1101-7.
- Weingart SD, Trueger NS, Wong N, Scofi J, Singh N, Rudolph SS. Delayed sequence intubation: a prospective observational study. *Ann Emerg Med* 2015;65(4):349-55.
- Jaber S, Jung B, Corne P, et al. An intervention to decrease complications related to endotracheal intubation in the intensive care unit: a prospective, multiple-center study. *Intensive Care Med* 2010;36(2):248-55.
- Cook TM, MacDougall-Davis SR. Complications and failure of airway management. *Br J Anaesth* 2012;109:68-85.
- Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, O'Sullivan EP et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. *Br J Anaesth* 2015;115:827-48.
- Mosier JM, Joshi R, Hypes C, Pacheco G, Valenzuela T, Sakles JC. The physiologically difficult airway. *West J Emerg Med* 2015;16:1109-17.
- Luedike P, Totzeck M, Rammos C, Kindgen-Milles D, Kelm M, Rassaf T. The MACOCHA score is feasible to predict intubation failure of nonanesthesiologist intensive care unit trainees. *J Crit Care* 2015;30(5):876-80.

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