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REVIEW ARTICLE

ENDOTRACHEAL INTUBATIONS AT THE MEDEOR INSTITUTE OF EMERGENCY MEDICINE: AN AUDIT

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ABSTRACT

Emergency departments manage a variety of patients at their most vulnerable time. Among the interventions undertaken for stabilizing the patient, endotracheal intubation is fundamental. Being an academic emergency department, the Medeor institute of emergency medicine (MIEM) undertook an audit to study the elements of endotracheal intubations at MIEM. Therefore, all patients requiring endotracheal intubations at MIEM were included prospectively over a period of seven months. A total of 70 endotracheal intubations were undertaken at MIEM during this period of which only 4 were in pediatric age group. Over three fourths of all of the endotracheal intubations were performed by emergency residents - post graduation year 2, under supervision of emergency consultants. Moreover, the commonest cause of securing airway was due to poor Glasgow Coma Scale. It was observed that the first pass success rate of all endotracheal intubations at MIEM was 93%. About a fifth of these were difficult airways, ascertained using LEMON (≥ 1) and/or Cormack Lehane grading (≥ 2) and the first pass success rate in difficult airway was 67%. Additionally, the rest of the endotracheal intubations were successful in the second attempt. In conclusion, although very few patients presenting to MIEM required endotracheal intubation, the first pass success rate of difficult airway could be improved by video laryngoscope which is now available at MIEM.

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INTRODUCTION

The Emergency Department witnesses a huge burden of critically ill patients requiring resuscitation, including airway management (Cook, 2011). Airway management is a fundamental skill of an emergency physician. Literature has shown that high first pass success rates of endotracheal intubation correlate with improved patient outcome (Sakles, 2013; Bernhard, 2015).

Objective: To learn the factors associated with endotracheal intubations at the Medeor Institute of Emergency Medicine (MIEM).

MATERIALS AND METHODS

An audit was prospectively undertaken from November 2018 through May 2019 at the Medeor Institute of Emergency Medicine (MIEM), Medeor Hospital, Haryana, India. All patients requiring endotracheal intubations at MIEM were included in the audit and data collected maintaining patient confidentiality. Difficult airway was assessed using LEMON law (look external, evaluate 3-3-2 rule, Mallampati score

(Mallampati, 1985), obstruction, immobilization), Figure 1, 2. Degree of visualization of the vocal cords was described using Cormack Lehane (C/L) grade (Cormack, 1984; Samsoon, 1987) as assessed by direct laryngoscopy, Figure 3.

RESULTS

A total of 3313 patients were registered from November 2018 through May 2019 at MIEM. And 70 endotracheal intubations were undertaken. Of these, 53 were male and 17 were female patients. The average age of the patient was 42.4 years (ranging from 2 – 99 years). Of the 70 endotracheal intubations undertaken, 66 (94%) were in adult and 4 (6%) were in pediatric age group. About two thirds of endotracheal intubations were for airway protection due to poor GCS. Furthermore, 14% were crash intubations, 11% were in patients with shock while 1% was for improving oxygenation and ventilation. Of the 70 endotracheal intubations, about a quarter were performed by emergency medicine PGY1 (post graduation year 1) residents, 0.3% by consultants, and the rest by PGY 2 (post graduation year 2) residents. Moreover, less than a percent of the intubations (5) were successful in the second attempt – 3 crash intubations and 2 due to poor GCS (Figure 4); 3 successful on the second attempt by PGY2 resident and 2 by Emergency Consultant. About a fifth (21.4%) of intubations were difficult, based on LEMON score of ≥ 1 and/or Cormack Lehane grading of ≥ 2 .

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LEMON Airway assessment method

L	Look externally (Facial trauma, large incisors, beard or moustache, large tongue)
E	Evaluate the 3-3-2 rule - Incisor distance: 3 FB - Hyoid-mental distance: 3 FB - Thyroid-to-mouth distance: 2 FB
M	Mallampati Score ≥ 3
O	Obstruction : Presence of any condition like epiglottitis, Peritonsillar abscess, trauma
N	Neck Mobility (Limited neck mobility)

Figure 1: LEMON airway assessment

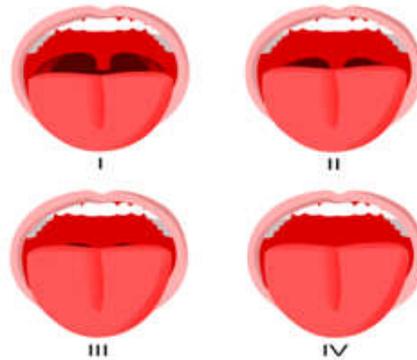
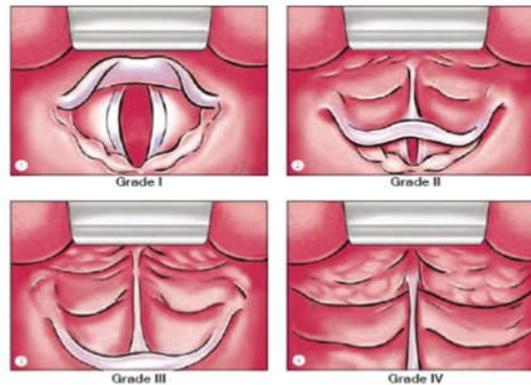


Figure 2. Mallampati Score



The Cormack-Lehane classification of laryngoscopic airway views.
 (Cormack RS, Lehane J. Difficult tracheal intubation in obstetrics. Anaesthesia. 1984;39:1105-11.)
 Grade I The vocal cords are fully visible.
 Grade II Only the arytenoid area and posterior part of the glottic opening are visible.
 Grade III Only the epiglottis is visible.
 Grade IV View is limited to the soft palate (pharyngeal structures cannot be seen).

Figure 3. Cormack Lehane classification

Glasgow Coma Scale		
Response	Scale	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
Verbal Response	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
Motor Response	No verbal response	1 Point
	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points		

Figure 4. Glasgow Coma Scale

Of the difficult intubations, about a third of patients had LEMON score of ≥ 1 . Cormack Lehane grade 1 was seen in 7%, C/L grade 2 in 33%, C/L grade 3 in 33%, and C/L grade 4 in 27% of difficult intubations. Of the difficult intubations, first pass success rate was 67%, while the rest of endotracheal intubations were successful in the second attempt. Adequate endotracheal tube placement was checked by auscultation and post intubation chest X-ray. No complication – can't intubate can't ventilate, dental loss, trauma to airway, post intubation pulmonary edema, aspiration pneumonia, intervention for respiratory distress or surgical airway, death was noted in any of the patients undergoing intubation while in MIEM.

Conclusion

At MIEM, about 2% of patients required endotracheal intubations, majority for airway protection, majority male patient. Almost all of these intubations were undertaken by residents, majority PGY2, under the supervision of Emergency Consultants, with a first pass success rate of almost 93%. Difficult airway was encountered in about a fifth of the cases with a first pass success rate of 67%. The use of videolaryngoscope, available now, would promisingly improve first pass success rate, especially in difficult intubation.

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