Swift Journals

Swift Journal of Emergency Medicine
Vol 1(1) pp. 001-005 December, 2016.
http://www.swiftjournals.org/sjem
ISSN: 2986-9978

Original Research Article

BE MOON Mnemonic, shall be useful?

Dr. Gamal A. M. Ejaimi

Anesthesia & Intensive care. Department of Surgery, King Khalid University, Abha, Kingdom of Saudi Arabia, Aseer Central Hospital.

Accepted 5th December, 2016.

ABSTRACT

Development of a mnemonic system to simplify and memorized airway assessment now it's become more adopted. These mnemonics will help and guide practitioners to go through and navigate their assessment. It increases the sensitivity and specificity of difficult airway prediction.

Keywords: Anaesthesia, Airway assessment, Difficult airway, Intensive care, Emergency

INTRODUCTION

Airway management is a fundamental aspect of anesthetic practice and of emergency and critical care medicine. Complications during airway management and intubation are due to patient, clinician, and equipment factors. Difficult and failure of management mandates immediate recognition and high scope of management to decrease the incidence of morbidity and mortality.[1]

The Incidence of failed intubation was found to be approximately 1 in 2000 in elective case. It increases during rapid sequence intubation to reach 1 in 300 in obstetrics. However, in the emergency department and intensive care unit approaching 1 in 5 – 100. [2] The selection of airway devices and route of insertion should be based on nature of patient injury, experience and skill level.[3]

LEMON [4,5,6]

LEMON with the components of look, evaluate, Mallampatti, obstruction, and neck mobility, is a very useful mnemonic to predict difficult intubation. The examiner and practitioner can memories it easily. In the emergency, the look, obstruction and neck mobility can be feasible while, the 'Evaluate' and 'Mallampatti' components are less easily applied. [5]

Table 1. LEMON for Difficult intubation

L	E	M	O	N
Look externally	Evaluate 3-3-2 rule	Mallampatti score	Obstruction	Neck Mobility

***Look externally*: -** There may be some physical clue or foreign object that portends difficulty.
Evaluate using the 3:3:2 rule: - Less than 3, 3, 2 suggest difficult intubation.
***Mallampatti classification*: -** Class II and above should alert you about difficult laryngoscope which will correlate with difficult Cormack-Lehane grade.
Class I: Visualization of the soft palate, fauces; uvula, the anterior and the posterior pillars.
Class II: Visualization of the soft palate, fauces and uvula.
Class III: Visualization of soft palate and base of uvula.
Class IV: Only hard palate is visible. The soft palate is not visible at all.
(Class IV was added in 1987 by Samsoon and Young to give the modification of the Mallampatti classification).
Obstruction: - Look for anything that might get in your way. These include mass, tissue swelling from smoke inhalation,

*Corresponding Author: Dr. Gamal A. M. Ejaimi *, Assistant professor, Anesthesia & Intensive care. Department of Surgery, King Khalid University, Abha, Kingdom of Saudi Arabia, Aseer Central Hospital.
E-mail: gamalejaimi@hotmail.com

burns, broken necks, trauma to the face or neck, foreign bodies in the airway, and excessive soft tissue from obesity.
Neck mobility: - It will be difficult in an emergency and uncooperative patient.

OBESE [7]

DIFFICULT MASK VENTILATION (DMV) was reported in 5% of the patients. OBESE is a simple scoring system to predict DMV. It was well established leading to more safety and accuracy in airway management.

Table 2. OBESE

O	The Obese (body mass index > 26 kg/m2)
B	The Bearded
E	The Elderly (older than 55 year)
S	The Snorers
E	The Edentulous

The presence of two indicating high likelihood of DMV (sensitivity, 0.72; specificity, 0.73). [7]

BONES [8]

Mnemonic BONES is a system used to predict difficult mask ventilation. It is simple and easy to be remembered. Difficult mask will be anticipated if the patient has 2 or > of the following parameters.

Table 3. BONES

B	Beard
O	Obesity (BMI more than 26.)
N	No teeth.
E	Elderly.
S	Snoring

MAGBOUL 4 M & MS SCORE [9]

M = Mallampati Class
M = Measurements 3-3-2-1 OR 1-2-3-3 Fingers: 1 = Finger Lower Jaw Anterior subluxation can be added to 3.3.2 rule.
3 Fingers Mouth Opening, 3 Fingers between the tip of the jaw and the beginning of the neck (under the chin), 2 Fingers between the thyroid notch and the floor of the mandible (top of the neck), and 1 Finger Lower Jaw Anterior subluxation.
M = Movement of the Neck
M =Malformation of the skull, teeth, obstruction, & Pathology (the Macros and Micros). We can memorize them with the word (STOP)
S = STOP Skull (Hydro and Microcephalus) T = Teeth (Buck, protruded, & loose teeth. Macro and Micro mandibles) O = Obstruction (due to obesity, short Bull Neck and swellings around the head and neck) P = Pathology (Craniofacial abnormalities & Syndromes: Treacher Collins, Goldenhar's, Pierre Robin, Waardenburg syndromes)
Skull Teeth Obstruction Pathology = STOP.

CORMACK AND LEHANE Classification [10,11,12]

It is the best view obtained during direct view using conventional laryngoscope. Difficult intubation had been classified into four grades. The optimal laryngeal view can be obtained using external manipulation. Grade 2 was subdivided to 2a and 2b latter by Lee and his colleague which leaded to modified Cormack and Lehane classification. Then another modification was done by subdivision of grade 3 to 3a and 3b depending on whether the epiglottis could be elevated from the posterior pharyngeal wall using a bougie or introducer. This later modification was done by Cook.

Table 4. Modified Cormack and Lehane classification.

Classification	Description	Frequency (%)	Possibility of intubation failure (%)
Grade 1	Full view of the glottis	68%	<1
Grade 2a	Partial view of the glottis	24%	4.3%
Grade 2b	Only posterior portion of glottis or arytenoid cartilages	6.5	67.4
Grade 3a	Epiglottis can be lifted from the posterior pharyngeal wall	1.2	87.5
Grade 3b	Epiglottis cannot be lifted from the posterior pharyngeal wall	Very rare	Very likely
Grade 4	Neither glottis or epiglottis can be seen	Very rare	Very likely

WILSON Score [13,14,15]

The Wilson scoring system is based on five risk factors which including, patient weight, head movement, buck teeth, mandibular recession, and neck and jaw movement. Each risk has a score of 1,2, or 3 giving a total score of 0 up to 10. A score greater than two predicts 75 per cent of difficulties. [13]

During this score a low true-positive rate and a low false positive rate were reported. Thus, Wilson scores correctly identified patients in whom intubation was easy. [14] The Wilson score is seldom used in clinical practice. It is a highly sensitive predictor of a difficult airway, although its specificity is low. Further studies are required for significant results. [15]

Table 5. Wilson scores

Patient Weight,	<90kg	0
	90 – 100 kg	1
	>110 kg	2
Head and Neck movement	>90	0
	±90	1
	<90	2
Jaw movement	Inter-incisor gap >5cm, *SL >0	0
	Inter-incisor gap 5cm, SL = 0	1
	Inter-incisor gap <5cm, SL <0	2
mandibular recession	Normal	0
	Moderate	1
	Severe	2
Buck teeth	Absent	0
	Moderate	1
	Severe	2

*Subluxation (SL) is the maximal forward protrusion of the lower incisors beyond the upper incisors

Be MOON

The combination of those mnemonic systems also can be included in Be MOON. Examiner and practitioner must look and examine every patient, aiming to evaluate and assess the airway. High prediction and suspicion should be applied. Be MOON to guide your approach and construct a clear pathway to difficult airway. You can use BE MOON easily.

B	Beard
E	Edentulous, Elderly, Evaluate (3-3-2-1 rule)
M	Male, Malformations, and Mallampatti score grade 3 & 4
O	Obese, Obstructive sleep apnea (OSA) and Snoring.
O	Obstructions and Obstacles.
N	Neck; decrease mobility, short and increase circumstances.

Table 6: Be MOON

		Moderate	**Severe**
B	Beard	**1**	**2**
E	Edentulous, Elderly, Evaluate (3-3-2-1 rule)	**1**	**2**
M	Male, Malformations, and Mallampatti score grade 3 & 4	**3**	**4**
O	Obese, Obstructive sleep apnea (OSA) and Snoring.	**3**	**4**
O	Obstructions and Obstacles.	**1**	**2**
N	Neck; decrease mobility, short and increase circumstances.	**3**	**4**

Score of > 6 associated with risk of difficult mask ventilation and difficult intubation.

Beard

Beard patient possesses challenge and difficulty during mask ventilation. It is a common problem in Arab, Iran, Pakistan and other Islamic area. It has been shown to be an independent predictor of impossible mask ventilation. Most of the patients are unwilling to shave their facial hair. Not only mask ventilation will be difficult also view for intubation and fixation of the endotracheal tube. [16] This may result in a lax and unwell secured ETT with risk of accident extubation. [17]

Edentulous7, Elderly

The prevalence of edentulism is high among individuals over 65 years (60%). Those who have a denture are commonly removed before being transferred to operation room. Denture may obstruct the airway or inhaled as foreign body during airway management. Elderly also have s decrease in neck mobility which also will increase the risk of difficult mask ventilation and endotracheal intubation. [18]

Obese, Obstructive sleep apnea (OSA) and Snoring

Obstructive sleep apnea (OSA) correlates positively with obesity and age, both of which are becoming increasingly prevalent. Obstructive sleep apnea has been recognized as a major contributor to morbidity and mortality in developed countries. It associated with increased risk of difficult intubation and other perioperative respiratory complications. Short thick neck and redundant tissue in the oropharynx cause a difficulty

during mask ventilation and intubation with increased risk of hypoxia specially among morbidly obese. [19,20]

Obstructions and Obstacles

Obstruction is the presence of any condition like epiglottitis, peritonsillar abscess, trauma which need proper evaluation. Patient with acromegaly have a Macroglossia and prognathism maxillae which cause difficult in both mask ventilation and endotracheal intubation. Trauma to mandible and cervical spine will put the practitioner in difficult situation for assessing and evaluating the airway. Acute burns present with edematous airway. [21]

Neck; decrease mobility, short and increase circumstances

Sniffing or Magill position assessed by movement of the atlanto-occipital joint. The patient is asked to hold head erect, facing directly to the front, then he is asked to extend the head maximally and the examiner estimates the angle traversed by the occlusal surface of upper teeth. Measurement can be by simple visual estimate or more accurately with a goniometer. Any reduction in extension is expressed in grades:

Grade I: >35°
Grade II: 22°-34°
Grade III: 12°-21°
Grade IV: < 12°

Normal angle of extension is 35° or more. [21]

CONCLUSION

This Mnemonic will not guarantee against failure of mask ventilation or endotracheal intubation. It is only used as guidance and to help in buying time during airway assessment and management. Practitioners should try to adopt the easy and familiar to them. More comparative studies will help in modification and interpretations of the old ones.

REFERENCES

1- Dr. Divatia J. V, and Dr. Bhowmick K. COMPLICATIONS OF ENDOTRACHEAL INTUBATION AND OTHER AIRWAY MANAGEMENT PROCEDURES. Indian J. Anaesth. 2005; 49 (4): 308 – 318.
2- Cook TM, MacDougall-Davis SR. Complications and failure of airway management. Br J Anaesth. 2012 Dec;109.
3- de Melo, Willian Morais, Brêda, Marcus Antônio, Pereira-Santos, Darklilson, Pereira, Cassiano Costa Silva, Sonoda, Celso Koogi, Araújo, and Marcelo Marotta. Submental Endotracheal Intubation: A Valuable Resource for the Management of Panfacial Fractures. Journal of Craniofacial Surgery. November 2012 - Volume 23 - Issue 6 - p 1851–1853.
4- Advanced trauma life support for doctors. Student course manual. Airway and ventilatory management. American College of Surgeons Committee on Trauma; 2008. 8th ed. Chicago; pp. 28–42.
5- Reed MJ, Rennie LM, Dunn MJ, Gray AJ, Robertson CE, McKeown DW. Is the 'LEMON' method an easily applied emergency airway assessment tool? Eur J Emerg Med. 2004; 11: 154–7.
6- American college of emergency physician. Think L-E-M-O-N When Assessing a Difficult Airway. **ACEP News. November 2007**. Available on https://www.acep.org/content.aspx?id=33992.
7- Langeron O, Masso E, Huraux C, Guggiari M, Bianchi A, Coriat P, Riou B: Prediction of difficult mask ventilation. Anesthesiology. 2000; 92(5): 1229–36.
8- Rashid M Khan, Pradeep K Sharma, and Naresh Kaul. Airway management in trauma. Indian J Anaesth. 2011 Sep-Oct; 55(5): 463–469.
9- M Ali Magboul. Airway Evaluation And Assessment For Anesthesia And Resuscitation. The Internet Journal of Health. 2006 Volume 6 Number 1.
10- Cormack RS, and Lehane J. Difficult tracheal intubation in obstetrics. Anaesthesia,1984; 39: 1105-11.
11- Yentis SM, and Lee DJ. Evaluation of an improved scoring system for the grading of direct laryngoscopy. Anaesthesia, 1998; 53 (11): 1041-4.
12- Cook TM. A new practical classification of laryngeal view. Anaesthesia, 2000; 55: 274 - 9.
13- Wilson ME, et al. Predicting difficult intubation. British Journal of Anaesthesia, 1988. 61: pp. 211- 6
14- Shiga T, et al. Predicting difficult intubation in apparently normal patients: a meta-analysis of bedside screening test performance. Anesthesiology, 2005. 103(2): pp. 429-37.
15- Gustavo Henrique S, et al. Clinical Criteria for Airway Assessment: Correlations with Laryngoscopy and Endotracheal Intubation Conditions. Open Journal of Anesthesiology 2013; 3: 320-325.
16- H Kamalipour, and K Kardan. New method for the fixation of endotracheal tube in patient with facial hair. Eastern Mediterranean health journal 2003; 9(1-2): 108-112.
17- Kheterpal S, Martin L, Shanks AM, Tremper KK. Prediction and outcomes of impossible mask ventilation: a review of 50,000 anesthetics. Anesthesiology. 2009 Apr;110(4):891-7.
18- Soleimanpour H, Sarahrudi K, Hadju S, Golzari SE. How to overcome difficult-bag-mask-ventilation: Recents approaches. Emerg Med. 2012;2:e116.
19- A. Rudra, S. Chatterjee, T. Das, S. Sengupta, G. Maitra, and P. Kumar. Obstructive sleep apnoea and anaesthesia. Indian J Crit Care Med. 2008 Jul-Sep; 12(3): 116–123.
20- Kristensen MS. Airway management and morbid obesity. Eur J Anaesthesiol. 2010 Nov;27(11):923-7.
21- GUPTA, SHARMA, and JAIN. AIRWAY ASSESSMENT PREDICTORS OF DIFFICULT AIRWAY. Indian J. Anaesth. 2005; 49 (4): 257 - 262