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Original Article

Relationship between Mallampati Score and Success Rate of LMA Insertion at Ibnu Sina Hospital

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Abstract

Background: The most important action in successful resuscitation is to immediately open the respiratory tract. Airway management in surgical patients with general anesthesia can use tools, one of which is the Laryngeal Mask Airway. To anticipate LMA insertion failure, it is best to use a difficult intubation evaluation or what is known as the Mallampati Score.
Objective: to determine the relationship between the Mallampati Score and the success of LMA insertion.
Method: This research uses a quantitative analytical research design using a cross-sectional study approach with non-probability sampling technique. This research was conducted at Ibnu Sina Hospital in September-November 2023. Data analysis used univariate and bivariate analysis tests using cross-sectional tests.
Results: The majority of respondents had a prediction of difficult intubation, namely 23 respondents (76.7%) while those who had a prediction of easy intubation were 7 respondents (23.3%) and 30 respondents (100%) had successful LMA insertion. There was no significant relationship between the Mallampati score and the success rate of LMA I-Gel insertion in patients at Ibnu Sina Hospital with a p-value of 0.397.
Conclusion: The Mallampati score has no relationship with the success rate of LMA insertion.

INTRODUCTION

Airway management is one of the most important parts of an anesthesia procedure. Airway management is carried out to ensure the airway is free so that air can enter the lungs normally and ensure adequate oxygenation of the body(Arianto Purba et al. 2019). According to The Committee on Trauma: American College of Surgeon (2017), the most important action in successful resuscitation is to immediately open the respiratory tract. Airway management in surgical patients with general anesthesia/GA can use tools, one of which is the Laryngeal Mask Airway (LMA)(Arianto Purba et al. 2019).One of the airway equipment used by anesthesia specialists in elective operations that do not require intubation or in cases of difficulty airwaying in the operating room is the laryngeal mask airway (LMA). LMA installation requires an insertion technique that can increase the success rate of installation by an anesthesia specialist(Klučka et al. 2018). To anticipate failure of LMA insertion, it is best to carry out a difficult intubation evaluation during the preoperative visit, which is a very important examination. The standard method for assessing potential difficult intubation is the Mallampati method. The Mallampati method was developed into the Modified Mallampati method in 1987 by adding a class 4 airway structure, namely the soft palate which cannot be visualized(Bacelar de Athayde et al. 2023). The anatomical basis proposed for this examination is the relationship of the tongue to the oral cavity. If the base of the tongue is large then the glottis is not visible during laryngoscopy. The Modified Mallampati examination is carried out with the patient sitting upright, head in a neutral position, tongue extended maximally, and without phonation(Tjahjadi.E 2017; Moseley

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and Cadogan 2022). Evaluation of difficult intubation using the Mallampati method. With the above rationale, this research aims to determine whether there is a relationship between the Mallampati Score and the success rate of LMA insertion.

METHOD

The researcher chose quantitative analytical research with a cross-sectional study approach to examine the relationship between the Mallampati score and the success rate of LMA insertion carried out by MPPD anesthetists at Ibnu Sina Hospital. The population in this study are patients who will be wearing a Laryngeal Mask Airway. operational definition that is mallampati score, Mallampati score is a measurement method and level of success LMA insertion LMA insertion success rate using The LMA insertion score is assessed based on the total score of limb movement, laryngospasm, swallowing, coughing and choking. The measuring scale used is ordinal. There are two analyzes in this research, namely univariate analysis and bivariate analysis. Univariate analysis is an analysis carried out on a variable, carried out on descriptive research, using descriptive statistics(Adiputra 2021). Once obtained, it is entered into a table and the percentage is calculated. The variables described in this study are Mallampati Score and LMA Incession Success. univariate analysis on each research variable. The independent variable is the Mallampati Score and the dependent variable is the success rate of LMA insertion Bivariate analysis is an analysis of two variables that are thought to be related or correlated. The research wants to know the relationship between the independent variable, namely the Mallampati Score as an airway assessment, and the dependent variable, namely the success of LMA insertion in patients. Bivariate analysis in this study was carried out using the SPSS program with the chi-square test in this study, both variables used a p-value <0.05. Bivariate analysis in this study was to determine the relationship between the Mallampati score and the success rate of LMA insertion, using the chi square test(Adiputra 2021; Priadana S. 2021).

RESULTS

Univariate analysis on each research variable. The independent variable is the Mallampati Score and the dependent variable is the success rate of LMA insertion

Table 1. Frequency distribution, characteristics of respondents based on Mallampati Score

Characteristics	amount	percentage (%)
Mallampati score		
easy	7	23.3
difficult	23	76.7
TOTAL	30	100

Based on table 1.1, it shows the frequency and characteristics of respondents with a total Mallampati score of grade 1-2 (easy intubation) of 7 (23.3%) while with a total Mallampati score of grade 3-4 (difficult intubation) there were 23 respondents (76.7%).

Table 2. Frequency distribution of success rates for LMA insertion

Characteristics	amount	Percentage(%)
Successful LMA Insertion		
LMA insertion was successful according to size	28	93.3
LMA insertion succeeded in changing size	2	6.7
TOTAL	30	100

Based on table 1.2, it shows the frequency distribution of the success rate for LMA insertion according to size, 28 respondents (93.3%) and 2 respondents (6.7%) for successful LMA insertion by changing size.

Bivariate analysis in this study was to determine the relationship between the Mallampati score and the success rate of LMA insertion, using the chi square test.

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Table 3. Distribution of the relationship between the Mallampati score and the success rate of LMA insertion in anesthesia patients at Ibnu Sina Hospital, Makassar City (n=30)

Mallampati Score	Success rate of LMA insertion				Total		p-value
	Very satisfactory		satisfying				
	F(n)	P(%)	F(n)	P(%)			
Easy	4	19%	3	33.3%	7	23.3%	0.397
Difficult	17	81%	6	66.7%	23	76.7%	
Total	21	100%	9	100%	30	100%	

Based on the results of data analysis in table 1.3 using the chi-square test, it is known that the p-value is 0.397 (p-value <0.05) which indicates that there is no significant relationship between the Mallampati Score and the Success Rate of LMA Insertion carried out by MPPD Anesthesia at the Hospital Ibn Sina Makassar.

DISCUSSION

Based on the results of research obtained at Ibnu Sina Hospital Makassar, show that almost all respondents who fall into the criteria for difficult intubation with Mallampati scores of grade III and IV are 23 respondents (76.7%), and respondents who fall into the criteria for easy intubation with Mallampati scores of grade I and II as many as 7 respondents (23.3%). In accordance with Walls and Murphy's theory states that the Mallampati assessment is an easy assessment, where if the Mallapati examination results are grades I and II, it is classified as easy intubation and grades III and IV are classified as difficult intubation(Putri et al. 2022; Raveendra et al. 2020). This is in line with previous research conducted by (Nasr-Esfahani et al., 2020), as many as 54 respondents received mallampati examination results including easy intubation with 33.3% grade I and 66.6% grade II and 52 respondents who received mallampati examination results experienced difficulty intubation with 57.7% grade III and 32.7% grade IV. However, in this study there is a score used to assess the success of LMA insertion, namely the LMA insertion score is assessed based on the total score of limb movement, laryngospasm, swallowing, coughing and choking (a total score of 0 considered very satisfactory, a total score of 1-4 is considered satisfactory, and a total score of 5-8 is declared unsatisfactory). 14 Body limb movement in this study was obtained by 21 respondents (70%) with a score of 0 (if there was no limb movement), a score of 1 if there was little limb movement was obtained by 6 respondents (20%) and a score of 2 if the body movement is very clear was obtained by 3 respondents (10%). In this research, it was found that all respondents, namely 30 respondents (100%) had no laryngospasm, where all respondents got a score of 0(Ali et al. 2020). In this research, all respondents, namely 30 respondents (100%) had no swallowing movements, so they were given a score of 0. Then respondents who did not experiencing coughing and choking were given a score of 0 with a total of 29 respondents (96.7%), and respondents who experienced coughing and choking persisting or less than 30 seconds were given a score of 1 with a total of 1 respondent (3.3%). The results found from the LMA score assessment above were that 21 respondents had very satisfactory LMA insertion success (score 0), while 9 respondents had satisfactory LMA insertion success (score 1-4).

Based on the results of the chi square hypothesis test, the p value was 0.397 (p value <0.05). This shows that there is no significant relationship between the Mallampati score and the success rate of LMA insertion at Ibnu Sina Hospital Makassar carried out by MPPD anesthesia. According to researchers, the Mallampati score airway assessment has been proven unable to determine the success of LMA insertion in patients undergoing general anesthesia using LMA I-gel. This is proven by the research results of 30 respondents who successfully underwent LMA I-gel insertion, including 7 respondents who got Mallampati scores with grades I and II, then 23 other respondents got Mallampati scores with grades III and IV.

The supraglottic airway is referred to as 'LMA', short for Laryngeal Mask Airway. The correct general term for all these devices is supraglottic airway (SGA) or what is also commonly known is supraglottic airway device (SAD)(Jayaraj et al. 2022; VSimon 2022).

Assessing the success of LMA insertion, namely the LMA insertion score is assessed based on the total score of limb movements, laryngospasm, swallowing, coughing and choking (a total score of 0 is considered very satisfactory, a total score of 1-4 is considered satisfactory, and a total score of 5-8 is considered unsatisfactory)(Ileatan Lewar et al. 2020; Marsaban et al. 2014).

Difficult airway algorithms are published annually by the American Society Of Anesthesiologists (ASA) to strengthen guidelines and are used by anesthesiologists. This standardizes how to secure a difficult airway. Initiation of an airway algorithm depends on assessing the likelihood and clinical impact of a basic management problem such as (1) difficulty ventilation, (2) difficulty intubation, (3) patient uncooperativeness, (4) difficulty tracheotomy(Dhillon 2018). It then proceeds to break down the algorithm into different basic management options such as awake intubation, non-invasive techniques, and spontaneous ventilation versus

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invasive intubation. Non-invasive conservative methods only become invasive and/or require surgical assistance and expertise when ventilation is unsuccessful(Oria et al. 2022; Hansel et al. 2022; Hung et al. 2020).
The intubation difficulty and failure scale was adapted from previously published research and rated on a five-point scale from 0 to 4, where 0 = not attempted, 1 = maximum of two intubations with direct laryngoscopy only, 2 = maximum of two intubations with other intubation equipment (for example a videolaryngoscope) or an aid for direct laryngoscopy is used, 3 = three or more intubation attempts regardless of intubation method, and 4 = intubation fails despite attempts and requires an alternative tool for oxygenation including a supraglottic airway (SGA), namely a Laryngeal Mask Airways(Markovetz et al. 2019; De Jong et al. 2022).
When a difficult airway is expected, when the patient can maintain spontaneous breathing, conscious intubation is an option. Devices for awake intubation can be non-invasive or invasive. LMA, supraglottic airway, and nasal x-rays are examples of non-invasive tools. Supraglottic airways such as the LMA have been shown to be a lifesaving tool in patients who cannot be intubated or mask-ventilated. The LMA can be used with a fiberoptic bronchoscope for intubation and can maintain or restore ventilation in patients with difficult airways(Castillo-Monzón et al. 2023).

The classic laryngeal mask design was studied extensively in comparison to endotracheal tubes for airway management, with most of the research published in the 1990s (Brimacombe 1995). Early studies comparing SGA with standard endotracheal tubes found that laryngeal masks provided better hemodynamic stability at induction and during recovery compared with intubation. Anesthesia requirements for the administration of a laryngeal mask are lower than for an ET tube, while conscious oxygen saturation is higher. SGAs are also easier to insert, and place and require relatively little skill, compared to endotracheal tubes which require at least a laryngoscope for placement and require more skill to place(Mani, Pinheiro, and Rawat 2022; Castillo-Monzón et al. 2023; Esen et al. 2022).

LMA provides convenience and speed in airway management. This makes LMA an option in the management of patients who have failed endotracheal intubation and have difficulty ventilating with a face mask. Laryngeal mask airway (LMA) is also used for ventilation in patients with Cormack scores 3 and 4. LMA placement is included in the management algorithm for patients with difficult intubation according to the American Society of Anesthesiologists (ASA) and the difficult airway society (DAS). Laryngeal mask airway (LMA) provides advantages compared to trans-tracheal jet ventilation because it provides ventilation more quickly and has minimal complications as an airway aid(Esen et al. 2022; Avcı 2018; Yan et al. 2022).

CONCLUSION

The Mallampati score in patients undergoing general anesthesia, namely by inserting LMA I-gel at Ibnu Sina Hospital, obtained grades 1 and 2 with the success rate for inserting LMA I-Gel in the very satisfactory category with the number of respondents 4 (19%) and for the category satisfactory, namely 3 respondents (33.3%).

The Mallampati score in patients undergoing general anesthesia, namely by inserting LMA I-gel at Ibnu Sina Hospital, obtained grades 3 and 4 with the success rate for inserting LMA I-Gel in the very satisfactory category with the number of respondents being 17 (81%) and for the category satisfactory, namely 6 (66.7%).

There is no relationship between the Mallampati score and the success rate of LMA I-gel insertion in patients at Ibnu Sina Hospital Makassar carried out by MPPD anesthesia with a p-value of 0.397 (p-value <0.005).

Based on the results of the research that has been carried out, there are suggestions that the author would like to put forward for consideration for implementation, namely as follows:
Ibnu Sina Hospital Makassar; With the results of this study, especially pre-anesthesia services in terms of checking the Mallampati score, there is no need to carry out examinations for the I-gel LMA insertion. If intubation is carried out, you must prepare an I-Gel LMA as an alternative tool if at any time the intubation action fails.

Further researchers are given the following suggestions: comparing the effectiveness and efficiency of LMA I-gel with LMA unique.

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Ethical Clearance

Ethical No. UMI012306299

Declaration of Conflicting Interest

This research will not cause problems when published and the results of this research are only to increase insight and knowledge about the absence of a relationship between the Mallampati score and the success rate of LMA insertion in the operating room.

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