

Mallampati Score and Intubation in Total Anesthesia Craniotomy Cases: A Correlation Study

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ABSTRACT

Intubation failure is often experienced in neurosurgery cases involving craniotomy under general anesthesia. This has the potential to cause airway patents and death. The aim of this study was to determine the relationship between Mallampati score and intubation. A total of 33 patients who were going to undergo neurosurgery, as respondents, applied the inclusion and exclusion conditions. Mallampati and intubation procedures were observed in the operating room using an observation sheet. The data obtained were analyzed using the Chi-square test with a confidence level of 95%. The results showed that there was a significant relationship between the Mallampati score and the success of intubation with a correlation coefficient of 0.707, p value 0.000. In conclusion, Mallampati score, especially grade 1-2, has the potential to achieve successful intubation compared to grade 3-4. Health workers who are responsible for carrying out neurosurgery in craniotomy cases need to be aware of the Mallampati score to save the patient.

Keywords: Mallampati Score, Intubation, Craniotomy Cases

Introduction

Neurosurgery is one of the most competitive incidents in managing disease disorders including infections, brain, nervous system tumors, and those related to the spine [1]. When administering anesthetic drugs intravenously, the patient's airway must remain secured [2]. Usually in neurosurgery cases Endotracheal Tube Intubation is used to maintain airway management. Endotracheal Tube Intubation is one way to help the process of maintaining airway patency, which is in the form of a tube that is inserted into the endotracheal or nasotracheal.

There are several things to watch out for when intubating such as trauma, infection, as well as different anatomy for each patient, for example a short neck, forward teeth, small chin, large chest or large breasts for female patients, and a large tongue [3,4]. In patients who are difficult to perform, endotracheal tube intubation can be fatal, causing death or permanent brain damage. In surgical patients under general anesthesia, it was found that 1-18% experienced difficulty intubating and 0.05-0.35% experienced failed intubation.

The Mallampati score performed before intubation is very important in the management of intubation. The mallampati assessment is carried out to prevent intubation failure. Mallampati score is a test or method used as a predictor of airway difficulty to facilitate the installation of an endotracheal tube. Mallampati score is divided into 4 grades. The grade 1-2 category is predicted to be easy to intubate and the grade 3-4 category is predicted to be difficult to intubate. The way to assess the Mallampati score is to position the patient sitting in an upright position and open the mouth while sticking out the tongue as much as possible [5,6].

In 2023 at RSUD "K" Tegal City there will be 240 neurosurgery patients. In September 2023, 7 out of 30 neurosurgical patients in craniotomy cases (23.3%) experienced failure during intubation, namely several laryngoscope attempts and attempts to insert an endotracheal tube. This is a challenge for health workers, especially specialist anesthetists and anesthetists, to find out the factors that influence this condition. Information about the causes of failed intubation in neurosurgical patients in craniotomy cases is still limited. Using the Cormack Lehane scale to detect 50 cases with grade 1 intubation difficulties, it was found that 33 of them (66%) were confirmed by the Mallampati score [7]. Most

of the patients with Mallampati class I and II classification, namely 36 respondents (90%) were categorized as predictors of intubation. easy, while Mallampati classification III and IV as many as 4 respondents (10%) were categorized as predictors of difficult intubation [8]. In connection with the Mallampati measurement position, it was known that 350 patients who were going to undergo surgical procedures were examined in the supine position showing Mallampati grades 3 and 4 (predicted difficult intubation) while in the sitting position it gets grades 1 and 2 (predicted to be easy to intubate) [9].

Research Entitled: Mallampati score and intubation in total anesthesia neurosurgical patients: a correlation study is intended to add information regarding the Mallampati score and special intubation in neurosurgical patients with craniotomy cases. Considering that neurosurgical cases usually use Endotracheal Tube Intubation to maintain airway management, the research suspects that there is a relationship between Mallampati score and intubation. The results of this research will provide additional information for health workers, especially anesthesiologists and anesthesia practitioners regarding the prediction of failure of intubation in an effort to save the patient's life.

Research Methods

A correlational descriptive study on 33 neurosurgical patients under general anesthesia at RSUD “K” Tegal city in February-March 2024. The inclusion requirements were (1) patients who would undergo neurosurgical operations, (2) patients who would undergo intubation, (3) patients aged >18 years, (4) ASA 2 - 4. The exclusion conditions are: (1) Decreased patient consciousness, (2) patients with cervical injuries, and (3) patients with oral and mandibular trauma.

The two variables studied were the Mallampati score and the act of intubation. Mallampati is a patient condition that can predict difficult intubation by looking at the anatomical structure of the oral cavity. Mallampati observation is carried out when the patient is conscious and in the operating room by positioning the patient sitting in an upright position and opening his mouth while sticking out his tongue as much as possible so that the anatomical structure of the oral cavity can be seen properly (5). The results are grouped into grade 1 or 2 or 3 or 4. Grade 1: soft palate, uvula, fauces, pillars visible, Grade 2: soft palate, uvula, fauces visible, Grade 3: soft palate, base of uvula visible, Grade 4: only the hard palate is visible. Intubation is an action aimed at maintaining airway patency, which is carried out by a doctor or anesthesia nurse in the operating room, when the patient is unconscious. The results are grouped into successful and unsuccessful or failed intubation actions. It is declared successful if there is 1 attempt at the laryngoscope and inserting the endotracheal tube, it is declared unsuccessful if there is more than 1 attempt at the laryngoscope and insertion of the endotracheal tube.

The instrument used to collect data on these 2 variables is an observation sheet. The observation sheet contains notes about the patient's identity (name, age and ASA status), mallampati score assessment and intubation. Patient identity (name, age and ASA status) was obtained from the patient's medical record or secondary data, while the Mallampati score assessment and intubation were obtained from direct observation while the patient was in the operating room or primary data.

The data obtained were analyzed using nonparametric correlation, namely Chi-square, confidence level 95%. This research has received Ethical Clearance with No.DP.04.03/e-KEPK.1/159/2024, dated January 30 2024 from SIM KEPK Poltekkes Kemenkes Yogyakarta.

Research Result

Respondent Characteristics

Most of the respondents were aged 46-55 years or early adulthood (45.5%) and the fewest respondents were aged 28-35 years or early adulthood (6.1%). As for ASA status, the majority were ASA 2, namely 60.6%. More details can be seen in Table 1.

Table 1: Characteristics of Respondents Based on Age at RSUD “K” Tegal City in 2024

Characteristics	f	(%)
Age		
18-25 years (late adolescence)	5	15,2
28-35 years (Early adulthood)	2	6,1
36-45 years (late adulthood)	6	18,2
46-55 years (Early old age)	15	45,5
56-65 years (late old age)	5	15,2
Status ASA		
ASA 2	20	60,6
ASA 3	8	24,2
ASA 4	5	15,2
Total	33	100

Mallampati Score

The percentage of respondents with Mallampati grade 3-4 was higher than grade 1-2, namely 51.5% and 48.5%. More details can be seen in Table 2.

Table 2: Distribution of Mallampati Score Characteristics at RSUD “K” Tegal City in 2024

Mallampati Score	f	(%)
grade 1-2 (Predicts easy intubation)	16	48,5
grade 3-4 (Predicted difficult intubation)	17	51,5
Total	33	100

Intubation Procedure

The percentage of intubation failures is greater than success, namely 60.7% and 39.4%. More details can be seen in Table 3.

Table 3: Distribution of Intubation Procedures at RSUD “K” Tegal City in 2024

Implementation of Intubation	f	(%)
Successful (1 time installation)	13	39,4
Failed (more than 1 installation)	20	60,7
Total	33	100

Based on the percentage of success, respondents with Mallampati Grade 1-2 positions had greater success than those with grades 3-4, namely 56.2% compared to 23.5%. If we look at intubation failures, respondents with mallampati grade 3-4 showed a greater

failure percentage than grade 1-2, namely 76.5% compared to 43.8%. More details can be seen in Table 4. There is a tendency that Mallampati grade 1-2 tends to be better than Mallampati grade 3-4 in relation to the success of intubation.

After carrying out statistical tests with Chi-square (2x2), the results showed that there was a significant relationship between the Mallampati score and the intubation action with a contingency coefficient of 0.707 (quite a close relationship) with a p value of 0.000. More details can be seen in Table 4.

Table 4: Correlation between Mallampati Score and Implementation of Intubation in Neurosurgical Patients at RSUD “K” Tegal City in 2024

Mallampati Score	Intubation Procedure			Coefisien Contingency	P Value ^a
	successful	failed	Total		
Grade 1-2	9 (56,2%)	7 (43,8%)	16 (100%)	0,707	0,000*
Grade 3-4	4 (23,5%)	13 (76,5%)	17 (100%)		
Total	13	20	33		

^a Chi-square test (2x2) . * Significant level 0,05

Discussion

The ASA status in the mallampati score assessment is mostly in grade 3-4, namely ASA status 3 and 4. This is because the selection of respondents, namely neurosurgical patients tend to have a decreased level of consciousness, and have serious systemic diseases that are life threatening, whereas for the mallampati score must be assessed When visualizing the larynx, the patient is in a sitting position and opens the mouth optimally and has good muscle relaxation [10].

In addition, if ASA 3 and ASA 4 status is associated with a fairly high rate of intubation failure, namely 20 out of 33 patients or 60.66%, this can be explained theoretically. The narrowest part of the respiratory tract is at the level of the glottis where this is the anatomical basis for assessing mallampati which can be seen by the relationship of the tongue to the oral cavity. If the base of the tongue is large then the glottis will not be visible, this is very influential in assessing the mallampati score [6].

The results of this study show that there is a relationship between Mallampati score and intubation in craniotomy cases [6]. These results are in line with Fibms research. The Mallampati score can predict difficult airways and is a very valuable preoperative assessment in reducing the risk of difficult intubation with better airway management [6]. In other words, the Mallampati score is one of the methods used to predict the airway in order to facilitate endotracheal tube placement [5]. One of the factors in carrying out intubation is preparing the patient as well and as fully as possible in order to increase success when carrying out intubation [11].

Based on table 4, it is known that the majority of patients experienced intubation failure, namely 20 patients out of 33 patients or 60.66%. If it is related to the majority of patients' age, namely 46-55 years or early elderly, then it can be explained that increasing age can lead to the risk of intubation failure or

difficult intubation due to anatomical changes, as well as disease [12].

The limitation in this research is that there is limited time in conducting the Mallampati score examination because the researcher carried out the examination in the pre-operative room so that the interaction time between the patient and the researcher was very short and less effective. Therefore, for future researchers, it is best to carry out the pre-assessment in the ward so that they can study well and cooperatively.

Conclusion

The success of intubation when installing an endotracheal tube in craniotomy neurosurgical patients using the Mallampati score assessment is almost in accordance with predictions where the Mallampati score grade 1-2 is declared easy to intubate and the Mallampati score grade 3-4 is declared difficult to intubate, however there are still some which is not in accordance with the predictions of the Mallampati score due to the patient's own anatomical abnormalities which can affect the time of endotracheal tube installation.

In carrying out neurosurgical operations in craniotomy cases, more attention can be paid to the Mallampati score so that the potential for intubation failure can be anticipated and a solution can be found so that the operation can be successful in saving the patient's life.

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