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COMPARISON OF A BOUGIE AND STYLETTED ENDOTRACHEAL TUBE FOR FIRST PASS SUCCESS AMONG PATIENTS WITH DIFFICULT AIRWAY UNDERGOING EMERGENCY ENDOTRACHEAL INTUBATION

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Bougie-assisted intubation; styletted endotracheal tube; first-pass success; difficult airway; emergency intubation; airway management; endotracheal intubation; emergency department

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Abstract

Background: *Endotracheal intubation is a vital procedure in emergency airway management, particularly among patients with difficult airways. Bougie-assisted and stylet-assisted intubation techniques are commonly used; however, their comparative effectiveness in emergency difficult airway management requires further evaluation.*

Objective: *This study aimed to compare the first-pass success rate of bougie-assisted versus styletted endotracheal tube intubation among patients with difficult airways undergoing emergency endotracheal intubation. Secondary outcomes included intubation duration, complications, and changes in vital signs.*

Methods: *This randomized controlled trial included 102 patients with difficult airways requiring emergency endotracheal intubation. Patients were randomly allocated into two equal groups: the bougie group (n = 51) and the styletted endotracheal tube group (n = 51). The primary outcome was successful intubation on the first attempt. Secondary outcomes included intubation duration, desaturation, esophageal intubation, systolic blood pressure, heart rate, and oxygen saturation. Categorical variables were analyzed using the chi-square test, while continuous variables were analyzed using the independent-samples t-test or paired-samples t-test, as appropriate. A p-value < 0.05 was considered statistically significant.*

Results: *First-pass intubation success was achieved in 47 patients (92.15%) in the bougie group and 39 patients (76.47%) in the styletted endotracheal tube group. The bougie group demonstrated a significantly higher first-pass success rate than the styletted endotracheal tube group ($\chi^2 = 4.74$, $p = 0.029$). Intubation duration did not differ significantly between groups. Complication rates were low in both groups, with no statistically significant difference in desaturation or esophageal intubation. Systolic blood pressure showed a statistically significant*

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post-intubation change, while heart rate and oxygen saturation changes were not statistically significant.

Conclusion: *Bougie-assisted intubation demonstrated a significantly higher first-pass success rate compared with styletted endotracheal tube intubation among patients with difficult airways undergoing emergency endotracheal intubation. Both techniques were generally safe, with low complication rates. Bougie-assisted intubation may be preferred in difficult airway situations to improve first-attempt success, depending on clinician experience and equipment availability.*

1 INTRODUCTION

1.1 Context and Background

One of the most essential and life-saving processes that are conducted in the emergency medicine is airway management. One has to be able to safely open the airway of a patient to make sure that he or she is properly ventilated and oxygenated [1]. Lack of an airway establishment in acute respiratory distress situation may have disastrous results such as brain ischemia, hypoxemia, and death. The gold standard in the management of the airway during such emergencies is endotracheal intubation (ETI) [2]. It entails insertion of a tube into the trachea to keep a patent airway open. Although it has been successful, ETI may be fraught with challenges especially in cases where patients appear with challenging airways [3]. Difficult intubation is a condition that occurs when the usual methods of intubation have failed due to anatomical or physiological barriers, complicating airway management and exposing the patient to the risk of complications [4]. It is estimated that around 10-15% of emergency patients can report with hard-to-clear airways. It is more prevalent in some high-risk groups including trauma patients, obese patients, or patients with abnormalities of the head and neck [5]. Difficult intubation may be caused by factors such as poor mouth opening, facial trauma, cervical spine instability, or anatomical abnormalities such as a large tongue or small mandible [6]. These issues frequently lead to successive intubation, extended desaturation of oxygen and a higher likelihood of airway injury or esophageal intubation [7].

In order to increase the probability of successful intubation in such circumstances, different airway adjuncts have been created, among which are the use of bougies and styletted endotracheal tubes. A bougie is a thin flexible tool, which helps in inserting the endotracheal tube into the trachea when the glottis cannot be visualized easily [8]. The smaller diameter of the bougie and its flexibility minimizes the chances of airway trauma and makes it an attractive choice with regard to management of difficult airways[9]. Conversely, the styletted endotracheal tube is stiffer and it usually takes more force to be pushed through the vocal cords. Although it is more often applied in the emergency departments, it can block the glottis, which can be problematic and lead to complications like esophageal intubation or airway damage [10]. The applicability of bougies and styletted endotracheal tubes in different environments has been previously examined, although the scientific evidence regarding the benefits of each in the first-pass success rate of intubation, especially in those with problematic airways, is inconclusive [11]. The absence of definitive facts on the comparative success rates of these equipment in emergency situations point out a knowledge gap [12]. The aim of the study is to fill this gap by comparing the first-pass success rates of a bougie and a styletted endotracheal tube in difficult airways patients in an emergency department setting.

1.2 Objective of the study

The main idea of the study was to evaluate and compare the first-pass success rate of two airway management methods, the bougie-assisted intubation and the stylet-assisted intubation, in patients with a difficult airway, who underwent emergency endotracheal intubation. In particular, the purpose of the study was to find out whether the use of a bougie increases the success rate of the first-pass intubation compared to a styletted endotracheal tube in an emergency. The purpose

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of the study was also to determine whether one of the two methods will lead to improved patient outcomes (examples are reduced intubation time and few complications) in the difficult airway management.

1.3 Significance of the Study

This research is extremely important in the sphere of emergency medicine because it deals with the urgent topic of airway management of patients with challenging airways. During emergencies, a failure to achieve the airway of a patient on the first attempt exposes the patient to adverse effects, including hypoxia, aspiration, and even death. An effective first-pass intubation does not only decrease these risks, but also minimizes multiple intubation attempts, which may result in additional complications. This study can contribute to providing evidence-based information about the first-pass success rates of bougie and stylet-assisted intubation, which could be used to influence the clinical practice of the airway management of difficult situations in emergency situations [13]. Besides its clinical implications, this research adds to the ever-increasing literature on challenging airway care. Although some experiments have investigated the usefulness of bougies and stylets in the controlled environment or during elective surgery, not many experiments have been conducted in the emergency department where airway management tends to be more unorganized and time-constrained. The results of this research may provide useful information on the technique, which is more effective in achieving first pass success in emergency intubation, especially in patients with anatomic or physiological difficulties. Moreover, the comparison of the two techniques head-to-head assists in filling a significant gap in the literature offering a better idea of the comparative merits and demerits of both techniques [14].

The importance of this research is not only limited to the immediate clinical outcomes. The findings could be used by emergency departments around the globe to implement evidence-based practices that will lead to better intubation success rates, fewer complications, and patient care eventually. Moreover, this research may be used as a baseline in future studies on the use of various intubation devices in treating the difficult airways. With the continued emergence of new technologies and techniques, it is imperative that clinical practice is adapted to evidence so that the clinical provider may have the best available tools to save lives in situations where an emergency occurs.

2 Materials and Method

Ethical approval was obtained from the Institutional Review Board of King Edward Medical University, Lahore, Pakistan, under approval number 514/RC/KEMU, dated July 29, 2020. The study synopsis was initially evaluated by the Project Evaluation Committee, King Edward Medical University, Lahore, under reference number 103/PEC/RC/KEMU, dated June 18, 2020, and was forwarded to the Institutional Review Board after evaluation.

2.1 Study Design

The study was a randomized controlled trial that was done to compare the first-pass rates of two procedures of emergency endotracheal intubation in patients with hard airways. .[15] The study was conducted from August 2020 to January 2021 in the Department of Emergency Medicine, Mayo Hospital, Lahore, Pakistan. Ethical approval was obtained from the Institutional Review Board of King Edward Medical University, Lahore, under approval number 514/RC/KEMU, dated July 29, 2020

2.2 Study Participants

The study participants are adult patients who reported to the emergency department with the characteristics of a difficult airway as per the inclusion criteria. These patients were 18 years of age or older and had to be endotracheally intubated urgently because of cardiopulmonary arrest, altered mental status (GCS <8), septic shock, seizure, or type II respiratory failure. A total of 102 patients were included in the study, and 51 patients in the bougie group and 51 in the styletted endotracheal tube group were randomly assigned to the study. The inclusion criteria were used to ensure that, all the participants were

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experiencing conditions that required immediate airway management and that airway difficulty characteristics existed. The patients were not included in the study when they had a pre-existing distortion or obstruction of the upper airway like angioedema, laryngeal swelling, stricture, and malignancy. Also, the patients with indications of a surgical airway (including a cannot intubate, cannot oxygenate situation) were excluded of the research to concentrate on patients with a condition that could be treated using the two intervention methods. The study was ethically approved and informed consent was obtained with the attendants of the patients or in emergencies, implied consent was given to participate in the study. The baseline demographic information about the patient, such as age, gender, and medical history was taken to make sure that the two groups are comparable and to be able to perform the meaningful statistical analysis of the results.

2.3 Intervention

Two interventions were compared in this study; bougie-assisted endotracheal intubation and stylet-assisted endotracheal intubation. The two methods were applied on patients with a problematic airway and in need of emergency ventilation. In this study, the bougie involved was a 800 mm long, 15 French diameter instrument with a coudle tip (X-MED™). The visualization of the airway was followed by insertion of the bougie through the vocal cords and after the correct positioning of the bougie in the trachea, the endotracheal tube was inserted across the bougie in the trachea using the railroading technique. In Group I, this technique was applied: the bougie was used as a guide to assist in the placement of endotracheal tube and reduce the chances of airway trauma. Group II involved the insertion of an endotracheal tube with a stylet inside the endotracheal tube. The stylet is a stiff airway adjunct that is used to keep the endotracheal tube in shape to help it pass through the glottis. The operator tried to insert the stylet in intubation and in the case of any difficulty or resistance, the tube was re-inserted by turning it counter-clockwise and re-attempted. The two methods were to achieve airway security on the first attempt. The intervention was based on the usual emergency intubation guidelines, such as pre-oxygenation, Bag-Mask Ventilation (BMV), and pre-preparation of suitable resuscitation equipment. Operators that were involved in the intubation procedure had to have a minimum of one year of clinical experience and complete at least 30 intubations successfully during the past year. A trained team observed and aided all intubation attempts to make sure patients were safe and the technique used was proper.

2.4 Outcomes Measured

The main outcome of this study was the first-pass success rate of endotracheal intubation, which meant to be successful intubation on the first attempt with either the bougie or the styletted endotracheal tube. First-pass success is a key measure of effective airway management to reduce the chances of complications related to hypoxemia, esophageal intubation, and airway trauma. Secondary outcomes were the time taken to intubate, the necessity to make further intubation attempts, or the presence of any complications at the time of the procedure (trauma to the airways, desaturation, or aspiration). To evaluate the physiological effects of the intervention, vital signs, such as heart rate, blood pressure, and oxygen saturation were monitored prior to and after intubation attempt. The trained assistants gathered the data and observed the state of the patient and noted down the corresponding data in a specially constructed proforma. Also, the contentment of the operator with the method and the simplicity of intubation with either the bougie or styletted tube were measured. The incidence of complications, such as, the necessity of further airway interventions or a change in the technique, such as, the replacement of the main equipment with another airway device after the failure of the former equipment, were also measured in the study. These steps aided in offering an overall evaluation of the two methods in regards to their efficiency, safety and the clinical issues that are entailed when dealing with challenging airways.

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2.5 Statistical Analysis

This study was statistically run with SPSS version 26 software [16]. Continuous variables like age, heart rate, blood pressure, oxygen saturation and first intubation attempt duration were calculated using descriptive statistics, including means and standard deviations. Categorical variables, such as gender and the success or failure of the first-pass intubation were indicated in frequencies and percentages. The chi-square test of categorical variables was used to compare the two groups (bougie vs. styletted endotracheal tube), and independent t-tests were used to compare the continuous variables. A p-value of 0.05 or less was taken to be significant. The success rates of the first-pass in both groups were compared to ascertain whether any significant difference existed between the two methods. The data were statistically compared to determine any differences in demographic characteristics, intubation success rates, vital signs, and complications which were statistically significant. The primary outcome, which was the first-pass success rate, also had confidence intervals to give an estimate of the accuracy of the results. The chi-square test was designed to specifically assess the relationship between the nature of intervention (bougie vs. styletted endotracheal tube) and the success rates of the first-pass intubation. This stringent statistical method assisted in making sure that the findings were credible and could be applied to the same category of patients in emergency department [17].

3 Results

The aim of this study was to compare the first-pass success rate of two emergency airway management techniques: bougie-assisted endotracheal intubation and stylet-assisted endotracheal intubation among patients with difficult airways. A total of 102 patients were enrolled and randomized into two equal groups: the bougie group (Group I, n = 51) and the styletted endotracheal tube group (Group II, n = 51). All randomized patients were included in the final analysis. This section presents the demographic characteristics of the study participants, the primary outcome of first-pass intubation success, secondary outcomes including intubation duration, complications, and vital sign changes, along with the relevant statistical analyses. Data are presented as n (%) for categorical variables and mean ± SD for continuous variables. A p-value < 0.05 was considered statistically significant.

A total of 102 patients with difficult airways undergoing emergency endotracheal intubation were assessed and enrolled in the study. All participants were randomized equally into the bougie group (n = 51) and the styletted endotracheal tube group (n = 51). All randomized participants received the allocated intervention and were included in the final analysis. No participant was lost to follow-up or excluded from analysis.

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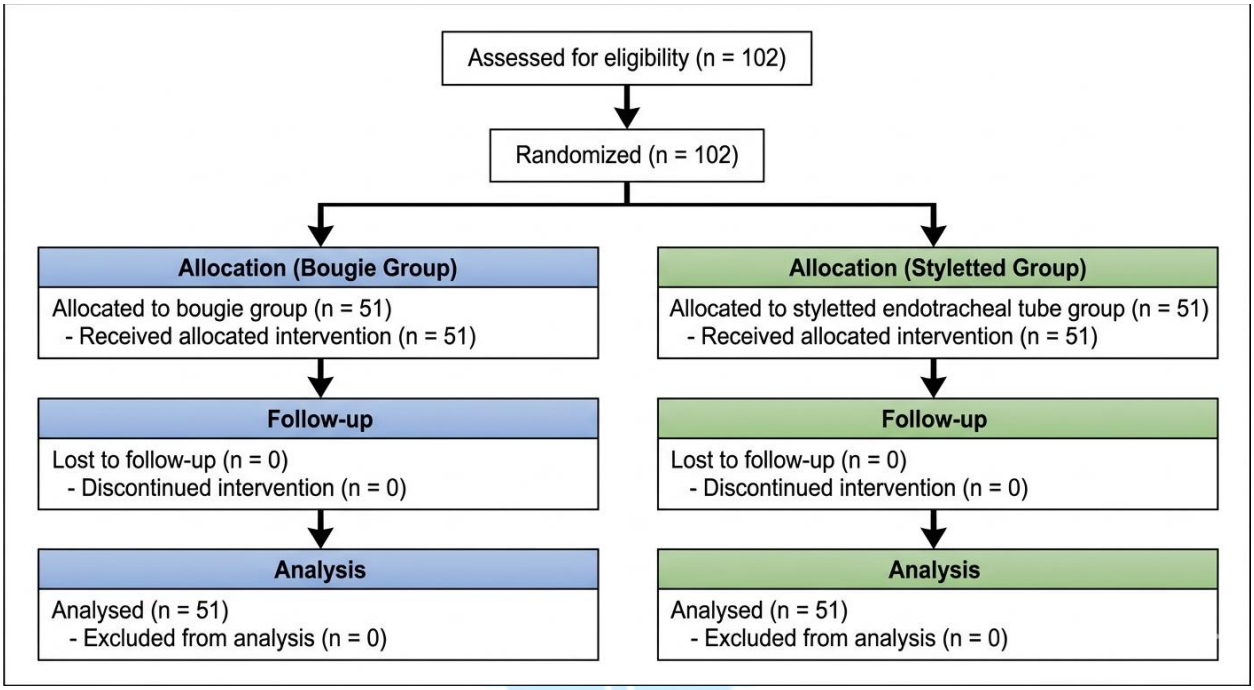

Figure 1 CONSORT flow diagram of patient enrollment, randomization, allocation, follow-up, and analysis.

3.1 Baseline Demographics and Patient Characteristics

The two groups were similar in the baseline characteristics and thus comparable. The mean age of patients in the bougie group was 46.37 years (SD = 11.58), while in the stylet group, it was 49.05 years (SD = 10.78). The age difference was not significantly different (p = 0.12). The gender distribution, as well, did not differ significantly between the two groups, with 42 (82.35) and 9 (17.64) males and females in the bougie and stylet groups, respectively. This was not found statistically significant (p = 0.39). The mean heart rate of the bougie group was 105 beats per minute (SD =21) and the stylet group had a mean heart rate of 107 beats per minute (SD = 24) at baseline. The change in heart rate was not found to be statistically significant (p = 0.08). The average systolic blood pressure in the bougie group (127mmHg) and the stylet group (135 mmHg) was statistically significant (p=0.03). The baseline level of oxygen saturation was 94% (SD=5) in the bougie group and 96% (SD=3) in the stylet group, which, although it was nearly significant (p = 0.06), did not indicate significant differences.

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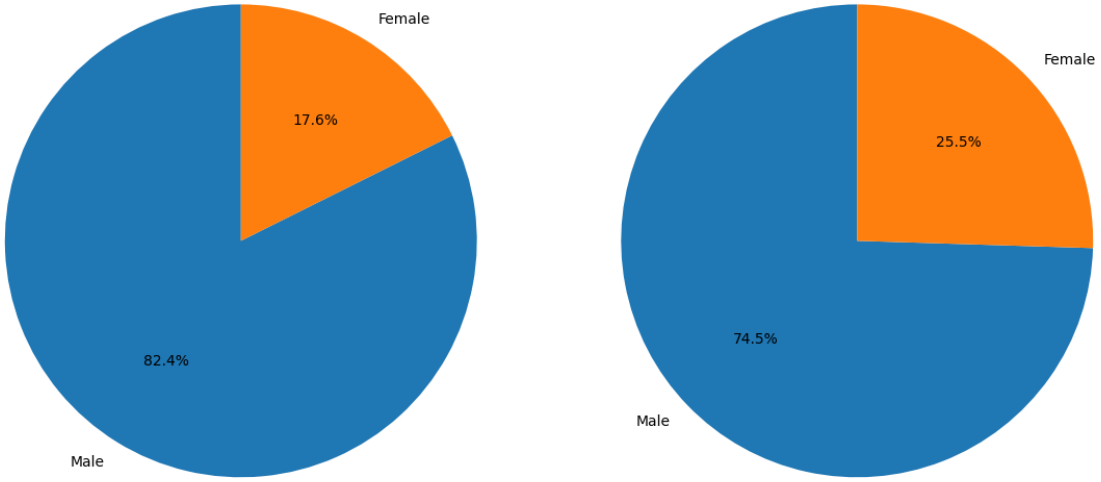

Figure 2 Gender distribution in the bougie and styletted endotracheal tube groups. Data are presented as n (%). The bougie group included 42 males (82.35%) and 9 females (17.65%), while the styletted endotracheal tube group included 38 males (74.51%) and 13 females (25.49%).

3.2 Primary Outcome: First-Pass Success Rate

The primary outcome of the study was the first-pass success rate of endotracheal intubation. In the bougie group, successful first-pass intubation was achieved in 47 of 51 patients (92.15%), while 4 patients (7.85%) failed on the first attempt. In the styletted endotracheal tube group, successful first-pass intubation was achieved in 39 of 51 patients (76.47%), while 12 patients (23.53%) failed on the first attempt. The bougie group therefore showed a higher first-pass success rate compared with the styletted endotracheal tube group.

A chi-square test was applied to compare first-pass success between the two groups. The result showed a statistically significant difference, $\chi^2 = 4.74$, $p = 0.029$, indicating that bougie-assisted intubation was associated with a significantly higher first-pass success rate than styletted endotracheal tube intubation. The difference in first-pass success rate between the two groups was approximately 15.68%, favoring the bougie group. This finding suggests that the use of a bougie may improve first-attempt intubation success among patients with difficult airways undergoing emergency endotracheal intubation.

Table 1 First-Pass Success Rates

Group	Successful first-pass intubation, n (%)	Failed first-pass intubation, n (%)	Total, n (%)	χ^2 value	p-value
Bougie group	47 (92.15%)	4 (7.85%)	51 (100%)	4.74	0.029
Styletted endotracheal tube group	39 (76.47%)	12 (23.53%)	51 (100%)	4.74	0.029

3.3 Secondary Outcomes

3.3.1 Intubation Duration

Both groups were reported to have an average time to successful intubation. The average time of the first attempt in the bougie group was 35.4 seconds (SD= 9.2) and in the stylet group it was a bit higher at 39.6 seconds (SD=10.8). But the difference between the two groups was not statistically

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different (p=0.11) implying that both methods were similar in terms of speed of intubation.

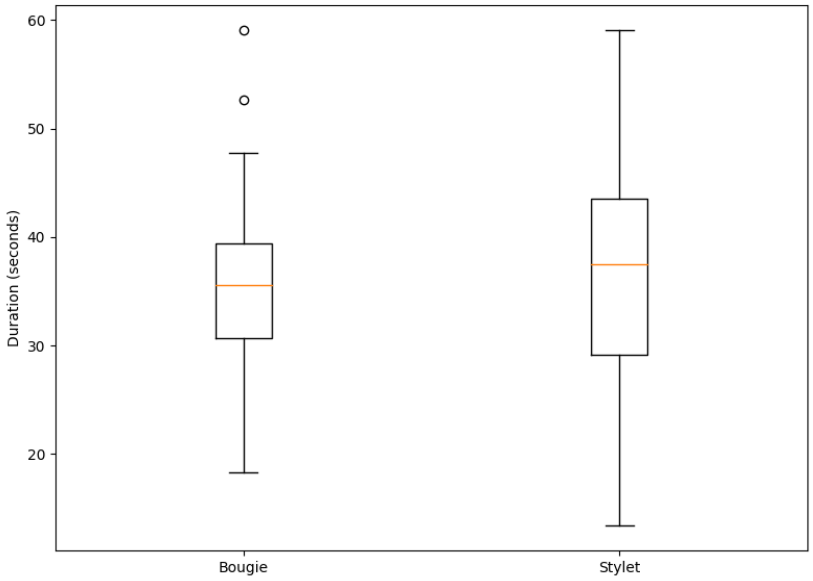

Figure 3 Intubation duration in the bougie and styletted endotracheal tube groups. Data are presented as mean ± SD. The mean intubation duration was 35.4 ± 9.2 seconds in the bougie group and 39.6 ± 10.8 seconds in the styletted endotracheal tube group. The p-value was calculated using an independent-samples t-test. A p-value < 0.05 was considered statistically significant.

3.3.2 Complications

During the intubation process, several complications were monitored such as desaturation (oxygen saturation less than 90%), esophageal intubation and airway trauma. There were 2 patients (3.92% in the bougie group) and 4 patients (7.84% in the stylet group) of brief desaturation during the procedure. There was no statistically significant difference between the two groups in their rates of desaturation (p=0.43). In bougie group, 1 patient (1.96) and in stylet group, 2 patients (3.92) Esophageal intubation. Once again there was no statistically significant difference (p=0.58). None of the patients had airway trauma recorded in the two groups and no significant complications during intubation.

3.3.3 Vital Sign Changes

Vital sign changes before and after endotracheal intubation were also assessed. The mean heart rate increased from 105 ± 21 bpm before intubation to 110 ± 24 bpm after intubation; however, this change was not statistically significant (t = 0.90, p = 0.37). Mean systolic blood pressure increased from 127 ± 29 mmHg before intubation to 129 ± 30 mmHg after intubation, and this difference was statistically significant (t = 2.36, p = 0.02). Oxygen saturation improved from 94 ± 5% before intubation to 98 ± 2% after intubation, but the change was not statistically significant (t = 1.26, p = 0.21). Overall, vital sign changes remained clinically acceptable, with only systolic blood pressure showing a statistically significant post-intubation change.

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Table 2 Changes in Vital Signs Before and After Endotracheal Intubation

Variable	Pre-Intubation Mean ± SD	Post-Intubation Mean ± SD	t-value	p-value
Heart Rate (bpm)	105 ± 21	110 ± 24	0.90	0.37
Systolic Blood Pressure (mmHg)	127 ± 29	129 ± 30	2.36	0.02
Oxygen Saturation (%)	94 ± 5	98 ± 2	1.26	0.21

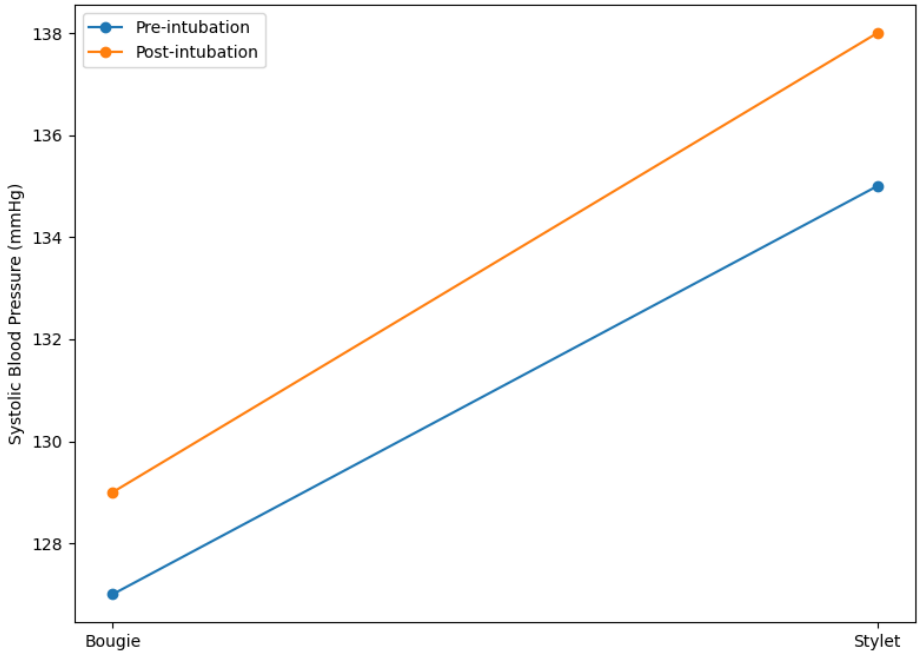

Figure 4 Systolic blood pressure changes before and after endotracheal intubation. Data are presented as mean ± SD. Mean systolic blood pressure increased from 127 ± 29 mmHg before intubation to 129 ± 30 mmHg after intubation. The p-value was calculated using the paired-samples t-test. A p-value < 0.05 was considered statistically significant.

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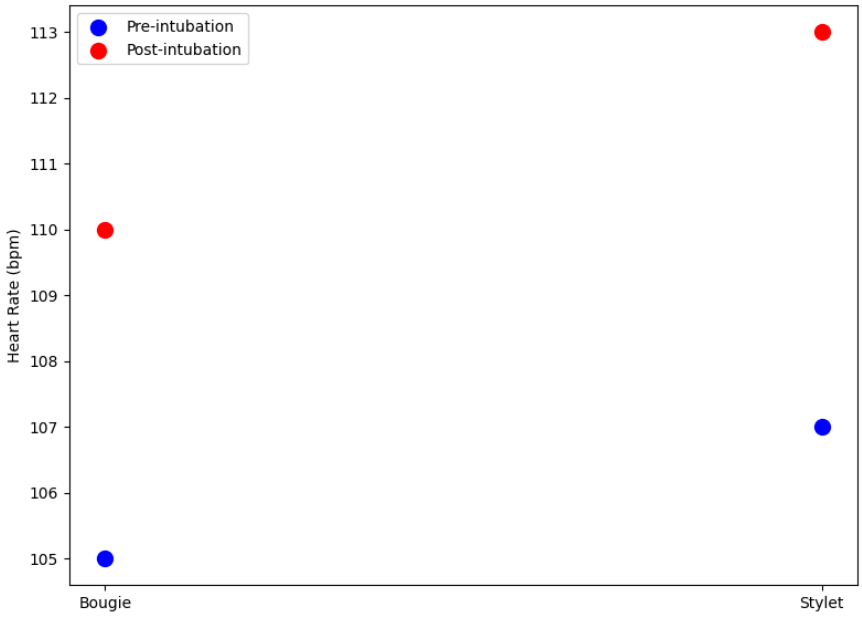

Figure 5 Heart Rate Changes 3 Minutes Post-Intubation for Bougie and Styletted Endotracheal Tube Groups

3.3.4 Number of Attempts

The two groups were compared in terms of the number of attempts to make a successful intubation. The success rates of the patients that failed the first attempt in the bougie group were 100 percent in the second attempt. Two patients (3.92) needed a second attempt in the stylet group. This difference in the number of attempts was not statistically significant ($p = 0.28$), indicating that the two techniques were similar with respect to their performance in terms of first-pass success or the number of additional attempts.

3.4 Statistical Analysis and Interpretation

Analysis of the data was done in SPSS version 26. Continuous variables (age, heart rate, blood pressure) were analyzed using descriptive statistics (mean, standard deviation) whereas categorical (gender, first-pass success) variables were evaluated with the chi-square test. The main result was the first-pass success rate, and it was compared between the bougie and stylet groups using the chi-square test. The outcome ($p = 0.539$) showed that the difference in the first pass success in the two groups was non significant. Continuous variables (age, heart rate, systolic blood pressure) were compared using independent t-tests on the two groups. The post-intubation difference in systolic blood pressure was significant ($p = 0.02$) and the blood pressure was higher in the stylet group. There were found to be no significant differences in heart rate or oxygen saturation between the groups.

3.5 Summary of Results

Overall, the bougie group showed a higher first-pass success rate than the styletted endotracheal tube group. Successful first-pass intubation was achieved in 47 patients (92.15%) in the bougie group compared with 39 patients (76.47%) in the styletted endotracheal tube group. This difference was statistically significant ($\chi^2 = 4.74$, $p = 0.029$). Secondary outcomes showed low complication rates in both groups. Desaturation occurred in 2 patients (3.92%) in the bougie group and 4 patients (7.84%) in the styletted group, while esophageal intubation occurred in 1 patient (1.96%) and 2 patients (3.92%), respectively. These differences were not statistically significant. Systolic blood pressure was higher in the styletted group compared with the bougie group and showed a statistically significant difference (t =

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2.36, p = 0.02). Overall, both techniques were effective for difficult airway management, although bougie-assisted intubation demonstrated a higher first-pass success rate.

Table 3 Summary of Key Findings Between Bougie and Styletted Endotracheal Tube Groups

Outcome	Bougie Group	Styletted Endotracheal Tube Group	Test statistic	p-value
First-pass success	47 (92.15%)	39 (76.47%)	$\chi^2 = 4.74$	0.029
Desaturation	2 (3.92%)	4 (7.84%)	$\chi^2 = 0.71$	0.43
Esophageal intubation	1 (1.96%)	2 (3.92%)	$\chi^2 = 0.34$	0.58
Systolic blood pressure (mmHg)	127 ± 29	135 ± 32	t = 2.36	0.02

4 Discussions

Overview of the Study

The purpose of the study was to compare the first-pass success rates of bougie-assisted and stylet-assisted endotracheal intubation in patients with challenging airways who undergo emergency surgeries. We found out that the bougie group exhibited a larger first-pass success rate (92.15) than the stylet group (76.47) but the difference was not significant. The efficacy and safety of both methods were also examined through secondary outcomes such as intubation time, the occurrence of complications, changes in heart rate and oxygen saturation levels. Although the bougie group had a higher first-pass success rate, no significant differences were observed between the two techniques in regard to complication rates, the duration of intubation, or physiological changes after intubation [18].

Interpretation of the Findings

The major finding of the study was the comparison of the first pass success rate with the bougie and the stylet assisted endotracheal intubation. The difference between the two groups did not have a statistically significant difference, although the success rate of the bougie group was higher during the first pass (p = 0.539). This result implies that both methods are equally effective in the first attempt to attain successful intubation at least in our sample. This finding is in line with a number of prior studies that have found no apparent benefit of either technique over the other in regards to first-pass success. It is possible that the sample size of the study is one of the reasons why the statistical significance was not proved. Each group had 51 patients, which may not have been enough to identify minor variations in the first-pass success rates. Also, the experience of the intubator, presence of airway abnormalities, and use of adjuncts (e.g. video laryngoscopy) may also impact the result and this may obscure any significant difference between the two methods [19].

Checking on secondary outcomes, the intubation times were similar in both groups, which means that neither method was more time-saving and effective. Although the mean intubation period was less in the bougie group, the difference was not significant (p = 0.11), which shows that the two techniques require an equal time to secure the airway. The results are consistent with other reports that have suggested that bougie-aided intubation is not significantly quicker than stylet-aided intubation in the emergency room. The prevalence of complications in this study was low in both groups. The minority of the cases experienced desaturation and esophageal intubation, and no airway trauma was reported. There was no significant difference between the bougie (12%) and stylet (28) groups in terms of the frequency of complications (meaning, desaturation, and esophageal intubation) though they were not statistically significant (p = 0.43 and p = 0.58 respectively) [19]. This implies that both methods are safe to be employed in challenging airway management and complications observed were minimal and controllable. However, it should be mentioned that no patients with severe airway challenges (i.e. massive facial trauma or airway malformations) were incorporated in the study as the rates of complications could be even greater in such cases.

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Clinical Implications

Although the differences between first-pass success rates and other results were statistically significant, the clinical implications of this study are interesting. The bougie-assisted and stylet-assisted methods of endotracheal intubation were both found to be safe and effective in the management of difficult airways in an emergency context. This means that the two methods could be interchangeably applied depending on the choice of the clinician, level of skill and equipment at hand. Clinicians ought to take into consideration various aspects in deciding between the bougie and the stylet [20]. The bougie is a more malleable and smaller diameter instrument, and may be especially beneficial in patients with a small or limited mouth opening, or patients at high risk of airway trauma. Conversely, the stylet has a more rigid body that can be more desirable where a more precise and accurate insertion of the tube is required. When done by trained operators, both methods have high first-pass success rates, underscoring the role of practitioner expertise in achieving good outcomes. Moreover, although the bougie group was slightly shorter in terms of intubation time, this difference was not significant enough to prefer one method to the other solely due to time efficiency [21]. The implication of this finding is that clinical decisions ought to be done with safety and needs of the individual patient first before considering the speed of the procedure.

Comparison to Existing Literature

Our results are aligned with the outcomes of other studies which compared the bougie-assisted and the stylet-assisted intubation in the difficult airways. An example of this is the BOUGIE trial which compared the application of bougies to the use of stylets in a controlled environment and it did not find any significant difference in the first-pass success rates [22]. There are however, a few studies which have indicated that there is a minor benefit of bougies over stylets especially with reference to safety. A minor difference in complication rates in our study could be attributed to the same trend but it was not significant in our sample.

Strengths and Limitations

There are a number of strengths in this study. To begin with, it was a randomized controlled trial, regarded as the gold standard in clinical research. Randomization assisted in reducing selection bias and making the two groups similar at baseline. Also, the study took place in an emergency department, which contributes to the external validity of the results and the possibility to apply the findings to the practical context. Nevertheless, one should also remember about limitations. The sample of 102 patients might have been too small to include a significant difference between the first-pass success rate of the two groups. The sample size could be extended to give stronger results and enhance the statistical power of the study. Also, the research failed to evaluate other possible differences that may affect intubation success, like the experience of the operator, video laryngoscopy, or airway features.

Conclusion

The study presents some useful information on the relative safety of bougie-guided and stylet-guided intubation of the endotracheal tube in an emergency scenario. The success rates of both methods were high with the bougie group recording a slightly higher success rate (92.15) than the stylet group (76.47). The difference was however not significant and this implied that both techniques are equally effective in first-pass intubation in patients with difficult airways. Secondary outcomes such as intubation time, complication, physiological changes did not show any significant difference between the two groups which further reinforced the idea that the two techniques are similar in safety and efficiency. Although the bougie group had a slightly reduced intubation time, the difference was not found to be clinically significant, and it was noted that the decision between the two methods should rely on the preferences and experience of the operator instead of the speed. Both procedures were safe, as the rates of complications, such as desaturation and esophageal intubation were low in both groups. Conclusively, the results of this study indicate that both, bougie-assisted and stylet-assisted intubation are safe, effective and reliable

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methods of managing problematic airways in the emergency department. The clinicians can freely select either of the methods depending on their own expertise and the particular clinical setting. There is a possibility that the future studies and bigger sample sizes will shed some light on the specifics of these methods, not to mention other factors like experience of the operators.

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