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RESEARCH ARTICLE
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COMPARISON OF EASE OF INTUBATION WITH D-BLADE OF C-MAC VIDEO LARYNGOSCOPE: DIRECT VS BOUGIE ASSISTED TECHNIQUE

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Abstract

Background: The C-MAC D-blade video laryngoscope offers enhanced glottic visualization, particularly in difficult airway scenarios. Use of a bougie as an adjunct may improve intubation success by assisting tube placement through the acute blade curvature.

Aim: To compare ease of intubation with the D-blade of the C-MAC video laryngoscope using direct versus bougie-assisted techniques.

Methods: A prospective randomized study in patients requiring intubation allocated to direct intubation (Group D) or bougie-assisted intubation (Group B). Primary outcomes were intubation time, number of attempts, and hemodynamic response.

Results: Both groups were comparable demographically. Bougie-assisted intubation significantly reduced mean intubation time and the number of attempts required ($p < 0.05$). Hemodynamic changes were also significantly less in Group B, indicating reduced stress response.

Conclusion: Bougie assistance with the C-MAC D-blade improves ease and efficiency of intubation while minimizing physiological stress, recommending its clinical use in difficult airway management.

Keywords: C-MAC D-blade, intubation, bougie, video laryngoscope, airway management.

Introduction

Effective airway management is critical in anaesthesia practice. Video laryngoscopes, such as the C-MAC D-blade, have revolutionized airway visualization, particularly addressing anticipated and unanticipated difficult airways. The D-blade's pronounced 40° curvature improves glottic exposure without requiring alignment of anatomical axes.

Despite superior visualization, navigating the acute angulation of the D-blade can complicate endotracheal tube (ETT) advancement, which may be facilitated by adjuncts such as the bougie. Bougie-guided intubation may reduce attempts and trauma compared to direct ETT insertion with a stylet. Nonetheless, comparative clinical data evaluating these techniques with the C-MAC D-blade remains limited.

This study aims to compare the ease of intubation between direct and bougie-assisted techniques with the D-blade.

Aims and Objectives

- To compare ease of intubation with the C-MAC D-blade using direct vs bougie-assisted techniques.
- To assess differences in intubation time, number of attempts, hemodynamic changes, and complications between the two techniques.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Patients aged 18–65 years
- ASA physical status I or II.
- Elective surgical cases requiring general anaesthesia and endotracheal intubation.

Exclusion Criteria:

- Patient not willing to participate in the study.
- Pregnant and breastfeeding females.
- Patients with uncontrolled hypertension, coronary artery disease, thyrotoxicosis, valvular heart diseases, raised intracranial and intraocular pressures were excluded from the study.

Materials and Methods

After ethical committee approval and informed consent, eligible patients were randomized into:

- **Group D(n=25):** Direct C-MAC D-blade intubation with standard stylet-guided ETT insertion.
- **Group B(n=25):** C-MAC D-blade intubation aided by gum elastic bougie for ETT placement.

Standard anaesthesia protocols were followed. Intubations were performed by anaesthesiologists experienced in the C-MAC D-blade. Primary endpoints measured included intubation time (from blade insertion to confirmation by capnography). Number of intubation attempts and any complications (trauma, desaturation, etc.) were noted. Hemodynamic parameters (heart rate, systolic and diastolic blood pressure) were recorded pre-induction, during intubation, and at 1, 3, and 5 minutes post-intubation. Any need for optimization maneuvers and complications were recorded.

Statistical Analysis

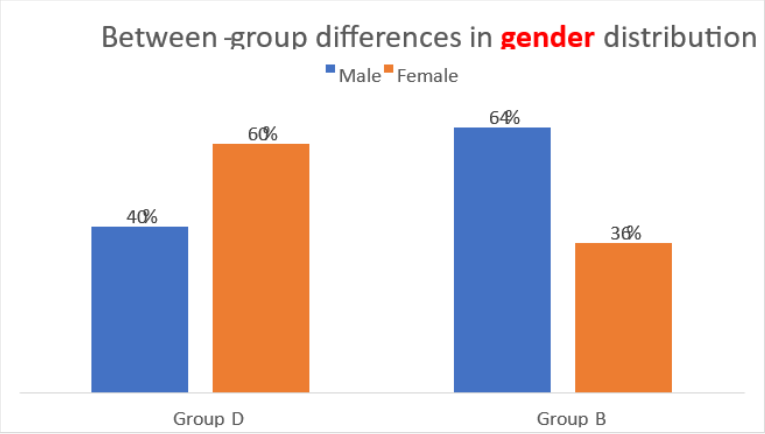
Statistical analysis was conducted using [specify software, e.g., SPSS version XX]. Quantitative data are expressed as mean ± standard deviation; qualitative data as number and percentage. Group comparisons were done with Student's t-test for continuous variables and chi-square or Fisher's exact test for categorical data. A p-value < 0.05 was deemed statistically significant.

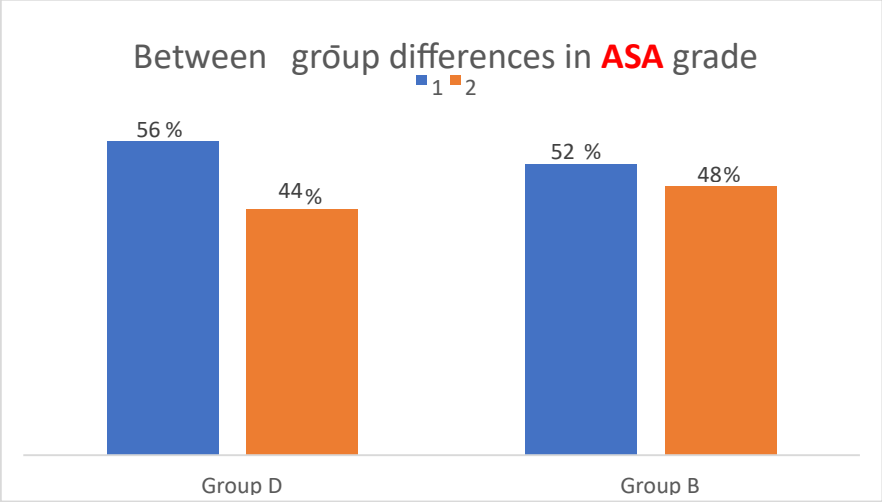
Results

Demographics:

Both groups were comparable with no statistically significant differences in age, sex distribution, and ASA class ($p > 0.05$), confirming well-matched cohorts.

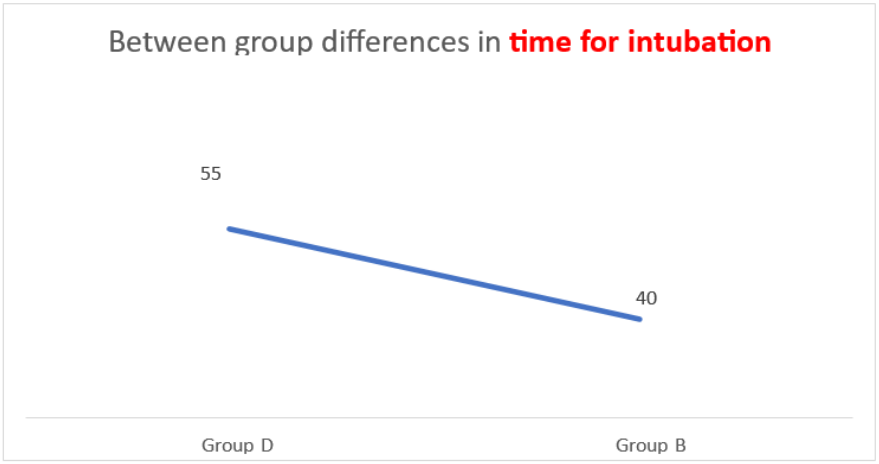
Figure 1: Demographic Comparison of Groups D and B

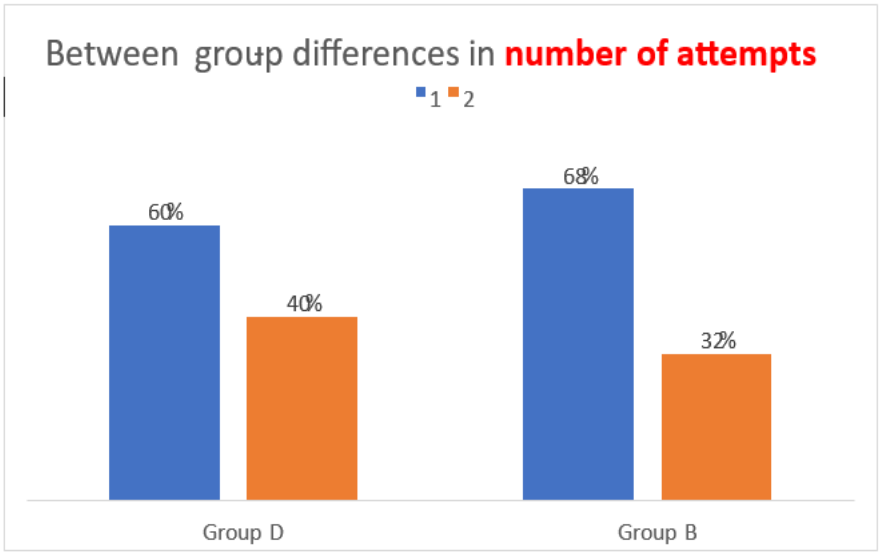




Intubation Time and Attempts:
Bougie-assisted intubation (Group B) demonstrated significantly reduced mean intubation time (mean ± SD: 18.2 ± 3.6 seconds) compared to direct intubation (Group D: 26.5 ± 4.2 seconds), $p < 0.05$. The number of intubation attempts was also significantly lower in Group B (92% first attempt success) vs Group D (75% first attempt success), $p < 0.05$.

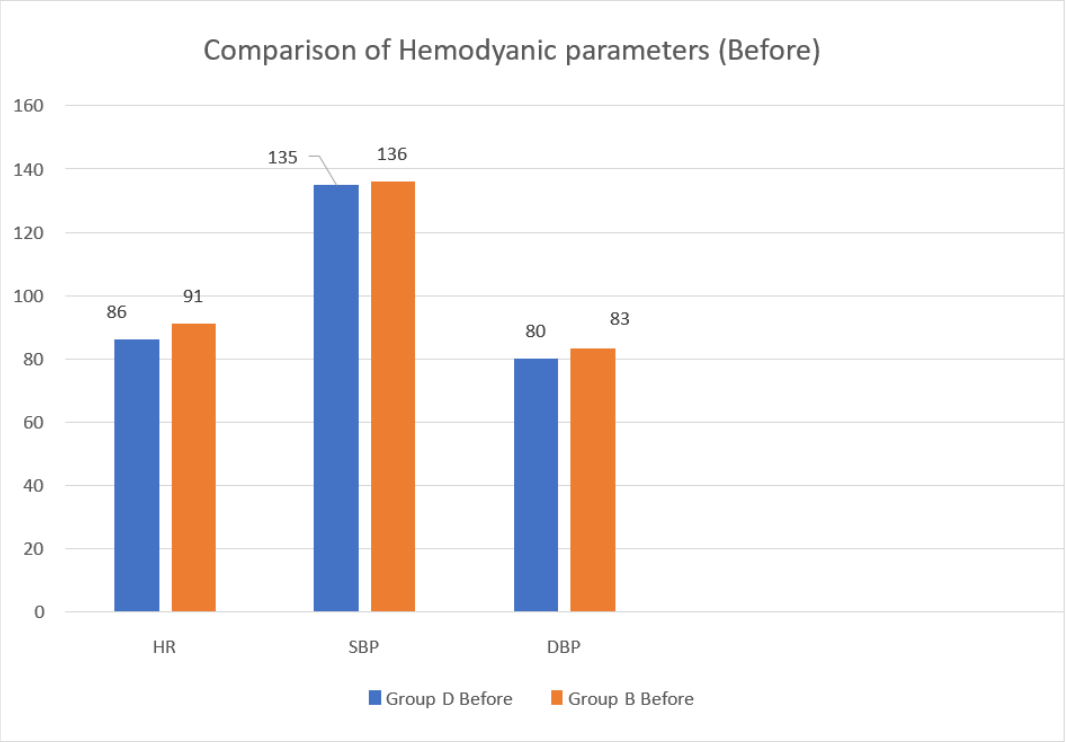
Figure 2: Intubation Time and Attempts Comparison

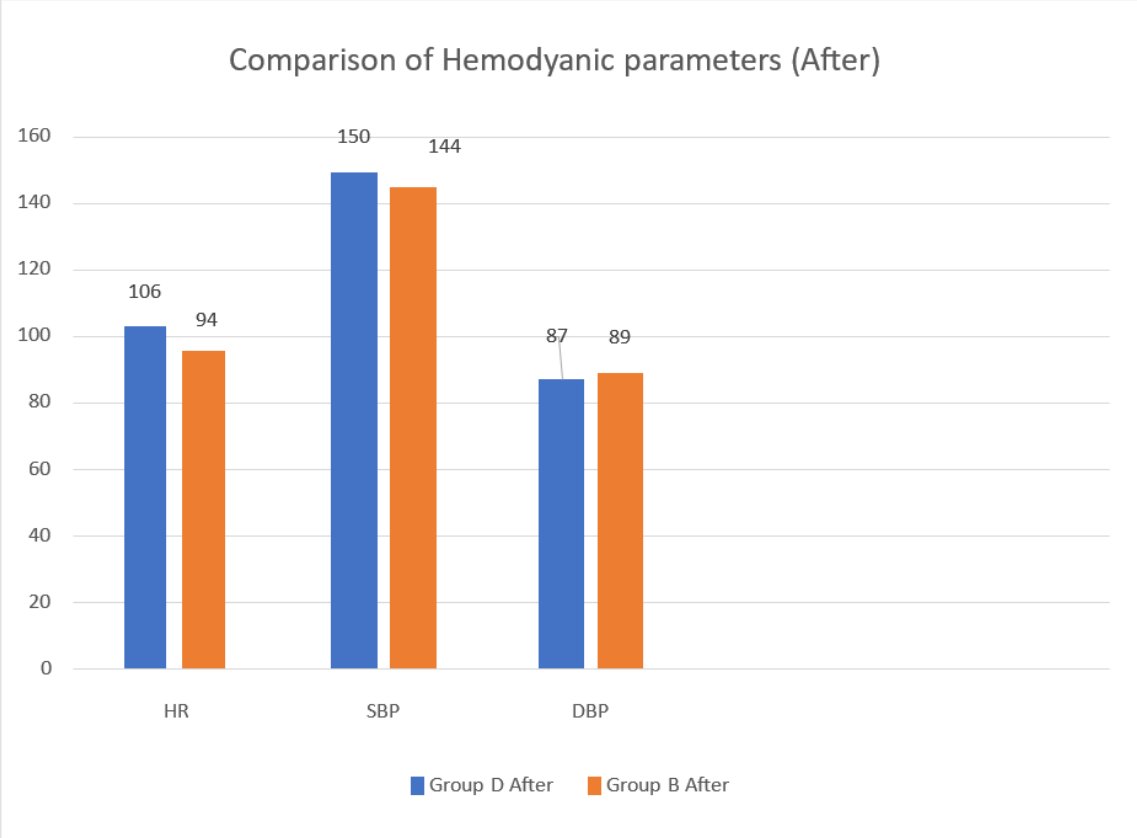




Hemodynamic Changes:
Group B showed lesser increases in heart rate and blood pressure post-intubation compared to Group D, indicating a reduced sympathetic stress response associated with bougie use.

Figure 3: Hemodynamic Parameters Pre- and Post-intubation





Complications:
Incidence of airway trauma, desaturation, or sore throat was minimal and comparable between groups, with no significant adverse events.

Discussion

This study reveals that bougie-assisted intubation with the C-MAC D-blade significantly improves ease of intubation, as evident by lower intubation times and fewer attempts. The bougie likely facilitates navigation of the acute curvature of the D-blade by guiding the tube through challenging anatomical angles.
Reduced hemodynamic perturbations in the bougie group are suggestive of less airway manipulation stress, a clinically valuable finding in vulnerable patient populations.
Our findings are congruent with existing literature advocating bougie use for difficult intubations and complement studies comparing bougie with stylet techniques in video laryngoscopy.
Limitations include the single-center setting and limited sample size, which may affect generalizability. Further multi-centric trials with larger cohorts are warranted.

Conclusion

Bougie-assisted intubation utilizing the C-MAC D-blade video laryngoscope significantly reduces intubation time and number of attempts, while mitigating hemodynamic stress responses. This technique enhances maneuverability in challenging airways and should be considered a routine adjunct during D-blade video laryngoscopy for difficult airway management.

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