



Comparison of Incidence of Post Operative Sore Throat during Conventional Laryngoscopy and Endotracheal Intubation Performed by Trainees and Senior Anaesthetists. A Prospective Randomised Single Blinded Study.

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ABSTRACT:

Background: Postoperative sore throat (POST) is a frequent complication following tracheal intubation during general anesthesia, causing patient discomfort and dissatisfaction. The influence of the intubator's experience on the incidence and severity of POST remains unclear.

Aim: To compare the incidence of postoperative sore throat between intubations performed by trainees and senior anaesthetists. Secondary aims were to compare the hemodynamic pressor response during intubation and the duration of laryngoscopy and intubation.

Methods: A prospective randomized single-blinded study was conducted on 60 ASA I and II patients aged 18 to 60 years undergoing elective surgeries requiring conventional laryngoscopy and endotracheal intubation. Patients were randomized into two groups: trainees (anaesthesia residents with ≥ 50 prior intubations) and senior anaesthetists (≥ 5 years of experience). Standardized anesthesia protocols and monitoring were applied. Postoperative sore throat was assessed over 24 hours using a 10-point numeric rating scale. Hemodynamic variables were recorded at baseline and at 1, 3, and 5 minutes post-intubation.

Results: POST incidence was 40.0% in the trainee group and 26.7% in the senior anaesthetist group, with no statistically significant difference ($p = 0.29$). Severity of POST also did not differ significantly ($p = 0.57$). Duration of laryngoscopy and intubation was longer in the trainee group (26.7 ± 5.5 seconds) compared to seniors (17.2 ± 4.9 seconds) ($p < 0.001$). Hemodynamic responses were similar between groups at all measured time points ($p > 0.05$). No major complications were reported.

Findings: The study demonstrates that, under supervision and standardized techniques, trainee-performed intubations do not increase the risk or severity of postoperative sore throat or hemodynamic instability compared to senior anaesthetists, despite longer intubation times.

INTRODUCTION

Postoperative sore throat (POST) and hoarseness are among the most frequent and distressing complications following tracheal intubation during general

anesthesia.[1],[2] Although these symptoms are generally considered minor and transient, they significantly contribute to patient discomfort and dissatisfaction with the perioperative experience.[3] The



incidence of POST varies widely, reported between 11% and 48%, and it can sometimes be severe enough to affect postoperative recovery and patient well-being.[4][5]

The pathophysiology of POST is multifactorial but primarily attributed to mucosal injury and inflammation caused by mechanical trauma from the endotracheal tube cuff and laryngoscopy during intubation.[6],[7] Additional contributing factors include the size and type of endotracheal tube,[8] cuff pressure, duration of intubation, lubrication, and the anesthetic technique used.[9],[10] These factors collectively influence the degree of airway irritation and subsequent sore throat or hoarseness after surgery.

One variable that remains incompletely understood is the influence of the anesthetist's level of experience on the incidence and severity of POST.[11] Some studies have suggested that the skill and experience of the intubator do not significantly affect the risk of developing postoperative sore throat.[12-14] For example, a prospective observational study involving 266 surgical patients reported no significant difference in POST incidence between intubations performed by trainees and senior anesthetists.[15-17] Conversely, other research, including larger observational studies, has indicated that less experienced practitioners may be associated with a higher incidence of postoperative airway complaints, suggesting that operator expertise could be an independent risk factor.[18]

These contradictory findings highlight the need for a well-designed, prospective study to clarify the relationship between intubator experience and postoperative sore throat.[19] Such evidence is critical to inform anesthetic training programs and to establish guidelines for supervision and practice standards that prioritize patient safety and comfort.[20]

The present study is designed as a prospective randomized single-blinded trial to compare the incidence of postoperative sore throat in patients undergoing conventional laryngoscopy and endotracheal intubation performed by trainees versus senior anesthetists. In addition to the primary outcome of sore throat incidence, secondary outcomes including the pressor response during intubation and the duration of intubation will be assessed. This comprehensive approach aims to elucidate not only the clinical outcomes but also the physiological

impact of operator experience during airway management.

AIM

The primary objective of this study is to compare the incidence of postoperative sore throat in patients undergoing conventional laryngoscopy and endotracheal intubation performed by trainees versus senior anaesthetists.

Secondary objectives include:

- To compare the hemodynamic pressor response during intubation between the two groups.
- To assess the duration of laryngoscopy and intubation performed by trainees and senior anaesthetists.

MATERIALS AND METHODS

This prospective, randomized, single-blinded study was conducted on 60 ASA physical status I and II patients, aged 18 to 60 years, scheduled for elective surgeries under general anesthesia requiring endotracheal intubation. Patients with anticipated difficult airways, head and neck surgeries, significant cardiovascular or cerebrovascular diseases, previous difficult intubation, severe respiratory distress, BMI over 30, or those on β -blockers were excluded. Ethical approval was obtained from the Institutional Human Ethical Committee, and written informed consent was secured from all participants. Patients were randomized into two groups based on the operator performing the intubation: trainees (anaesthesia residents with at least 50 prior intubations) and senior anaesthetists (with a minimum of 5 years of experience), with patients blinded to the intubator's experience level. Preoperative preparation included administration of ranitidine 150 mg and alprazolam 0.5 mg the night before and on the morning of surgery, along with securing venous access. Upon arrival in the operating room, standard ASA monitors including ECG, non-invasive blood pressure, and pulse oximetry were applied, and baseline hemodynamic parameters were recorded. General anesthesia was induced with intravenous propofol (1–2 mg/kg) and fentanyl (2 μ g/kg), followed by neuromuscular blockade using atracurium (0.5 mg/kg) with neuromuscular monitoring. Intubation was performed using a Macintosh laryngoscope (blade size 3 or 4) at the discretion of the



intubator, with polyvinyl chloride cuffed endotracheal tubes of 7.5 mm internal diameter lubricated with 2% lignocaine gel. The cuff was inflated with 3 to 7 ml of air to prevent leaks, and intracuff pressure was monitored. Trainee intubations were supervised by senior anaesthetists. The duration of laryngoscopy and intubation, defined as the time from insertion of the laryngoscope into the oral cavity to placement of the endotracheal tube, was recorded using a stopwatch. Anesthesia was maintained with sevoflurane or isoflurane (1.5–2%) in oxygen and air mixture, without nitrous oxide. Fentanyl (0.1–0.2 $\mu\text{g}/\text{kg}$) was administered for analgesia, and neuromuscular blockade was maintained with atracurium (0.1 mg/kg), reversed at the end of surgery with neostigmine (0.05 mg/kg) and glycopyrrolate (0.01 mg/kg). Hemodynamic parameters were recorded at baseline, and at 1, 3, and 5 minutes post-intubation. Postoperatively, patients were monitored for

24 hours for the incidence and severity of sore throat in the surgical intensive care unit, using a 10-point numeric rating scale (0 = no sore throat, 1–3 = mild, 4–7 = moderate, 8–10 = severe with hoarseness or voice changes). Steroid nebulizations were administered if sore throat symptoms occurred. Sample size calculation was based on alpha error of 0.05 and beta error of 0.20, with 30 patients per group. Statistical analysis was performed using appropriate tests, with $p < 0.05$ considered significant.

RESULTS

A total of 60 patients were enrolled and completed the study, with 30 patients in each group—intubations performed by trainees and by senior anaesthetists. The demographic characteristics including age, sex, ASA physical status, and type of surgery were comparable between the two groups ($p > 0.05$).

Table 1: Demographic and Baseline Characteristics of Patients

Parameter	Trainee Group (n=30)	Senior Anaesthetist Group (n=30)	p-value
Age (years), mean \pm SD	39.1 \pm 11.2	41.5 \pm 10.3	0.48
Sex (M/F)	17 / 13	14 / 16	0.62
ASA Grade I / II	19 / 11	21 / 9	0.51
Type of surgery (Elective)	30 (100%)	30 (100%)	—

The overall incidence of postoperative sore throat (POST) was observed in 40.0% of patients intubated by trainees and 26.7% in the senior anaesthetist group. Although the incidence was slightly higher in the trainee group, this difference was not statistically significant ($p = 0.29$). The severity of POST, categorized as mild,

moderate, or severe based on the numeric rating scale, showed no significant difference between the two groups ($p = 0.57$). The majority of patients in both groups reported mild sore throat, with few cases of moderate or severe symptoms.

Table 2: Incidence and Severity of Postoperative Sore Throat (POST)

Outcome	Trainee Group (n=30)	Senior Anaesthetist Group (n=30)	p-value
Incidence of POST (%)	12 (40.0%)	8 (26.7%)	0.29
Severity of POST			0.57
Mild (1–3)	6	5	



Moderate (4–7)	4	2	
Severe (8–10)	2	1	

The mean duration of laryngoscopy and intubation was significantly longer in the trainee group (26.7 ± 5.5 seconds) compared to the senior anaesthetists (17.2 ± 4.9 seconds) ($p < 0.001$).

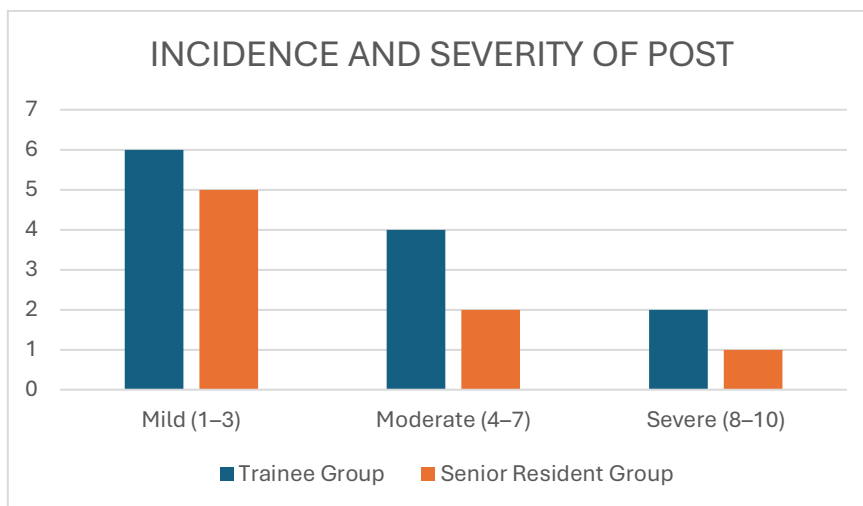


Figure 1 : INCIDENCE AND SEVERITY OF POST

Table 3: Duration of Laryngoscopy and Intubation

Parameter	Trainee Group (seconds)	Senior Anaesthetist Group (seconds)	p-value
Mean duration \pm SD	26.7 ± 5.5	17.2 ± 4.9	<0.001

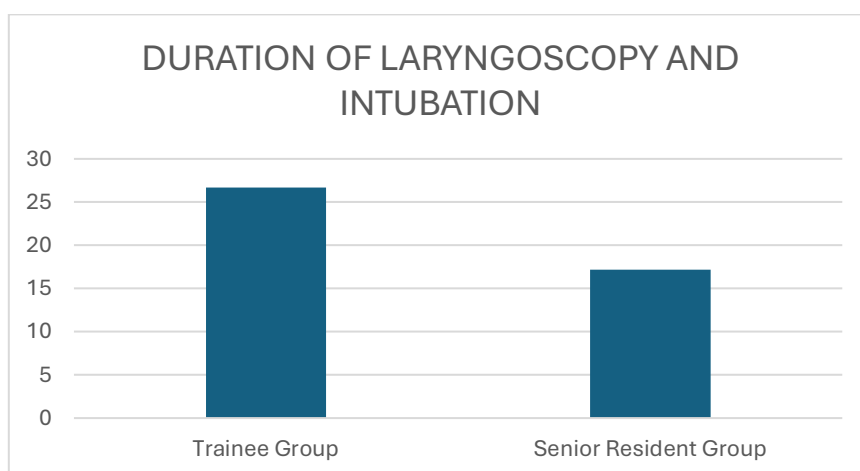


Figure 2 : Duration of Laryngoscopy and Intubation



Hemodynamic parameters including heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean arterial pressure (MAP) were recorded at baseline and at 1, 3, and 5 minutes post-intubation. Both groups exhibited the expected transient pressor response immediately after intubation, with significant

increases in HR and blood pressure at 1 minute ($p < 0.05$ compared to baseline). However, there were no statistically significant differences between trainees and senior anaesthetists in the magnitude or duration of hemodynamic changes at any time point ($p > 0.05$).

Table 4: Hemodynamic Parameters (Mean \pm SD)

Time Point	HR (beats/min)	SBP (mmHg)	DBP (mmHg)	MAP (mmHg)
Baseline				
Trainee	80.3 \pm 8.9	126.7 \pm 13.2	80.1 \pm 7.4	95.2 \pm 7.9
Senior	78.9 \pm 9.4	124.5 \pm 12.7	79.4 \pm 6.8	93.7 \pm 8.3
1 minute post-intubation				
Trainee	97.8 \pm 14.3	149.5 \pm 16.7	94.2 \pm 8.9	112.8 \pm 10.1
Senior	95.7 \pm 13.9	146.8 \pm 15.2	91.8 \pm 9.2	110.4 \pm 11.0
3 minutes post-intubation				
Trainee	86.3 \pm 10.7	134.4 \pm 14.1	85.7 \pm 7.8	101.9 \pm 9.3
Senior	84.5 \pm 11.8	131.6 \pm 13.5	83.9 \pm 8.1	99.7 \pm 8.7
5 minutes post-intubation				
Trainee	81.1 \pm 9.8	126.2 \pm 11.4	79.5 \pm 6.7	95.7 \pm 7.6
Senior	79.4 \pm 8.7	124.3 \pm 10.8	77.8 \pm 6.1	93.5 \pm 7.2

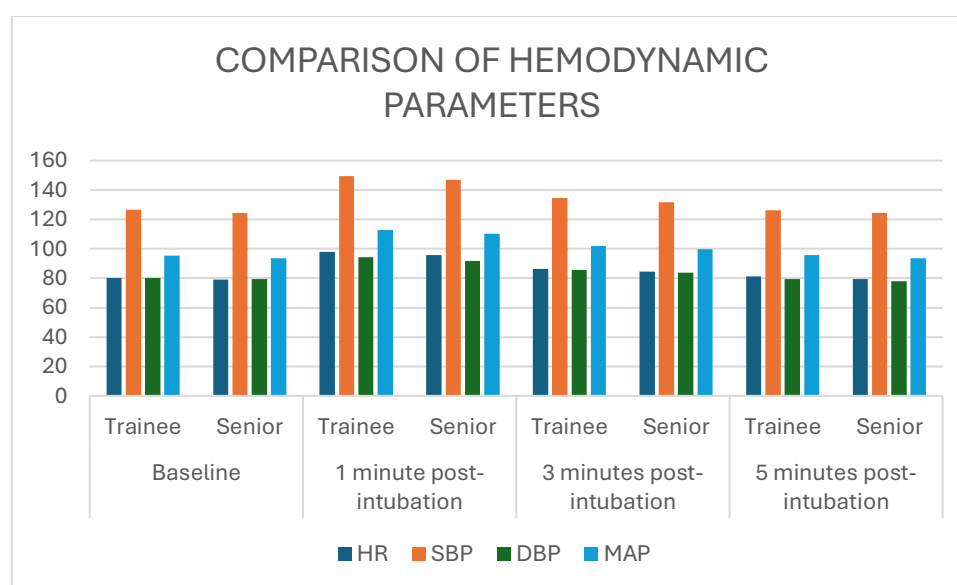


Figure 3 : COMPARISON OF HEMODYNAMIC PARAMETERS



No major complications such as airway trauma, multiple intubation attempts, or failed intubations were reported in either group.

DISCUSSION

Postoperative sore throat (POST) is a common adverse effect following tracheal intubation, with previous studies reporting incidence rates varying from 11% to nearly 50%. The present study found no statistically significant difference in the incidence or severity of POST between patients intubated by trainees and those intubated by senior anaesthetists, although the trainee group showed a numerically higher incidence (40.0% vs. 26.7%).

This aligns with **Inoue et al.**'s[21] large retrospective analysis of over 20,000 patients, which reported no significant difference in POST incidence or duration between tracheal intubations performed by trainees under supervision versus experienced anaesthetists. Both studies emphasize that supervised training effectively minimizes differences in POST related to operator experience.

Similarly, **Christensen et al.**'s[22] prospective study involving more than 1,300 patients documented a POST incidence of approximately 14% and found no significant impact of operator experience on sore throat. Although this study did not specifically distinguish between trainees and seniors, it supported the idea that factors other than experience, such as patient demographics and surgical variables, play a major role.

Conversely, **Jaansson et al.**[23] observed a higher incidence of POST in patients intubated by less experienced personnel, attributing it to increased mucosal trauma and longer intubation times. However, this study lacked strict supervision protocols and did not control for confounders such as cuff pressure or multiple intubation attempts, which are known to affect POST risk.

Regarding intubation duration, the current study found that trainees took significantly longer (26.7 ± 5.5 seconds) than senior anaesthetists (17.2 ± 4.9 seconds). This finding is consistent with previous literature, which reports that less experienced operators generally require more time for airway management. Importantly, despite the longer duration, no increase in POST was observed, suggesting that the quality of technique and supervision

may be more important than intubation speed in preventing sore throat.

Hemodynamic responses to intubation in this study—measured as heart rate, systolic and diastolic blood pressures, and mean arterial pressure—showed the expected transient increases immediately post-intubation but did not significantly differ between trainees and seniors. This is in agreement with studies such as those by **Schmidt et al.**,[24] which reported comparable hemodynamic stress responses when trainees performed intubations under consultant supervision. This finding reassures that supervised trainees do not subject patients to additional cardiovascular stress during airway management.

Other studies, including **Klob's**[25] work on technical factors influencing POST, underscore the importance of adequate cuff pressure monitoring, appropriate tube sizing, and lubrication—elements that appear to mitigate the effect of operator experience. The current study's findings echo this, as trainees were supervised and used standardized equipment and techniques, likely contributing to the absence of increased POST despite longer intubation times.

These comparisons suggest that supervised trainees can perform conventional laryngoscopy and endotracheal intubation safely, without increasing the risk of postoperative sore throat or adverse hemodynamic responses. The results highlight the importance of structured training, proper technique, and close supervision in clinical practice to ensure patient safety and comfort during airway management.

CONCLUSION

The findings of this prospective randomized study indicate that when endotracheal intubation is performed under appropriate supervision and using standardized techniques, the experience level of the intubator—whether a trainee or a senior anaesthetist—does not significantly affect the incidence or severity of postoperative sore throat. Despite the longer duration of laryngoscopy and intubation observed in the trainee group, this did not lead to an increase in postoperative airway complications or hemodynamic instability. This suggests that the quality of intubation technique and proper supervision are more critical factors than operator experience alone in minimizing postoperative discomfort



and physiological stress associated with airway management.

These results reinforce the importance of comprehensive and structured airway management training programs that include simulation-based learning and direct clinical supervision. Such programs ensure that trainees develop the necessary skills to perform safe and effective intubations without compromising patient safety or comfort. Additionally, adherence to best practices such as careful tube sizing, cuff pressure monitoring, and gentle laryngoscopy likely plays a pivotal role in reducing postoperative sore throat, regardless of the operator's experience.

In clinical practice, the safe involvement of trainees in airway management is essential for their education and the ongoing development of competent anaesthetists. The evidence from this study supports continuing this practice under rigorous supervision protocols, ensuring that patient outcomes remain optimal while providing valuable learning opportunities.

The present study contributes important evidence that trainee-performed intubations, when properly supervised and standardized, are comparable to those performed by senior anaesthetists in terms of postoperative sore throat incidence, severity, and hemodynamic effects. This emphasizes that experience alone should not be a barrier to trainee participation in airway management and highlights the value of structured training and supervision in enhancing both patient safety and trainee competence.

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