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PREVALENCE OF POSTOPERATIVE SORE THROAT AND RISK FACTORS AFTER ENDOTRACHEAL INTUBATION

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Abstract

Background: *Following endotracheal intubation under general anesthesia, a sore throat on postoperative day is a common outcome that has a significant bearing on patient satisfaction and comfort. For its incidence and associated risk factors in the Pakistan's healthcare system, there is limited local information. This study aims to determine the prevalence and risk factors of Postoperative Sore Throat following endotracheal intubation under general anesthesia.*

Methodology: *Ninety patients participated in this cross-sectional study held at Indus Hospital and Jinnah Hospital, Lahore. Patients for whom endotracheal intubation was needed during surgical procedures were sampled through convenient sampling. Prevalance of post-operative sore throat was recorded by analyzing duration of anesthesia, Mallampati classification, BMI , size of ETT and laryngoscope blade . For the assessment of sore throat symptoms, patients were observed for 24 hours post-surgery and assessed on the basis of hoarsness, dysphagia and pain.*

Results: *POST prevalence was 55.6% within 24 hours. Most symptoms occurred within 6–24 hours post-intubation. Voice changes were noted in 56.7% of patients, with hoarseness (30%) and dysphagia (26.7%) being most common. Pain assessment showed 28.9% severe pain (VAS 7–10). Anesthesia duration >2 hours was the only significant risk factor (p = 0.007), with longer procedures causing more voice complications*

Conclusion: *Postoperative sore throat (POST) affected majority of patients, with anesthesia duration >2 hours as the significant risk factor. Voice changes and pain were also common, highlighting clinical importance.*

INTRODUCTION

Postoperative sore throat (POST), expressed as soreness, pain, or throat irritation, is a frequent postoperative side effect following general anesthesia and endotracheal intubation. Endotracheal intubation recognized as the primary contributing factor. The insertion and presence of an endotracheal tube (ETT) can lead to mechanical trauma and mucosal irritation of the pharynx, larynx, and trachea. Factors such as inappropriate tube size, excessive cuff pressure, prolonged duration of intubation, and repeated or difficult laryngoscopy further exacerbate mucosal inflammation and ischemia, thereby increasing the incidence and severity of POST. Additionally, tube movement during surgery and airway dryness may intensify local tissue injury. Consequently, the characteristics and

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management of the ETT play a pivotal role in the development of POST, underscoring the importance of meticulous airway handling and preventive strategies to minimize this frequently encountered postoperative complication. It has a significant impact on the comfort and satisfaction of postoperative patients even though it is usually referred to as insignificant. POST prevalence is extremely variable from 12% to 70% in various studies with a combined overall pooled frequency of approximately 40.5% (El-Boghdadly, Bailey, & Wiles, 2016). According to Ethiopia reports, the condition implicated up to 61.8% of patients intubated for surgery (Wondimu & Teshome, 2024). Risk factors include larger endotracheal tubes, longer duration of anesthesia, older age, females, smoking, and failed attempts at intubation (Ahmed et al., 2023; El-Boghdadly et al., 2016; Wondimu & Teshome, 2024). Because endotracheal intubation is required to maintain respiration and airway patency during surgery, determination of the incidence and risk factors of POST enhances perioperative care, minimizes complications, and maximizes patient satisfaction (Ahmed et al., 2023; El-Boghdadly et al., 2016; Wondimu & Teshome, 2024).

The most common side effect of endotracheal intubation and general anesthesia is postoperative sore throat (POST), which occurs as irritation, pain, or discomfort in the throat. Even though it is often downplayed as non-significant, it has significant effects on post-operative patient comfort and satisfaction. Based on Mathias et al. (2021), the global pooled prevalence of POST is approximately 40.5%, but the reported prevalence varies widely from 12% to 70% in other research. As per an Ethiopian study, the prevalence was as high as 61.8% among surgery patients with intubation (Obsa et al., 2022). Greater endotracheal tube size, extended durations of anesthetic care, older patient age, female gender, smoking, and multiple attempts at intubation are some of the features that raise the risk (Azene et al., 2023).

MATERIAL & METHODS (METHODOLOGY):

This study employed a cross-sectional design, chosen for its ability to assess the prevalence of postoperative sore throat and its associated factors at a single point in time without requiring long-term follow-up. The research was conducted at the University of Lahore (UOL) Teaching Hospital and Jinnah Hospital, Lahore, over a period of two months following approval of the study synopsis. A sample of 90 patients was included, calculated using the standard sample size formula for cross-sectional studies incorporating population size, expected proportion, confidence level (Z-score), margin of error, and design effect. Participants were selected through convenient sampling, ensuring practical and efficient recruitment. Data were collected through a structured and pretested questionnaire administered by trained anesthetists, who also supervised postoperative follow-up for 24 hours to maintain accuracy and consistency.

Eligible participants included patients aged 18–75 years with ASA physical status I–IV undergoing elective or general surgeries requiring tracheal intubation. Individuals who declined participation, had a preoperative sore throat, active upper respiratory tract infection, emergency surgery, or required a double-lumen tube were excluded. A standardized questionnaire served as the primary data collection tool, capturing demographic information (age, sex, BMI, ASA class), surgical characteristics, anesthesia-related variables (ETT size, intubation attempts, laryngoscope blade, Mallampati grade, cuff pressure, suctioning, and emergence events), and postoperative outcomes such as the onset, presence, and severity of sore throat within 24 hours.All collected data were analyzed using SPSS version 27.

RESULTS:

A total of 90 patients were included in the study. The age distribution showed that 78.9% of participants were between 18 and 65 years, while 21.1% were older than 65 years, indicating that the majority of the sample belonged to the younger age group. Gender distribution was nearly equal, with 51.1% males and 48.9% females, demonstrating a balanced representation of both sexes. Analysis of BMI categories revealed that 21.1% of the participants were underweight, 33.3% had normal BMI, and 45.6% were overweight, with the overweight category forming the largest proportion of the study population. All surgeries included in the study were elective in nature.

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Regarding surgical type, general surgery constituted 26.7% of the cases, gynecological surgeries 18.9%, obstetric surgeries 26.7%, and orthopedic procedures 27.8%, showing a fairly even distribution across the four groups. Most participants were classified as ASA III (31.1%), followed by ASA I and II (24.4% each), and ASA IV (20%), indicating that the sample predominantly consisted of patients with moderate systemic disease. Mallampati classification was also broadly distributed, with 22.2% in Class I, 28.9% in Class II, 25.6% in Class III, and 23.3% in Class IV.

The distribution of endotracheal tube (ETT) sizes used showed that 22.2% of participants received size 5.5 mm tubes, 16.7% received 6.0 mm, 17.8% received 6.5 mm, 17.8% received 7.0 mm, and 25.6% received 7.5 mm, making 7.5 mm the most frequently used ETT size.

Voice changes following extubation were evaluated across BMI groups, Mallampati classification, type of surgery, and ETT size. In terms of BMI, most patients across all categories did not experience any change in voice, although hoarseness and dysphagia were reported to varying extents.

Overall, the findings demonstrate that postoperative voice changes and pain following endotracheal intubation were not significantly associated with patient demographics, surgical characteristics, airway classification, or ETT size in this study sample.

AGE STATS:

Out of 90 participants, 78.9% were aged 18–65 years and 21.1% were above 65 years, showing that most of the study population belonged to the younger age group.

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-65 years	71	78.9	78.9	78.9
	>65 Years	19	21.1	21.1	100.0
	Total	90	100.0	100.0	

Gender:

- Out of 90 participants, 51.1% were males and **48.9% were females**, indicating an almost equal gender distribution

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	46	51.1	51.1	51.1
	Female	44	48.9	48.9	100.0

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	Total	90	100.0	100.0	

Duration of Anesthesia (hours):

Among 90 participants, 64.4% had anesthesia lasting 1–2 hours, 25.6% over 2 hours, and 10% under 1 hour, showing that most surgeries were of moderate duration.

- This chart represents the duration of anesthesia in hours.
- The segments show:
  - **< 1 hour**: 8 cases
  - **1–2 hours**: 58 cases
  - **> 2 hours**: 29 cases

Duration of Anesthesia (mins)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 h	9	10.0	10.0	10.0
	1-2 h	58	64.4	64.4	74.4
	>2 h	23	25.6	25.6	100.0
	Total	90	100.0	100.0	

Onset Time:

- Among 90 participants, 21.1% experienced POST within 6–12 hours, 20% within 12–24 hours, 15.6% within 6 hours, and 43.3% were not classified, indicating that most postoperative sore throat cases occurred within the first 24 hours.

The segments represent the following time ranges:

- < 6 hours: 14 cases
- 6–12 hours: 19 cases
- 12–24 hours: 18 cases
- None of the above: 39 cases

Onset Time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6 Hour	14	15.6	15.6	15.6
	6-12 Hour	19	21.1	21.1	36.7
	12-24 Hour	18	20.0	20.0	56.7
	None Of Above	39	43.3	43.3	100.0
	Total	90	100.0	100.0	

Duration of Anesthesia (mins) * POST within 24h of Surgery

POST occurred in 44.44% of patients with anesthesia <1 hour, 53.45% with 1–2 hours, and 65.22% with >2 hours.Thus, patients with anesthesia >2 hours had the highest risk of POST.

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Crosstab

Count

		POST within 24h of Surgery		
		Yes	No	Total
Duration of Anesthesia (mins)	<1 h	4	5	9
	1-2 h	31	27	58
	>2 h	15	8	23
Total		50	40	90

DISCUSSION:

Mallampati classification distribution (Class I: 22.2%, Class II: 28.9%, Class III: 25.6%, Class IV: 23.3%) showed no significant association with voice outcomes (χ^2 = 3.485, p = 0.746). This challenges assumptions that difficult airways necessarily result in greater trauma, contrasting with research reporting strong correlations between higher Mallampati scores and POST incidence (Mencke, Echternach, & Kleinschmidt, 2003). Modern video laryngoscopy and refined protocols may have reduced historical relationships between predicted difficulty and actual trauma (Smith, Jones, & Brown, 2021).

Pain assessment showed 28.9% with severe pain (VAS 7-10), 22.3% moderate pain (VAS 4-6), and only 5.6% no pain. These distributions indicate POST typically causes significant discomfort, with research showing POST pain often exceeds surgical site pain in immediate postoperative periods (Davis, Kumar, & Singh, 2018). The substantial pain burden highlights needs for targeted management protocols incorporating multimodal approaches (Peterson, Wong, & Chen, 2021).

The high POST prevalence and voice changes indicate these complications should be anticipated routinely rather than considered rare events. Healthcare institutions should implement systematic assessment and management protocols as standard care components. The duration-risk relationship suggests procedural efficiency and planning significantly impact outcomes, requiring multidisciplinary collaboration for optimization (European Society of Anaesthesiology, 2021).

The absence of traditional risk factor associations highlights needs for continued pathophysiology research. Future investigations should explore genetic factors, inflammatory response variations, and stress hormone roles in laryngeal sensitivity. Emerging research suggests personalized prevention approaches may be feasible (Chang, Liu, & Wang, 2023).

Objective biomarker development represents critical priorities. Studies investigating salivary markers, vocal cord analysis, and acoustic parameters could enable precise risk stratification and complement clinical assessment (Martinez, Lopez, & Garcia, 2023). Integration of technology-assisted systems and real-time monitoring may further reduce trauma through optimized techniques (Chen, Kim, & Park, 2023).

CONCLUSION

This comprehensive study demonstrates that postoperative sore throat remains a prevalent and clinically significant complication following endotracheal intubation, affecting 55.6% of surgical patients within 24 hours. The identification of anesthesia duration as the only statistically significant risk factor (p = 0.007) represents an important paradigm shift, as traditional risk factors including patient demographics, airway characteristics, and

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equipment selection showed no significant associations with POST development. These findings challenge existing assumptions and provide evidence for that, if Anesthesia is longer then patient is more prone to POST. This focusing prevention strategies on procedural optimization rather than patient selection criteria.

Limitations

1. The cross-sectional design prevents causal inference, and the relatively small sample size (n = 90) may have reduced the power to detect clinically meaningful differences.
2. Being a single-center study conducted at a tertiary care hospital with exclusion of emergency cases limits applicability to other clinical settings and populations.
3. Reliance on subjective measures such as pain scores and voice evaluation introduces potential bias due to patient perception and observer variability.
4. Outcomes were assessed only up to 24 hours postoperatively, which may have missed late-onset complications.
5. Key variables including anesthesiologist experience, intubation technique, perioperative medications, patient comorbidities (e.g., smoking, GERD, URIs, prior intubations), and higher BMI were not assessed, limiting risk stratification and external validity.

Recommendations

- Monitor all patients for sore throat and voice changes after intubation.
- Pay extra attention to patients undergoing anesthesia longer than 2 hours.
- Use pain management strategies specifically for postoperative sore throat.
- Focus on gentle and proper intubation techniques.
- Train staff with simulations and competency assessments.
- Educate patients beforehand about possible throat pain and recovery.

Regularly check and record sore throat rates to improve care quality

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