

Original Article

Postoperative Sore Throat Following General Surgical Procedures under General Anesthesia with Endotracheal Intubation

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ABSTRACT

Background: Postoperative sore throat (POST) is a frequent complication following general anesthesia with tracheal intubation, significantly impacting patient comfort and satisfaction. Despite being considered a minor issue by healthcare providers, POST remains a substantial concern for patients. The incidence of POST varies widely among different studies, necessitating further investigation into its prevalence and contributing factors.

Objective: To evaluate the prevalence of postoperative sore throat among patients undergoing elective and general surgeries requiring tracheal intubation under general anesthesia at two teaching hospitals in KPK, Pakistan, and to identify factors associated with its occurrence.

Methods: A descriptive cross-sectional study was conducted from July to December 2023 at Mardan Medical Complex, Mardan, and Northwest General Hospital and Research Center, Peshawar. A total of 295 patients aged 18-65 years, with ASA physical status I or II, undergoing elective and general surgeries with tracheal intubation, were included using a convenience sampling technique. Exclusion criteria included unwilling participants, those with preoperative sore throat, emergency surgeries, and ASA physical status III or IV. Data were collected on patient demographics, surgical details, and postoperative symptoms. Patients were interviewed 1 to 2 hours post-surgery about symptoms such as throat pain, dysphagia, thirst, and hoarseness. The data were analyzed using SPSS version 25, and frequencies and percentages were computed for categorical variables. The study adhered to ethical standards in line with the Declaration of Helsinki.

Results: Out of 295 patients, 115 (38.9%) experienced postoperative sore throat. Among males, 30.5% (41/134) reported POST, whereas 45.9% (74/161) of females were affected. Age-wise, 22.3% (44/197) of patients aged 18-30 years reported POST, compared to 85.0% (23/27) aged 31-40 years, 75.5% (34/45) aged 41-55 years, and 53.8% (14/26) aged over 56 years. The incidence of POST was higher with larger ETT sizes: 13.9% (9/65) for size 6.0, 29.9% (29/97) for size 6.5, 61.5% (24/39) for size 7.0, and 63.6% (42/66) for size 7.5. Only 3.5% (1/28) of patients using LMA reported POST. Surgical procedure duration also influenced POST incidence: 33.9% (18/53) for incision and drainage, 37.0% (33/89) for appendectomy, 44.6% (21/47) for laparotomy, 35.4% (11/31) for hernia repair, and 42.6% (32/75) for other surgeries.

Conclusion: The study identified a 38.9% incidence of postoperative sore throat among patients undergoing surgeries with tracheal intubation under general anesthesia. Factors such as gender, age, ETT size, and type of surgical procedure significantly influenced the occurrence of POST. Awareness and specific guidelines are essential to manage and reduce the incidence of POST, thereby improving patient outcomes and satisfaction.

Keywords: postoperative sore throat, general anesthesia, tracheal intubation, elective surgery.

INTRODUCTION

Anaesthesia-related complications, such as postoperative sore throat (POST), are frequent and often overlooked despite their significant contribution to perioperative morbidity. A sore throat, characterized by a dry, uncomfortable feeling, frequently results from nerve irritation and injuries during elective surgical operations involving tracheal intubation. Endotracheal intubation, an essential technique performed by healthcare professionals, involves inserting an endotracheal tube into the patient's trachea, typically by visualizing the airway with a laryngoscope or bronchoscope (1). While crucial for maintaining an airway during anaesthesia, this procedure carries inherent risks, necessitating careful evaluation of potential hazards, strategies for managing complications, and awareness of possible issues such as hypertension, tachycardia, airway injury, bleeding, oral and dental damage, bronchoconstriction, laryngeal swelling, and postoperative sore throat (2, 3).

Postoperative sore throat, a common complication following general anaesthesia with intubation, has a high incidence rate but is often underappreciated. The exact etiology is not entirely understood, though it is believed to be associated with dehydration or swelling of the mucosal lining, reduced tracheal blood supply due to endotracheal tube cuff pressure, forceful oropharyngeal suctioning, and soft tissue damage from endotracheal tube contact (4). Symptoms of POST include pharyngitis, pain, discomfort, laryngitis, tracheitis, hoarseness, cough, and dysphagia, all of which can arise from various factors (5).

Numerous studies have identified factors contributing to POST, including female gender, smoking, difficult intubation, use of Succinylcholine, high endotracheal cuff pressures, airway suctioning, prolonged surgeries, laryngeal mask use, tissue damage during laryngoscopy, oropharyngeal airways, and larger tracheal tube sizes. The inflammation triggered by intubation-induced damage causes the windpipe lining to release inflammatory mediators, which then affect sensory nerves in the airways (6). POST impacts 30% to 70% of patients after tracheal intubation, with higher rates occurring during tracheal intubation (14.4% to 50%) compared to laryngeal mask airway insertion (5.8% to 34%) and significantly lower rates with face mask anaesthesia (7, 8).

A thorough review indicates the incidence of POST can reach up to 62% following general anaesthesia. Key risk factors among adults include female gender, younger age, pre-existing lung disease, longer anaesthesia duration, and blood-stained tracheal tubes after extubation (9, 10). The higher incidence in females is linked to the use of more tightly fitting endotracheal tubes (ETTs) rather than a gender-specific difference (11). Research suggests that using smaller ETT diameters (6.5mm to 7mm for women and 7.5mm to 8mm for men) reduces POST occurrences compared to larger ETTs (12).

A 2006 study in Nigeria involving patients aged 18 to 77 found that 63% experienced POST, closely related to the intubation duration (13). Significant risk factors include ETT size, cuff pressure, anaesthetic spray use, female gender, anaesthesia duration, patient positioning, Succinylcholine administration, concurrent nasogastric tube use, forceful oropharyngeal secretion removal, and the chosen airway management method (endotracheal tube, laryngeal mask airway, or face mask) (14). Pharmacological interventions to mitigate POST have been extensively studied, with dexamethasone, a commonly researched steroid, showing efficacy in reducing POST incidence and severity when administered intravenously at doses exceeding 0.1 mg/kg (16). Additionally, research on the direct application of lidocaine to the glottis has demonstrated beneficial effects, although the use of lidocaine lubricants and sprays remains controversial, with mixed evidence regarding their effectiveness (17, 18, 19).

This study aims to determine the incidence of postoperative sore throat following endotracheal intubation during general anaesthesia at two teaching hospitals in KPK, Pakistan. By identifying the contributing factors and assessing the prevalence of POST, this research seeks to inform better clinical practices and improve patient outcomes in the perioperative setting.

MATERIAL AND METHODS

The study utilized a descriptive cross-sectional approach to evaluate the prevalence of postoperative sore throat among patients undergoing elective and general surgeries requiring tracheal intubation under general anaesthesia at Mardan Medical Complex, Mardan, and Northwest General Hospital and Research Center, Peshawar. Conducted from July to December 2023, the study received approval from the Institute's ethical review committee. A convenience sampling technique, a non-probability approach, was employed to select participants. Data on patient age, gender, and American Society of Anesthesiologists (ASA) physical status were documented using a standardized form.

Prior to the surgical procedures, routine informed consent for the surgery and anaesthesia was obtained from each patient. Detailed records of the specific surgical procedure, its duration, the type of airway device used (either an endotracheal tube [ETT] or a laryngeal mask airway [LMA]), the size of the ETT, and the patient's position during surgery were maintained. After surgery, patients were monitored until they regained consciousness and could respond to commands. Once stable, they were transferred to the post-anaesthesia care unit and subsequently to the ward within 45 minutes to an hour. One to two hours post-surgery, patients were

interviewed by one of the researchers regarding symptoms such as throat pain, dysphagia, thirst, and hoarseness of voice. This information was recorded in a structured datasheet.

The study included 295 patients, calculated based on a prevalence rate of 0.26% for postoperative sore throat, with a 95% confidence interval and a 5% margin of error. The sample size calculation followed the formula:

$$n = Z^2 \cdot p \cdot (1-p) / E^2$$

where n is the sample size, Z is 1.96 (reflecting a 95% confidence interval), p is the prevalence rate (0.26), and E is the margin of error (0.05). Substituting the values into the formula:

$$n = (1.96)^2 \cdot 0.26 \cdot (1-0.26) / (0.05)^2 = 295$$

Informed consent was obtained from all participants prior to data collection. Inclusion criteria were restricted to patients aged 18 to 65 undergoing elective and general surgeries requiring tracheal intubation under general anesthesia, with an ASA physical status of grades 1 or 2, and willingness to participate. Exclusion criteria included unwilling participants, those with a preoperative sore throat, those unable to communicate, patients undergoing emergency procedures, individuals with mouth tumors, hyperplasia, or non-cooperative behavior, patients under 16 or over 65, and those classified as ASA 3 or 4.

Data were analyzed using SPSS version 25. Frequency and percentage were computed for all categorical variables to determine the prevalence of postoperative sore throat in the study population. Ethical considerations adhered to the Declaration of Helsinki, including obtaining prior authorization from relevant authorities, ensuring informed consent with the option for participants to withdraw at any time, respecting participant autonomy, and maintaining data confidentiality. The study was conducted independently without external financial support, thereby eliminating potential conflicts of interest (Declaration of Helsinki).

RESULTS

Table 1: Frequency of Postoperative Sore Throat

Sore Throat	Frequency	Percentage (%)
Yes	115	38.9%
No	180	61.1%
Total	295	100%

Table 2: Comparison of Sore Throat by Gender

Gender	Sore Throat		Total
	Yes	No	
Male	41 (30.5%)	93 (69.4%)	
Female	74 (45.9%)	87 (54.0%)	
Total	115 (38.9%)	180 (61.1%)	

Table 3: Age and Sore Throat

Age	Sore Throat		Total
	Yes	No	
18-30	44 (22.3%)	153 (77.6%)	
31-40	23 (85.0%)	4 (14.8%)	
41-55	34 (75.5%)	11 (24.4%)	
>56	14 (53.8%)	12 (46.1%)	
Total	115 (38.9%)	180 (61.1%)	

Table 4: ETT Size and Sore Throat

ETT Size	Sore Throat		Total
	Yes	No	
6.0	9 (13.9%)	56 (86.1%)	
6.5	29 (29.9%)	68 (70.1%)	
7.0	24 (61.5%)	15 (38.4%)	
7.5	42 (63.6%)	24 (36.3%)	
Total	114 (42.6%)	153 (57.3%)	

Table 5: Sore Throat Development in Patients Using LMA

LMA Size	Sore Throat		Total
	Yes	No	
3.0	0 (0%)	5 (100%)	5 (100%)
4.0	1 (4.34%)	22 (95.6%)	22 (95.6%)
Total	1 (3.5%)	27 (96.4%)	27 (96.4%)

Table 6: Duration of Surgical Procedures and Sore Throat

Surgical Procedure	Sore Throat		Total
	Yes	No	
Incision and Drainage	18 (33.9%)	35 (66.1%)	35 (66.1%)
Appendectomy	33 (37.0%)	56 (62.9%)	56 (62.9%)
Laparotomy	21 (44.6%)	26 (55.3%)	26 (55.3%)
Hernia	11 (35.4%)	20 (64.5%)	20 (64.5%)
Other Surgeries	32 (42.6%)	43 (57.3%)	43 (57.3%)
Total	115 (38.9%)	180 (61.1%)	180 (61.1%)

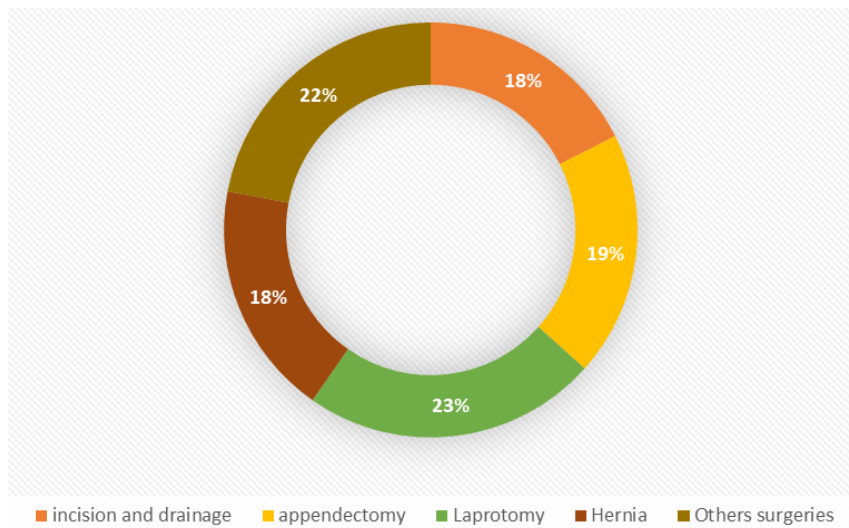


Figure 1 Distribution of Different Types of Surgeries

The study assessed the prevalence of postoperative sore throat (POST) among patients undergoing elective and general surgeries requiring tracheal intubation under general anesthesia at two hospitals in KPK, Pakistan. The findings revealed that out of the 295 patients included in the study, 115 (38.9%) reported experiencing a postoperative sore throat, while 180 (61.1%) did not (Table 1).

A comparison of sore throat incidence by gender indicated that 41 out of 134 males (30.5%) reported a sore throat, compared to 74 out of 161 females (45.9%). This suggests a higher prevalence of postoperative sore throat among female patients (Table 2). The distribution of sore throat incidence across different age groups showed that patients aged 18-30 years had the lowest incidence, with 44 out of 197 (22.3%) reporting a sore throat. In contrast, the age group 31-40 years had the highest incidence, with 23 out of 27 (85.0%) reporting sore throat. The age group 41-55 years had 34 out of 45 patients (75.5%) reporting sore throat, and patients older than 56 years had an incidence rate of 53.8%, with 14 out of 26 patients affected (Table 3).

The size of the endotracheal tube (ETT) used during surgery also impacted the incidence of postoperative sore throat. Patients intubated with a 6.0 mm ETT reported the lowest incidence, with 9 out of 65 (13.9%) experiencing a sore throat. For those with a 6.5 mm ETT, 29 out of 97 (29.9%) reported sore throat, while 24 out of 39 patients (61.5%) with a 7.0 mm ETT, and 42 out of 66 patients (63.6%) with a 7.5 mm ETT reported sore throat (Table 4). The incidence of sore throat among patients using a laryngeal mask airway (LMA) was notably lower. Only 1 out of 28 patients (3.5%) reported a sore throat, with size 4.0 LMA associated with this single case (Table 5).

Regarding the duration of surgical procedures, different types of surgeries were analyzed. Patients undergoing incision and drainage procedures had an incidence rate of 33.9% (18 out of 53), while appendectomy patients had a sore throat incidence of 37.0% (33 out of 89). Laparotomy procedures had a higher incidence rate at 44.6% (21 out of 47). Hernia surgeries resulted in a sore throat incidence of 35.4% (11 out of 31), and other types of surgeries had an incidence rate of 42.6% (32 out of 75) (Table 6). The detailed distribution of surgical procedures contributing to postoperative sore throat is also visually represented in the accompanying figure, highlighting the relative contributions of different surgery types (Figure 1).

These results underscore the significant prevalence of postoperative sore throat, with notable variations across gender, age groups, ETT sizes, and types of surgical procedures. The findings highlight the importance of tailored approaches to minimize the risk of POST, especially in high-risk groups.

DISCUSSION

The study found that 115 out of 295 patients (38.9%) experienced postoperative sore throat (POST) following elective and general surgeries that required tracheal intubation under general anesthesia. This incidence is consistent with findings from a different study involving 809 patients, which reported a 40% incidence rate of POST (20). The prevalence of postoperative sore throat varies significantly across different investigations, with reported rates ranging from 12.1% to 70% (21). For instance, a 2006 study in Nigeria observed a 63% incidence rate among patients aged 18 to 77, highlighting the correlation between sore throat prevalence and the duration of intubation (22). Another study by Bekele et al. reported a 61.8% prevalence among patients undergoing surgery with endotracheal tubes (ETTs) under general anesthesia (23).

The current study corroborated previous findings that the size of the endotracheal tube is a critical factor in the incidence of POST. Specifically, the use of a 6.0mm ETT significantly reduced the likelihood of postoperative sore throat in female patients, aligning with the conclusions of Rehman et al. (24). Additionally, the study noted that patients intubated with larger ETTs, such as 7.0mm and 7.5mm, had higher rates of POST compared to those with smaller tubes, reinforcing the importance of selecting appropriate tube sizes to minimize throat discomfort.

In pediatric populations, the incidence of POST also varies. An Ethiopian study reported a 45% occurrence rate in children intubated with ETTs (25), while a 2019 study in England found a 36.5% incidence among pediatric patients undergoing general anesthesia surgery. These variations highlight the need for tailored approaches in different demographic groups to mitigate the risk of POST.

The reduction of postoperative sore throat can significantly enhance patient satisfaction, shorten hospital stays, and reduce overall healthcare costs (26). Both pharmacological and non-pharmacological methods have been explored to alleviate POST, with varying degrees of success. Recommendations from prior research include using smaller tubes, water-soluble jelly for lubrication, and reducing cuff pressure. Pharmacological interventions such as lignocaine jelly, lozenges, gargling with lignocaine and ketamine, and steroid nebulization have also been proposed (27, 28). Notably, studies have shown that K-Y jelly is more effective than lidocaine jelly in preventing POST (29).

This study emphasized the impact of surgical duration, patient age, gender, ASA classification, and positioning on the incidence of POST. Patients over 40 were found to be more susceptible to sore throats compared to younger individuals. The findings also indicated that the choice of airway management technique, particularly the use of larger diameter ETTs during lengthy surgeries, significantly influenced the occurrence of POST. As an alternative, laryngeal mask airways (LMAs) were associated with a lower incidence of sore throat, suggesting their potential as a preferable option in certain cases.

Despite its strengths, the study had limitations, including the use of a convenience sampling method, which may limit the generalizability of the results. Additionally, the study was conducted in only two hospitals, potentially limiting the applicability of the findings to other settings. Future research should aim to include a more diverse patient population and explore additional variables that may influence the incidence of POST.

CONCLUSION

The study underscored the high prevalence of postoperative sore throat, highlighting the need for increased awareness and specific guidelines among healthcare professionals to manage and reduce this common postoperative complaint. The choice of tracheal tube size and airway management techniques were identified as critical factors in minimizing the risk of POST. By adopting appropriate preventive measures, the incidence of postoperative sore throat can be significantly reduced, thereby improving patient outcomes and satisfaction.

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