

Prevalence of Decreased Bowel Movements in Tracheostomy Patients in a Tertiary Care Hospital

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Abstract: Tracheostomy alters laryngeal mechanics and may impair the Valsalva manoeuvre, predisposing patients to decreased bowel movements and constipation. Evidence on constipation using the Rome IV criteria in adult tracheostomy patients is limited. **Objective:** To determine the prevalence of Rome IV-defined constipation and describe bowel symptoms among adult tracheostomy patients in a tertiary-care setting. **Methods:**

This single-centre prospective study enrolled consecutive adults (≥ 18 years) who underwent tracheostomy at the Otorhinolaryngology Department, Dow University of Health Sciences & Dr. Ruth K. M. Pfau Civil Hospital, Karachi, Pakistan, from March to May 2025. Patients had a tracheostomy in place for ≥ 30 days; those with prior gastrointestinal disorders, constipation secondary to medications, current laxative use, or ICU/vegetative state were excluded. Participants completed a questionnaire at 1-month follow-up, capturing demographics and Rome IV items. Categorical variables were compared with Chi-square tests and continuous variables with independent-samples t-tests ($\alpha=0.05$). **Results:** Ninety-five patients were included (mean age 51.9 ± 15.6 years; 78.9% male). Prior constipation was reported by 3.2% ($n=3$); none were on constipation medications, and none had colon or neurological disease. Overall, 91.5% reported hard stools in the prior two weeks; 57.9% had hard stools in $\geq 50\%$ of defecations; 71.6% strained in $>25\%$ of defecations; 29.4% reported incomplete evacuation in $>25\%$; 29.5% experienced anorectal obstruction in 25%; 11.6% required manual evacuation; and 86.3% had <3 Spontaneous bowel movements/week. Rome IV constipation prevalence was 71.6% (68/95). Compared with non-constipated patients, the constipated group more often had hard stools $\geq 50\%$ (100% vs 0%), straining $>25\%$ (100% vs 0%), anorectal obstruction 25% (41.2% vs 0%), manual evacuation (16.2% vs 0%), and precisely two bowel movements/week (95.6% vs 51.9%) (all $p<0.001$ except manual evacuation $p=0.030$). Age did not differ significantly (51.1 ± 15.7 vs 53.9 ± 15.4 years; $p=0.439$). **Conclusions:** Constipation by Rome IV criteria is highly prevalent (72%) one month after tracheostomy in this tertiary-care cohort, despite minimal prior diagnoses. Routine screening and early bowel regimens (including hydration, fibre, mobilization, and laxatives as indicated) should be integrated into post-tracheostomy care pathways. Multicentre, longer-term studies are warranted to confirm these findings and identify modifiable risk factors.

Keywords: tracheostomy; constipation; Rome IV; bowel movements; tertiary care; Pakistan

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Introduction

Tracheostomy is a standard procedure performed to provide an alternative airway and assist patients with respiratory compromise. It is indicated in various clinical settings, including neck dissection, prolonged mechanical ventilation, glottic cancers, and neurological conditions such as paralysis (1). Additionally, tracheostomy is employed in patients with respiratory failure, such as those with chronic obstructive pulmonary disease (COPD), to alleviate airway obstruction, reduce breathing resistance, and decrease dead space (2). It also facilitates oral hygiene, enables oral nutrition, and permits speech (3). Compared to endotracheal tubes, tracheostomies, due to their rigid structure, shorter length, and in some models, a removable inner cannula, are associated with decreased airflow resistance and reduced work of breathing. Reported advantages of tracheostomy include a more secure airway, increased patient comfort, improved airway suctioning, early transfer of ventilator-dependent patients from the intensive care unit (ICU), reduced risk of endolaryngeal injury, enhanced oral nutrition and phonation, and decreased incidence of nosocomial pneumonia in specific patient subgroups (3, 4). However, the presence of a tracheostomy can disrupt essential laryngeal functions, including phonation, secretion clearance, respiration, and straining. The tracheostomy stoma creates a pressure leak, reducing the ability to generate sufficient intra-abdominal pressure, which is necessary for effective swallowing, abdominal straining, and defecation. Consequently,

tracheostomy patients may experience decreased bowel movements and difficulty in defecation due to impaired Valsalva manoeuvre (5). Constipation is a common gastrointestinal complaint in patients with tracheostomy or other laryngeal stomata. It is one of the most prevalent digestive disorders, affecting 16–24% of adults, with higher rates observed in hospitalised elderly individuals (6, 7). Constipation may manifest as a primary disorder or develop as a secondary condition to other underlying conditions. In case of primary constipation, the Rome IV criteria are applied to assess when there is no identifiable cause of the constipation in an adult. Risk factors include reduced physical activity, certain medications, poor socioeconomic status, depression, and stress (7). A systematic review reported that the prevalence of constipation in the general population ranges from 0.7% to 79% (median, 16%). Among children, prevalence rates ranged from 0.7% to 29.6% (median 12%), with a female-to-male ratio of 2.1:1 for functional constipation (8, 9). In a study conducted in Turkey, ICU patients with tracheostomy were evaluated post-discharge, with constipation identified as the most common nutritional problem, affecting 42.9% of patients (10). The underlying mechanism is likely related to decreased intra-abdominal pressure and impaired Valsalva manoeuvre. To our knowledge, no study has evaluated the frequency of constipation according to the Rome IV criteria in adult tracheostomy patients, except for one study focusing on



paediatric tracheostomy patients. Therefore, our study aims to assess the frequency of constipation in adult tracheostomy patients to determine the need for prophylactic laxatives or other therapeutic interventions in this patient population.

Methodology

This single-centre, hospital-based prospective longitudinal study included all adult patients (≥ 18 years of age) of either gender who underwent tracheostomy over a period of 3 months, from March 2025 to May 2025, at the Otorhinolaryngology (ENT) Department, Dow University of Health Sciences (DUHS) & Dr. Ruth K.M. Pfau Civil Hospital, Karachi, Pakistan. Civil Hospital is one of the significant public tertiary care referral hospitals in the Sindh province. All patients with a tracheostomy in place for at least 30 days, including those with head and neck cancer and patients on a PEG tube with a liquid diet, were included in the study. Patients with a prior history of gastrointestinal disorders, constipation due to any medications, or those on laxatives were excluded. Additionally, patients in the ICU and those in a vegetative state were excluded from the study.

After obtaining approval from the CPSP and the institutional Ethical Review Committee (ERC) at DUHS, Civil Hospital, patients undergoing tracheostomy from the ENT clinic at Ruth K. M. Pfau Civil Hospital, Karachi, were recruited for the study at the time of admission. The project was explained to all participants, and informed consent was obtained. Relevant baseline data, including age and gender, were collected for all eligible patients undergoing tracheostomy.

Patients were followed up and asked to complete the questionnaire one month after the procedure during their follow-up visit to the ENT clinic. The questionnaire comprised nine questions assessing previous history of constipation, colon disease, and neurological disorders, as well as any current medication for constipation. Additionally, it evaluated all aspects of the Rome IV criteria (Appendix 01) to assess constipation status among tracheostomy patients.

According to the Rome IV criteria for constipation, the Diagnosis must include two or more of the following (11):

- Straining during more than 25% of defecations
- Lumpy or hard stools in more than 25% of defecations
- Sensation of incomplete evacuation in more than 25% of defecations
- Sensation of anorectal obstruction/blockage in more than 25% of defecations
- Manual manoeuvres for stool evacuation, such as digital assistance
- Fewer than three spontaneous bowel movements per week
- Loose stools rarely occur without the use of laxatives
- Insufficient criteria for irritable bowel syndrome

Anonymity of all participants was strictly maintained, and no personal information was disclosed. The confidentiality of the data was ensured by assigning a code number to each participant.

Statistical analysis was conducted using IBM® SPSS Statistics Software, version 25. Categorical variables were presented as frequencies and percentages. In contrast, quantitative variables were expressed as mean \pm

standard deviation for normally distributed data and as median with interquartile range for non-normally distributed data. The Shapiro–Wilk and Kolmogorov–Smirnov tests were used to assess the normality of numerical variables. The association between constipation Diagnosis as per the Rome IV criteria and clinical variables was evaluated using the Chi-square test for categorical variables and the independent sample t-test for continuous variables. A p-value of <0.05 was considered statistically significant.

Results

A total of 95 adult patients who underwent tracheostomy between March 2025 and June 2025 at our centre and met the inclusion criteria were included in this study. All patients were aged 18 years or older, with ages ranging from 22 to 87 years. The mean age was 51.9 ± 15.6 years. The majority of the patients were male ($n = 75$, 78.9%), while 20 patients (21.1%) were female. Among these 95 patients, only 3.2% ($n = 3$) had a prior Diagnosis of constipation. However, none of them was currently taking medication for constipation. Additionally, none of the patients had a history of colon disease or neurological disorders.

In our study, 91.5% ($n = 87$) of the patients reported experiencing hard stools over the past two weeks. Overall, 57.9% ($n = 55$) reported hard stools in at least 50% of defecations. Straining during more than 25% of defecations was noted in 71.6% ($n = 68$) of patients. Moreover, 29.4% ($n = 28$) reported a sensation of incomplete evacuation in more than 25% of defecations, while 29.5% experienced a feeling of anorectal obstruction in 25% of defecations. Manual digital evacuation was reported in 11.6% ($n = 11$) of patients (Figure 1). The majority of patients ($n = 82$, 86.3%) had fewer than three spontaneous bowel movements per week. According to the Rome IV criteria, 71.6% ($n = 68$) of the tracheostomy patients were diagnosed with constipation. These patients were relatively younger, with a mean age of 51.1 ± 15.7 years, compared to 53.9 ± 15.4 years in those without constipation; however, this difference was not statistically significant ($p = 0.439$). All patients without a Rome IV-based constipation Diagnosis had no prior history of constipation ($p = 0.556$).

All patients diagnosed with constipation experienced hard stools in at least 50% of defecations over the past two weeks. In contrast, among those without constipation, 70.4% reported hard stools in 25% of defecations, and 29.6% reported no hard stools ($p < 0.001$). Additionally, all patients diagnosed with constipation reported straining during more than 25% of defecations, whereas none of the non-constipated patients experienced such straining ($p < 0.001$). Furthermore, 58.8% ($n = 40$) of the patients with constipation reported a sensation of incomplete evacuation in only 25% of defecations, while 88.9% ($n = 24$) of the non-constipated group reported the same ($p < 0.001$). Regarding bowel movement frequency, 51.9% ($n = 14$) of our patients without a constipation Diagnosis had two spontaneous bowel movements per week, whereas 95.6% ($n = 65$) of those diagnosed with constipation had two spontaneous bowel movements per week ($p < 0.001$). A sensation of anorectal obstruction in 25% of defecations was absent in 58.8% ($n = 40$) of the constipated patients, whereas none of the non-constipated patients reported this symptom ($p < 0.001$). Lastly, 83.8% ($n = 57$) of the constipated patients did not require manual digital evacuation, while none of the non-constipated patients required it ($p = 0.030$) (Table 1).

Table 1: Rome IV Constipation vs No Constipation

| Variable | Constipation (n=68) | No constipation (n=27) | p-value |
|--|---------------------|------------------------|---------|
| Age, years (mean \pm SD) | 51.1 \pm 15.7 | 53.9 \pm 15.4 | 0.439 |
| Prior constipation Diagnosis, n (%) | 3 (4.4%) | 0 (0.0%) | 0.556 |
| Hard stools $\geq 50\%$ of defecations, n (%) | 68 (100.0%) | 0 (0.0%) | <0.001 |
| Hard stools in 25% of defecations, n (%) | 0 (0.0%) | 19 (70.4%) | <0.001 |
| No hard stools, n (%) | 0 (0.0%) | 8 (29.6%) | <0.001 |
| Straining during >25% of defecations, n (%) | 68 (100.0%) | 0 (0.0%) | <0.001 |
| Incomplete evacuation in 25% of defecations, n (%) | 40 (58.8%) | 24 (88.9%) | <0.001 |
| Anorectal obstruction in 25% of defecations, n (%) | 28 (41.2%) | 0 (0.0%) | <0.001 |

| | | | |
|---|------------|------------|--------|
| Manual digital evacuation, n (%) | 11 (16.2%) | 0 (0.0%) | 0.030 |
| Exactly two spontaneous BMs/week, n (%) | 65 (95.6%) | 14 (51.9%) | <0.001 |

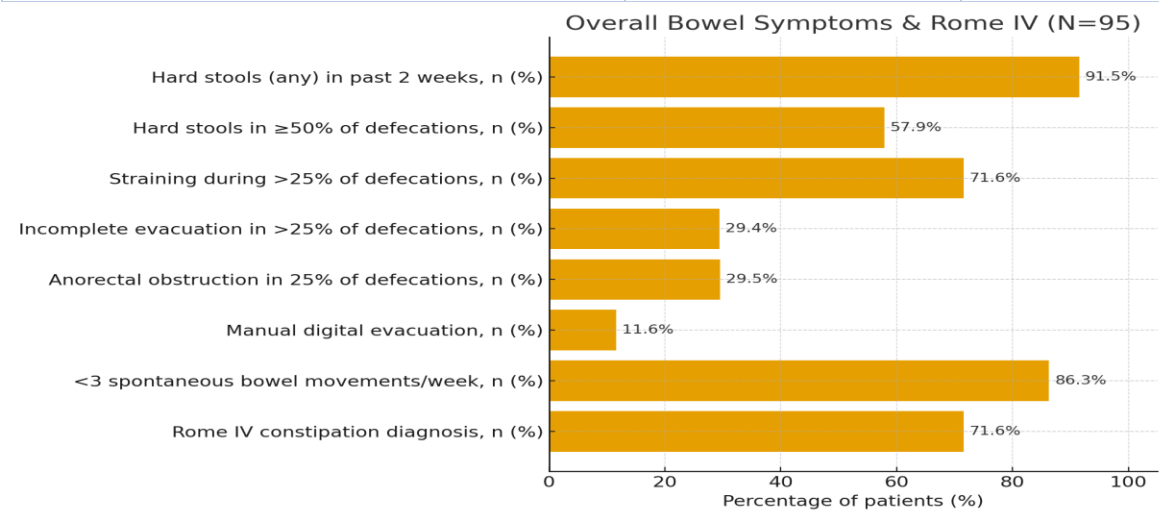


Figure 1: Bowel Symptoms and Rome IV

Discussion

This study identified a significant prevalence of decreased bowel movements among adult tracheostomy patients admitted to a tertiary care setting, confirming the high burden of gastrointestinal dysmotility in this population. A majority of patients (71.6%) reported symptoms that met the Rome IV criteria for constipation Diagnosis, despite not having a previous Diagnosis, highlighting a potential association between tracheostomy and constipation. Constipation is therefore common among adults after tracheostomy.

The results show that 91.5% of patients experienced hard stools in the two weeks preceding the follow-up visit. More than half reported having hard stools in at least 50% of their bowel movements, which is significantly higher than the threshold of 25% bowel movements according to the Rome IV criteria. Straining during defecation was also frequent, occurring in nearly 75% of participants. The majority had fewer than three bowel movements per week, further supporting the Diagnosis of constipation in the cohort.

A clear pattern emerged when comparing patients diagnosed with constipation to those without the condition. Patients with constipation experienced symptoms like hard stools and straining more frequently or at a higher intensity compared to their counterparts. These differences were statistically significant, underscoring the importance of risk assessment according to established guidelines in this population. The diagnostic framework used in this study, the Rome IV criteria, is established as a reliable method for diagnosing functional constipation and is widely used in both clinical and research settings (12,13). Even though a small proportion of participants did not meet some of the Rome IV criteria and hence were labelled as not having constipation, they still reported some symptoms of constipation that prompted treatment.

Our results also align with existing literature. Studies have shown that children and adults with tracheostomies or airway support are at increased risk of constipation compared to the general or control populations, with prevalence rates as high as 60% in studies on children (14,15). Mechanically ventilated and critically ill patients also exhibit increased gastrointestinal dysmotility, as shown in past studies (16). One study found that non-defecation accounted for more than 60% of days in ventilated ICU patients (17).

This high burden of symptoms of constipation in post-tracheostomy patients can be attributed to a few factors, namely immobility, use of opioids or other medications, and changes to airway management. However, as none of the participants had a prior Diagnosis of colon

disease or neurological disorders, the onset of constipation appears to be associated with their tracheostomy status.

These findings underscore the importance of routine monitoring of bowel function in tracheostomy patients to prevent complications, including patient discomfort, faecal impaction, and the need for hospitalisation. Early identification and management of constipation, through measures such as increased hydration, a fibrous diet, mobilisation, and laxatives, is paramount to improving patient outcomes and ensuring quality care (18). The study had a few limitations. The study had a small sample size and was based in a single tertiary care centre in a metropolitan city for a limited period, which limits its generalizability to other hospitals, community centres, and countries. As patient care protocols and available resources have a significant impact on outcomes, hospitals with better resources may experience different outcomes. The cross-sectional nature of the study prevented us from establishing a temporal relationship between tracheostomy and constipation; unmeasured variables may have confounded the observed associations. Future research should incorporate multicenter designs, prospective cohorts, and the measurement of potential confounding variables and their impact on the findings.

Conclusion

In conclusion, our study reveals that decreased bowel movements are prevalent among post-tracheostomy patients in a tertiary care setting, a finding consistent with previous research on populations with airway compromise. Systematic risk assessment and timely intervention are necessary to address this frequently overlooked complication.

Declarations

- Data Availability statement
- All data generated or analysed during the study are included in the manuscript.
- Ethics approval and consent to participate
- Approved by the department concerned. (IRBEC-24)
- Consent for publication
- Approved
- Funding
- Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

SQH (Resident)

Manuscript drafting, Study Design,

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Review of Literature, Data entry, Data analysis, and drafting an article.

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Conception of Study, Development of Research Methodology Design,

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Study Design, manuscript review, and critical input.

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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