

# Indications of Tracheostomy in Patients Attending Baquba Teaching Hospital in Diyala, Iraq: A cross Sectional Study

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## Abstract

Tracheostomy is a description of the surgical opening of the trachea, and represents the most frequently carried out surgical procedures in medical practice, especially in patients who require long-term mechanical ventilation for airway disorders. This study aimed to evaluate the main indications for tracheostomy. Approximately 100 patients underwent tracheostomy in different age groups, from 12 to 80 years, and both genders, who attended Baquba Teaching Hospital, (Iraq) in the period from August 2021 to December 2022, were included in this cross-sectional study. The results showed that the indications for tracheostomy were due to prolonged ventilation (70%) resulting from trauma in most cases (71.5%), followed by upper airway obstruction (25%) due to tumors (40%) or trauma (60%). As for the rest (5%), it was from other procedures such as maxillofacial injuries. It was concluded that prolonged ventilation due to trauma was the most common indication for tracheostomy in Baquba Teaching Hospital.

**Keywords:** Tracheostomy, mechanical ventilation, airway obstruction.

## Introduction

A tracheostomy can be simply defined as a surgical procedure in acute cases of airway obstruction, as patients requiring prolonged mechanical ventilation undergo this procedure in an effort to provide airway safety, enhance patient comfort, and facilitate care [1,2]. It has been described since the Middle Ages (1595-1645) in a book called "Armamentarium Chirurgicum" as a means of providing immediate relief to patients with acute cases of respiratory distress[3]. It is worth noting that the presence of a tracheostomy was hypothesized to assist weaning from mechanical ventilation, and that airflow resistance in the artificial airway corresponds to air turbulence and tube diameter and length. Also, airflow resistance and labor associated with breathing should theoretically be less with a tracheostomy than for endotracheal tubes. However, such an effect has not been consistently demonstrated in patients after tracheostomy [4,5]. The occurrence of a tracheostomy motivates surgeons to be more aggressive in weaning attempts, especially if the tracheal hole in its place does not tolerate liberation from mechanical ventilation, which requires reconnection to the ventilator circuit [6]. It is like other surgeries that are not without potential complications, whether during or after the operation, such as bleeding, pneumothorax, swallowing disorders, and others [7,8]. Many of the benefits of tracheostomy relative to prolonged trans-laryngeal intubation are either unproven or subjective. For this reason, there is a great deal of variation in the approach to performing tracheostomy [9,10]. In general, patients with difficult airways as a result of major maxillofacial trauma, bullet injury to neck, surgical vocal cord paralysis, obstructive upper airway tumors, or others are among the indications for tracheostomy [11-13]. The current study included tracheostomy in patients attending Baquba Teaching Hospital in Diyala governorate in order to assess the main indicators of tracheostomy and identify them.

## Methods and patients

This cross-sectional study was carried out in otolaryngology ward, respiratory care unit, and emergency department of Baquba Teaching Hospital for one hundred (100) patients who underwent a tracheostomy, between August 2021 and December 2022, after approval from the ethics committee officially from the local

health directorate, along with the informed consent of each patient participating in the study. They were under nursing care and followed up healthily and monitored until they left the hospital. The inclusion criteria included all patients undergoing tracheostomy of different age groups ranging from 10 to 80 years (table 1) and for both sexes.

Table 1: Proportions of age groups of studied patients

Age groups	Frequency	%
10-30	32	32 %
31-40	19	19 %
41-80	49	49 %
Total	100	100%

A classic surgical tracheostomy technique (figure 1) was used, as previously described with emphasized that the surgical procedure was slightly variance between children and adults [14]. Through a vertical and horizontal midline incision in the skin (H-shape) followed by dissection of the girdle muscles and ligation of the isthmus of the thyroid gland, when needed.

The trachea was carefully palpated and its position assured by aspiration of air through a syringe and needle. Before the surgery, each patient was given local anesthesia by injection in adults, but the children underwent general anesthesia with tracheal intubation. All sedative medications were excluded before the airway was established, and the neck area was treated with betadine solution to clean it beside to applied antiseptics. All patients underwent strict postoperative management with continuous monitoring of the general condition of each one and his healthy nutrition, and noting any post-surgery complications early for the necessary intervention. After collecting the data, the statistical analysis processed using SPSS version 26, and the data were tabulated and expressed as frequencies and percentages. Chi square was applied to determine the association between variables with  $P < 0.05$  considered significant.



Figure 1: Vertical midline skin incision after palpating the trachea.

## Result

The results showed that the most frequent indications were the presence of prolonged ventilation due to various reasons in 70 patients (70%), and upper airway obstruction was observed in 25 patients (25%), while another parts procedures to protect the airway was found in 5 patients (5%), as shown in Figure (2).

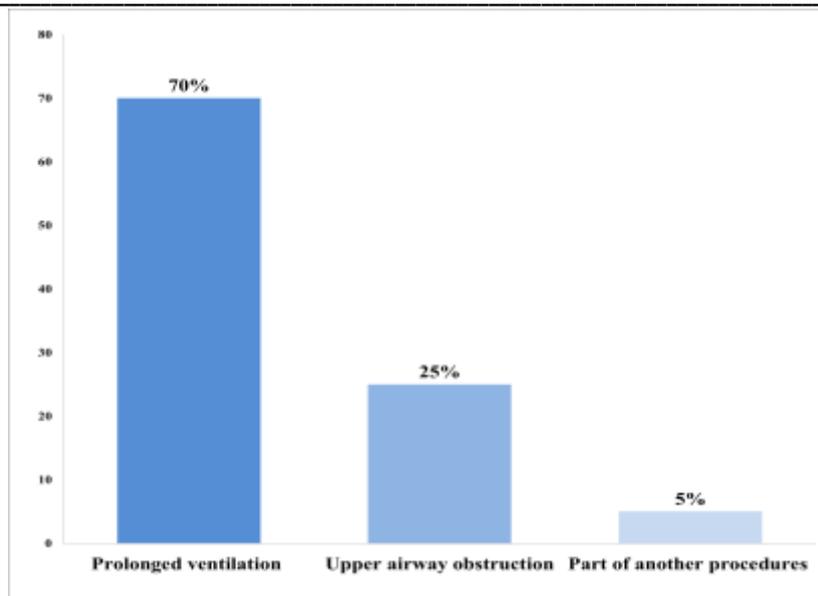


Figure 2: The most common indications of tracheostomy in studied patients.

As for the indications for tracheostomy by age group, it was more in patients between the ages of 41-80 years old, which was observed in 49 patients (49%). While the lowest incidence was in the age group of 31-40 years old, which occurred in 19 patients (19%).

Prolonged ventilation was a reason for tracheostomy in 35 patients (35%), whose age ranged between 41-80 years, while it was a reason in the age group 20-39 years in 10 patients, with a significant difference observed (P-value= 0.001). As for upper airway obstruction, it was recorded in 14 patients, whose age ranged between 41-80 years, compared to 5 patients in the age group 10-30 years, with a significant difference (P-value= 0.001). On the other hand, it was recorded for part of another procedure in 3 patients whose ages ranged between 31-40 years, compared to zero patients in the age group 41-80 years, and also with a significant difference (P-value= 0.237), as in Table (2).

Table 2: Distribution of indications of tracheostomy according to age groups .

Indications	Age groups (years)				P-Value
	10-30	31-40	41-80	Total	
Prolonged ventilation	25	10	35	70	0.001
Upper airway obstruction	5	6	14	25	0.001
Part of another procedures	2	3	0	5	0.237
Total	32	19	49	100	

As shown in Table 3, in 50 patients (71.5%), the trauma was the most common cause of prolonged ventilation indicator, while the viral cause was the least (1.5%).

Table 3: The causes of prolonged ventilation in studied patients

Causes	Frequency	%
Trauma	50	71.5
Tumors (Brain tumor)	9	13
Systemic diseases ( CVA )	13	18.5

Viral (Guillain-Barre syndrome)	1	1.5
Total	70	100

Head injuries were the highest percentage (72%) of the rest of the types of trauma resulting from prolonged ventilation, followed by bullet injuries (24 %) and then chest injuries (4%) as illustrate in table (4).

Table 4: Types of traumas due to prolonged ventilation

Causes	Frequency	%
Head injuries	63	72
Bullet injuries	12	24
Chest injuries	2	4
Total	50	100

As for the causes of upper airway obstruction, traumas were proven to be a cause in 15 patients (60%), while tumors were the second common cause that occurred in 10 patients (40 %), as shown in Table (5). Tracheostomy as part of another procedure with airway protection was seen in 5 cases of maxillofacial trauma.

Table 5: The causes of upper airway obstruction in studied patients

Causes		Frequency	%
<b>Traumas 60%</b>	Bullet injury	4	27
	Surgical trauma (vocal cord paralysis)	10	67
	RTA	1	6
	Total	15	100
<b>Tumors 40%</b>	Larynx cancer	5	50
	Thyroid cancer	2	20
	Pharynx cancer	1	10
	Oropharyngeal tumor	1	10
	Parapharyngeal cancer	1	10
	Total	10	100

## Discussion

One of the most important features of tracheostomy is facilitating weaning in ventilated patients, leading to reduction in the duration of mechanical ventilation and thus reducing potential complications and hospital stay [15,16]. In a recent meta-analysis study conducted by Araujo and colleagues (2022) they concluded that a tracheostomy performed in the first 14 days of ventilation can reduce time spent on a ventilator and thus reduce the incidence of ventilator-associated pneumonia, with no effect on mortality [17]. In our study we found that the majority of patients with tracheostomy relapsed for prolonged ventilation (70%) and this may be due to the high rate of ex-tubation failure and the need for prolonged protection of the airways secondary to neurological injury. Of note, in general restorative care unit (RCU) patients, a tracheostomy is most commonly carried out 2 weeks after admission [18,19].

A high rate of head injuries was observed as an indicator of tracheostomy (72%). Although a penetrating tracheal injury is rare, it can be life threatening. However, laryngeal-tracheal injuries have a combined incidence among patients with penetrating neck trauma [20]. Our finding is consistent with a previous study by Atmaca and colleagues (2011) at a specialized tertiary care center with 54 children, retrospectively. The generality indication for tracheotomy was prolonged intubation (87%), followed by upper airway obstruction (13%) [21]. Recently in Uganda, a prospective cohort study by Nyanzi *et al.* (2023) of 100 patients undergone tracheostomy, they conclude that long-term ventilation was expected among the most common indications for tracheostomy in major hospitals [22]. In our study there were 28% of the patients with trauma which included bullet injuries and chest injuries. It is known that penetrating tracheal injuries have varying signs according to the severity of the injury and the association with other injuries, for example blood vessels or the esophagus [23,24]. To avoid the negative consequences of airway compromise, early recognition and proper management are needed [25]. Carcinoma of the larynx represents one of the most common non-cutaneous cancers of the head and neck region. The cure rate is usually high in the early stage, but it is unfortunately low in otherwise [26,27]. In current study there were 25% with tracheostomy mainly due to an imminent threat to the airway, usually in the presence of traumas or tumors causes. Most of the procedures are performed on a semi-selective basis, by implementing urgent procedures tailored to each patient according to his condition [28]. In a similar study, Veder *et al.* (2021) retrospectively enrolled 225 children under 18 years of age with a tracheostomy tube at Sofia children's hospital. According to the results, (73.3%) required tracheostomy due to airway obstruction and (32.4%) children due to neurological diseases as a result of head trauma [29]. In another prospective, interventional study by Kawale *et al.* (2017), 124 patients underwent tracheostomy. They concluded that the most general indications for tracheostomy in adults as well as children is facilitated ventilation, while upper airway obstruction was 25%, most of which were due to malignant tumors [14]. In the current study, the other reason for tracheostomy to be performed as part of another procedures was maxillofacial trauma to protect the airway from edema either due to trauma or due to postoperative swelling, as well as to avoid aspiration and to provide a clear surgical field for the maxillofacial surgeon.

## Conclusion

According results of current study, we concluded that the most general indication for tracheostomy was prolonged ventilation mainly due to trauma, followed by airway obstruction resulting from either trauma or tumors. We recommend conducting more studies on the actual indications and in greater detail for tracheostomy and comparing them.

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