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The Indications of Tracheostomy in Basrah (Iraq): A Retrospective Descriptive Study

Conflict of interest: nothing to declare.

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Limitations of the study: questionnaire data with limited information as the main source of analysis, small sample size, study design, lack of analysis of the heterogeneity of indications for tracheostomy and other related to the profiling of institutions.

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Abstract

Purpose. To determine the indications of tracheostomy and compared them with other parts of the world.

Materials and methods. A retrospective descriptive study, all the patients underwent tracheostomies in Basrah major hospitals during one year period (from July 1st, 2015 to June 30th, 2016). Ninety-two patients were enrolled in this study and their medical records were reviewed and data collected on a questionnaire form and then analyzed statistically.

Results. In this study, 92 patients were enrolled, 75 of them were male (82%) and 17 (18%) were female, with male to female ratio of 4.41:1. The ages of the patients ranged from 6 months to 80 years, with a mean age of 36.58 years. Classical tracheostomy was performed to all patients. Eighty one patients receive general anesthesia (88%) and eleven patients were operated under local anesthesia (12%). Only three patients were operated as an emergency (3%), while the rest were operated electively. The main indication for tracheostomy is prolonged endotracheal intubation (91.3%), which is mainly caused by trauma.

Conclusion. Tracheostomy in Basrah is mainly indicated for prolonged endotracheal intubation.

Keywords: tracheotomy, tracheostomy, indications, larynx, oropharynx

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Показания к трахеостомии в Басре (Ирак): ретроспективное описательное исследование

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Ограничения исследования: данные анкетирования с ограниченной информацией в качестве основного источника анализа, небольшой размер выборки, дизайн исследования, отсутствие анализа неоднородности показаний к трахеостомии и другие аспекты, связанные с профилированием учреждений.

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Резюме

Цель. Определить показания к трахеостомии и сравнить их с другими частями света.

Материалы и методы. Ретроспективное описательное исследование включает пациентов, которым была проведена трахеостомия в крупных больницах Басры в течение одного года (с 1 июля 2015 г. по 30 июня 2016 г.). В исследование были включены 92 пациента, был изучен их анамнез, данные собраны в виде анкеты, а затем проанализированы статистически.

Результаты. Из 92 пациентов 75 были мужчинами (82%) и 17 (18%) – женщинами, соотношение мужчин и женщин составляло 4,41 : 1. Возраст пациентов колебался от 6 мес. до 80 лет, средний возраст составил 36,58 года. Всем пациентам была выполнена классическая трахеостомия. 81 пациент получил общий наркоз (88%) и 11 были прооперированы под местной анестезией (12%). Только 3 пациента были прооперированы в экстренном порядке (3%), остальные оперированы планово. Основным показанием к трахеостомии является длительная интубация трахеи (91,3%), что обусловлено преимущественно травмой.

Заключение. Трахеостомия в Басре в основном показана при длительной эндотрахеальной интубации.

Ключевые слова: трахеотомия, трахеостомия, показания, гортань, ротоглотка

■ INTRODUCTION

Tracheostomy and tracheotomy are terms of similar meaning, usually used intermingled; but we can give a separate definition for each term. Tracheotomy means the formation of an opening in the trachea, which firmly refers to a temporary procedure. Tracheostomy refers to the formation of a stoma at the skin surface which leads into the trachea [1, 2].



The earliest reported medical records focused on tracheostomy as a mean of surgical step used to alleviate respiratory obstruction are mentioned in Rig Veda, the ancient Hindu book of medicine around (2000 BC); Imhotep of Pharon Egypt (1500 BC) described a surgical maneuver similar to modern tracheostomy [3, 4]. After the nineteenth century the tracheostomy regarded as safe surgical method used in emergency conditions then in the next century tracheostomy become a popular procedure and evolved the adage that 'if you think of tracheostomy do it' [5–7]. This study highlights on the most reliable indications for doing tracheostomy in our community.

To decide to do a tracheostomy; we should keep many points in our mind like the type of primary lesion, the type of clinical presentations, the type of surgical procedure and finally the planned of surgical reconstruction that we shall use [8, 9]. The indications for tracheostomy have progressed, over many years, in equivalent to the developments in medicine. Recently, and because of the availability, safety and simplicity of use of endotracheal intubation, the latter is considered to be the first line therapy for the short term airway protection and/or ventilation [10, 11]. Therefore, tracheostomy is generally considered an elective procedure, with the exception of a few cases in which endotracheal intubation cannot be done initially [12–14]. Indications for tracheostomy can be broadly categorized into three major groups namely: (i) to relieve an upper airway obstruction [15, 16], (ii) to assist ventilation [17–19] and (iii) to facilitate toilet of both trachea and bronchus [20, 21].

■ PURPOSE OF THE STUDY

To determine the indications of tracheostomy and compared them with other parts of the world.

■ MATERIALS AND METHODS

In this retrospective descriptive study we reviewed the records of all patients who underwent tracheostomy in two major Basrah Hospitals, namely the Sadder Teaching Hospital and Basrah General Hospital, which are the main hospitals where tracheostomies took place during the period from July 1st, 2015 to June 30th, 2016. Cases with missed basic information were excluded from the study. Data were collected by using our preformed questionnaire (which includes the age, gender, primary diagnosis, date of tracheostomy, indication of tracheostomy and type of anesthesia). With the help of the department of the community medicine, these data were statistically analyzed by Microsoft 2007 ver. Excel. Descriptive statistics consist of numbers, and percentages were measured. Mean, range and standard deviation (SD) for numerical data calculated. The confidence intervals for the average values is 95% CI.

■ RESULTS

During the period of the study (one year), ninety two cases of tracheostomies were done; of these, 75 patients were male (81.5%) and 17 female (18.5%). Male to female ratio is 4.41:1. The patients' ages ranged from 6 months to 50 years, with a mean age of 36.58 ± 9.5 years.

Eighty one patients were operated under general anesthesia (88.1%) and eleven patients under local anesthesia (11.9%).

Only three patients (3.3%) were operated as an emergency surgery, one of them has bilateral vocal cords palsy and the other two had laryngeal tumor; all the rest (96.7%) had elective tracheostomy.

All those data are listed in the table (1) which is clear below.

As we mentioned previously, ninety two cases of tracheostomy were included in this study; eighty four of them were indicated because of prolonged intubation (91.3%) (Table 2). Of these, trauma account for 58 cases. We found that head trauma due to road traffic accident represent fifty percent of all indications of tracheostomy in this study. The next most frequent indication is cerebrovascular disease (14 patients). Other indications include brain tumor (6 cases), cervical spine injuries (5 cases), head trauma due to fall from height (4 cases), bullet injury to the brain (3 patients), two patients have severe respiratory disease (COPD), another two with Gullian Berre syndrome, one patient with

Table 1
Basic data distribution of patients (n=92)

Parameters	No.	%
Mean age (years)	36.58	–
Male/Female	75/17	81.5/18.5
Surgery type: emergency/elective	3/89	3.3/96.7
Anesthesia type: Local/general	11/81	11.9/88.1

Table 2
Indications for tracheostomy according to the cause

Indications				No.	%
Prolonged mechanical ventilation				84	91.30
	Trauma			58	63.04
		Head		53	57.60
			RTA	46	50
			FFH	4	4.34
			Bullet	3	3.26
		Cervical spine		5	5.43
	CVA			14	15.21
	Tumor			7	7.60
		Brain		6	6.52
		Lung		1	1.08
	Other			5	5.43
		Respiratory diseases		4	4.34
			COPD	2	2.17
			G.B. syndrome	2	2.17
		Encephalitis		1	1.08
Upper airway obstruction			8	8.69	
	V.C. paralysis		1	1.08	
	Tumor		7	7.60	
		Larynx	6	6.52	
		Oropharynx	1	1.08	



bronchogenic carcinoma and one patient with encephalitis. Only eight patients were operated for tracheostomy without prolonged ventilation. One of them had bilateral vocal cord paralysis following URTI, another one had oropharyngeal carcinoma and the other six had laryngeal tumors.

■ DISCUSSION

The indications of tracheostomy are diverse, and vary in different eras and locations in the world. They also continue to change with time according to the varying circumstances. In this study, 92 patients are included in Basrah city during one year period. The ages ranged from 6 months to 50 years, with a mean age of 36.58 years. Male predominance is obvious in all age groups. This is an expected finding because the male population are the more susceptible to trauma. This is consistent with Gilyoma study [22] who found male to female ratio of 3.1:1 and Agoda study [23] who enrolled 29 male and 17 female patients. The most common indication for tracheostomy was prolonged mechanical ventilation (91.3%); whereas upper airway obstruction contribute to only 8.69%. this is in contrary to Gilyoma [22] who found that the upper airway obstruction constitute 55.1% and Agoda [23] (63%).

In contrast to a study from National Trauma Data Bank, 24% of traumatic patients underwent tracheostomy [24], the most common cause for prolonged ventilation in our study was head trauma caused by road traffic accidents; we record 46 cases under this category which represent 50% of all cases enrolled in this study, more than half of them are young (less than 30 years old). This very high percentage may be due to the fact that the young represent the majority of our population; in addition, they are less restricted by road safety precautions and safe driving policies. The teenagers (age group 11–20) constitute the majority of our patients (25% of all patients included in this study); this is in contrast to Gilyoma [23] study who found the majority of their patients in their third decade. Again, most of those patients are victims of trauma by road traffic accidents. This age group has the highest activity level, in addition to the participation of high risk activities; this makes them the most vulnerable to head and neck injuries. In addition, the lack of the driving standardization rules and lack of strict application of the law in our country especially during the recent years has significantly contributed to the increasing numbers of road traffic accidents. Although in Nathens et al. [25], there was a significant unexplained variation in the rates of tracheostomy in critically injured patients with acute respiratory failure, that might reveal predetermined concepts of efficacy among surgeons working in the absence of established guide care.

The second most common cause for prolonged ventilation in this study was the cerebrovascular disease (14 patients). Tumors in general constitute the third most common cause for tracheostomy in our study (14 cases). Six cases of brain tumor, half of them are under the age of 22 15 years old, have their tracheostomies due to prolonged mechanical ventilation. One patient have advanced lung cancer and another one with advanced oropharyngeal cancer. The rest of them (6 patients) had laryngeal cancer and this is obviously differ from the Nigerian study in which the most common indication for tracheostomy was UAO secondary to tumors which were laryngeal carcinoma [26]. The vast majority of our patients have their operations done electively. Only three patients had emergency tracheostomy because they present with acute stridor and airway obstruction in the emergency department; two of them had laryngeal tumor and one patient had

bilateral vocal cord paralysis following URTI. This is again in contrary to Gilyoma [22] study, who found 80.4% of his cases are done as emergency. As a general rule, the majority of our patients (88%) were operated under general anesthesia with orotracheal intubation. Only 11 patients (12%), were not suitable for general anesthesia, and therefore, they were operated under local anesthesia. Five patients had laryngeal tumors and therefore intubation was risky in causing laryngeal bleeding. One patient had large oropharyngeal tumor which made intubation extremely difficult. The remaining patients had significant comorbid conditions that made general anesthesia a challenge. In a nearby country, like Iran, the subglottic stenosis was the main cause for tracheostomy and the second cause was the prolonged ventilation, as shown in a study done in Alkhalili hospital [27]; whereas in developed countries, the main indication for tracheostomy was laryngotracheal disorders (47%), as supported by the results of Fuller et al. [28].

CONCLUSION

In this study, we found that the most common indication for tracheostomy in Basrah is prolonged ventilation due to head trauma caused by road traffic accidents, the second cause was the cerebrovascular disease followed by tumors.

REFERENCES

- Kost K.M. Endoscopic percutaneous dilatational tracheostomy: a prospective evaluation of 500 consecutive cases. *Laryngoscope*. 2005 Oct;115(10 Pt 2):1–30. doi: 10.1097/01.MLG.0000163744.89688.E8.
- Heininger A., Krueger W.A., Dieterich H.J., Königsrainer I., Schroeder T.H. Complications using a hollow fiber airway exchange catheter for tracheal tube exchange in critically ill patients. *Acta Anaesthesiol Scand*. 2008 Aug;52(7):1031. doi: 10.1111/j.1399-6576.2008.01686.x.
- Musso C.G. (2005) Imhotep: the dean among the ancient Egyptian physicians. An example of a complete physician. *Humane Medicine Health Care*. 5:169.
- Braun N.M.T. Negative Pressure Noninvasive Ventilation (NPNIV): History, Rationale, and Application. *Nocturnal Non-Invasive Ventilation*. 2015 Oct 1:27–71. doi: 10.1007/978-1-4899-7624-6-2.
- Faris C. Scott-Brown's Otorhinolaryngology, Head and Neck Surgery, 7th edn. *Ann R Coll Surg Engl*. 2011 Oct;93(7):559. doi: 10.1308/147870811X598605b.
- Kodiya A.M., Afolabi A.O., Grema U.S., Ajayi I.O., Ngamdu Y.B., Labaran S.A. Tracheostomy in Northern Nigeria – A Multicentre Review. *East and Central African Journal of Surgery*. April 2013; 18(1):65–70.
- Alabi B.S., Afolabi O.A., Dunmade A.D., Omokanye H.K., Ajayi I.O., Ayodele S.O., Busari N.O. Indications and outcome of tracheostomy in Ilorin, North Central Nigeria: 10 years review. *Ann Afr Med*. 2018 Jan-Mar;17(1):1–6. doi: 10.4103/aam.aam_130_16.
- Bonny A. Joseph, Sandeep Ghosh, Sanjay M. Desai. Safe tracheostomy in head and neck carcinoma patients during covid era: method and demographics. *International Journal of Scientific Research*. 2020;9(1):42–43.
- AlMarshad S., AlEnazi A., Owaidah A. Tracheostomy Practice Questionnaire: Development of a Valid and Reliable Tool for Assessing Tracheostomy Practice. *Qatar Med J*. 2022 Mar 16;2022(1):17. doi: 10.5339/qmj.2022.17.
- Pandian V., Atkins J.H., Freeman-Sanderson A., Prush N., Feller-Kopman D.J., McGrath B.A., Brenner M.J. Improving airway management and tracheostomy care through interprofessional collaboration: aligning timing, technique, and teamwork. *J Thorac Dis*. 2023 May 30;15(5):2363–2370. doi: 10.21037/jtd-23-205.
- Clum S.R., Rumbak M.J. Mobilizing the patient in the intensive care unit: the role of early tracheostomy. *Crit Care Clin*. 2007 Jan;23(1):71–9. doi: 10.1016/j.ccc.2006.11.011.
- Nagarkar R., Kokane G., Wagh A., Kulkarni N., Roy S., Tandale R., Pawar S. Airway management techniques in head and neck cancer surgeries: a retrospective analysis. *Oral Maxillofac Surg*. 2019 Sep;23(3):311–315. doi: 10.1007/s10006-019-00782-1.
- Keller M.W., Han P.P., Galarneau M.R., Brigger M.T. Airway Management in Severe Combat Maxillofacial Trauma. *Otolaryngol Head Neck Surg*. 2015 Oct;153(4):532–7. doi: 10.1177/0194599815576916.
- Rana S., Pendum S., Pogodzinski M.S., Hubmayr R.D., Gajic O. Tracheostomy in critically ill patients. *Mayo Clin Proc*. 2005;80(12):1632–1638.
- Jean Louis Trouillet et al. Tracheostomy in the intensive care unit: guidelines from a French expert panel. *Ann. Intensive Care*. 2018;8:37:2–15.
- Lewith H., Athanassoglou V. Update on management of tracheostomy. *British Journal of Anaesthesia education*. 2019;19(11):370–376.
- Freeman B.D., Borecki I.B., Coopersmith C.M., Buchman T.G. Relationship between tracheostomy timing and duration of mechanical ventilation in critically ill patients. *Crit Care Med*. 2005;33(11):2513–2520.
- Sutt A.L., Fraser J.F. Early versus late tracheostomy: what do patients want? *Crit Care*. 2023 Apr 19;27(1):151. doi: 10.1186/s13054-023-04443-4.
- Frutos-Vivar F., Esteban A., Apezteguia C., Anzueto A., Nightingale P., Gonzalez M., et al. Outcome of mechanically ventilated patients who require a tracheostomy. *Crit Care Med*. 2005;33(2):290–298.
- Sohal A.S., Anand A., Kaur P., Kaur H., Attri J.P. Prospective Comparative Evaluation of Noninvasive and Invasive Mechanical Ventilation in Patients of Chronic Obstructive Pulmonary Disease with Acute Respiratory Failure Type II. *Anesth Essays Res*. 2021 Jan-Mar;15(1):8–13. doi: 10.4103/aer.aer_53_21.



21. Nieszkowska A., Combes A., Luyt C.E., Ksibi H., Trouillet J.L., Gibert C., Chastre J. Impact of tracheostomy on sedative administration, sedation level, and comfort of mechanically ventilated intensive care unit patients. *Crit Care Med.* 2005;33(11):2527–2533.
22. Gilyoma et al. Ten-year experiences with Tracheostomy at a University teaching hospital in Northwestern Tanzania: A retrospective review of 214 cases. *World Journal of Emergency Surgery.* 2011;6:38.
23. Adoga A.A., Ma'an N.D. Indications and Outcomes of tracheostomy: results from a Nigerian tertiary hospital. *BMC Surgery.* 2010;10:2.
24. Nora H. Cheung, Lena M. Napolitano. Tracheostomy: Epidemiology, Indications, Timing, Technique, and Outcomes. *Respiratory care.* 2014;59(6):895–919.
25. Nathens A.B., Rivara F.P., Mark C.D., Rubenfeld G.D., Wang J., Jurkovich G.J., Maier R.V. Variations in rates of tracheostomy in the critically ill trauma patients. *Crit Care Med* 2006;34(12):2919–2924.
26. Alabi B.S., Ologe F.E., Dunmade A.D., Segun-Busari S., Olatoke F. Acute laryngeal obstruction in a Nigerian hospital: Clinical presentation and management. *Niger Postgrad Med J.* 2006;13:240–243.
27. Haashemi S.B., Gandomi B. Evaluation of the causes of upper airway obstruction leading to tracheostomy in Shiraz. *Derakhshandeh the Iranian Journal of Otolaryngology.* 2006;18(43):1–5.
28. Fuller C., Wineland A.M., Richter G.T. Update on Pediatric Tracheostomy: Indications, Technique, Education, and Decannulation. *Curr Otorhinolaryngol Rep.* 2021;9(2):188–199. doi: 10.1007/s40136-021-00340-y.