

AN AUDIT OF TRACHEOSTOMY AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To determine the indications and complications of tracheostomy in a tertiary care hospital.

Methodology: This descriptive study was conducted at the department of ENT, Head and Neck surgery, Lady Reading Hospital Peshawar from January to December 2010. This study included 160 patients fulfilling inclusion and exclusion criteria. All these patients were properly evaluated. After taking well informed consent tracheostomy was performed in all the patients as emergency or elective procedure depending upon the clinical condition of the patient. The data was collected on a proforma and it was analyzed using SPSS version 10.

Results: A total of 160 patients underwent tracheostomy who constituting 110 male and 50 female, with male: female ratio of 2.2:1. The age of the patients ranged from 01-75 years with mean age of $37.61 \pm$ S.D 19.99 years. Tracheostomy was performed in 148 cases (92.5%) as emergency and in 12 cases (7.5%) as elective procedure. The commonest indication for tracheostomy was trauma (65.62%) followed by infection (26.25%). Elective tracheostomy was performed for inoperable tumours. The early complications were 37.5% while late complications were 7.5%.

Conclusion: It is concluded that the common etiology of tracheostomy in our part of the world is airway obstruction due to trauma and complications of tracheostomy can be minimized by improving the postoperative care of tracheostomized patients.

Key Words: Tracheostomy, Indications, Complications, Airway Obstruction.

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INTRODUCTION

Tracheostomy is one of the oldest medical procedures known¹. It has been routinely used since the middle of the 19th century, when Armand Trousseau used this technique in order to treat diphtheria patients with dyspnea². Tracheostomy is a commonly performed procedure. Tracheostomy is thought as an important life saving procedure in many conditions and has become a well-established procedure with more specific indications³. During the early 1970s the most common indication for tracheostomy was acute obstructive airway infections but due to revolution in life style of human being across the globe there

is also a change in indications and complications of tracheostomy. The indications of tracheostomy includes: long term mechanical ventilation, weaning failure, upper airway obstruction, bronchial toilet and as a part of another operation⁴. Tracheostomy is frequently performed as an emergency therapeutic procedure^{2,5}. Tracheostomy has been reported to have advantages over translaryngeal intubation⁶. The advantages are easier handling of the airways, greater patient comfort, reducing the need for sedation, possibility of oral feeding, improved respiratory mechanics, prevention of ventilator-associated pneumonia (VAP) and easier weaning⁷. However, despite being a safe procedure, tracheostomy can be associated with complications⁷. Complications of tracheostomy quoted in the literature ranges 6 to 66 percent for surgical tracheostomy⁸. The complications could be either early or late. The early complications include hemorrhage, wound infection, pneumomediastinum, and pneumothorax while late complications include tracheal stenosis, laryngeal stenosis, and failed reinsertion of cannula⁹. The mortality of tracheostomy is reported to be less than 2%¹⁰. The aim of this study is to identify the indications and complications experienced in a tertiary care hospital and compare

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these findings with other national and international studies.

METHODOLOGY

This descriptive study was conducted at the department of ENT, Head and Neck surgery, Lady Reading Hospital Peshawar from January to December 2010. This study included 160 patients. All the patients of any age and either sex who had undergone tracheostomy were included in this study. The patients with repeat tracheostomy, those who had tracheostomy performed in other hospitals and those who were lost from follow up were excluded from the study. All these patients were evaluated in terms of detailed history, thorough examination and relevant investigations. A well informed consent was taken from parents/relatives explaining the procedure, its risks, benefits and associated complications and the study was approved by the hospital ethical committee. The patient was put in supine position having extended neck with help of sand bag put under the shoulder of patient. After draping and scrubbing the neck of the patient incision was given about 2 cm above the suprasternal notch. Horizontal incision was given for elective cases while vertical incision was given for emergency tracheostomy. After dissecting the soft tissues and strap muscles of the neck tracheal rings were exposed. Then incision was given in 2nd and 3rd tracheal rings. In adult patients a piece of tracheal ring was excised while in pediatric patients a tracheal ring flap was made. Appropriate size portex tracheostomy tube was inserted. The tube was fixed by taking sutures

through the prongs of tube and tying the ribbon of tracheostomy tube. Proper post op care of the tube was ensured. All those patients having permanent tracheostomy were followed up regularly on monthly basis. The data was collected on a preformed proforma and statistical analysis was performed using the statistical program for social sciences (SPSS version 10).

RESULTS

This study with total duration of one year included 160 cases constituting 110 male and 50 female, with male: female ratio of 2.2:1. The age of the patients ranged from 01-75 years with mean age of $37.61 \pm$ S.D 19.99 years. Tracheostomy was performed in majority of the patients who were in 3rd and 4th decade of life (Graph 1). Tracheostomy was performed in 148 cases (92.5%) as emergency/temporary and in 12 cases (7.5%) as elective/permanent procedure. Duration between receiving the patient and performing tracheostomy ranged from 0.5 to 12 hours with mean of $4.91 \pm$ S.D 2.34 hours. In this study commonest indication for tracheostomy was trauma (65.62%) followed by infection (26.25%). Road traffic accident was main indication (26.87%) among trauma (Table 1). In 36 cases (22.50%) fire arm injury was indication for tracheostomy. In our study elective tracheostomy was performed for inoperable hypopharyngeal tumours in 4 cases (2.5%), laryngectomies in 3 cases (1.87%) and inoperable laryngeal tumours in 3 cases (1.87%). In this study both early and late complications of tracheostomy were recorded. The commonest were early complication i.e. 37.5%.

Graph 1: Age distribution of patients in this study (n=160)

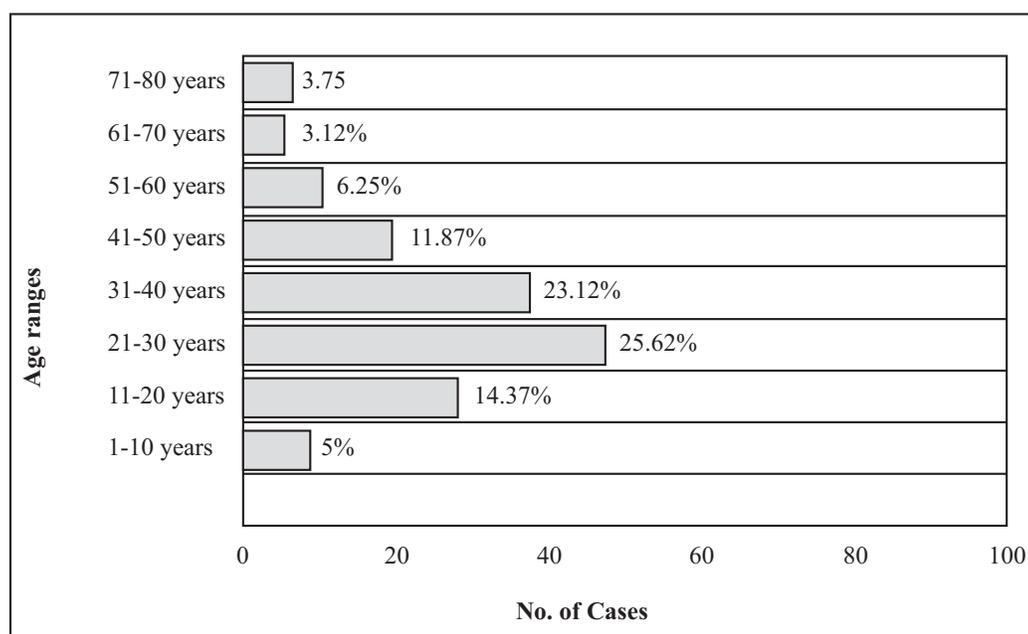


Table 1: Etiology of tracheostomy in this study (n=160)

S. No.	Etiology	No. of cases & %age
	Emergency Tracheostomy	
A	Trauma	105(65.62%)
1	Road Traffic Accidents	43(26.87%)
2	Fire Arm Injuries on maxillofacial region	36(22.50%)
3	Bomb Blast Injuries of head and neck region	20(12.50%)
4	Mechanical Injuries of neck	03(1.87%)
5	Sports Injuries of head and neck region	02(1.25%)
6	Post Thyroid Surgery with bilateral cards palsy	01(0.6%)
B	Infections	42(26.25%)
1	Tetanus	21(13.12%)
2	Diphtheria	14(8.75%)
3	Guillain-Barre syndrome	04(2.5%)
4	Ludwig's Angina	02(1.25%)
5	Acute Epiglottitis	01(0.6%)
C	Congenital Anomaly	01(0.6%)
1	Pierre Robin's sequence	01(0.6%)
	Elective Tracheostomy	12(7.5%)
1	Advanced Hypopharyngeal tumours	04(2.5%)
2	Laryngectomies	03(1.87%)
3	Advanced Laryngeal tumours	03(1.87%)
4	Advanced Thyroid tumours	02(1.25%)
	Total cases	160(100%)

Table 2: Complications of tracheostomy in this study (n=160)

S. No.	Complications	No of cases & %age
A	Early Complications	60(37.5%)
1	Hemorrhage	27(16.87%)
2	Tube obstruction	17(10.62%)
3	Wound infection	12(7.5%)
4	Neck Emphysema	4(2.5%)
B	Late Complications	12(7.5%)
1	Stomal stenosis	9(5.62%)
2	Tracheo-esophageal fistula	2(1.25%)
3	Tracheostomy tube fracture and inhalation	1(0.6%)

Table 3: Frequency of complications of tracheostomy in three groups (n=160)

Type of Complications		Type of Tracheostomy						Total
		Emergency tracheostomy (No of cases)	%age	Infections (No of cases)	%age	Elective Tracheostomy (No of cases)	% age	
Early Complications	Hemorrhage	17	10.62%	6	3.75%	4	2.5%	(16.8%)27
	Tube obstruction	9	5.62%	5	3.12%	3	1.87%	(10.6%)17
	Wound infection	6	3.75%	4	2.5%	2	1.25%	(7.5%)12
Late Complications	Stomal stenosis	4	2.5%	3	1.87%	2	1.25%	(5.62%)9
	Scar formation	3	1.87%	1	0.62%	1	0.62%	(3.12%)5
	Tracheo-esophageal fistula	2	1.25%	-	-	-	-	(1.25%)2

Among early complication hemorrhage was on top (16.87%) followed by tube obstruction (10.62%). The late complications were 7.5%. Stomal stenosis was the commonest (5.62%) among late complications of tracheostomy (Table 2, 3).

DISCUSSION

In this study tracheostomy was performed in 160 patients where males were dominant and the age of the patients ranged from 01-75 years with mean age of $37.61 \pm S.D$ 19.99 years which is in accordance to study of Khan¹¹. In the past main indication of tracheostomy was airway obstruction due to infections of upper airway, but due to proper vaccination incidence of infection is reducing^{12,13}. In our study the main etiology of tracheostomy was airway obstruction due to trauma (65.62%), infections (26.25%) and hypopharyngeal tumour (2.5%) while in Gilyoma¹⁴ study although trauma was the commonest etiology (55.1%), however other causes were neoplastic (39.3%), infections (10.1%), congenital lesions (1.1%), diaphragmatic injury (7.7%). Our study is also at variance from study of Choudhury who had 26.67% cases with trauma^{11,15}. Our results are also different from the study of Adoga¹⁶ in terms of etiology of tracheostomy who found that the causes of tracheostomy were upper airway obstruction (63%), craniofacial trauma (15.2%), prolonged intubation (11%), infections (4.3%), head and neck malignancies (4.3%), tracheobronchial toileting (2.2%). Due to different life style of the population globally the etiology of tracheostomy in our study varies from the results of Graf¹⁷ who reported etiology of tracheostomy congenital heart disease (26%), airway malacia (17%) neuro-muscular disease (14%), skeletal diseases (13%), chromosomal syndromes (13%), metabolic diseases (10%), static encephalopathy (16%), and primary

lung disease (27%). In developed world the etiology of tracheostomy is different from the etiology in developing country which is supported by the results of Klotz¹⁸ having etiology of tracheostomy as laryngotracheal disorder (47%), bronchopulmonary dysplasia (10%), neurologic disorders (10%) and down syndrome (7%). Similarly Lewis¹⁹ studied the etiology of tracheostomy and found pulmonary disorder (73.2%), craniofacial disorder (19.6%), and chronic upper airway obstruction (28.7%). The explanation for this is probably increased terrorist activity on our soil. In our study tracheostomy was performed for head and neck tumours in 7.5% which is keeping with study of Bhuiyan²⁰ where tracheostomy was performed for carcinoma of larynx (65%), carcinoma pyriform fossa (28%), carcinoma base of the tongue (3%), carcinoma tonsil (2%) and carcinoma thyroid gland (2%). Airway obstruction due to infection was the next common etiology (26.25%) for tracheostomy simulating other studies¹⁵. Elective tracheostomy was performed in 12 cases (7.5%). Laryngeal tumour was on top (3.75%) among the causes for elective tracheostomy which is comparable to the work of Bhuiyan^{9,20}. In this study both early and late complications of tracheostomy were recorded. Early complication was common (37.5%) as comparative to late complication (7.5%). Among early complication hemorrhage was found in 27 cases (16.87%), similar complication is also reported in national study carried out by Khan²¹ and international study conducted by Kiakojouri²². The next common early complications in this study were tracheostomy tube obstruction (10.62%), tracheostomy wound infection (7.5%) and emphysema in neck (2.5%) which are in accordance to national and international studies. In this study late complication were stomal stenosis

(5.62%), tracheo-esophageal fistula (1.25%) and in one case (0.6%) tracheostomy tube was fractured. Such complications are also reported by Itamoto, Shashinder and Piromchai²³⁻²⁵. In our study mortality due to tracheostomy was zero percent which in accordance to other studies^{26,27}.

CONCLUSION

It is concluded from the results of this study that the common etiology of tracheostomy in our part of the world is airway obstruction due to trauma and the common complication of this conventional technique is hemorrhage.

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None Declared

REFERENCES

- Najam A, Manzoor T, Qayum A. Emergency tracheostomy: an experience of 120 cases. *Pak Armed Forces Med J* 2010;3:12-5.
- Principi T, Morrison GC, Matsui DM, Speechley KN, Seabrook JA, Singh RN, et al. Elective tracheostomy in mechanically ventilated children in Canada. *Intensive Care Med* 2008;34:1498-502.
- Karapinar B, Arslan MT, Ozcan C. Pediatric bedside tracheostomy in the pediatric intensive care unit: six-year experience. *Turk J Pediatr* 2008;50:366-372.
- Sousa A, Nunes T, Farinha R, Bandeira T. Tracheostomy: indications and complications in paediatric patients. *Rev Port Pneumol* 2009;15:227-39.
- Zia S, Arshad M, Nazir Z and Awan S. Pediatric tracheostomy: complications and role of home care in a developing country. *Pediatr Surg Int*.2010; 26:269-73.
- Perfeito JA, Mata CA, Forte V, Carnaghi M, Tamura N, Leao LE. Tracheostomy in the ICU: is it worthwhile? *J Bras Pneumol* 2007;33:687-90.
- Adoga AA, Maan ND. Indications and outcome of pediatric tracheostomy: results from a Nigerian tertiary hospital. *BMC Surg* 2010;12:10-12.
- Leyn PD, Bedert L, Delcroix M, Depuydt P, Lauwers G, Sokolov Y, et al. Tracheotomy: clinical review and guidelines. *Eur J Cardiothorac Surg* 2007;32:412-21.
- Zenk J, Fyrmipas G, Zimmermann T, Koch M, Constantinidis J, Iro H. Tracheostomy in young patients: indications and long-term outcome. *Eur Arch Otorhinolaryngol* 2009;266:705-11.
- Schutz P, Hamed HH. Submental intubation versus tracheostomy in maxillofacial trauma patients. *J Oral Maxillofac Surg* 2008;66:1404-9.
- Khan FA, Ashrafi SK, Iqbal H, Sohail Z. Operative complications of tracheostomy. *Pak J Surg* 2010;26:308-10.
- Dhrampal A, Pearson D, Berry N. Outcome of tracheostomy timing on critically ill adult patients undergoing mechanical ventilation: a retrospective observational study. *Crit Care* 2011;15:159-63.
- Agrawal A, Johrapurkar SR, Golhar KB, Shahapurkar VV. Early tracheostomy in severe head injuries at a rural center. *J Emerg Trauma Shock* 2009;2:56.
- Gilyoma JM, Balumuka DD, Chalya PL. Ten-year experiences with tracheostomy at a University teaching hospital in Northwestern Tanzania: a retrospective review of 214 cases. *World J Emerg Surg* 2011;6:38.
- Choudhury AA, Sultana T, Joarder MAH, Tarafder KH. A comparative study of elective and emergency tracheostomy. *Banglad J Otorhinolaryngol* 2008;14:57-62.
- Adoga AA, Maan ND. Indications and outcome of pediatric tracheostomy: results from a Nigerian tertiary hospital. *BMC Surg* 2010;10:2.
- Graf JM, Montagnino BA, Huckel R, Pherson MLM. Pediatric tracheostomies: a recent experience from one academic center. *Pediatr Crit Care Med* 2008;9:96-100.
- Klotz DA, Hengerer AS. Safety of pediatric bedside tracheostomy in the intensive care unit. *Arch Otolaryngol Head Neck Surg* 2001;127:950-5.
- Lewis CW, Carron JD, Perkins JA, Sie KCY, Feudtner C. Tracheotomy in pediatric patients: a national perspective. *Arch Otolaryngol Head Neck Surg* 2003;129:523-9.
- Bhuiyan MAR, Rashid MS, Kamruzzaman M, Islam MS, Ahmed KU. Tracheostomy in head-neck malignancy. *Banglad J Otorhinolaryngol* 2010;16:120-5.
- Khan FA, Ashrafi SK, Abbasi Z, Khambaty Y, Musani MA, Jawaid I, et al. Our experience of tracheostomy in patients of ICU versus trauma centre. *Pak J Otolaryng* 2011;27:9-11.
- Kiakojoury K, Amiri AP, Ahmadi MH, Madadian M. Indication and early

- complications of tracheostomy in the intensive care unit patients in Shahid Beheshti and Shahid Yahyanejad Hospital (Babol, Iran; 2001-2006). *J Babol Univ Med Sci* 2009;11:67-71.
23. Itamoto CH, Lima BT, Sato, Fujita RR. Indications and complications of tracheostomy in children. *Braz J Otorhinolaryngol* 2010; 76:10-5.
 24. Shashinder S, Tang IP, Kuliit S, Muthu K, Gopala KG, Jalaludin MA. Fracture synthetic tracheostomy tube: an ENT emergency. *Med J Malaysia* 2008;63:254-5.
 25. Pirochchai P, Lertchanaruengrit P, Vatanasapt P, Ratanaanekchai T, Thanaviratananich S. Fractured metallic tracheostomy tube in a child: a case report and review of the literature. *J Med Case Reports* 2010;4:234.
 26. Fasanla AJ. Challenges of tracheostomy in patients managed for severe tetanus in a developing country. *Int J Prev Med* 2010; 1:176-81.
 27. Meininger D, Walcher F, Byhahn C. Tracheostomy in intensive care long-term ventilation: indications, techniques and complications. *Chirurg* 2011;82:107-10.

CONTRIBUTORS

FW conceived the idea and planned the study. AH & QK did the data collection, BZ analyzed the study, IAK supervised the study. All the authors contributed significantly in the submitted manuscript.