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Original Research Article

STUDY OF INCIDENCE, INDICATIONS OF TRACHEOSTOMY IN RELATION TO AGE AND SEX AT A TERTIARY HOSPITAL

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Abstract

Background: Tracheostomy is the term used to describe the creation of an opening in the anterior wall of trachea and converting it into a stoma on the skin surface. Upper airway obstruction is one of the commonest indications for tracheostomy. Present study was aimed to study incidence, indications of tracheostomy in relation to age and sex at a tertiary hospital. **Material and Methods:** Present study was prospective, observational study, conducted in patients presenting with acute airway obstruction/ are mechanically ventilated/ with respiratory insufficiency, required tracheostomy. **Results:** Among 90 cases, age of the majority patients in the present study was 31-40 years age group (22.2%). Majority were males (81.1%) and only 17 cases (18.9%) were females. Tracheostomy was done commonly as an elective procedure (71.2%) as compared to emergency procedure (28.8%). The commonest primary disease was carcinoma of the larynx comprising 32 cases (35.5%=supraglottis 17.7%, glottis–16.6% and sub glottis -1.1%) followed by Organophosphorus poisoning (30.5%) So in the present series carcinoma larynx (35.5%) was the commonest indication causing respiratory obstruction. CA hypopharynx cases which needed tracheostomy are 3 (3.3%). In the present study out of 90 cases, tracheostomy was done on 42 cases (46.6%) intubated for various reasons. Remaining 48 cases (53.4%) were not intubated and tracheostomy was performed directly. Post-Operative complications were noted in 7 cases (7.%). Subcutaneous emphysema was the commonest post -operative complication that occurred in 3 cases (3.3%). Wound infection was seen in 2 cases (2.2%). Bleeding from the stoma was seen in 2 cases (2.2%) which was minimal and controlled. No complications were seen in remaining 83 cases (92.3%). **Conclusion:** Tracheostomy is a life-saving surgical procedure that is not devoid of complications. However, most of the complications can be avoided with meticulous technique, adequate and appropriate post-operative care.

INTRODUCTION

Tracheostomy is the term used to describe the creation of an opening in the anterior wall of trachea and converting it into a stoma on the skin surface.[1] Tracheostomy is a simple and an important life saving operation. The first known tracheostomy was performed by Asclepiades of Bithynia.

The decision to perform tracheostomy in a patient with respiratory insufficiency is based mostly on clinical observation. Upper airway obstruction is one of the commonest indications for tracheostomy.[2,3] Infectious processes, cancer of the larynx and hypopharynx, foreign bodies of the trachea or larynx, subglottic oedema and occasionally infections of the oropharynx may require tracheostomy. Moser's dictum "The time to do a tracheostomy is when you first think about it" is well applicable in upper airway obstruction.

The advantages of tracheostomy are, diminution of dead space by 50 percent and a decrease in the airway resistance, provides access to the lower respiratory tract allowing aspiration of secretions, instillation of drugs, general anaesthesia and bronchoscopy, with use of cuffed tube - positive pressure ventilation can be carried.[4] Although several complications are likely to arise in tracheostomy, most of them can be avoided if the operation is carefully performed and postoperative care is diligently carried out. Present study was aimed to study incidence, indications of tracheostomy in relation to age and sex at a tertiary hospital.

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MATERIAL AND METHODS

Present study was prospective, observational study, conducted at Department of ENT, Gandhi Medical College, Mahabubnagar, India. Study duration was of 2 years (July 2018 to July 2020). The present study of tracheostomy was conducted after obtaining the ethical committee clearance from the Institutional Ethical Committee.

Inclusion Criteria

- Patients presenting with acute airway obstruction/ are mechanically ventilated/ with respiratory insufficiency, required tracheostomy, patients relatives willing to participate in present study

Exclusion Criteria

- Patients/relatives not giving consent for participation in study.

Study was explained to patients relatives in local language & written consent was taken for participation & study. Patients particulars such as age, sex, socioeconomic status, occupation and address was noted in proforma. A detailed history was taken and then a thorough clinical examination was conducted, and the findings were recorded. Investigations like haemoglobin estimation, clotting time, bleeding time, total count, differential count, erythrocyte sedimentation rate, urine examination and X-ray chest PA view and X-ray neck AP and lateral views were advised depending on the condition of the patient.

Type of anaesthesia, type of procedure, intra-operative and post-operative problems were noted in a format. Details were analysed in detail with reference to the indications, their incidence in various age groups and sex wise. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

Among 90 cases, age of the majority patients in the present study was 31-40 years age group (22.2%). Majority were males (81.1%) and only 17 cases (18.9%) were females. Tracheostomy was done commonly as an elective procedure (71.2%) as compared to emergency procedure (28.8%). In this series of 90 cases 87 cases (96.6%) were done under local anaesthesia and only 3 cases (3.4%) were done under general anaesthesia.

Table 1: General Characteristics

	No. of patients	Percentage
Age groups (in years)		
0-10	0	0
11 -20	8	8.8
21-30	13	14.4
31-40	20	22.2
41-50	7	7.7
51-60	18	20
61-70	17	18.8
71-80	7	8.1
Mean age (mean±SD)		
Gender		
Male	73	81.1
Female	17	18.9
Type		
Emergency	26	28.8
Elective	64	71.2
Type of Anesthesia		
Local Anesthesia	87	96.6
General Anesthesia	3	3.4

In the present study of 90 cases, 36 cases (40%) were because of various malignancies of larynx and hypopharynx whereas 54 cases (60%) were due to non-malignant causes. In the present series of 90 cases of tracheostomy the commonest primary disease was carcinoma of the larynx comprising 32 cases (35.5%=supraglottis 17.7%, glottis–16.6% and sub glottis -1.1%) followed by Organophosphorus poisoning (30.5%) So in the present series carcinoma larynx (35.5%) was the commonest indication causing respiratory obstruction. CA hypopharynx cases which needed tracheostomy are 3 (3.3%).

Table 2: Distribution of cases with reference disease type & indications

	Male	Female	Total	Percentage
Disease type				
Malignant	30	6	36	40
Non-Malignant	43	11	54	60
Primary Disease				
CA glottis	26	1	27	30.5
CA supraglottis	14	2	16	17.7

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CA sub glottis	13	2	15	16.6
CA hypopharynx	4	1	5	5.5
Organophosphorus poisoning	3	2	5	5.5
Supervasmol poisoning	1	2	3	3.3
Cut Throat	2	0	2	2.2
SAH and SDH	1	1	2	2.2
Hanging	1	1	2	2.2
Snake Bite	1	1	2	2.2
CVA with RF	1	1	2	2.2
Vocal Cord palsy	1	1	2	2.2
Ischemia	1	1	2	2.2
Ectopic pregnancy	0	1	1	1.1
LeFort's Fracture	1	0	1	1.1
CA Tongue	1	0	1	1.1
GBS	1	0	1	1.1
Others	1	0	1	1.1

In the present study out of 90 cases, tracheostomy was done on 42 cases (46.6%) intubated for various reasons. Remaining 48 cases (53.4%) were not intubated and tracheostomy was performed directly. Post-Operative complications were noted in 7 cases (7.%). Subcutaneous emphysema was the commonest post -operative complication that occurred in 3 cases (3.3%). Wound infection was seen in 2 cases (2.2%). Bleeding from the stoma was seen in 2 cases (2.2%) which was minimal and controlled. No complications were seen in remaining 83 cases (92.3%). In the present series we decannulated in 13 (14.4%) cases. In our study, we used to block the opening of tracheostomy with cotton buds, to see whether patient was tolerating this partial block of tube. If the patient was tolerating, then decannulation was tried. In our study overall mortality rate was 2.2% (2 cases).

Table 3: Post procedure characteristics

Characteristics	No. of cases	Percentage
Intubation status		
Intubated	42	46.6
Not Intubated	48	53.4
Type of Complication		
Subcutaneous emphysema	3	3.3
Wound Infection	2	2.2
Bleeding from Stoma	2	2.2
Decannulation		
Decannulated	13	14.4%
Not Decannulated	77	85.6%
Outcome		
Expired	2	2.2%
Alive	88	97.8%

DISCUSSION

Since it was originally described in the first century B.C tracheostomy is currently one of the commonly performed surgeries in the critically ill patients.[5] Tracheostomy is a lifesaving procedure. It is usually a procedure to relieve upper respiratory obstruction in an emergency when patients are in respiratory distress. It is used as an alternative for difficult intubation and used in patients on ventilators for a better tracheobronchial toilet.

Tracheostomy once used almost exclusively to bypass upper airway obstruction is now a very common elective therapeutic procedure used to mostly facilitate prolonged intubation and mechanical ventilation to the critically ill.[1]

In the present study, tracheostomy was most commonly done in 31-40 age group. The predominant age group for tracheostomy in the study by Chandrika et al.[6] was 60-70years. A study by Choudhury et al.[7] shows that predominant age group for tracheostomy was 40-50.

In the present study of 90 cases, male: female ratio was 4.2:1. In a study conducted by Kodiya et al. in Nigeria, out of the total 111 cases analysed, 79 cases (71.2%) were seen in males and 32 cases (28.8%) was seen in females. The male: female ratio is 2.4:1.[8] In a study conducted by Santosh et al,[9] male: female ratio was 3.5:1. The incidence is more in males probably because diseases like CA larynx and CA hypopharynx are more common in males due to their personal habits like smoking, alcoholism, tobacco chewing, gutkha and bad oral hygiene.

Tracheostomy is done as an emergency procedure when the patients presents to the ENT department with stridor due to upper airway obstruction and cases of injury to neck like cutthroat. Elective tracheostomy is done for patients admitted in ICU with MV. In the present study, out of 90 cases, 26 cases (28.8%) were done as an emergency procedure and 64 cases (71.2%) were done as an elective procedure.

The various indications for tracheostomy are airway obstruction, tracheobronchial toilet and continuous assisted mechanical ventilation.

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Tracheostomy once used almost exclusively to bypass upper airway obstruction is now a very common elective therapeutic procedure fused mostly to facilitate prolonged intubation and mechanical ventilation to the critically ill. Airway obstruction maybe be due to CA larynx, CA hypopharynx, VC palsy, cut throat, supervasmol poisoning, etc. Continuous assisted mechanical ventilation includes cases like orghanophosphorous poisoning, CVA with RF, SAH and SDH, hanging, snake bite, ectopic pregnancy, etc.

In the present study, in around 51.9% cases tracheostomy was done due to airway obstruction and in 48.1% cases tracheostomy was done for providing continuous assisted mechanical ventilation. In this study the most common indication was malignancy. In a study by Santosh a total of 100 patients underwent bedside tracheostomy during mechanical ventilation.[9] A study by Okafor[10] revealed the three most common indications for emergency tracheostomy are CA larynx (25%), foreign body aspiration (21.2%) and iatrogenic bilateral VC paralysis (9.6%). In a study by Amusa et al.[11] the three common indications for emergency tracheostomy are trauma (34.1%), infections (29.5%) and CA larynx (11.4%).[3] In a study by Choudhary et al.,[7] the most common indication for tracheotomy is CA larynx (53.33%) followed by CA hypopharynx (13.33%).

Complications due to a properly performed tracheostomy are almost negligible. The main causes for high complication rate in tracheostomy appear to be the amount of time required to open the trachea. Therefore, simple and fast procedures are mandatory. They are discussed under 2 heads. operative and post-operative. Most of them occur during post-operative period.

Post-operative complications were found to be more common than operative complications. Post-operative complications were noted in 7 cases (7.7%). Subcutaneous emphysema was the commonest post-operative complication noted (3.3%). 2 patients (2.2%) developed bleeding from the stoma which was minimal and subsided by application of pressure pack and with ethamsylate injections and antibiotics.

According to a study by Goldenberg et al.,[12] the most common complication was tracheal stenosis and haemorrhage was the second most common complication of tracheostomy. The complications were seen in 49 cases (4.3%). According to Ting et al.[13] post-operative bleeding was the most common complication (2.6%) of tracheostomy whereas tracheal stenosis was seen in 1.7% cases.[13] Imperatore et al.[14] on 140 patients revealed bleeding in 2.14%, wound infection in 2.85% and tracheal stenosis in 0.71% cases of tracheostomy.

A statistically significant increased risk of complications was found in emergency and in ICU. Haemorrhage was seen in 2.8% cases and wound infection in 7.8% cases. Yellon[14] reported 7 cases of totally obstructing tracheostomy associated supra-stomal granulations. He noted that the complications due to granulations include progression of subglottic stenosis, posterior laryngeal stenosis and supra-glottic stenosis.

In a study by Graham et al[16] on elective tracheostomy the rate of complications was 8.94%. In a study by Wax et al.,[4] on elective tracheostomy the rate of complications was 19.64%. Arola et al.,[17] found 9 cases of tracheal stenosis with the incidence rate of 1.1%. All the cases were diagnosed within 10 weeks of extubation. Cases were managed by various methods including resection and anastomosis (5 cases), dilatation (4 cases) and removal of granulations (1 case). He concluded that the use of low pressure cuff and avoidance of over inflation of the cuff are the most important measures to prevent cuff related tracheal stenosis.

Costa et al.,[18] had shown tracheostomy complications such as haemorrhage, surgical wound infection, subcutaneous emphysema and no death occurred during tracheostomy procedure. In a study done by El Solh.,[19] the tracheostomy complication rate was between 14% and 25%. The study concluded that the complication rates in tracheostomy patients were more inobese patients.

In a retrospective study of hospital records of 43 tracheostomy patients by Aass AS[20] at Scandinavia there was tubal occlusion in 2.3% cases, dislocated tube in 2.3% cases, bilateral pneumothorax in 2.3% cases, fatal innominate arterial haemorrhage in 2.3% cases as early complications and tracheal stenosis in 40-60% cases as late complication. In a study by Soni et al.,[21] wound infection was the most common complication followed by subcutaneous emphysema.

In our study overall mortality rate was 2.2%. In the present study the cause of death was not attributed to the procedure of tracheostomy, rather due to co-morbid conditions. The study done by Klemm Ehad[22] shown a mortality rate of 0.62%. The most common cause of death was haemorrhage and displaced tube. A technique in tracheostomy would decrease the incidence of mortality in the displaced tube. In a study by Rahman et al.,[23] the mortality rate was 1.78%.[37] The fatalities were due to tube displacement and tube blockage.

CONCLUSION

Tracheostomy is a life-saving surgical procedure that is not devoid of complications. However, most of the complications can be avoided with meticulous technique, adequate and appropriate post-operative care. Most common primary disease-causing air-way obstruction is tumours of larynx and hypopharynx. Most common indication in adults was malignancies of larynx and

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hypopharynx and in children it was foreign bodies in the tracheobronchial tree.

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