

## Open surgical tracheostomy and complications

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### Abstract:

**Objective:** To study the complications associated with emergency and elective tracheostomy.

**Study Design:** A descriptive study.

**Place and Duration:** Department of E.N.T and Head & Neck Surgery Fatima Hospital Baqai Medical University Karachi, and Department of ENT & Surgery Sir Syed Girls Medical College Karachi from November 2006 to August 2011.

**Material and Method:** 64 patients of both gender all ages who underwent for tracheostomy were included in this study. After pre-operative assessments open for surgical tracheostomy were performed. An already designed proforma was used and all these patients were observed for any complications occurred immediately (per-operative) early post-operative and in late post-operative period.

**Results:** Out of 64 patients 43 were male and only 21 were females. All underwent open surgical tracheostomy. Ages ranged from 05 to 78 years. Emergency tracheostomy was performed in 58 % cases while elective tracheostomy was done in 42 % patients. 9% complications were seen immediately, 17% in early post-operative and only 04% in late post-operative period, of total 30% complications which were more commonly seen in emergency tracheostomy & in young children.

Per-operative bleeding was seen in 04%, aponea in 03%, emphysema in 02% as immediate complications while in early post-operative period dysphagia in 6% tubal obstruction in 04%, tubal displacement in 02% and infections was observed in 05% cases while in late post-operative period difficult decannulation seen in 03% and hypertrophied scar was noticed in 01% patient.

**Conclusions:** Complications were noticed more commonly in emergency tracheostomy and in young children.

**Keywords:** Elective tracheostomy, complications of tracheostomy, emergency tracheostomy

### Introduction:

Tracheostomy is a common surgical procedure most widely used in critically ill patients<sup>1</sup>, while historically the tracheostomy procedure have been associated with high morbidity and mortality. Now the tracheostomy is better tolerated than oral or nasal intubation.<sup>2</sup>

Tracheostomy can be associated with numerous complications including haemorrhage, infections, pneumothorax, tubal obstruction, accidental decannulation, granulation tissue

formation and difficult decannulation etc. Some of these complications are per-operative while others may be even after the placement of the tracheostomy tube.

Tracheostomy means making an opening into the anterior wall of the trachea along with conversion into a stoma on the skin surface<sup>1</sup>. Around 1000 BC it has reported that Alexander saved the life of his soldiers from suffocation in the trachea using the tip of his sword. The process has evolved over the years and undergone

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revolutionary changes in methodology, instrumentation and indications.<sup>3</sup> Initially it was indicated for laryngeal obstruction but later on the spectrum of indications expanded to respiratory failure and paralysis, removal of retained secretion via bronchial toilet and also the reduction of dead space<sup>4</sup>, it is also carried out before certain head and neck operations.

Tracheostomy is of various types like emergency, elective, temporary and permanent and percutaneous dilatation tracheostomy.<sup>5</sup> It is associated with a number of complications which may be per-operative, immediate and late post-operative complications.

In twentieth century Chevalier Jackson refined and standardized the technique thus reducing the operative mortality from 25% to 2%, while previously it was associated with major complications ranging from 14% to 66%. The development of plastic or portex tubes with low pressure and high volume cuffs have significantly reduced the morbidity of this procedure<sup>6</sup>. The complications and mortality rates seen higher during emergency tracheostomy, in children and infants and with the use of metallic tracheostomy tubes.

#### **Material and methods:**

This study was conducted in the departments of ENT and Head and Neck Surgery Fatima Hospital Baqai Medical University and department of ENT and surgery Sir Syed Girls Medical College Karachi. Sixty four patients were included in this study from November 2006 to August 2011. Patients undergoing tracheostomy of any age and both the gender were included in our study, while only those patients were excluded from the study where post-tracheostomy follow up was not possible either the patients were critically ill, sent back to the referring hospitals or who were lost in the followup.

All of these cases were admitted in our department for tracheostomy either via emergency, OPD, or referred from other departments or institutions. Pre-operatively in all acute emergency cases a brief history was taken and quickly

the patients were assessed as a whole for physical status, severity of respiratory obstruction, status of consciousness and signs of respiratory distress were specially looked for while thorough assessment like detailed history, general physical and systemic examination, thorough local examination and investigations as CBC, X-ray chest and neck were carried out in all non emergency cases.

An informed consent was taken and open surgical / conventional tracheostomy was performed under local or general anaesthesia in the operation theatre but it was also done in casualty and in ICU in few patients only, cannulation of the trachea was achieved with metallic or portex tubes of different sizes which were chosen according to the age of the patient.

After the tracheostomy, patients were kept in the recovery room for a short while and then shifted in the ward where routine X-ray chest and neck were done in all cases within few hours. Post-operative care like regular suction clearance of the tracheostomy tube and humidification was the joint responsibility of the duty doctor, nursing staff and also the attendant of the patient. Every patient was observed for any complication during the procedure, in the recovery room as well as in the ward during early and late post-operative period. The followup of all these patients were scheduled as first, one week after discharge from the hospital the second after three weeks and the third or the last follow-up was recorded after three months. Any complication noticed during these period were recorded accordingly.

#### **Results:**

In this study of 64 cases 43 were male and only 21 were females, with male to female ratio of 2:1. Age ranging from 05 to 78 years. (Table-1 and 2)

Among these cases 52% were from the ENT department itself, 32% were referred from the Surgical Intensive Care Unit / Neurosurgery unit, 09% from the radiotherapy department, 04% from the Paediatric and 04% from the Medical unit. The indications for tracheotomy recorded in all these patients were carcinoma larynx in

Table 1: Gender distribution of patients

Sex	No	%age
Male	43	67.19%
Female	21	32.81%
Total	64	100%

Table 2: Age of the patients &amp; percentage

Age in years	No. of Patients	Percentage
03 – 15	23	35.94%
16 – 30	12	18.75%
31 – 45	09	14.06%
46 – 60	14	21.88%
61 – 75	05	07.81%
76 & above	01	01.56%
Total	64	100%

27%, Oral and hypo pharyngeal tumor in 14%, Laryngeal foreign body in 11%, gunshot injuries 09% and road traffic accidents in 22% cases, post radiation laryngeal odema in 09%, laryngo-tracheal bronchitis in 04% while tetanus and CVA were the indications in 04% cases.(Table-3).

All 64 patients underwent tracheostomy either under local anaesthesia ( 88% ) or general anaesthesia in (12%) cases. Emergency tracheostomy was done in 58% while elective tracheostomy was performed in 42% patients. Metallic tube was used in 78% and portex tube was selected in 22% patients.

Total complications rate was 30% with 09% per-operative /immediate, 17% early post-operative and 04% were late post-operative complications. (Table-4).

In all cases of acute laryngeal obstruction a vertical incision was preferred for tracheostomy to established the air way as early as possible but due to engorged anterior jugular veins excessive per-operative bleeding was encountered .

Among the immediate or per-operative complications bleeding was noticed in 4% cases, were specially those patients who were brought in emergency with acute respiratory distress. Tracheostomy was done first to by pass the airway then all bleeding points were ligated and some were diathermised. Aponea was seen in 3% cases all were also in respiratory distress for long

period and sudden gush out of carbon dioxide after tracheostomy were dealt accordingly while the third complication was surgical emphysema developed in only 2% cases it was due to tight stitches of the tracheostomy wound in emergency and was relieved with immediate loosening of the stitches and dressing. In early post-operative period maximum complications were noticed as dysphagia was seen in 6% patients mostly with metallic tube which was gradually better with time. Wound infection was present in 5% patients who had history of road accident and where tracheostomy was performed in emergency. All were managed with antibiotics and aseptic dressing. Tubal obstruction was seen in 4% and tubal dislodgement was noticed in 2% cases. Late post-operative complications were few like difficult decannulation was noticed in 3% and hypertrophied scar was complained by 1% patient only. It was noticed that the complications were mostly seen in emergency tracheostomy specially in children and were also higher with the metallic tubes.

#### Discussion:

Tracheostomy is a common surgical procedure most widely used in acute airway obstruction and in critically ill patients<sup>7</sup> or it has been found to be the most important procedure in the management of laryngeal / airway obstruction<sup>8</sup>. This surgical procedure causes certain complications which were specially related to the emergency tracheostomy and when it is performed in children<sup>9,10</sup>.

In our study complications rate was 30% which were seen in all phases and is very close to a retrospective studies of Asmatullah et.al and Onakoya PA et.al<sup>11,12</sup>. Per-operative bleeding or haemorrhage was observed in 4% cases of emergency tracheostomy where engorged anterior jugular veins or the vessels of strap muscles were the sites of bleeding. This bleeding was controlled by ligation and in some cases with the help of diathermy.<sup>13,14</sup>

Aponea was observed in 3% patients due to sudden washed of carbon dioxide it was managed by routine methods by giving a mixture of

Table 3: Indications of tracheostomy

Causes	No.	Percentage
Carcinoma Larynx	17.28	27 %
Oral & hypo pharyngeal tumor	08.96	14 %
Laryngeal F.Body	07.04	11 %
Gunshot injuries	05.76	09 %
Road traffic accidents	14.08	22 %
Post radiations laryngeal odema	05.76	09 %
Laryngo-tracheal bronchitis	02.56	04 %
Tetanus	02.56	04%
TOTAL	64	100 %

Table 4: Complications related to tracheostomy immediately and later on

Time of On Set	Complications	Percentage
Immediate	Bleeding	4%
	Apnoea	3%
	Surgical emphysema	2%
Early post-operative	Dysphagia	6%
	Wound infection	5%
	Tubal obstruction	4%
	Tubal dislodgement	2%
operative-Late post	Difficult decannulation	3%
	Hypertrophied scar	1%
TOTAL		30%

carbon dioxide or usual respiratory support.<sup>15</sup> Surgical emphysema was seen in 2% patients where the wound might be sutured very tightly. Among the early post-operative complications dysphagia was the commonest in our study in 6%<sup>17</sup>, tubal obstruction and tubal dislodgement were seen in 4% and 2% respectively<sup>18</sup>. Wound infection / stomal infection was observed in 5% cases which were dealt meticulously with anti-septic measures and appropriate antibiotics.<sup>19</sup>

In late –post-operative period we also found few complications like difficult decannulation in 3% cases.<sup>20</sup>

This difficult decannulation was a specific problem in paediatric patients and those who were kept on tracheostomy and ventilator for a long period. Patients on tracheostomy for a longer duration gets psychologically dependent like in our study 2% of paediatric patients had this complication. 1% in this study faced granulation tissue formation which also leads to difficult

decanulation. General anaesthesia for a short period to decannulate the tracheostomy tube was the solution for this complication. In the retrospective study we found the similar percentage of this complication.<sup>21</sup>

Only 1% of our patients ended with hypertrophied scar which was managed with plastic surgery.

All of the above mentioned complications were common in children and more frequently seen after emergency tracheostomy, these findings are supported with retrospective studies.

### Conclusion:

After endotracheal intubation tracheostomy is the most common surgical procedure being performed to relieve the acute airway / laryngeal obstruction in all ages and both gender under local & general anaesthesia.

Although it may have many complications but saving ones life out weights all those problems. Skilled surgeon with proper post operative nursing may also reduce these complications.

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