

# Complications of Emergency Tracheostomy

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## ABSTRACT

**Objective:** To determine the complications of emergency tracheostomy in patients presenting to E.N.T emergency. **Study design:** Prospective type of study. **Place and duration of study:** Allied Hospital Faisalabad from 01-09-2012 to 31-05-2013 **Methodology:** This study includes 50 patients in which emergency tracheostomy was performed by the otorhinolaryngology department of Allied Hospital Faisalabad.

Patients came from all over the province of Punjab either directly or referred cases from various BHUs. / RHCs or even DHQ.

**Results:** Complications rate was 26 % after emergency tracheostomy. The rate of immediate complications was 14%.

**Conclusion:** Emergency tracheostomy, though lifesaving, is associated with definitive complications. **Key words:** Complications. Emergency tracheostomy

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## INTRODUCTION

“Tracheotomy” is a word of greek origin meaning temporary opening of trachea, while “tracheostomy” is used when a permanent opening<sup>1</sup> into trachea is made surgically. Tracheostomy is generally described as a procedure that involves opening the trachea and exteriorizing it to the cervical skin<sup>2</sup>. It is a lifesaving procedure. Airway compromise may be sudden or insidious, and partial or complete. Therefore assessment and frequent reassessment of airway patency and adequacy of ventilation are important. The patient with an altered level of consciousness is at particular risk of airway compromise and often requires provision of a definite airway. The unconscious head-injured patient, the patient obtunded from alcohol and/or other drugs and the patient with thoracic injuries may have compromised ventilatory effort.

Maintaining oxygenation and preventing hypercarbia are critical in managing the trauma patient. So airway and ventilation are the first priorities. Regarding paediatric cases, congenital laryngeal cyst and subglottic stenosis if mismanaged, lead to high incidence of morbidity

and mortality. They may present with severe stridor and emergent management may obviate tracheostomy<sup>3</sup>.

Percutaneous endoscopically guided tracheostomy is also performed in some centers where facilities are available<sup>4</sup>. In our setup, this procedure is not only performed by the otorhinolaryngologist but also by the general surgeons, neuro surgeons and icu personnel. So they should be familiar with not only its procedure and complications but also with its care and technique of decannulation.

Thus the objective of this study was to evaluate the incidence of different postoperative complications that occur after emergency tracheostomy. So we can become more vigilant while doing the procedure and in post-operative care to reduce these complications and of course morbidity and mortality of the patient.

## MATERIALS AND METHODS

The study was of prospective type, conducted at the Allied Hospital Faisalabad. This study includes 50 cases in which emergency tracheostomy was performed. Patients came from all over the province of the punjab. Patients got their admissions either through OPD or casualty or were referred from other units of the hospital or from other hospitals for emergency tracheostomy. Few patients were basically admitted for some other disease but later turned upto be candidates for emergency tracheostomy.

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Whole of the data of the patients from admissions till last follow-up visit was written in the given proforma and was also saved in the computer. Patients of all ages and both sexes were included who presented with acute respiratory distress. Patients requiring tracheostomy as a planned procedure e.g. to reduce physiological dead space, to do tracheobronchial toilet and to provide artificial respiration, were excluded. Patients were assessed pre-operatively. Any sign and symptom of acute respiratory distress were especially looked for, e.g.: difficulty in breathing, increased respiratory rate, increased heart rate, grunting, stridor, cyanosis, restlessness, sweaty, clammy skin, retractions, anxiety, flared nostrils, Change in pulse or blood pressure, difficulty or refusal to eat, inability to wake the child, head bobbing due to use of strap muscles for breathing, reduce airflow through the tube, more comfortable with elevated or sitting up, low o<sub>2</sub> saturation for children with a home pulse oximeter. Local examination of face especially in fractured maxilla and mandible including head and neck examination, lymph nodes and thyroid gland had also been done. Some of the patients undergoing emergency tracheostomy were not having enough time for pre-operative investigations. Blood gases were not performed routinely.

Routine investigations viz: Hb gm % , CBC, BT/CT. , CUE, x-ray chest, x-ray neck soft tissue lateral view, ECG, especially in middle and old age. Specific investigations viz: LFTs, thyroid scan, abdominal ultrasound were done, where indicated and condition of the patient allowed. An open surgical technique was used. After the operation, patients were kept in recovery room of the operation theatre. After stabilization, the patients were brought in the ward and early assessment for surgical emphysema, dislodgment of tube, pneumothorax, over-tightness of tracheostomy cord around neck causing discomfort, were made. Difficulty in suction was thoroughly assessed and patients were advised for the soft diet. Suction machine was provided individually for the tracheostomy patients and they were advised to have their separate tube for suction to reduce cross infection rates. Wet gauze was routinely placed over tracheostomy tube and humidification provided. Decannulation was done

according to protocol i.e. downsizing, corking the tube followed by extubation. Decannulation was not attempted in some patients due to persistence of primary disease. The patients were clearly instructed about the follow up visits and their significance. The complications in post-operative period were assessed and managed.

In this study, Z-test for statistical analysis was applied. Data analysis was performed by using Statistical Package for Social Sciences (SPSS) version 16.0 computer software and word excel program for assimilation and analysis of data was used.

## RESULTS

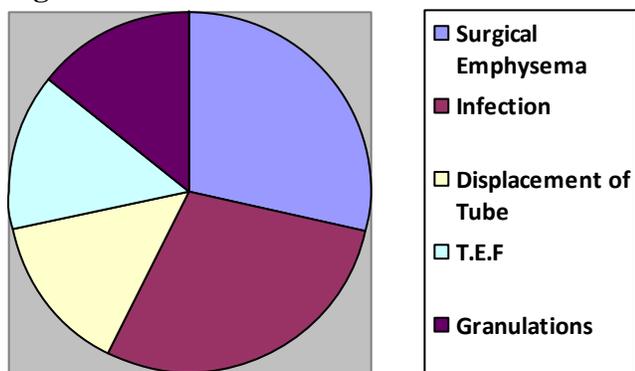
In our study of 50 cases of emergency tracheostomy, there were 30 males (60%) and 20 females (40%), with a male: female ratio of 6:4. Their age varied between 1 and 80 years. Majority of the patients (30%) were between the ages of 1-10 years. Common indication of all patients was that of acute respiratory distress. In children emergency tracheostomy was done due to Diphtheria and Tracheobronchitis 15 cases (30%) followed by foreign body laryngo-tracheobronchial tree 5 cases (10%). In adults common indications were RTA (head injury), 10 cases (20%);, firearm injury, one case(2%) and growth larynx ,4 cases(8%). Other indications for which emergency tracheostomy was done were: blunt trauma larynx,3 cases(6%); post thyroidectomy, 2 cases(4%); congenital subglottic stenosis,2 cases(4%); cut throat 2 cases(4%); post angiofibroma excision, one case(2%); recurrent respiratory papillomatosis,1 case(2%)patients stated that they would rate 'the fear that an embarrassing condition could arise in result of their disease' as 'Moderate' followed by 38.2%(P-Value 0.55) as 'Highly' while 10.7% of the patient rated their fear as 'Somehow', 1% did not fear embarrassment.(Table 2,3)

Local anesthesia was given in 44 cases (88%); whereas general anesthesia was given in 6 cases (12%). In our study most of the patients were operated by vertical incision, 34 cases (68%); whereas 16 cases (32%) had horizontal incision. Metallic silver tubes were used in 45 cases (90%) and portex cuffed tracheostomy tubes were used in 5 cases (10%) only. In our study, complication rate was 26%; out of these complications, 6% were immediate. It included a case of hemorrhage

from thyroid veins, which was secured by ligation. Apnea occurred in one child, which was managed successfully.

The rate of intermediate complications was 14% (figure1). It included surgical emphysema, 2 cases (4%); stomal infection was seen in 2 cases (4%). Displacement of the tube was seen in 1 case (2%). Tracheoesophageal fistula was seen in 1 case (2%). Suprastomal granulation was seen in 1 case (2%). Late complications were seen in 6% cases. Stenosis of the trachea was seen in two patients (4%), after 8 weeks of decannulation. Tracheocutaneous fistula was seen in one case (2%) of head injury.

**Figure 1**



**Table 1 Complications of Tracheostomy**

A) Immediate complications		
Sr. No.	No.of Cases	%age
Hemorrhage	2	4%
Apnoea	1	2%
Total	3	6%
B) Intermediate complications		
Surgical emphysema	2	4%
Infection	2	4%
Displacement of tube	1	2%
T.E.F	1	2%
Granulations	1	2%
Total	7	14%
C) Late complications		
Tracheal stenosis	2	4%
T.C.F	1	2%
Total	3	6%
Grand total	13/50	26%

**Table 2 Complications in relation to tracheostomy tubes**

Type of Tube	% Complication
Portex cuffed tube	20%
Metallic tube	6%

## DISCUSSION

In our study of 50 cases of emergency tracheostomy, different age groups from 1 to 80 years were entered. The most frequent presenting is paediatric age group (group 1) from 1-10 years (30%). There was seen slight male preponderance 60% (n=30) and female 40% (n=20). In adults, commonest indications were those of head injury 20% (n=10) and growth larynx 8%(n=4). Growth larynx was the commonest indication in Nigeria followed by prolonged ventilation and foreign body aspiration<sup>5</sup>. In paediatric group, most common indications were diphtheria and tracheobronchitis 30%(n=15). Next comes recurrent respiratory papillomatosis 10%(n=5). According to Tirmizey's<sup>6</sup> study, 14.5% children who underwent tracheostomy had acute laryngotracheo-bronchitis and 57.9% had diphtheria. Diphtheria is still the commonest indication for tracheostomy in this part of the world along with laryngo-tracheo-bronchitis. According to Perez the commonest indication of tracheostomy in children is upper airway obstruction<sup>7</sup>. In Tirmizey's<sup>6</sup> study 25% cases presented with foreign body bronchus. Whereas in our study, foreign body bronchus cases had been 10% (n=5). Blunt trauma larynx were 6%(n=3), post-thyroidectomy 4% (n=2); congenital subglottic stenosis 4% (n=2); angiofibroma excision 2% (n=1); firearm injury 2% (n=1); cut throat 4%(n=2); in Tirmizey's study, congenital subglottic stenosis was 1.3 % comparable to our study of 4%.

In Donnelly's<sup>8</sup> study, major indication was an airway problem secondary to congenital anomalies (65%). According to Shinkwin<sup>9</sup>, epiglottitis and lower respiratory tract disease used to be the main indications, but now, the leading indication is subglottic stenosis due to intubation for respiratory distress. In this study the author is in favour of vertical incision. In

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most of the cases, vertical incision 68% (n=34) was given as it is less vascular, safe and easy to perform. Alvi<sup>10</sup> is also in favour of vertical incision in critically ill patients. In 44 patients (88%), emergency tracheostomy was done under local anesthesia, the rest under G.A. This shows that the author is in favour of local anesthesia, as emergency tracheostomy could easily be performed under L.A in most of the patients. Metallic tracheostomy tubes were used in 90 % (n=45) cases while portex in 10% (n=5). The complication rate was 20% with portex cuffed tube as compared to only 6% with metallic tubes. Reasons for high complication rate with portex cuffed tubes may be due to non-availability of wide range of different sizes, improper care for inflating/deflating the cuff and difficulty in cleaning and sterilising the tube as well. The relative frequencies for different complications were determined and were studied in different groups. Viz according to type of tracheostomy tube, age groups etc. In our study the complication rate was 26%.

In Donnelly's study, the overall complication rate was 41% . In another study, complication rate of between 6-66% has been quoted<sup>11</sup>. Hemorrhage was the leading immediate complication due to damage in anterior jugular vein and vessels in strap muscles, which were ligated and hemostasis secured. Haemorrhage occurred in 6 % of patients according to Shahabi and Asmatullah. Astrachan<sup>13</sup> et al revealed 14% of interoperative and 16% (n=8) as post-operative complication rate. Hawkins and Williams<sup>14</sup> reported 14% operative and 22% postoperative complications. As mentioned earlier, in our study, complication rate was 26%. Out of these complications 6% were immediate. Apnea occurred in one child, which was managed successfully. The main bulk of complications is made by the intermediate complications; most probably due to poor post-operative care. In our study intermediate complications were 14%. In Manzoor's study, intermediate complications were 15.9 % . In our study surgical emphysema was the leading cause (4%). The incidence of this complication was 9% in study by Stauffer<sup>15</sup>. Second most common complication was stomal infection 4%. It was

4.5 % in Manzoor's study but was the commonest complication in a study by Fasunla et al<sup>16</sup>. The third most common complication in our study was tracheal stenosis 4%, which is quite low as compared to study of 81 cases of long term tracheostomy by Law<sup>17</sup>, in which incidence of tracheal stenosis was 14%. Tracheal stenosis is serious and potentially life threatening condition of varied etiology<sup>18</sup>. In our study low rate of this complication (tracheal stenosis) is because of proper size tracheostomy tube and the shorter duration as well for which the tracheostomy tube was kept. There was one case of tracheo-esophageal fistula in our study. The incidence of this fistula was less than 1% in a study by Stauffer<sup>16</sup>. The incidence in this series may be due to better post-operative care. One case of tracheocutaneous fistula was seen in our study, which was later on followed by direct laryngoscopy and then excision of the tract followed by repair. In our study tracheostomies done for congenital anomalies are few (4%), while in Tirmizey's study they are 2.6%. The reason attributed by him is probably due to poor neonatal care in this part of the world and many neonates with multiple congenital defects probably donot survive to present as a case of upper airway obstruction requiring tracheostomy in ENT department. This is again in sharp contrast to reports in developed countries where congenital anomalies are the commonest indications for tracheostomy in children. Tracheostomy decannulation can be successfully achieved in majority of patients<sup>19</sup>.

UI affects different health parameters, Papanicolaou et al in his study which was conducted in four European countries, found out that the greatest negative effects of UI were observed in self-esteem, confidence, social and physical activities.<sup>21</sup> In the present study, results showed that the majority of the respondents were feared of an embarrassing situation or bothered by the symptoms of their condition. A study by Fultz et al observed that more than three fourth of the patients with UI were bothered by their symptoms and more than a quarter believed that the condition is moderately or highly bothersome and they were significantly concerned regarding social embarrassment.<sup>16</sup>

## CONCLUSION

It concludes that emergency tracheostomy though lifesaving, however, is associated with definite complications, most of which are intermediate complications. They could be prevented by experience of the surgeon, proper post-operative care, OT facilities, type of tracheostomy and condition of the patient.

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Submitted for Publication: 04-06-2013

Accepted for Publication: 15-06-2013

After minor revisions