



ORIGINAL RESEARCH PAPER

ENT

ANALYSIS OF INDICATIONS FOR TRACHEOSTOMY IN RURAL TERTIARY CARE CENTRE

KEY WORDS: Tracheostomy, Indications, Hair dye poisoning

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ABSTRACT

Introduction: Tracheostomy is a life saving airway establishing procedure. We analyse the indications for which tracheostomy was done in a rural tertiary care centre where the resources are limited but the expectation of outcomes are higher. **Materials and methods:** 23 consecutive patients underwent tracheostomy in a single year included in study. 15 patients survived and 8 patients died later. **Results:** Out of 23 tracheostomies, 10 patients were from IMCU elective tracheostomy. 13 patients were in casualty requiring emergency tracheostomy out of which 7 patients were of laryngeal edema secondary to hair dye poisoning, 3 patients with laryngotracheal trauma and 3 patients in stridor secondary to laryngopharyngeal malignancies. **Discussion:** Epidemiology highlights the higher incidence of medicolegal cases especially suicides. Indications compared with other parts of the world shows higher percentage to relieve upper airway obstruction (56.52%) followed by prolonged ventilation (43.47%). Complications were minimal (13%) related to tracheostomy, however mortality was higher (34.78%) overall, all were from IMCU, 80% of tracheostomised patients in IMCU to be specific. Most of cases in IMCU on ventilator underwent tracheostomy on 5th or 6th day after intubation (50%). Timing of tracheostomy and Early versus late tracheostomy in IMCU discussed with review of journals. Hair dye poisoning 7 cases (30.43%) were noticeably higher compared to other parts and mechanisms of poisoning with treatment protocol discussed. **Conclusion:** In this period of rationalization where intubation precedes tracheostomy, tracheostomy has a strong role in establishing airway to accelerate cure with better convalescence.

INTRODUCTION

Tracheostomy is a life saving airway establishing procedure. Early depiction of tracheotomy is seen in Egyptian artifacts in 3600 BC¹. Rigveda, a Sanskrit text, has descriptions of tracheostomy in Circa around 2000 BC². Asclepiades of Bithynia performed early tracheostomy in Rome around 100 BC. Galen and Aretaeus from Rome in the 2nd century AD, credit Asclepiades first to perform a non-emergency tracheotomy³. Antonio Musa Brassavola (1490-1554) of Ferrara treated a patient suffering from peritonsillar abscess by tracheostomy and published it in 1546⁴. The tracheostomy technique what we are using today was described in 1909 by Chevalier Jackson of Pittsburgh Pennsylvania⁴. Thomas Fienus (1567-1631), Professor of Medicine at the university of Louvain was the first to use the word "tracheotomy" in 1649⁵.

AIM:

To analyse the indications for which tracheostomy was done in a rural tertiary care centre in Tamilnadu, India where resources are limited but expectation of outcomes are higher. The study shall focus on common indications for which tracheostomy is done as elective and emergency cases and also discuss the timing, need, outcomes and complications of the procedure till the patient was discharged.

MATERIALS AND METHODS

The study period was one year. 23 consecutive patients who underwent tracheostomy were included in the study (table. 1) Tracheostomy is done by vertical incision (figure.1) from lower border of cricoid to sterno clavicular junction. In most cases inferior based flap from anterior wall of trachea (figure.2) made and sutured with inferior margin of incision (figure.3). this helps in easy insertion of tracheostomy tube (figure.4) even by health care providers without tracheal dilator.

10 patients were in IMCU and 13 patients in casualty. 11 male and 12 female patients. 15 patients were alive till discharge and 8 patients succumbed to disease. 13 patients were between 30-50 years of age. 6 patients above 50 years and 4 patients less than 30 years of age.

RESULTS

Casualty

13 cases underwent emergency tracheostomy from casualty. The indications were Hair dye ingestion poisoning = 7 cases,

Cut throat = 3 cases, Laryngopharyngeal malignancy with stridor = 3 cases. All patients survived till discharge.

Hair dye ingestion poisoning

Average time of hospitalization after consuming hair dye with suicidal intention was 5 hours. The common presentation was severe difficulty in taking breathing and stridor. All patients were treated by emergency tracheostomy (Figure.5) and with systemic steroids. All patients survived. Tracheostomy removed and strapping or closure done after 2 weeks of recovery.

Cut throat

3 patients presented with cut throat between 35 – 44 years of age.

A 36 yr female presented with severe laryngotracheal trauma (Figure.6) in thyroid region exposing pharynx. Emergency tracheostomy, nasogastric feeding tube insertion and primary suturing was done. She developed fistula, re suturing done twice and later Z-plasty stopped fistula leak. Tracheostomy removed after 45 days after patient tolerated oral feeds.

A 35 yr male known psychiatric disorder patient presented himself with self inflicted cut throat below cricoid (Figure.7). Tracheostomy tube inserted thro same incision. Later weaned and removed in 10 days

A 44 year male presented with homicidal cut throat with involvement of jugular vein. Vascular injury managed. Tracheostomy done was removed after 3 weeks.

All patients survived till discharge.

Laryngopharyngeal malignancy with stridor

3 patients with stridor secondary to laryngopharyngeal malignancy between 42-63 yrs presented in casualty. 42 yr female with postcricoid malignancy with stridor, 47 yr male with pyriform fossa malignancy with stridor and 63 yr male with supraglottis malignancy with stridor. All patients had fullers metal tracheostomy tube, biopsy confirmed and later sent to oncology department for further management with tracheostomy tube.

IMCU

There were 10 patients on ventilator in imcu who underwent

elective tracheostomy for prolonged ventilation. Among them 7 were male & 3 were female patients between 30- 60 years. After intubation and on ventilator, tracheostomy was done on 5th – 6th day in 50% of patients. Organophosphorus compound poisoning patients were 4 and 2 patients with medical conditions. One patient each with acid poisoning, rat killer poisoning, attempted hanging and postnatal complication were on ventilator required elective tracheostomy. 8 patients succumbed to disease and 2 patients survived.

DISCUSSION

Out of 23 patients, 10 IMCU and 3 cut throat patients had portex tracheostomy tube, 7 Hair dye ingestion poisoning patients and 3 malignancy patients had fullers metal tracheostomy tube.

Epidemiology

Medico legal cases constitute 17/23 (74 %). Out of them patients with suicidal intent were 15 cases, 65% of total cases who underwent tracheostomy. The various mode of medicolegal cases were hair dye ingestion poisoning = 7, cut throat = 3, organophosphorus poisoning = 4, rat killer poisoning = 1, acid poisoning = 1, attempted hanging = 1. According to data published by NCRB Tamilnadu along with Maharashtra and west Bengal have highest incidence of suicides in 2014 (figure.8). If suicides are eliminated, then the number of cases requiring tracheostomy would have been diminished to 8 cases from 23 cases in a year.

INDICATIONS

The common indications for tracheostomy are a)Upper airway obstruction, b)Removal of secretions, c)Prolonged ventilation and d)Part of another procedure⁶. In our study the indications were Upper airway obstruction constituted 13 cases (56.52%) and assisted ventilation 10 cases (43.47%). Out of cases of upper airway obstruction there were 7 Hair dye ingestion poisoning cases, 3 Cut throat cases and 3 laryngopharyngeal malignancy cases. Taiwo et al⁵ from Japan reported 63.5% cases for upper airway obstruction, 9.6% for assisted ventilation and 11.5% for protection of lower airway. Nora H Cheung et al⁷ from united kingdom published 3% cases for upper airway obstruction and 67% cases for assisted ventilation. Kokong et al⁸ from Nigeria recorded 73.72% cases for upper airway obstruction and 22% cases for assisted ventilation. Laith ali mahmood et al⁹ from Iraq reported 67.2% cases for upper airway obstruction, 17.6% cases for assisted ventilation and 15.2% cases for protection of lower airway. On comparison, united kingdom has more percentage of tracheostomy for assisted ventilation whereas in others including our study upper airway obstruction is the reason for majority of tracheostomy indications.

Complications

The common complications for tracheostomy may be divided into immediate, intermediate and late¹⁰. In our study complications following tracheostomy were minimal, only 3 out of 23 cases (Tube block – 1, Emphysema – 1, Salivary fistula – 1). Complications were minimal (13%) related to tracheostomy. However mortality was higher 8/23 (34.78%) which is not related to tracheostomy. Overall all mortality patients were from IMCU, 8/10 (80%) of tracheostomised patients in IMCU to be specific. Kernan et al¹¹ reported 39% complications and Waldron et al¹² reported 25.3% complications following tracheostomy. However they were old studies done decades ago, newer references were not found by us regarding complications following tracheostomy.

Hair dye ingestion poisoning¹³

Hair dye ingestion poisoning is notorious in this part of world. The Ingredients of Hair dye constitutes Aqua, light liquid paraffin, Para phenylene diamine, propylene glycol, ceto stearyle alcohol, sodium lauryl sulphate liquid, EDTA Ethylene Diamine Tetra Acetic Acid, disodium resorcinol, herbal extracts, preservatives, almond proteins and

perfumes.

The Pathogenesis is divided into Acute catarrhal which forms majority 97% patients having acute inflammation of mucosa, severe congestion, gross submucosal oedema angioneurotic rather than poison itself and Ulcerative which is rare 3% manifesting as Ulcers were very small with moderate degree of congestion.

The exact concentration causing toxicity is unknown. Studies¹³ have found out 3gms is sufficient to cause complications and Fatal dose is 7–10 gm. Fatal period is within 24 h of consumption with high mortality rate (47%).

Clinical manifestations of hair dye poisoning include Pain in the throat, Cough, dyspnoea, oedema of tongue, pharynx and neck (angio neurotic oedema), vomiting, gastritis, Bronchial spasm, chocolate brown colored urine (myoglobinuria), metabolic acidosis, hypovolemia, hemolysis, rhabdomyolysis etc. Deposition of myoglobinuria casts within the renal tubule cause renal failure, Cardiac arrhythmias like Ventricular fibrillation.

Management includes Emergency tracheostomy, if Endo tracheal intubation is not possible, along with anti histamines, Steroids, Alkaline diuresis (isotonic saline, sodium bicarbonate, diuretics) and Haemoperfusion/hemodialysis.

Early vs late tracheostomy in ventilator patients

The timing of tracheostomy for already intubated patients is a major area of friction between intensivists and ENT surgeons. Of the 10 cases of tracheostomy in intubated patients, 3 patients underwent tracheostomy on 5th day, 2 patients underwent on 3rd day and 6th day and 1 patient each on 7th, 9th and 10th day after intubation.

The definition of early tracheostomy differs between studies. Of the papers surveyed from the past 10 years, Early is defined as tracheostomy within 3–10 days of mechanical ventilation and Late varies within 7–14 days, 14–28 days, or 28 days after initiation of mechanical ventilation.

Mark J.Rumbak et al¹⁴ stated that early percutaneous tracheostomy done within 48hrs is more advantageous. Chia-Lin Hsu et al¹⁵ found late tracheostomy done after 21 days has higher complications. Groves et al¹⁶ found no difference in patients undergoing tracheostomy less than 10 days and more than 21 days after intubation. Christophe Clec'h et al¹⁷ analysed 2186 patients over 8 years and stated that tracheostomy is a burden and has no advantage if done early. Scales D, Thiruchelvam D et al¹⁸ analysed 11000 patients and declared early tracheostomy is slightly advantageous. Young D et al¹⁹ analysed 909 patients to interpret no significant difference between early and late tracheostomy and also found difficult to predict who require extended ventilator support. Terragni P et al²⁰ found no statistically significant difference of ventilator associated pneumonia between early and late tracheostomy patients.

Percutaneous tracheostomy

Although we didn't do any percutaneous tracheostomy in the study group published above, percutaneous tracheostomy has improved safety compared with conventional tracheotomy proved by many studies^{21,22,23,24,25,26,27,28,29}.

The Intensive Care Society³⁰ have issued cautions and relative contraindications for percutaneous tracheostomy. They include Emergency airway access, Difficult anatomy, Morbid obesity with short neck, Limited neck movement, Cervical spine injury – suspected or otherwise, Aberrant blood vessels, Thyroid or tracheal pathology, Moderate coagulopathy, Prothrombin time or activated partial thromboplastin time greater than 1.5 time the reference range, Platelet count less than 50000 / mcl, Significant gas

exchange problems: e.g. PEEP > 10 cm H₂O or FiO₂ greater than 0.6, Evidence of infection in the soft tissues of the neck at the insertion site and age less than 12 years.

CONCLUSION

The tracheostomy evolvement can be seen as five periods³¹:

1. period of legend from 2000BC to AD 1546
2. period of fear from 1546-1833, as it was done only by few brave with risk
3. period of drama from 1833-1932, done only in emergency situations
4. period of enthusiasm from 1932-1965, if you think tracheostomy...do it was the dictum
5. period of rationalisation from 1965 to date now, intubation considered before tracheostomy

In this period of advanced anesthesia and intubation techniques, Tracheostomy still has a strong role in establishing airway to accelerate cure with better convalescence.

With two of our tamilnadu state prominent political leaders and popular singer had undergone tracheostomy during their final days of life, interest to know about what, when and how of tracheostomy has increased among common public. Our Study highlights disease pattern in this part of world, incidence of medico legal cases and suicide attempts. Hair dye ingestion poisoning is unique with need for tracheostomy as immediate intervention

Table 1. Master case sheet

Age/Sex	Ward	Indication	Outcome	Tube
45/M	Imcu	Opc Poisoning On Ventilator 5th Day	Dead	Portex
36/F	Casualty	Cut Throat	Alive/ Salivary Fistula	Portex
65/M	Imcu	Opc Poisoning On Ventilator 6th Day	Alive / Tube Block	Portex
56/F	Casualty	Hair Dye Poisoning	Alive	Fullers
45/F	Casualty	Hair Dye Poisoning	Alive	Fullers
42/F	Casualty	Postcricoid Growth/ Stridor	Alive	Fullers
19/F	Casualty	Hair Dye Poisonng	Alive	Fullers
23/F	Imcu	Postnatal/ Ventilator 10th Day	Dead	Portex
63/M	Casualty	Ca Supraglottis/ Stridor	Alive	Fullers
26/F	Casualty	Hair Dye Poisoning	Alive	Fullers
57/M	Imcu	Ckd/ Pulmonary Edema On Ventilator 7th Day	Dead/ Subcutaneous Emphysema	Portex
45/F	Imcu	Hanging/ Hypoxic Ischemic Encephalopathy On Ventilator 5th Day	Dead	Portex
66/M	Imcu	Opc Poisoning/ On Ventilator 9th Pod	Dead	Portex
35/M	Casualty	Cut Throat	Alive	Portex
24/F	Casualty	Hair Dye Poisoning	Alive	Fullers
44/M	Casualty	Cut Throat	Alive	Portex
33/M	Imcu	Rat Killer Poisoning On Ventilator 5th Day	Dead	Portex
31/F	Imcu	Acid Poisoning/ Stridor 3rd Day	Alive	Portex
39/F	Casualty	Hair Dye Poisoning	Alive	Fullers

49/M	Imcu	Opc Poisoning On Ventilator 6th Day	Dead	Portex
33/F	Casualty	Hair Dye Poisoning	Alive	Fullers
47/M	Casualty	Ca Pyriform Fossa Stridor	Alive	Fullers
56/M	Imcu	Dm/Ht/ Ihd/ Pulmonary Edema On Ventilator 3rd Day	Dead	Portex



Figure.1 incision



Figure. 2 flap from tracheal wall



Figure.3 flap sutured

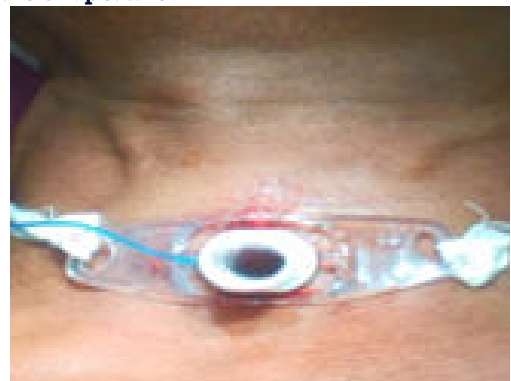


Figure.4 portex trachoesotomy tube

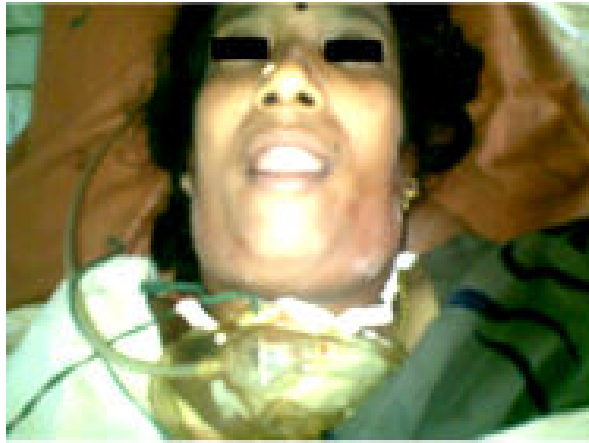


Figure.5 patient with hair dye ingestion poisoning



Figure.6 laryngotracheal trauma in thyrohyoid region



Figure.7 endotracheal tube through cut throat intrachea

Suicides in India - 2014

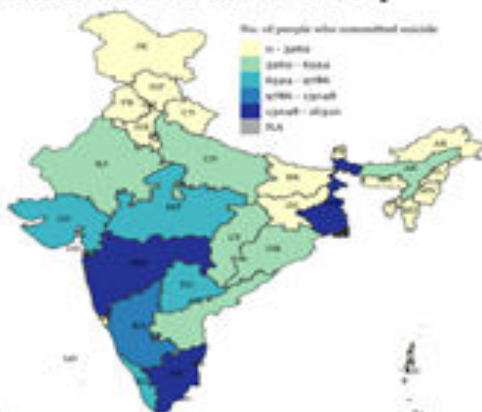


Figure.8 NCRB data on suicides in india

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