

RESEARCH ARTICLE

THE STUDY OF TRACHEOSTOMY IN INTENSIVE CARE UNIT

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ABSTRACT

Aims and Objectives: To study the indications, timing and complications of tracheostomy in intensive care unit patients and to compare early versus late tracheostomy outcomes.

Materials and Method: Studied 120 patients undergoing open surgical tracheostomy in ICU.

Results: Majority of the tracheostomies were performed early, that is within five days of endotracheal intubation and none of the patients were kept intubated for more than 15 days. The commonest indication for performing a tracheostomy was anticipated prolonged intubation. The early complications most frequently faced with were bleeding and tracheostomy tube blockade. Lower respiratory tract infection was more likely in patients with prolonged intubation periods especially if more than 10 days of intubation.

Discussion: The average duration of stay in the ICU following a tracheostomy was shorter when an early tracheostomy was performed and the mortality rate was also found to be less in patients undergoing an early tracheostomy.

Conclusion: For patients who are predicted to be on ventilator for a longer period; it is certain that an early tracheostomy does improve the outcomes of the patients.

Key Words: Tracheostomy, Prolonged intubation, Intensive care.

INTRODUCTION

Tracheostomy is a surgical procedure that creates a stoma at the skin surface that leads into the trachea. Indications of tracheostomy in intensive care unit include: relief of upper airway obstruction, improved pulmonary hygiene, long term positive pressure ventilation and decreased airway resistance to assist weaning from mechanical ventilatory support. Benefits of tracheostomy in long term mechanical ventilation include improved airway suctioning, better patient comfort, easier tube changes and capabilities for oral nutrition. Also ventilator dependant patients may tolerate weaning attempts better when spontaneously breathing through a tracheostomy that contributes less to airway resistance compared to an endotracheal tube (Yung and Snowdon, 1984). Complications associated with this procedure include: haemorrhage, apnoea, and cardiac arrest, damage to thyroid cartilage, cricoid cartilage, and recurrent laryngeal nerve. Surgical emphysema, pneumothorax, pneumo-mediastinum, perichondritis, tracheal blockade, tracheal necrosis, tracheo-arterial fistula, tracheo-esophageal fistula are other complications seen. Long term complications include stenosis, difficult decannulation, tracheo-cutaneous fistula, scar etc.

MATERIALS AND METHODS

The study was conducted on 120 intensive care unit patients in Goa Medical College who underwent a tracheostomy within the ICU. The tracheostomy was either an elective procedure following a period of endotracheal intubation or an emergency procedure when endotracheal intubation failed. Patient was reviewed every alternate day till the stay in ICU.

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If tracheostoma was infected or if excessive, foul smelling secretions were present then a tracheal swab was sent for culture and sensitivity, cultured organisms noted and antibiotics were changed accordingly. In the peripheral wards the patients were reviewed every third day till decannulated and discharged from the hospital. If decannulation was attempted the procedure was recorded in detail with the timing, duration, method, any morbidity and mortality associated with decannulation, hindrance during decannulation and any long term effects after decannulation were noted. The decannulation procedure was carried out by ENT department. The number of patients who were decannulated were noted and their outcome seen. The patients were followed up at O.P.D level for a period of six months.

RESULTS

Indications of Tracheostomy

The reasons for tracheostomy as stated by the intensive care resident when ENT surgeon was called upon to perform a tracheostomy were: A prolonged period of intubation anticipated by the intensive care doctor and the treating speciality with a majority of 33 of the 120 patients who were under the study (27.5%). The next common indication was difficulty encountered in weaning the patient off the ventilator as seen in 26 patients (21.6%). A poor general and neurological condition thus predisposing the patient to risk of aspiration and subsequent pneumonia was cited as the third most common indication in 24 patients (20%). Respiratory distress and insufficiency in maintaining proper ventilation and saturation was stated in 18 patients (15%). 10 patients underwent tracheostomy due to a difficult or failed intubation (8.3%), all of which were emergency tracheostomies. Only 6 patients

underwent a tracheostomy for the purpose of better bronchial toilet accounting for 5% of all tracheostomies. In 3 patients (2.5%) a blocked endotracheal tube which was not cleared by suction underwent a tracheostomy rather than a re-intubation.

Timing of Tracheostomy

79 patients were tracheostomised within 1 to 5 days of intubation (65.8%) which were taken as an early tracheostomy, 38 patients were tracheostomised between 6 to 10 days (31.6%) which were taken as tracheostomies performed in an intermediate period, 3 were tracheostomised between 11 to 15 days (2.5%) which were taken as late tracheostomies; and none after 15 days.

Complications Early

The main complications encountered early include bleeding from the tracheostomy site in 13 patients (26.5%), tracheostomy tube blockade in 13 patients (26.5%), infected stoma and respiratory arrest immediately following tracheostomy each was seen in 5 patients (10.2% each). Those patients who had a respiratory arrest were successfully revived. These patients probably developed a respiratory arrest due to carbon dioxide wash out or due to stimulation of the trachea, apnea immediately following tracheostomy was observed in 4 patients (8.1%), tracheostomy tube displacement in 3 patients (6.1%), subcutaneous emphysema in 3 patients (6.1%) and accidental decannulation in 3 patients (6.1%).

Late

The complications included in this group are those complications developing after 7 days of tracheostomy, especially during and after decannulation, in the ICU and in the peripheral wards. Three patients developed a stenosis. Two of these patients developed a subglottic stenosis, whereas one patient developed tracheal stenosis.

Early versus late Tracheostomy

The number of patients undergoing an early tracheostomy within 5 days was 79 out of which 66 patients were weaned off the ventilator (83.5%). 41 patients underwent a tracheostomy between 6 to 15 days of intubation, of which 27 patients were weaned (65.85%). CHI- SQUARE test was applied= 4.84. p value was found to be < 0.05, thus p value was significant. This study also shows correlation between the duration of intubation and the presence of lower respiratory tract infection. 35.4% patients that underwent an early tracheostomy, within 5 days of endotracheal intubation developed a lower respiratory tract infection. 60.5% patients who had a tracheostomy between 6 and 10 days of intubation developed a lower respiratory tract infection. 100% of patients who were intubated for more than 11 days and underwent a tracheostomy between 11 and 15 days developed a lower respiratory tract infection.

DISCUSSION

The decision of timing of tracheostomy after intubation was taken by a consensus opinion by intensivists, surgeons and physicians. The decision was taken considering various factors like nature of illness and expected prognosis of the illness and appearance of complications, and that early tracheostomy will provide better pulmonary toilet, a shorter stay in the intensive care unit and a quicker weaning from the ventilator. It is difficult to predict the optimal timing when to convert the endotracheal intubation into a tracheostomy. However different intensivists, surgeons and physicians made different decisions in the timing of tracheostomy. In the present study majority of patients in our intensive care unit were tracheostomised early that is within 0 to 5 days (65.8%). The most common indication was when the intensivist or the treating doctors after evaluating all the general parameters of the patient; anticipated a long duration of mechanical ventilation of more than two weeks, in 27.5% of all those tracheostomised.

The complications that occurred in the patients undergoing a tracheostomy were categorized as early if occurring during the surgical procedure or within seven days of tracheostomy. The late complications were those detected after seven days of tracheostomy and during and after decannulation of the patient. Complications such as bleeding, tracheostomy tube blockade, tracheostomy tube displacement, apnoea, subcutaneous emphysema, accidental decannulation, respiratory arrest and infected stoma were encountered immediately after tracheostomy or within seven days of tracheostomy. All of them were controlled with appropriate measures and none resulted in mortality or serious morbidity of patients. The complication rate found was 40.83% and was found to be more in emergency tracheostomy- 47.7% than those who underwent an elective tracheostomy wherein the complication rate was 31%.

CONCLUSION

In conclusion, it can be said that the next time we counsel families on the benefits of an early tracheostomy for patients who are predicted to be on ventilator for a longer period; it is certain that an early tracheostomy does improve the outcomes of the patients.

Abbreviations

ICU: Intensive care unit

REFERENCES

Yung, M. W. and Snowdon, S. L. 1984. Respiratory resistance of tracheostomy tubes, *Arch. Otolaryngol.*, 110: 591-95.
