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ORIGINAL RESEARCH ARTICLE

A study to evaluate the safety of open elective tracheostomy for patients under long mechanical ventilation

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Abstract

Introduction: The approach of elective open tracheostomy has proved to be safe in selected patients. The primary objective of this study was to determine the safety of elective open tracheostomy as a routine ICU procedure without any selection criteria, considering its peri- and postoperative complications.

Methods: This Retrospective Analytical study involved data of 50 of the randomly selected patients (candidates / study subjects) .) During this study, prior to tracheostomy brief history was noted about all the patients.

Results: In our study a total of 50 patients underwent bedside elec- tive open tracheostomy during the course of mechanical ventilation. Reasons for mechanical ventilation in above patients included polytrauma, head injury, organo-phosphorous poisoning, septicemia with multi organ failure, dengue encephalitis etc. In this study of 50 patients, 36 were male and 14 were female with a male to female ratio of 2.57:1 and average age of 37 years, youngest being 18 years and oldest being 68 years. Conclusion: . Elective open tracheostomy seems to be a safe and simple procedure. It is cheaper than other techniques and should always be consid- ered as an option for ICU patients who are under prolonged mechanical ventilation.

Keywords: Elective open tracheostomy , ICU, Retrograde , Ventilation

1 | INTRODUCTION

Tracheostomy is electively performed in critically ill patients requiring prolonged respiratory support or frequent broncho pulmonary toilet, or to help with weaning from mechanical ventilation. It is better tolerated than oral or nasal tracheal intubation and is thought to reduce sedation requirements and time in the intensive care unit (ICU) [1]. Traditionally, elective tracheostomy has been performed in the operating room (OR) by using the standard surgical techniques originally described by Jackson [2]. Ciaglia et al. [3] described a percutaneous dilational tracheostomy (PDT) based on a model proposed by Seldinger for endo- vascular intervention procedures. This technique, described as a bedside procedure, has found widespread acceptance as an alternative method to the conventional open procedure, since it eliminates risks associated to transporting critically ill patients and decreases costs related to the operating room. Both methods have been compared to assess their clinical (morbidity and mortality), surgical (technique), and/or financial (cost) differences, but results are controversial, and there are insufficient data to establish a clear superiority of the PDT technique. The approach of elective open tracheostomy has proved to be safe in selected patients. In a prospective randomized study, Massick et al. [4] found excellent results and stated that elective open tracheostomy represents the stan- dard of care in bedside tracheostomy, since it provides a more secure airway at markedly reduced patient charge. However, the use of very rigid selection criteria excluded many patients who might have benefited from this ap- proach. No evidence supports these exclusion criteria, and it is not clear whether they are really necessary. The primary objective of this study was to determine the safety of elective open tracheostomy as a routine ICU procedure without any selection criteria, considering its peri- and postoperative complications.

2 | METHEDOLOGY

This Retrospective Analytical study involved Prior Consent from Hospital Authorities / Medical Superintendents of the Local Randomly selected Secondary & Tertiary care Radio-diagnostic Centres / hospitals to see the records of the patients from Medical Records Department (MRD). The study was conducted within ethical standards. The Patients who were attending or admitted in randomly selected ICUs / hospitals including our Hospital in the city were selected for the study during last one year . Randomization was done using computer tables in selecting data. All Patients underwent standard clinical examinations, routine biochemical and haematological investigations with CT. Medical record numbers were used to generate the data for analysis. For the purpose of the present study, data of 50 of the randomly selected patients (candidates / study subjects) who seek care for care were retrospectively identified. During this study, prior to tracheostomy brief history was noted about all the patients. It was duly noted that Informed consent was taken for surgery and follow up also from the patient's relative. Bedside elective tracheostomy was performed by conventional open surgical technique under local anaesthesia with patient's vitals being monitored by an intensivist. Vertical incision technique was used in all patients. Cuffed Portex tracheostomy tube of different sizes according to age of the patient was used. All the patients were observed for complications during the procedure and follow up for the period of two months. First follow up was done one week after discharge. Second follow up was conducted two weeks later last follow up was done after two months. During second follow up strapping of the tracheostomy site was done.

Supplementary information The online version of this article (https://doi.org/10.15520/ijmhs.v5i1.3426) contains supplementary material, which is available to authorized users.

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3 | RESULTS

Totally 50 patients were retrospectively included in the study. In our study a total of 50 patients underwent bedside elec- tive open tracheostomy during the course of mechanical ventilation. Reasons for mechanical ventilation in above patients included polytrauma, head injury, organo-phosphorous poisoning, septicemia with multi organ failure, dengue encephalitis etc. In this study of 50 patients, 36 were male and 14 were female with a male to female ratio of 2.57:1 and average age of 37 years, youngest being 18 years and oldest being 68 years. One patient (2%) developed cardiac arrest during the procedure and he was revived successfully and procedure was completed. 1 patient (2%) developed surgical emphy- sema involving face, neck and upper chest during first six hours after the procedure. He was managed conservatively and it subsided after three days. 1 patient (2%) developed hemorrhage from operated site during first post operative day. Tracheostomy site was reopened and bleeding vessel was ligated. 1 patient (2%) developed left sided pneumo- thorax during second post operative day. He was managed by insertion of inter costal drainage tube. 1 patient (2%) developed tracheo-cutaneous fistula during second post operative week. The patient was managed by excision of fistulous tract and secondary suturing under local anesthesia. 2 patients (10%) developed tracheo-oesophageal fistula during the 3rd post operative week and they were referred to thoracic surgeon for further management (Table 1).

Table 1

Complications	Time	No of patients	Percentage
Cardiac arrest	Intraoperative	1	2%
Surgical emphysema	8 hrs	1	2%
Hemorrhage	1st day	1	2%
Pneumothorax	2nd day	1	2%
Tracheo-cutaneous fistula	2nd week	1	2%
Tracheo-oesophageal fistula	3rd week	2	10%

4 | DISCUSSION

Tracheostomy is performed primarily in critically ill pa- tients who require prolonged mechanical ventilation and/or in whom multiple attempts to wean from mechanical ven- tilation have been unsuccessful for 14–21 days. Tracheos- tomy facilitates weaning by decreasing the work of breath- ing in patients with limited reserve. However, the effect on dead space ventilation is marginal. Tracheostomy decreases the requirement for sedation and may allow for earlier pa- tient mobilization, feeding, and physical and occupational therapy. Less common indications include relief of upper airway obstruction, severe sleep apnea, difficult airway, and pulmonary secretion clearance. The main complications of prolonged tracheal intubation are ventilator-associated pneumonia and the adverse effects associated with per- sistent sedation. Local complications including subglottic stenosis are more likely if tracheal intubation is continued for more than 2 weeks.

Tracheostomy procedures have been associated with high morbidity and mortality. So it has been thought that the procedure should be performed in the operating room because of the need for adequate lighting, instruments, and support facilities [5]. However, some problems must be handled under this circumstance, including the hazard of moving critically ill patients to the operating room the associated cost, and the inconvenience of the operating room schedules. The PDT procedure helped to resolve some of these issues. It convinced surgeons and intensiv- ists that tracheostomy could be done at the bedside. The good outcomes seen in several series led to a change in ICU practices worldwide. Comparative studies of PDT and elec- tive open tracheostomy showed similar results regarding complications. Two recent meta-analyses showed similar rates of major peri-procedural and long-term complications for both procedures.

Patients who had a neck injury or were morbidly obese were included in our series and probably would have been excluded if literature criteria had been used . We were unable to identify how many more patients would have been assigned to the operating room tracheostomy based on literature criteria; because anatomical landmarks were not considered exclusion criteria, Despite this absence of selection criteria, our average procedure time and com- plication rate were similar to those now available for open tracheostomy performed either at bedside or in the operat- ing room, Our median procedure time was 20 minutes, but a large range was observed (8–60 minutes). This can be explained by the fact that even patients with unfavorable anatomical features such as distance between cricoid and supraesternal notch were included. In these cases, dissec- tion and tracheal exposition can be difficult and more time consuming.

We identified three crucial principles for good results with bedside tracheostomy. First, the team must be expert with tracheostomy. Many people think that tracheostomy is a simple procedure, and the least trained surgeon usually performs it. In the ICU, the consequences of inexperience may be disastrous. Surgeons experience is very important for managing complications. Second, team cooperation is essential. Nurse staff and intensivist must be committed for successful outcomes. Third, there must be adequate lighting and material, and everyone involved must know all the procedural steps.

However, the absence of a control group limits the power of our conclusions. The absence of some information such as APACHE II scores, ventilatory parameters, coagulation disorders, and intraoperative bleeding quantification are a consequence of incomplete recordings. Unfortunately, these gaps in the data also weaken our conclusions and pre- vent statistical analysis that would be of great interest.

5| CONCLUSION

Figure 4 (A–F): Tuberculosis initially misdiagnosed as metastasis. Parasagittal T1W (A) and sagittal T2W (B) images show a lesion with T1 and T2 hypointensity in the L1 vertebra and pedicle. Sagittal ADC map (C) reveals mild restriction of diffusion Sagittal T1W (D) and axial T2W (E) images after 6 months reveal multifocal lesions with T1 hypointensity, from D5 to D8, with a prevertebral abscess and an epidural soft tissue component. Sagittal diffusion image (F) at this time, reveals mildly bright signals in the involved dorsal vertebrae. The previously effected L1 vertebra (arrow in F) shows no significant change.

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Ethical standards: Yes

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