

Endotracheal intubation versus tracheostomy for prolonged ventilation

(Advantages and Disadvantages)

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ABSTRACT

The provision of an artificial airway by tracheal intubation is frequently required in intensive care, especially in patients with impaired laryngeal reflexes or who are in acute respiratory failure. Intubation of trachea is possible with an orotracheal, nasotracheal or tracheostomy tube. Usually endotracheal tube (ET) is safe upto two weeks and tracheostomy is done afterwards if prolonged ventilation is required. But practically it has been observed that when prolonged ventilatory support is required, an early tracheostomy gives good results compared to endotracheal tube, particularly in those centers, which lack the facility of trained medical staff.

INTRODUCTION

Endotracheal intubation is mandatory to manage the patient for ventilatory support. When the patient needs prolonged ventilatory support, the tracheostomy is advised. According to the experience of English and American intensivists the ET tube may be safe for two weeks in well established ICU where an experienced registrar of anaesthesia is on duty round the clock. The nursing staff of those units is very well trained, experienced and responsible. Two nurses are detailed to look after each patient on ventilator. In ICU of our hospitals most of the times only two nurses are looking after more than ten patients and in the peripheral hospitals often lack proper training. An inexperienced and over worked nursing staff is unable to manage the ventilated patient properly. Similarly duty medical officer is also not well trained so most of the time it has been practically noticed that ET tube is blocked and patient is not being ventilated because of scab formation and blockage of the tube. In our setup no one else dares to deal the patient except the anaesthetist, even the senior consultants are reluctant to deal this situation. By the time the anaesthetist is called patient is very near to death point.

There are many answers to this avoidable morbidity and mortality. We should have reasonable number of anaesthetists posted in our hospitals so that one anaesthetist is on duty round the clock to act promptly if such situation arises. There is acute shortage of anaesthetists in Army. Similarly there is shortage of well trained nursing staff, so on and so

forth. Practically we have learnt from day to day experience that to avoid such drastic situation we have to adopt other means and methods. As for the current subject of maintenance of airway for prolonged ventilation is concerned it is practically noticed that an early tracheostomy can save the life of the patient.

The tracheostomy is not 100% safe, it has its own complications but if an expert surgeon performs it then certainly it has fewer complications. In this context advantages and disadvantages of both procedures are discussed and final decision is left to the treating doctor.

ENDOTRACHEAL INTUBATION:

ADVANTAGES:

- 1) In emergency situation it is the first most step to secure the proper airway.
- 2) As compared to tracheostomy it has less complications.
- 3) The procedure can be performed within seconds.

DISADVANTAGES:

- 1) Suction through ET is difficult as compared to tracheostomy and most of the time the suction catheter is pushed to right main bronchus due to anatomical reasons and it is very difficult to direct it to left main bronchus resulting in retention of secretions and super-added infection. Secondly, frequent suction is required to keep the airway patent.

- 2) The possibility of accidental extubation or misplacement into main bronchus resulting in one lung ventilation, hypoxia and lung collapse.
- 3) Laryngeal damage which may be very serious. Laryngeal oedema and hoarseness of voice may be a problem following extubation.
- 4) The need for adequate sedation in order to tolerate the oral tube. However, nasal intubation requires less sedation and biting on the tube is avoided.
- 5) Patient takes much longer time to understand the process of ventilation and is very irritable and uncooperative
- 6) Anatomical dead space is more as compared to tracheostomy.
- 7) Kinking of ET tube may result into airway obstruction.
- 8) Oral hygiene can not be well maintained in case of oral intubation
- 9) Although nasal intubation is considered a better option but it has it's own associated complications i.e. bleeding, injuries to turbinates etc. and secondly it is difficult to insert the CUFFED tube through nostril especially when the patient is in respiratory failure.
- 10) Oral tube is difficult to secure as compared to nasal tube and later is better tolerated by the patient. So whenever facility for tracheostomy is not available it is better to do nasal intubation for prolonged ventilation.
- 11) Weaning from ventilator is usually difficult and may take much longer time.

TRACHEOSTOMY:

ADVANTAGES:

- 1) Easy to suck out the secretions from both lungs.
- 2) Less possibility of blockage and obstruction.
- 3) Less possibility of accidental extubation or misplacement into a main bronchus.
- 4) The laryngeal damage, oedema and hoarseness can be avoided.
- 5) The patient needs not any sedation and takes less time in understanding the process of ventilation.

- 6) The anatomical dead space is less.
- 7) Oral hygiene can be well maintained.
- 8) Tracheostomy tube is properly secured and tied round the neck.
- 9) Even untrained person can institute intermittent ventilatory support easily.
- 10) Weaning from ventilator is much easier and takes much shorter time.
- 11) Double cuff high volume and low pressure tracheostomy tubes are now used which don't interfere with the process of ventilation and there is almost no chance of development of ischaemia of tracheal wall.

DISADVANTAGES

- 1) The procedure requires shifting of the ventilated patient to the operation theatre, however percutaneous tracheostomy can be performed in ICU.
- 2) It may require general anaesthesia, which has its own hazards for critical ill patients.
- 3) There is a long list of associated per-operative and post-operative complications. However tracheal stenosis is now a rare problem with the use of low-pressure high volume double cuff tracheostomy tubes.
- 4) Tracheostomy should not be embarked on lightly, because of the considerable morbidity as well as associated mortality of approximately 3%.
- 5) A new iatrogenic port is created very near to lung fields and by frequent suction and instrumentation, susceptibility to lung infection is increased.
- 6) Possibility of formation of granulation tissue that bleeds on instrumentation.

DISCUSSION:

Acute respiratory failure requiring prolonged ventilation is initially managed by securing the airway through ET tube. One can not keep the ET tube longer than two weeks, because it causes damage to vocal cords. In most of the centers early tracheostomy is practiced, when it has been decided that the patient may require prolonged ventilation. There is no definite time factor to distinguish between short-term ventilation and prolonged ventilation, but as a general

rule, whenever patient requires ventilatory support for more than two weeks it should be considered as prolonged ventilation.

In most of the advanced units now the anaesthetists themselves perform bedside percutaneous tracheostomy and there is no need to shift the patient to operation theater. Cricothyroid membrane is punctured and a guide wire is passed through the needle and after making a skin incision of about half cm, tracheal opening is dilated and the tracheal tube is guided on the guide wire. This is very simple procedure and it only takes 5 to 10 min. Percutaneous tracheostomy has made the procedure very easy and an early tracheostomy is often decided.

As is mentioned above, each procedure has advantages and disadvantages. In our setup where there is shortage of well-trained staff the ventilated patient may be saved by performing early tracheostomy that requires prolonged ventilation. It is noticed that the anaesthetist is called in an emergency to see the ventilated patient in distress, cyanosed and fighting with ventilator. When the ET tube is taken out, patient feels much comfortable without tube; reason being that ET suction was not done at proper time and

tracheal opening of ET tube was blocked. Most of the patients have died unnoticed during the night when the over worked staff is tired. But it has been observed that patients who get tracheostomy early, they don't develop airway obstruction due to blockage of tube.

CONCLUSION

Short-term ventilation can be instituted through ET tube and nasotracheal tube is superior to orotracheal tube. But when patient requires long term ventilatory support then an early tracheostomy should be performed in those centers, which lack the facility of trained staff.

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BRIEF COMMUNICATION

A patient at AFIU was planned to undergo TURP on 19 May 99. Epidural anaesthesia was to be administered with catheterization. Patient was prepped, draped and local infiltration was made in L 3-4 interspace. Tuohy needle was pushed into the tissues and loss of resistance technique was used to identify the epidural space. Once the needle was inside the space, five ml of local anaesthetic solution was injected. Then an attempt was made to thread the catheter, but it did not enter the needle despite repeated attempts. Another 10 ml of local anaesthetic was injected into the space and the needle was pulled out. An attempt at threading the needle through either end was impossible. The thickness of the catheter was more than the stillete, so obviously the manufacturer, B. Braun had erroneously packed the wrong combination of catheter with Tuohy needle.

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