

Practice of Tracheostomy Decannulation among Neurosurgery Patients: Single Center Study

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Background: A tracheostomy is a surgical procedure in which trachea is opened below the larynx from which a tube is placed in trachea to facilitate mechanical ventilation, removal of tracheo-bronchial secretions and to protect upper airway. The aim of this study is to find out the current status of decannulation following institutional guideline. **Materials and methods:** A cross sectional study was done among patients in neurosurgery with tracheostomy who were successfully decannulated. This study was conducted in department of neurosurgery B&C Medical College Teaching Hospital, Jhapa, Birtamode. Total 47 patients were included in this study those underwent decannulation. Various demographic data including gender age diagnosis, days of tracheostomy and decannulation started day were recorded and entered in SPSS and version 20. **Results:** Among 47 patients, male were 81% (38) and females 19% (9). Road Traffic accident is the most common diagnosis 66% (31) among tracheostomy patients. The average days with Tracheostomy were 24. And after decannulation process, the successful tracheostomy closure in 83% (39) patients was achieved. **Conclusion:** Patients with tracheostomy tube could be decannulated successfully by following strict institutional guidelines, adequate medical and nursing care in a center with limited resources.

Key words: Airway, Decannulation, Ventilation, Tracheostomy

Tracheostomy is a procedure to secure airway, mostly done for prolonged ventilation and airway protection among neurosurgery patients due to delayed recovery in consciousness. The main indications for tracheostomy are prolonged mechanical ventilation or respiratory weaning, provision of pulmonary toilet, protection of the airway, management of upper airway obstruction, and as part of a surgical procedure.¹ Patients who underwent tracheostomy were slowly weaned off from ventilators and transferred to ward. Decannulation is the process to close the stoma. It may depend on the severity of clinical illness and general condition. Most of time, patients with good

consciousness recovery and low chest secretions are good candidates for decannulation.

The decannulation process should be staged and monitored with caution so that there is less risk of de-saturation and other complications. The stoma of tracheostomy site starts to heal within few hours after the tube taken out, so we must ensure the good airway patency and oral hygiene before taking out tube.

Every patient with tracheostomy would get equal chances for decannulation, though the different factors may limit their success rates. There are many guidelines and criteria according to country and institutions, we are following a guideline

which is made up by taking references from other standard guidelines and modified with our experiences.

In this study, we explain current practice of decannulation among tracheostomy patients in department of neurosurgery at our center.

Methods and Materials:

This cross-sectional descriptive study was conducted at department of neurosurgery, B&C Hospital Teaching Hospital, Jhapa, Nepal. The ethical clearance was taken from department of neurosurgery and medical director of the hospital. All participants were assessed first for ability of decannulation and then this protocol was started. Patients with neurological and neurosurgical illness were included in this study and rests were excluded. Patients who were deceased after tracheostomy and taken home against medical advice were not included in this study.

Initially, patients were started with partial corking or capping of the cannula followed by complete closure which needed to be monitored closely and if normal spontaneous respiration was achieved with low suction rates then tube was taken out and stoma was sealed with tight dressing.

At the beginning, the tube size was changed to smallest possible before starting the decannulation process, after which partial corking was started with cuff being deflated for about 72 hours. Patients with good consciousness levels, who tolerated capping successfully with no respiration difficulties, no regurgitation and less tracheal secretions were undergone the process for decannulation. The final stage was done with complete closure of the tube for next 24 hours and if successful, tube was taken out and stoma was closed with tight dressing. Patient was kept not per oral during the change of tracheostomy tube and decannulation day to avoid the risk of aspiration.

We have included patients with different age and gender (**Figure 1**).

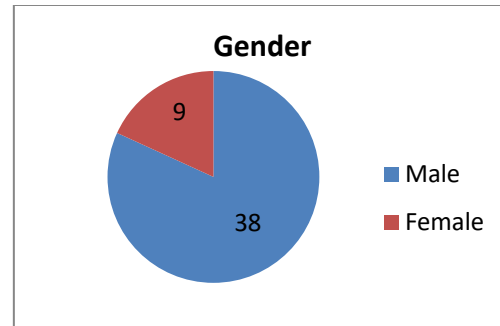


Figure 1: Pie-chart showing the gender distribution of the decannulation patients

Patients with different medical conditions were included in this study (**Figure 2**)

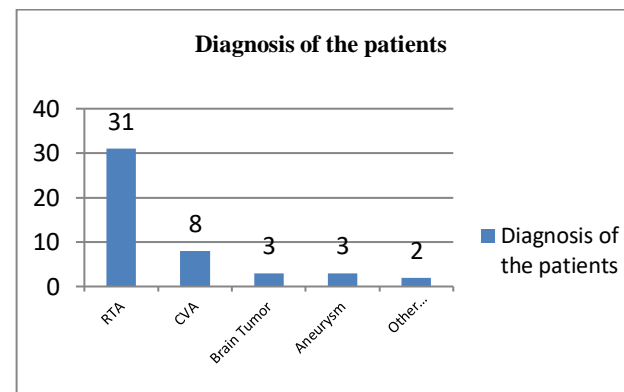


Figure 2: Bar-graph showing the different medical condition among decannulation patients

Decannulation Protocol Criteria and Steps:

- 1-Partial capping of the tube for 72 hours
- 2-Check airway patency with normal breathing pattern and maintained SaO₂ >95%
- 3-Chest secretion less than 2 per time while suctioning
- 4-No regurgitation or aspiration
- 5-Complete occlusion of tube for 24 hours
- 6-Decannulation and tight dressing closure

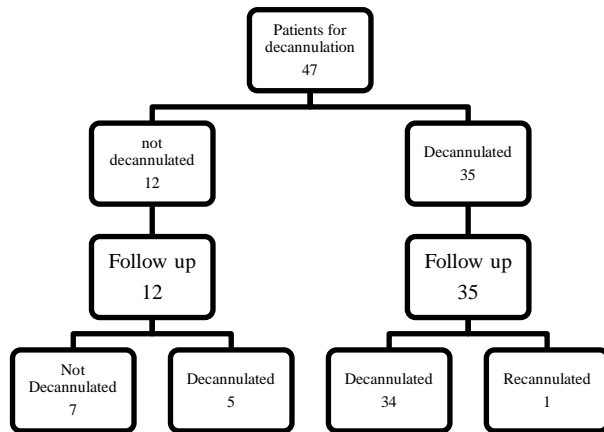


Figure 3: Chart showing patients undergone decannulation process at our center

Results:

Patients were successfully processed to decannulation for most of the patient, few left unsuccessful due to low level of consciousness, aspiration, high chest secretion (**Table 1**).

Table 1 Findings of the patients who underwent decannulation

Diagnosis	Number of patients	Average Tracheostomy days	Successful Decannulation	Failure and Recannulation	Successful Percentage (%)
Head Injury	26	18	23	3	88.50
Cervical Injury	5	28	4	1	80
CVA	8	21	5	3	62.50
Brain tumor	3	>30	2	1	67
Aneurysm	3	24	3	0	100
Other Neurological Illness	2	>30	2	0	100
Total	47	24	39	8	83

The patients with successful decannulation were males, 38 (Figure 1) and most common pathology was Road Traffic Accident, 31(Figure 2). The mean stay time of tracheostomy and decannulation process was 24 days. There are 8 Patients, who couldn't be decannulated due to poor respiratory efforts, low consciousness level and continues chest secretion. Our results of the study are shown in table 1. The overall patients, who underwent tracheostomy decannulation process was as shown in Figure 3.

Discussion:

The procedure of decannulation is needed after tracheostomy to make the patients to recover in their previous state of airway patency. Few patients

may need it life time due to low consciousness level, other comorbidities or recurrent chest infections.^{1,2} We have successfully decannulated most of the patients who underwent tracheostomy after following our intuitional guideline.

The common difficulties faced for decannulation are low consciousness level, increased chest secretions, and progressive neuromuscular diseases. The tracheostomy tube-capping trial consisted of the ability to breathe through the mouth with the tracheostomy cannula closed with a cap for 72 hours. In a study by Santus et al, the ability to tolerate tracheostomy tube capping and cough effectiveness were the most frequent criteria used by clinicians to predict successful decannulation². In our study this is also confirmed with high sensitivity and specificity for the decannulation process. There are 12 patients who were failed initially were followed up again and successful decannulation was achieved in 7 patients but rest five needed reinsertion of the tracheostomy tube due to respiratory failure. In our study there was one patient with symptoms of partial tracheomalacia, and two patients had bilateral vocal fold paresis. In few studies, it has been shown that a partial upper airway occlusion could be asymptomatic when subjects breathe at tidal volume.^{2,3}

There are few studies, those have proposed two parameters, Quantitative and qualitative to be identified prior to decannulation. The decisional process of decannulation should be rely on quantitative parameters.³ The possibility of success rate is more when Glasgow Coma Scale(GCS) is Eight or more than Eight.^{5,6} The other parameters were stability of cardiac frequency with less than 140 beats/minute, non-dependence on vasoactive drugs; non-febrile and spontaneous cough reflex.^{3,4,5} The ability to manage secretions has positive outcome.⁸ Those patients with tracheostomy for at least seven days; respiratory rate below 20 times/minute; saturation level of oxygen is above 90% in air environment, alert with collaborative level of consciousness has very high successful rate in decannulation process.^{3,5} There are few institutions, who use the valve for occlusion training of the traqueosthomy.^{9, 10}

We have limited resources in the periphery and made out new protocol based on these resources. In our study, major parameters included for the successful tracheostomy closure are GCS more than eight, normal spontaneous respiratory rate and pattern, less tracheal secretions, tolerating capping partially for 72 hours and completely for 24 hours, no regurgitation or aspiration. The minor parameters are young age of the patient, less days of tracheostomy.

Conclusion:

The tracheostomy patients were successfully decannulated after close monitoring and following specific guidelines. Few patients may need long term observation for it. The type of illness, duration of tracheostomy, associated chest infection and consciousness level play key factor in decannulation.

Limitation:

This study was conducted in single center among limited number of patients so it may not be generalized. The guidelines may vary in centers where in-house sophisticated services of Barrium swallow, nasopharyngolaryngoscopy, fibroendoscopic swallowing assessment is available.

Conflict of Interest: None

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