

Foleys catheter vs Conventional Suction Catheter in Tracheostomy Suctioning

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Abstract

This prospective observational study aimed to compare the effectiveness of conventional suction catheter with Foleys catheter for tracheostomy suctioning. It was conducted among the patients with tracheostomy admitted in Neurosurgical areas of a tertiary care centre. Fifty patients were enrolled in each group. Patients in group I received tracheostomy suctioning with Foleys catheter and patients in group II received tracheostomy suctioning with conventional suction catheter. Patients were evaluated for bleeding complications and suctioning adequacy in both groups. The two groups were comparable in terms of age, sex, tracheostomy days, duration of hospitalisation, size of the catheter used and suctioning pressure applied. The bleeding streak was noted in 9 percent of the subjects of Foleys catheter group when compared to 18 percent in conventional suction catheter group, which was significant at $p < 0.05$. However there was no reported tracheostomy tube block and ability to attain suctioning adequacy in both groups. It is concluded that to prevent trachea-bronchial mucosa injury the Foleys catheter can be used for tracheostomy suctioning.

The purpose of suctioning is to remove mucus from the tracheostomy tube, maintain patent airway, and avoid tube blockages. Tracheostomy suction with suction catheter causes mucosal injury and leads to bleeding many times. A small amount of bleeding is expected after the initial tracheostomy procedure and after every tracheostomy tube change. This small amount of bleeding is normally self-limited. However appropriate suction catheter would help in minimising bleeding by preventing mucosal bleed.

Tracheostomy is a surgical hole into the trachea to lower the larynx through which an indwelling tube is placed to conquer upper airway obstruction, lessen mechanical ventilatory support to remove the tracheo-bronchial secretions. Different types of available suction catheters include closed system catheters, yankauer tips, latex rubber catheters, latex-free catheter etc.

In the milieu of today's critical care tracheostomy/endotracheal (ET) suctioning is routine procedure. Though these are life-saving procedures, they are

not totally devoid of complications. Suctioning of secretions via the ET tube/tracheostomy tube with a suction catheter is associated with trauma to the passages owing to the structure and material of catheters. To avoid the traumatic complications associated with the suction catheter, this study intended to use Foley's catheter instead of suction catheter since the Foleys catheter is softer and more pliable than conventional sectional catheter.

Review of Literature

Prasad et al (2009) conducted a prospective study to compare the advantages of using Foley's catheter vs suction catheter for suctioning through the endotracheal tube/tracheostomy tube. All the patients who underwent tracheostomy were included. Patients with bleeding disorders, coagulation profile abnormalities, and ICU stay less than a week were excluded from the study. Every alternate patient was suctioned using Foley's catheter. All the patients were followed till the time of discharge for any complications developed during the study. Data were collected from 363 patients of whom 181 were randomised to Foley's catheter group and 182 to the suction catheter group. The results showed that only 2 percent of the patients developed bleeding when Foley's catheter was used as compared to 23 percent when the suction catheter was used. Adequate suctioning was

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obtained in both groups and there was no other significant complication related to the suctioning noted in both methods.

Bleeding is the most common and fatal complication of tracheostomy. The incidence is higher with an emergency procedure. Bleeding in the immediate post-operative period may be exacerbated by suctioning with conventional suction catheter and high suction pressure which may be prevented with soft, pliable rubber catheter for initial days to avoid tracheal damage.

Table 1: Distribution of socio- demographic variables of study participants (N=100)

Variables	Foleys catheter group N (%)	Conventional suction catheter group N (%)	p value
Age	52 ± 6 years	54 ± 4 years	p= 0.42
Male	32 (64%)	30 (60%)	$\chi^2= 0.170$ df=1 p=0.6803
Female	18 (36%)	20 (40%)	
Post tracheostomy mean days	7 ± 3	8 ± 2	p=0.39814
Clinical Diagnosis			
Head injury	24 (48%)	22 (44%)	$\chi^2=0.583$ df=3 p=0.90
Spinal injury	14 (28%)	13 (26%)	
Cranial tumours	8 (16%)	9 (18%)	
Others	4 (8%)	6 (12%)	p=0.34746
Duration of hospitalised days	12 ± 4	14 ± 3	

Table 2: Suction catheter characteristics (N=100)

Variables	Foleys catheter group N (%)	Conventional suction catheter group N (%)
Catheter size	14 French	12-14 French
Mean number of suction / day	14 ± 2	15 ± 2
Suction pressure	80-120 mm Hg	

p=0.40

Table 3: Bleeding complications and suctioning adequacy in both groups (N=100)

Variables	Foleys catheter group N (%)	Conventional suction catheter group N (%)
Visible bleeding		
No	419 (82%)	32(64%)
Yes	9 (18%)	18(36%)
Suctioning adequacy, Yes	50	50
No. of reported Tracheostomy tube block	nil	nil

p=0.043

Methods

It was a prospective observational study in patients with tracheotomy admitted in Neurosurgical area. The inclusion criterion was tracheostomised patients admitted in Neuro surgery areas and patients with age of 18 years and above. Exclusion criteria was patients with bleeding disorders. Fifty consecutive patients were enrolled in experimental group and followed by control group using purposive sampling method. Sample size was estimated with an expected difference in percentage of patients reported with bleeding as 21 percent (2% of the patients developed bleeding when Foley's catheter was used as compared to 23 percent when the suction catheter was used) with 5 percent level of significance and 90 percent power.

The study was approved by scientific advisory committee followed by Institute Ethics committee. Informed consent was obtained from patients or their relatives if they are very critically ill. Group I patients received tracheostomy suctioning with Foleys catheter and group II patients conventional suction catheter was used for tracheostomy suctioning. Optimal suctioning pressure (80-120 mmHg) was maintained in both groups. Patients were evaluated for bleeding complications and suctioning adequacy in both groups with the help of observation checklist. Other demographic and clinical variable was collected using subject data sheet. Outcome variables was bleeding complication in control and intervention groups and suctioning adequacy in both groups.

Data Analysis

The data on categorical variables such as gender, clinical characteristics at the time of presentation, type of surgery, anticoagulants, suctioning adequacy, and complications were expressed as frequencies and percentages. The comparison of the categorical variables between the groups was carried out by using chi-square test. The continuous variables were age, post-operative stay in hospital. Post tracheostomy days were expressed as mean with SD. All statistical analysis was carried out at 5 percent level of significance and p-value less than 0.05 was considered as significant.

Results

Table 1 shows that the two groups were comparable in terms of age, sex, tracheostomy days and duration of hospitalisation.

Table 2 shows that the catheter size was 14 French in Foleys catheter group and 12-14 French in conventional suction catheter group. The frequency of suction in two groups did not differ. The average suc-

tion pressure was maintained.

The bleeding streak was noted in 9 percent of the subjects of Foleys catheter group as against 18 percent in conventional suction catheter group, which is significant at $p < 0.05$ (Table 3). However the groups did not differ in suctioning adequacy and tracheostomy block.

Tracheotomy is a regular procedure in intensive care units, and nurses must provide appropriate care to tracheostomy patients to avoid complications. One of the most significant considerations is effective mobilisation of secretions, and a suction catheter is the most important tool for that purpose. Each bedside should be equipped with a functional suctioning system, an oxygen source, a manual resuscitation bag, and a complete tracheostomy kit. These should accompany patients wherever they go in the hospital. Complications include infection, skin breakdown, which lead to bleeding during suctioning and tracheoesophageal fistula.

In this study the experimental and control group were comparable along all clinical variables. However in the experimental group, where Foleys catheter were used as suction catheter, reported bleeding streaks of 18 percent of the patients compared to double the frequency in control group as 36 percent. This result is comparable with study results conducted by Prasad et al (2009) who identified that 2 percent of the patients developed bleeding when Foley's catheter was used as compared to 23 percent when the conventional suction catheter was used.

Peri-operative complications of a new tracheostomy include haemorrhage for initial 1-2 days. Initial bleeding streaks was not included in this study. The observations from day 3 onwards only were included for analysis. The experimental and control groups were comparable in all other confounding variables including suction pressure and suction catheter size.

Conclusion

Patients who need repeated suctioning may experience bloody or blood-tinged secretions. In these patients Foleys catheter or rubber catheter may act as better alternative in preventing bleeding complication without compromising quality nursing care. The soft blunt tip of a rubber catheter does not irritate the tracheal wall, and tracheal healing is more rapid than with a regular suction catheter.

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