



Which is the best endotracheal tube fixation method?

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Abstract

Objective: Unintended extubation in critical care settings may prolong ICU stays. A stabilization endotracheal (ET) tube decreases unplanned extubations. There are several tapes available in healthcare facilities for ET tube fixation. Here, we aimed to investigate which tape is the best for ET tube fixation.

Methods: This study was a pilot study conducted at Semi-intensive medical care unit, Mahasarakham Hospital. We enrolled patients who needed ET tube intubation and assigned one ET tube fixation method; adhesive tape, fixumull tape, and cotton tape. Each ET tube fixation was performed by trained ICU nurses. Outcomes of this study were displacement of the ET tube and displacement of the ET tube in rotation. Complications of ET tube fixation were also observed. All participated nurses also evaluated each fixation methods in terms of easy to use, complications, and overall satisfaction.

Results: There were 18 patients participated in this study. Each ET tube fixation method comprised of six patients. Baseline characteristics of patients in each group were comparable. Regarding outcomes of the ET tube fixation methods, adhesive tape group had no ET tube displacement and displacement in rotation after 72 hours. Fixumull and cotton group had six and five displacements within 72 hours, respectively. None of the patients had oral or ear ulcers after 72 hours. Evaluation by nurses found that the fixumull tape had higher satisfaction scores in all three categories.

Conclusions: Adhesive tape had the best ET fixation property but the nurses preferred to use the fixumoll tape.

Key words: endotracheal tube; fixation; tape; preferences; complications

Introduction

Unintended extubation in critical care setting is a crucial issue. The incidence of unplanned extubation varies from 0.14 to 5.3 UEs/100 intubation days. It may cause trauma to patients' airways which can result in cardiac arrest, or death (Curry et al., 2008). Costs of unplanned extubation /re-intubation may be approximately 1,000 USD for supplies and staff per incident (Curry, Cobb, Kutash, & Diggs, 2008). Additionally, unplanned extubation does result in prolonged mechanical ventilation, longer ICU/hospital stay, and an increased need for chronic care for those patients who do not tolerate an unplanned extubation (Jarachovic et al., 2011).

Several risk factors may contribute to unplanned extubations such as pain, agitation, anxiety and delirium all contribute to unplanned extubations. The risks associated with unplanned extubations include bronchospasms, arrhythmias, aspiration, pneumonia, respiratory failure, and cardiopulmonary arrest (Jarachovic et al., 2011). A stabilization endotracheal (ET) tube decreases in unplanned extubations (King and Elliot, 2012). Among three fixation methods (tape, suture, tape with suture) in cadavers, using tape with suture through the tape is the most effective method even with head movement (20613600). There are several tapes available in healthcare facilities including adhesive tape, fixumull tape, or cotton tape. There is no previous study comparing the effectiveness of these tapes in ET tube fixation. Here, we aimed to investigate which tape is the best ET tube fixation method.

Methods

This study was a pilot study conducted at Semi-intensive medical care unit, Mahasarakham Hospital. The study period was between January to April, 2016. We enrolled patients who needed ET tube intubation and assigned one ET tube fixation method. There were three ET tube fixation options including adhesive tape, fixumull tape, and cotton tape.

Each ET tube fixation was performed by trained ICU nurses. All participated nurses were informed by the standard methods of each fixation type. Adhesive tape fixation was performed by using the tape one inch width and 25 cm long which were cut into two pieces longitudinally. Fixumull tape, 10 cm width and 16 cm long, was cut into three prong pattern, like an E shape. Cotton tape used in this study was 1 cm width and 80 cm long showed the characters of each fixation method. In cotton tape group, we also performed by using writing grip or gauze to prevent ear ulcers.

Baseline characteristics of all patients were collected, including age, sex, patient classification, communication ability, and consciousness. Outcomes of this study were displacement of the ET tube and displacement of the ET tube in rotation or when the patients

moved. Complications of the ET tube fixation were also observed including angle of mouth ulcer and ear ulcers. These outcomes and complications were evaluated at 24 hours, 48 hours, and 72 hours after the ET tube fixation.

All participated nurses also evaluated each fixation methods in terms of "easy to use," "complications," and "overall satisfaction." The evaluation was performed by using the Likert scale; 1-5 with the best score of 5. All data were computed and presented using descriptive statistics and categorized by each ET tube fixation methods. The study protocol was approved by the institutional review board, Mahasarakham Hospital.

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Results

There were 18 patients who participated in this study. Each ET tube fixation method comprised of six patients. Baseline characteristics of patients in each group were comparable in terms of sex, patient classification, communication ability, and consciousness. The median age of patients in Fixomull tape group had somewhat higher than other groups (66.00 vs 50.17 vs 48.83 years).

Regarding outcomes of the ET tube fixation methods, adhesive tape group had no ET tube displacement and displacement in rotation after 72 hours. Fixomull group had six displacements within 72 hours, while cotton tape group had five displacements within 72 hours. None of the patients had oral or ear ulcers after 72 hours.

Subgroup analysis in cotton tape group was performed in six patients; 3 patients used writing grip and 3 patients used gauze. All patients using writing grip had ulcers at the ears after 72 hours. Evaluation by nurses found that the fixomull tape had higher satisfaction scores in all the three categories; easy to use, less complications, and overall satisfaction. The average Likert scale in these three items were 4.00, 3.64, and 3.91/5 in fixomull tape group.

Discussion

This pilot study showed that using adhesive tape for ET tube fixation has fewer ET tube displacement than Fixomull and cotton tape, while oral/ear ulcer were not detected during the 72-hour observation period. The displacement rates in the adhesive, fixomull, and cotton tape group was 0, 50%, and 33%, respectively.

A meta-analysis compared cotton tape, adhesive tape, gauze, or tube holder in terms of ET tube fixation. This study found that all methods were comparable to fix the ET tubes.

(Gardner et al). Unlike in this study, the adhesive tape seemed to be more effective than the other two tapes in terms of ET tube displacement both when patients moved and were stabilized. Regarding complications from the tapes, there was no ulcer detected in the use of any of the tapes. Even though the cotton tape may cause ear ulcers (xxx), the subgroup of cotton tape showed that using gauze with the cotton tape may have fewer ulcers than writing grip (0 vs 3).

For users' perspective, nurses preferred to use the fixomull tape with the highest Likert scales in all aspects including easy to use (80%), fewer complications (72%), and overall satisfaction (78%) as shown in table 4. The explanation for fixomull preferences by nurses may be due to properties of the fixomull tape. It is sticky but not greasy, and easily to cut. The E shape fixomull tape also provided easier fixation compared with adhesive or cotton tape. However, fixomull and adhesive tape may cause facial allergy and lip breakdown.

The main limitation in this study is the small numbers of patients in

each group. Additionally, there is no randomized method for method selection. Finally, this study is unable to perform blindly. Further large randomized trials are needed to confirm the results of this study.

Conclusion

Adhesive tape had the best ET fixation property but the nurses preferred to use the fixomull tape. All three tapes used in ET fixation had very few complications.

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