ABSTRACT

Objectives: To analyze potential risk factors associated with tracheotomy-related pressure sores.

Study Design: Retrospective cohort study.

Methods: Review of critically ill patients undergoing a tracheotomy from July 2008 to December 2009 at an academic, tertiary care hospital system.

Results: One hundred sixty-seven adult patients underwent tracheotomy. Nineteen (11.4%) developed tracheotomy-related pressure sores. Percutaneous tracheotomy, age, obesity, duration of intensive care unit stay, duration of tracheotomy faceplate sutures, and low albumin were each associated with pressure sores. However, this study had insufficient power to determine if these risk factors were independent of each other.

Conclusions: Tracheotomy-related pressure sore formation is likely multifactorial, including patient related and care related factors. Larger studies are required to examine the independence of the potential risk factors that were identified.

INTRODUCTION

Pressure sores are common in hospitalized patients, with a prevalence ranging from 10 – 23% [1]. The incidence of pressure sores are reportedly as high as 56% in critically ill patients [2]. Multiple risk factors have been identified to be associated with the development of pressure sores [3], leading to significant morbidity and mortality [4]. According to research by the Centers for Medicare and Medicaid Services (CMS), pressure sores are a high cost and high volume preventable complication. The treatment of pressure sores costs an estimated 11 billion dollars per year in the United States [5].

In 2007, the state of California amended the California Health and Safety Code §1279.1 [6] to require hospitals to report specified serious adverse events, including acquired severe pressure ulcers. Currently, it is unclear whether or not tracheotomy-related pressure sores significantly impact the overall clinical outcome.

METHODS AND MATERIALS

Patients

A retrospective review of an adult tracheotomy database from July 2008 through December 2009 at a large, tertiary, university-based hospital was performed. Tracheotomy was defined by a Current Procedural Terminology code of 31600 or 31610. Tracheotomy-related pressure sores (Figure 1) were identified by adult critical care nurse wound specialists.

Statistical Analysis

Twenty-three potential risk factors were evaluated (Table 1) by univariate analysis using the x2 test and multivariate logistic regression.

RESULTS

- 167 adult patients, 100 male, 67 female
- Age: 19 to 89 years [57 ± 15 SD]°
- History of head and neck cancer: 41
- History of XRT treatment to the head and neck: 25
- Open vs. percutaneous tracheotomies: 119 vs. 48
- APACHE II score: 0 – 41 (14.5 ± 7.6)
- Duration ICU stay: 1 – 218 days (23 ± 23)
- Tracheotomy-related pressure sores: 19 (11.4%)

METHODS AND MATERIALS

• Univariate analysis demonstrated one risk factor, percutaneous tracheotomy, to be statistically significant (p-value = 0.004) with a risk ratio of 3.29 (95% CI, 1.41-7.78). Five risk factors (age, obesity, duration of ICU stay, duration of tracheotomy faceplate sutures, and low albumin) demonstrated a trend towards significance (Table 2). These 6 risk factors were subjected to multivariate logistic regression and none showed statistical significance. Figure 1 demonstrated a statistical trend (p-value = 0.06).

DISCUSSION

In this study, 11.4% of critically ill patients developed a tracheotomy-related pressure sore. Of the 23 potential risk factors that were analyzed, univariate analysis demonstrated percutaneous tracheotomy to be statistically significant. Appropriate candidates for percutaneous tracheotomy typically require favorable neck anatomy. It is conceivable that slimmer neck anatomy tends to an increase risk of tracheotomy-related pressure sores. Body mass index (BMI) was also a risk factor that trended towards significance. Thus, having a BMI less than 30 further substantiates the notion that a more slender body habitus lends a higher risk to developing a tracheotomy-related pressure sore.

Other risk factors that showed a statistical trend included duration of ICU stay greater than 18 days, low serum albumin, older age, and duration of tracheotomy faceplate sutures use. ICU duration and albumin can be considered nonspecific indicators of morbidity. Older individuals may possess more severe co-morbidities compared to younger individuals. Lastly, prolonged use of sutures leads to increased friction between the tracheotomy tube faceplate and the underlying skin, thereby increasing the risk of a pressure sore.

All adverse events are required to be reported by law and in the future, may be linked to a hospital’s quality rating. Tracheotomy-related pressure sores seem to differ compared to other ulcer types with more associated morbidity. Future studies will determine if there are any severe consequences of such sores compared to more well publicized decubitus ulcers. These studies are necessary in working with regulating agencies such as CMS moving forward.

CONCLUSIONS

Tracheotomy-related pressure sore formation is likely multifactorial. Larger studies are necessary to examine the independence of the potential patient-related and care-related risk factors identified in this study. Furthermore, future studies should subsequently assess the potential consequences due to tracheotomy-related pressure sores.

REFERENCES