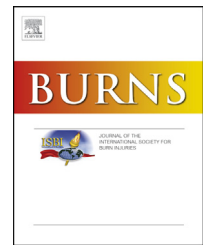


Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/burns

Tracheostomy in pediatric burn patients

Soman Sen^{a,*}, Jonathan Heather^b, Tina Palmieri^a, David Greenhalgh^a

^aDepartment of Surgery, Division of Burn Surgery, Shriners Hospital for Children Northern California, University of California Davis, Sacramento, CA, United States

^bMiddlemore Hospital, Department of Plastic Surgery, Auckland, New Zealand

ARTICLE INFO

Article history:

Accepted 8 October 2014

Keywords:

Tracheostomy

Pediatric burn injury

Tracheostomy duration

ABSTRACT

Background: Tracheostomy is often performed in the pediatric burn population to establish secure airways. Tracheostomy is safe in this population, but the duration of tracheostomy may be related to age and extent and severity of burn. We hypothesized that burn related factors and not age determine the time to removal of a tracheostomy in pediatric burn patients.

Methods: A 5-year retrospective review was performed for pediatric burn patients (age ≤ 18 years) who underwent tracheostomy. Patients were divided into three groups by age (group 1: 0 to ≤ 2 years, group 2: >2 to ≤ 12 years, group 3: >12 to ≤ 18 years). Data collected included: age, total body surface area burn injured (TBSA), gender, mechanism of injury, diagnosis of inhalation injury, mortality, time from injury to admission, time from admission to placement of tracheostomy, time of injury to placement of tracheostomy, duration of tracheostomy, days of mechanical ventilation, and tracheostomy related complications.

Results: 45 patients were reviewed. There were no differences in TBSA, length of ICU stay, length of hospital stay, and mortality between the three groups. Additionally, there were no differences in ventilator days and duration of tracheostomy. Multivariate linear regression analysis indicated that TBSA and not age independently increased the duration of tracheostomy.

Conclusion: Tracheostomy duration is dependent on the extent of burn in pediatric burn patients.

© 2014 Elsevier Ltd and ISBI. All rights reserved.

1. Introduction

Airway management is a complex process in severely burned children. The complexity lies in both the anatomic considerations for different pediatric age groups as well as the pulmonary dysfunction that can arise from both burn and inhalation injuries. Establishment of secure and stable airways is an essential element in the acute management critically ill pediatric burn patients [1]. Tracheostomies are

sometimes performed in pediatric burn patients due to difficulty in establishing and maintaining a secure oral or nasal airway, extensive burn or severe inhalation injury necessitating prolonged mechanical ventilation, and severe prolonged pulmonary dysfunction [2].

Controversy exists over the utility of tracheostomies in burn patients [3,4]. However, more recent reports indicate that tracheostomy is a safe and efficacious method of airway management in children with burns [5,6]. Despite these reports, age or injury related factors involved in the length

* Corresponding author at: 2425 Stockton Blvd., Suite 718, Sacramento, CA 95817, United States. Tel.: +1 916 453 2050; fax: +1 916 453 2373.

E-mail address: soman.sen@ucdmc.ucdavis.edu (S. Sen).

<http://dx.doi.org/10.1016/j.burns.2014.10.005>

0305-4179/© 2014 Elsevier Ltd and ISBI. All rights reserved.

of time from placement to tracheostomy removal remain unknown. Possible age related factors include difficulty with pain control, agitation, communication, or concern about airway security and post-extubation failure [7,8]. We hypothesized that burn injury related factors and not age determine the time to removal of a tracheostomy in pediatric burn patients. Our primary goal was to compare age and injury related factors involved in the time to removal of tracheostomies in pediatric burn patients. Our secondary goal was to correlate tracheostomy specific complications to age and injury related factors.

2. Methods

A 5-year (2008–2012) retrospective chart review was performed for pediatric burn patients. Inclusion criteria were age ≤ 18 years, a second or third degree burn injury, and placement of a tracheostomy. Demographic data collected included: age, total body surface area burn injured (TBSA), gender, mechanism of injury, diagnosis of inhalation injury, and mortality. Hospital data collected included: time from injury to admission, time from admission to placement of tracheostomy, time of injury to placement of tracheostomy, duration of tracheostomy, days of mechanical ventilation, and tracheostomy related complications. All tracheostomies were open procedures and were performed by the treating burn surgeons in the operating room. No percutaneous tracheostomies were performed. All tracheostomies placed were cuffed. Cuff pressures were maintained between 20 and 30 mmHg using a Posey Cufflator (Posey Company, Arcadia, CA). The University of California Davis Institutional Review Board approved all human subjects research protocols.

R statistical package (www.r-project.org) was used to analyze the data. Continuous variable comparisons between two groups were performed using the 2-sample Student's *t*-test for continuous parametric data and Wilcoxon rank sum test for non-parametric continuous data. Analysis of variance with Tukey's honest significant difference post hoc analysis was performed for comparisons between 3 or more groups for continuous data. The chi-square test was used to assess association between discrete categorical variables. Univariate and multivariate linear regression analysis was performed to determine associations between discrete continuous outcome variables and independent continuous and categorical predictor variables. Analysis was performed for variables that result in prolonged duration of tracheostomy (continuous outcome variable). Predictor variables for the analysis included age, gender, TBSA, inhalation injury, ventilator days, days of hospitalization, and mortality. Statistical significance was set at a *p*-value of <0.05 and all mean values are presented as mean $\pm$ standard deviation.

3. Results

A total of 45 patients were included in the study (Table 1). The majority of the patients were male (71%) and the mean age was 6.1 ± 5.5 years. Overall TBSA was $53.1 \pm 18.1\%$ and the mortality rate was 20%. Inhalation injury was diagnosed in

Table 1 – Patient demographics.

Patients	45
Female	13
Male	32
Fire injury	32
Scald injury	11
Other mechanism	2
Age (years)	6.1 ± 5.5
TBSA (%)	53.14 ± 18.1
Inhalation injury	18
Died	9
ICU length of stay	55.5 ± 36.7
Hospital length of stay (days)	92.8 ± 71.6
Injury to admission (days)	5 ± 11.4
Admission to tracheostomy (days)	2.1 ± 3.6
Injury to tracheostomy (days)	5.2 ± 3.6
Tracheostomy days	56.9 ± 46
Ventilator days	46.5 ± 33.4
TBSA, total body surface burn injured.	

40% of the patients and flame burn was the predominant mechanism of injury (71%). A total of four tracheostomy related complications occurred (Table 2). One complication was a tracheal stenosis, one was tracheomalacia, and two were tracheal granulomas. Mean TBSA (42.2 ± 21.4 vs. $54.2 \pm 17.7\%$), mean age (6.9 ± 5.5 vs. 6.1 ± 5.5 years), mean tracheostomy duration (83.5 ± 67.2 vs. 53.5 ± 43), and mean ventilator days (47.5 ± 41.9 vs. 46.4 ± 33.1) were not significantly different between patients with and without complications. These complications resulted in 4 failed primary decannulation attempts. None of the tracheostomy complications underwent tracheal reconstruction. In addition, none of these complications resulted in death and all of the surviving patients eventually had successful removal of the tracheostomy prior to discharge. Of note, during the time period reviewed, 70 pediatric burn patients on mechanical ventilation were managed via endotracheal intubation and did not receive a tracheostomy. The mean age of this group was 6.8 ± 5.6 years and the mean TBSA was significantly lower at $26.4 \pm 14\%$. The mean number of ventilator days was also significantly lower with a median of 4 days and an interquartile range of 2–7.8 days. Additionally, inhalation injury was diagnosed in 11% of the patients and mortality was also significantly lower at 3%. There were no airway related complications in this group.

We divided the tracheostomy patients into 3 age groups to determine if age had any impact on the duration of tracheostomy (tracheostomy days). Age group 1 was from 0 to ≤ 2 years old, group 2 was from >2 to ≤ 12 years old, and group 3 was from >12 to ≤ 18 years old. There were no differences in TBSA, length of ICU stay, length of hospital stay, and mortality between the three groups. Group 2 suffered significantly more inhalation injury (73%) than groups 1 and 3. However despite the increased rate of inhalation injury in

Table 2 – Tracheostomy related complications.

Complication	Number
Stenosis	1
Tracheomalacia	1
Granuloma	2

Download English Version:

<https://daneshyari.com/en/article/3104437>

Download Persian Version:

<https://daneshyari.com/article/3104437>

[Daneshyari.com](https://daneshyari.com)