Australian Critical Care xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Australian Critical Care

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

Research paper

Clinical indicators associated with successful tracheostomy cuff deflation

Lee N. Pryor BASc[a,b,*], Elizabeth C. Ward PhD[b,c], Petrea L. Cornwell PhD[d,e], Stephanie N. O'Connor MNSc[a,f], Marianne J. Chapman MD, PhD[a,f]

[a] Royal Adelaide Hospital, Intensive Care Unit, SA, Australia
[b] The University of Queensland, School of Health & Rehabilitation Sciences, QLD, Australia
[c] Centre for Functioning & Health Research (CFAHR), QLD, Australia
[d] The Prince Charles Hospital, Metro North Hospital and Health Service, QLD, Australia
[e] School of Applied Psychology, Menzies Health Institute Queensland, Griffith University, QLD, Australia
[f] The University of Adelaide, School of Medicine, SA, Australia

ARTICLE INFORMATION

Article history:
Received 28 August 2015
Received in revised form 9 December 2015
Accepted 12 January 2016

Keywords:
Clinical indicators
Criteria
Cuff deflation
Decannulation
Subglottic suction
Tracheostomy

ABSTRACT

Background: Tracheostomy cuff deflation is a necessary stage of the decannulation pathway, yet the optimal clinical indicators to guide successful cuff deflation are unknown.
Objectives: The study aims were to identify (1) the proportion of patients tolerating continuous cuff deflation at first attempt; (2) the clinical observations associated with cuff deflation success or failure, including volume of above cuff secretions and (3) the predictive capacity of these observations within a heterogeneous cohort.
Methods: A retrospective review of 113 acutely tracheostomised patients with a subglottic suction tube in situ was conducted.
Results: Ninety-five percent of patients ($n = 107$) achieved continuous cuff deflation on the first attempt. The clinical observations recorded as present in the 24 h preceding cuff deflation included: (1) medical stability, (2) respiratory stability, (3) fraction of inspired oxygen $\leq$0.4, (4) tracheal suction $\leq$1–2 hourly, (5) sputum thin and easy to suction, (6) sputum clear or white, (7) $\geq$moderate cough strength, (8) above cuff secretions $\leq$1 ml per hour and (9) alertness $\geq$ eyes open to voice. Using the presence of all 9 indicators as predictors of successful cuff deflation tolerance, specificity and positive predictive value were 100%, although sensitivity was only 77% and negative predictive value 19%. Refinement to a set of 3 clinically driven criteria (medical and respiratory stability, above cuff secretions $\leq$1 ml/h) provided high specificity (100%), sensitivity (95%), positive predictive value (100%) and an improved negative predictive value (55%).
Conclusions: Key criteria can help guide clinical decision-making on patient readiness for cuff deflation.
Crown Copyright © 2016 Published by Elsevier Ltd. on behalf of Australian College of Critical Care Nurses Ltd. All rights reserved.

1. Introduction

Evidence based criteria for progressing patients with a tracheostomy towards decannulation is limited, despite the procedural frequency of tracheostomy tube insertion in intensive care settings.[1] Interpretation of existing research is difficult, in part, due to the heterogeneity of patient populations managed in critical care,[2] as well as the multitude of factors influencing patient outcomes.[3] Furthermore, the majority of existing research has

Abbreviations: FiO_2, fraction of inspired oxygen; PPV, positive predictive value; NPV, negative predictive value.

* Corresponding author at: Speech Pathology Department, Royal Adelaide Hospital, North Terrace, Adelaide, SA 5000, Australia. Tel.: +61 882225524; fax: +61 882225924.
E-mail address: lee.pryor@sa.gov.au (L.N. Pryor).

http://dx.doi.org/10.1016/j.aucc.2016.01.002
1036-7314/Crown Copyright © 2016 Published by Elsevier Ltd. on behalf of Australian College of Critical Care Nurses Ltd. All rights reserved.

Please cite this article in press as: Pryor LN, et al. Clinical indicators associated with successful tracheostomy cuff deflation. *Aust Crit Care* (2016), http://dx.doi.org/10.1016/j.aucc.2016.01.002

focused on establishing indicators for decannulation[4,5] as opposed to key steps in the decannulation pathway, such as cuff deflation tolerance.

Once the underlying reason for tracheostomy insertion has resolved and mechanical ventilation is no longer required, the factors that have been put forward as influencing decision-making for tube removal include, a patient's conscious state, oxygen levels, cough effectiveness and both pulmonary and oral secretions.[5,6] The ability to tolerate prolonged occlusion of the tracheostomy via capping or corking has been suggested as an indicator of suitability for decannulation.[4,5] There is, however, a clinical debate around the safety of tracheostomy occlusion, due to the potential for increased airway resistance from breathing through a reduced tracheal space.[7,8] There also remains the debate as to the 'best' decannulation pathway,[9] with some of the more commonly described processes including, cuff deflation only (that is, cuff deflation followed by decannulation),[10] downsizing and occlusion,[6,10–12] the use of fenestrated tubes[13] and the placement of a one-way valve.[12,14]

The factor that is common to all of these pathways, and a necessary first stage in any progression towards decannulation, is tracheostomy cuff deflation. This is where airflow through the upper airway, including the vocal cords, is restored.[15] Studies to date documenting cuff deflation in clinical practice have only examined mechanically ventilated patients, for whom cuff deflation may restore speech[16,17] or promote weaning through increased aperture for airflow.[18] There is yet to be any systematic research that identifies the patient characteristics that can serve as reliable predictors for determining their ability to tolerate continuous cuff deflation. At present, statements in clinical practice guidelines are based only on clinical consensus.[19,20] Such guidelines suggest that considerations prior to initial cuff deflation should include the ability to cope with oral secretions in a setting of respiratory and medical stability.

The ability for patients to manage oral secretions is an important component of these criteria. Oropharyngeal secretions can contain pathogenic bacteria which, if aspirated into the lower airways, may cause pneumonia.[21] Premature cuff deflation in someone who does not tolerate secretions, due to either copious secretion production or to the presence of dysphagia, may lead to excessive aspiration and respiratory deterioration. This hinders their progression towards decannulation. Conversely, any unnecessary delay to commencing cuff deflation may be detrimental to a patient's physiological and psychosocial recovery due to the deferred return to verbal communication and oral intake.[22]

At present, determining a patient's ability to manage their secretions is typically based on subjective observations, including the visual inspection of the amount of oral secretions and the frequency of suctioning. However, the increased clinical use of tracheostomy tubes enabling subglottic suction may provide greater opportunity to establish more objective, volumetric monitoring of above cuff secretions to inform clinical decisions. Tracheostomy tubes with subglottic suction lines enable removal of secretions from above the inflated cuff[23] and have been shown to reduce the amount of normal flora in the subglottic space.[24] A large amount of secretions removed from above the cuff could indicate a poor swallow. Minimal accumulated secretions may indicate adequate secretion management and those patients most likely to protect their airway with the cuff deflated.

In light of the absence of validated clinical criteria to predict successful cuff deflation, the current study set out to investigate factors related to successful continuous cuff deflation in a cohort of acute patients with a tracheostomy, each with a subglottic suctioning tube in situ. The specific aims were: (1) to determine the current proportion of success on initial continuous cuff deflation, (2) to describe the common clinical observations associated with continuous cuff deflation success or failure, including volume of above cuff secretions, and (3) to explore the sensitivity, specificity and predictive value of these clinical indicators within a heterogeneous cohort.

Table 1
Patient factors commonly considered prior to cuff deflation.

Characteristics considered
Medical status (*stable or improving*)
Respiratory status (*stable or improving*)
Oxygenation ($FiO_2 \leq 0.4$)[a]
Cough strength (≥*moderate*)
Patient alertness (≥*eyes open to voice*)
Sputum colour (*clear or white*)
Sputum nature (*thin and easy to suction*)
Tracheal suction frequency (≤1–2 *hourly*)
Above cuff secretions (≤1 *ml per hour*)

[a] FiO_2, fraction of inspired oxygen.

2. Methods and materials

A retrospective case-note and chart audit was conducted on all patients who underwent surgical or percutaneous tracheostomy at the Royal Adelaide Hospital (RAH), a 640 bed acute tertiary hospital, between January and December 2009. The study was conducted in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) and approval was obtained from the RAH Human Research Ethics Committee to access all information recorded within the medical records, including progress notes, operation records, intensive care and ward observation charts. This study is a secondary analysis of a larger cohort of patients. The patterns of oral intake commencement, enteral nutrition cessation, and decannulation for the heterogeneous cohort have also been reported.[25]

2.1. Participants

All patients recorded as having a tracheostomy in situ were identified through Diagnostic Related Group case-mix coding (DRG A06), with procedural codes 41880-00 (*percutaneous tracheostomy*), 41881-00 (*open tracheostomy, temporary*) or 41881-01 (*open tracheostomy, permanent*). These patients were cross referenced with the hospital nursing records that indicated a tracheostomy occasion of care. Patients were excluded if they had a tracheostomy in situ on admission, had undergone a total laryngectomy, had a mini-tracheostomy in situ, the case-notes were unavailable for review, or if the patient had died with a cuffed tracheostomy in situ. Data sets were also excluded if an extended length tracheostomy was in place as these tubes do not allow subglottic suction. A cohort of 113 patients remained for analysis (Fig. 1). All were ≥24 h free from mechanical ventilation prior to the initial cuff deflation trial.

2.2. Cuff deflation practices

Whilst there are no set protocols or criteria for cuff deflation in the participating hospital, there are common considerations that are discussed by the multidisciplinary tracheostomy team when evaluating patients for tracheostomy progression which may be applicable to cuff deflation (Table 1). These are consistent with the factors considered prior to decannulation[5,6] and include the 3 parameters reported in the clinical guidelines that are relevant to cuff deflation, namely a stable or improving medical and respiratory status, and evaluation of oral secretions.[19,20] Medical/respiratory stability in this instance refers to patients who are not showing signs of new infection, or deterioration. A patient who is receiving

Please cite this article in press as: Pryor LN, et al. Clinical indicators associated with successful tracheostomy cuff deflation. *Aust Crit Care* (2016), http://dx.doi.org/10.1016/j.aucc.2016.01.002

Download English Version:

https://daneshyari.com/en/article/5562994

Download Persian Version:

https://daneshyari.com/article/5562994

Daneshyari.com