A decision making tool and protocol for early cuff deflation and one way valve inline for patients who are ventilated with a tracheostomy – a case series

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Introduction

Early cuff deflation and one way valve placement inline for patients who are ventilated with a tracheostomy allows for the restoration of verbal communication with concomitant psychological benefits, and enables assessment of bulbar function, delirium, pain, airway patency and speech and language problems.[1,2]

Such an approach has not been shown to impact respiratory or ventilatory outcomes.[3-5] Whilst the benefits may seem obvious, the practice of using one way valves inline has not been widely documented and there are a few published patient selection criteria or protocols, but no national guidelines.

Our multidisciplinary team designed a novel decision making tool and protocol to improve specialist service provision.

Objective

This was a retrospective audit of

i) our decision making tool

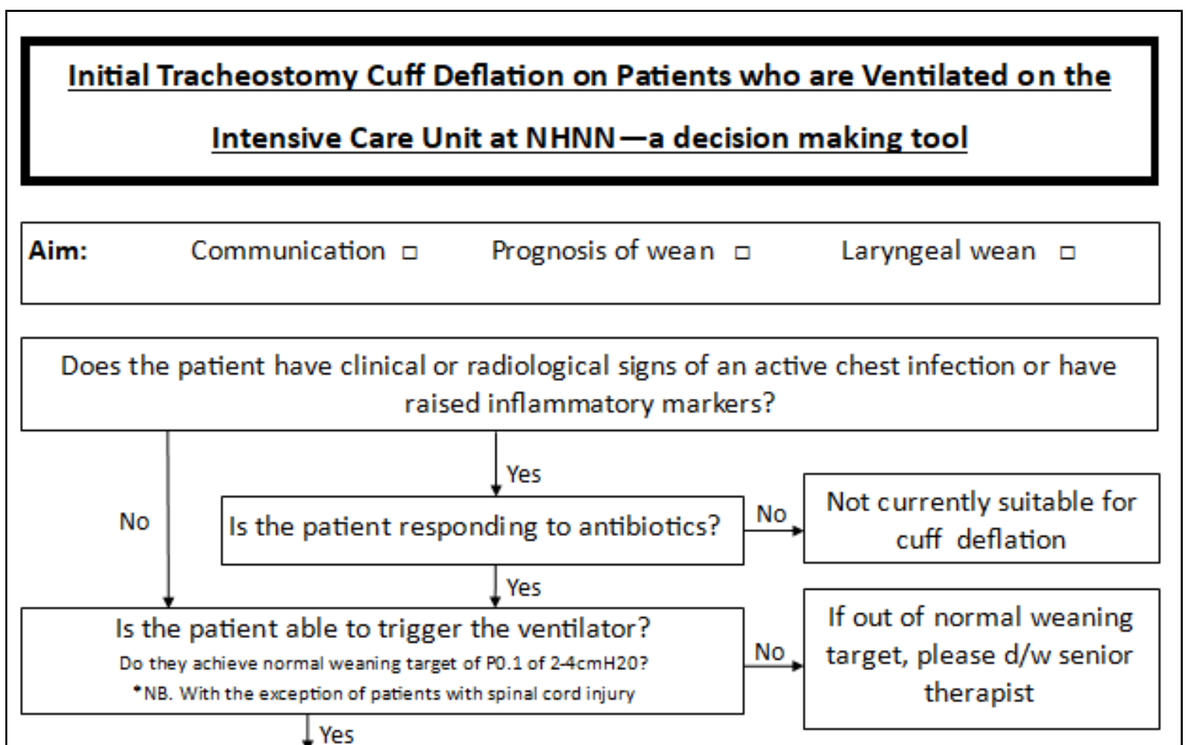
ii) our protocol for early cuff deflation, one way valve inline placement and ventilator adjustments in a specialist tertiary referral neuroscience intensive care unit.

Methods and Materials

The decision making tool and protocol guides the selection of patients and the approach to early cuff deflation (see below).

We performed a retrospective analysis of medical and therapy electronic patient records on consecutive patients with whom we had used this tool and protocol over a two year period from December 2018 - December 2020.

Data included diagnosis, primary mode of ventilation, aim of first cuff deflation, time tolerated for first cuff deflation (minutes), and number of days between first cuff deflation and decannulation.



Results

Eighteen consecutive patients were selected for early cuff deflation using the decision making tool with the following diagnoses: Encephalitis (5), COVID pneumonitis (5), Guillain Barre Syndrome (4), Intracerebral haemorrhage (1), Posterior communicating artery aneurysm (1), Motor Neurone Disease (1), Syringomyelia (1).

At the time of the initial assessment, the ventilation status was:

10 - CPAP/PS

4 - SIMV

2 - High Flow Oxygen Therapy

2 - a period of self-ventilation.

The decision making tool defined the aim of the initial trial as "laryngeal wean" for 10 patients and "to facilitate communication" for 8.

The median time for one way valve use for the initial trial was 10 minutes (range 4-25).

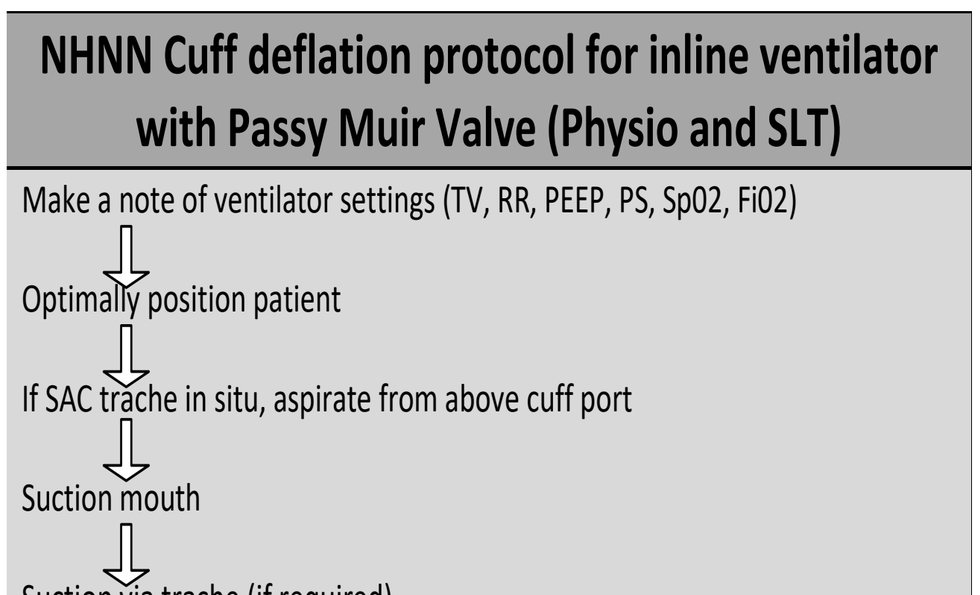
There were no deleterious effects from following the protocol. All patients received further one way valve inline trials, and seventeen were weaned from the ventilator without respiratory compromise. One patient with Motor Neurone Disease remained ventilator dependent. Seventeen patients were subsequently decannulated (median 26.5 days after initial cuff deflation, range 12-209).

Conclusion

Eighteen neurointensive care patients were successfully able to use a one way valve inline in accordance with our decision making tool and protocol.

It is hoped that our practice will prompt a wider discussion amongst different intensive care multidisciplinary teams about careful patient selection and judicious use of a one way valve inline.

We plan to collect patient's experience of the practice and to update our protocol with emerging evidence around optimal ventilator settings for using one way valves inline.



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References

1.Freeman-Sanderson AL, Togher L, Elkins MR, Phipps PR. Return of voice for ventilated tracheostomy patients in ICU: a randomized controlled trial of early-targeted intervention. Critical Care Medicine. 2016; 44(6):1075-81. **2.**Kowalski S, El-Gabalaway R, Macaulay K, Thorkelsson R, Robertson A, Bshouty Z, Girling L. Weaning from mechanical ventilation using tracheostomy cuff deflation and a one-way speaking valve: a historical cohort series. Can J Anesth/J Can Anesth. 2017;64:1286-1288. **3.**Sutt AL, Cornwell P, Mullany D Kinneally, Fraser JF. The use of tracheostomy speaking valves in mechanically ventilated patients results in improved communication and does not prolong ventilation time in cardiothoracic intensive care unit patients. Journal of Critical Care. 2015;3. **4.**Sutt AL, Fraser J. Speaking valves as part of standard care with tracheostomized mechanically ventilated patients in intensive care unit. Journal of Critical Care. 2015;1119-1120. **5**.Sutt AL, Caruana LR, Dunster KR, Cornwell PL, Anstey CM, Fraser JF. Speaking valves in tracheostomised ICU patients weaning off mechanical ventilation – do they facilitate lung recruitment? Critical Care. 2016;20:91.

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