Prophylactic Administration of Steroids and the Effect on Post-extubation Stridor: A Scoping Review

Chelsey Benson, BSN, RN; Karlene Ferraro, BSN, RN
Faculty Advisor - Donna Lynch-Smith, DNP, ACNP-BC, NE-BC, CNL
College of Nursing - The University of Tennessee Health Science Center - Memphis, TN

THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER
COLLEGE OF NURSING

Purpose

The purpose of this DNP project is to answer the following question:

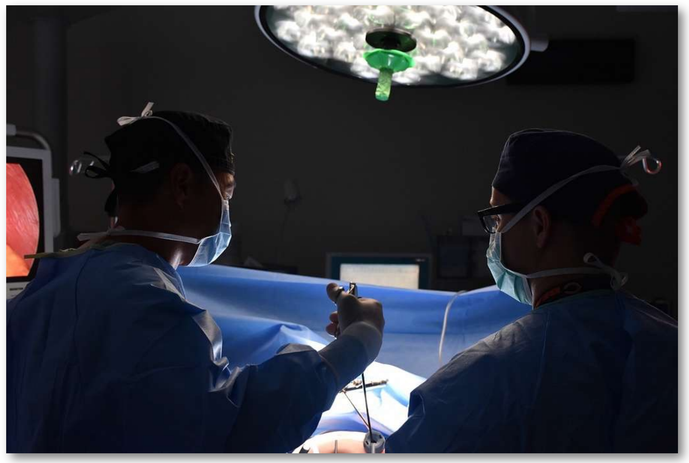
In an adult ICU setting, does the administration of prophylactic steroids decrease the occurrence of stridor and the need for reintubation?

Specific aims:

- Examine clinical and statistical significance of primary outcomes related to a decrease in the occurrence of stridor and the need for reintubation.
- Examine clinical and statistical significance of secondary outcomes related to the duration of mechanical ventilation and subsequent decrease in length of ICU stay.
- Identify the importance of this project in relation to nurse practitioner implications.
- Identify areas of opportunity to conduct more research.

Background

- Prolonged periods of mechanical ventilation can lead to complications such as ventilator-associated pneumonia (VAP) and a number of other related issues such as laryngeal edema.
- Laryngeal edema typically arises after the patient has been intubated for at least 36 hours.
- Reintubation is required when a patient develops post-extubation stridor, signaling that the airway is no longer patent and the patient is in respiratory distress.
- Post-extubation stridor occurs in 6-37% of intubated patients and can increase a patient's length of ICU stay and mortality.
- Many providers have differing opinions on the benefit versus risk of the steroid administration before planned extubation to prevent post-extubation stridor.



Methods

Study design:

- A scoping review
- Critical appraisal of all considered articles in literature search between November 2019 and October 2021, resulting in 11 articles total.

Study population:

- We included only studies conducted in an intensive care unit (ICU) setting involving mechanically ventilated adults.

Data collection process:

- We screen each article for study type (level of evidence), sample size, age, cuff-leak testing, administration of steroids, development of post-extubation stridor, and instance of re-intubation.
- Secondary outcomes are also examined including: success in weaning patients from the ventilator, decrease in overall time spent on the ventilator, and decrease in length of ICU stay.

Data synthesis:

- A table of results was then constructed to compare the outcomes of utilizing prophylactic steroids versus administering no steroids.

Results

Study (year)	Study type	Sample size (F/M)	Average age (years)	Average duration of MV	Steroid	Cuff leak test done?	P-value in favor of steroid
Kuriyama et al. (2017)	Systematic review	2,597 (1140/1457)	61.56	7.77 days	36% Methylprednisolone, 45% Dexamethasone, 19% Hydrocortisone	Yes	0.002
Lee et al. (2007)	RCT	80 (66/14)	72.55	162.9 hours	Dexamethasone	Yes	0.037
Jaber et al. (2009)	Meta-analysis	1846 (NR)	NR	6.9 days	43% Methylprednisolone, 28% Dexamethasone, 29% Hydrocortisone	Yes	0.02
Fan et al. (2008)	Meta-analysis	1923 (419/1504)	61.77	NR	50% Methylprednisolone, 33% Dexamethasone, 17% Hydrocortisone	Yes	0.02
Baloch et al. (2010)	RCT	92 (41/51)	39.64	71 hours	Dexamethasone	Yes	0.025
François et al. (2007)	RCT	761 (277/484)	65.5	7 days	Methylprednisolone	No	<0.0001

Study (year)	Total participants	Percentage of participants in control group	Percentage of participants in intervention group	Events in control group	Events in intervention group	Percentage of control group that experienced an event	Percentage of intervention group that experienced an event
Kuriyama et al. (2017)	2597	50%	50%	195	86	16.7%	6.5%
Lee et al. (2007)	80	50%	50%	13	4	32.5%	10%
Jaber et al. (2009)	1846	51.4%	48.6%	55	37	6.1%	3.9%
Fan et al. (2008)	1923	48.9%	51.1%	129	45	13.7%	4.5%
Baloch et al. (2010)	92	50%	50%	39	14	84.8%	30.4%
François et al. (2007)	761	45%	46.6%	102	24	29.7%	6.7%
Total	**7299**	**50%**	**50%**	**533**	**210**	**14.6%**	**5.8%**

Implications for Practice

- As future acute care nurse practitioners, many of us will be treating patients in an intensive care unit setting where we will frequently be assessing patients for ventilator weaning readiness and extubation.
- It is important to provide the most effective evidence-based care for our patients.
- The prophylactic administration of steroids can help decrease the incidence of reintubation due to post-extubation stridor.
- While the use of steroids remains a topic of controversy among healthcare professionals, the evidence supports the implementation of prophylactic steroids to decrease the risk of complications associated with prolonged intubation, laryngeal edema, and decrease the total length of ICU stay.
- Based on the scoping review we performed, we recommend the prophylactic administration of steroids to prevent post-extubation stridor in high-risk patients.
- Opportunities for further research on this topic could include a protocol used for prophylactic steroid dosing and frequency of administration.

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