

Rocuronium Versus Succinylcholine in the Traumatically Injured Brain: A Prospective, Pilot Study

Nadine Alwawi, BS¹; Lauren Stambolic, PharmD²; Marc McDowell, PharmD, BCPS²; Sabrin Jaber, PharmD³; Brook Walsh, PharmD⁴; Ellen Omi, MD²; Robert Mokszycki, PharmD, BCPS⁵

¹Rosalind Franklin University; ²Advocate Christ Medical Center; ³Stanford University Medical Center; ⁴Little Company of Mary Hospital; ⁵University of Massachusetts

Background

- In 2014, approximately 2.9 million emergency department (ED) visits in the United States resulted from traumatic brain injury (TBI)¹
- Severity of brain injury is typically assessed using the Glasgow Coma Scale (GCS)
- A GCS score of 9-12 is considered moderate and 3-8 considered severe²
- Patients who present with TBI often require rapid sequence intubation (RSI) to protect their airway
- Succinylcholine and rocuronium are paralytics typically used in RSI due to their rapid onset of action and relatively short duration
- The Brain Trauma Foundation Guidelines does not make any recommendations on agents of choice for RSI in patients with a severe TBI³
- Animal models have demonstrated an increase in intracranial pressure when administered succinylcholine, which prompted concern in TBI management⁴
- Recent retrospective data suggests increased mortality in patients exposed to rocuronium compared to succinylcholine⁵

Objective

To assess mortality among other outcomes following RSI with rocuronium compared to succinylcholine.

Methods

Design

Prospective, observational cohort

Inclusion Criteria Exclusion Criteria

- | | |
|---|--|
| <ul style="list-style-type: none"> Patients enrolled from September 2018 through June 2020 Presentation to ED with TBI Administration of either succinylcholine or rocuronium for RSI Age \geq 18 years of age | <ul style="list-style-type: none"> Pregnancy Paralytic agent other than succinylcholine or rocuronium administered Surgical airway placed Cardiac arrest prior to intubation Intubation prior to ED arrival |
|---|--|

Results

TABLE 1.

Demographics	Rocuronium (n=18)	Succinylcholine (n=42)	P-value	
Age (years), mean	51.1	46	0.35	
Sex (male), n (%)	14 (77.8)	36 (89.7)	0.45	
Body mass index, mean	27.3	27.3	0.78	
Home anticoagulant use, n (%)	2 (11.1)	5 (11.9)	0.93	
Home antiplatelet use, n (%)	3 (16.7)	3 (7.1)	0.35	
Initial GCS score, mean	6	7	0.38	
	13-15, n (%)	0 (0)	5 (11.9)	0.42
	9-12, n (%)	4 (22.2)	8 (19.1)	
	3-8, n (%)	14 (77.8)	29 (69.1)	
Seizure prophylaxis, n (%)	15 (83.3)	33 (71.4)	0.33	

TABLE 2.

Outcomes	Rocuronium (n=18)	Succinylcholine (n=42)	P-value	
In-hospital mortality, n (%)	5 (27.8)	14 (33.3)	0.67	
In-hospital survival, n (%)				
	Discharge home	5 (27.8)	11 (26.2)	0.90
	Transfer to rehab	6 (33.3)	8 (19.1)	0.23
	Transfer to long term care	2 (11.1)	9 (21.4)	0.34
Length of stay, days	In-hospital	9.5 \pm 7.8	13 \pm 12.5	0.43
	ICU	5.7 \pm 6.8	7.4 \pm 6.6	0.39

Results Continued

FIGURE 1. IN-HOSPITAL MORTALITY

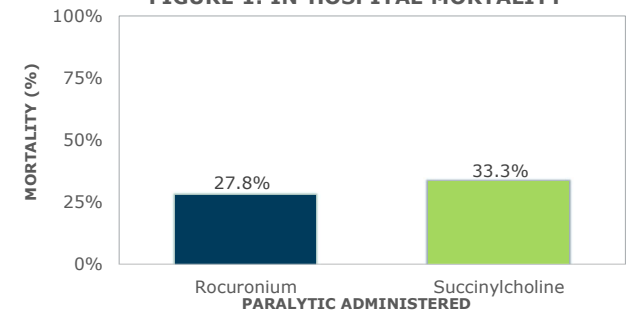
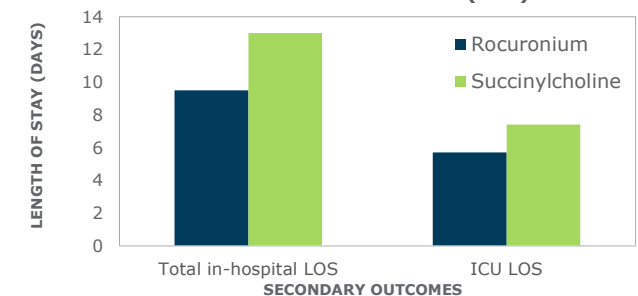


FIGURE 2. LENGTH OF STAY (LOS)



Conclusions

Primary Endpoint

- No difference was observed in the incidence of in-hospital mortality.

Secondary Endpoints

- No difference was observed in in-hospital outcomes or ICU LOS.
- Rocuronium does not confer a mortality benefit based on preliminary results. Patient enrollment is ongoing.

References

1. National Emergency Department Visits, Hospitalizations, and Deaths (NEDS), Centers for Disease Control and Prevention. <https://www.cdc.gov/nchs/nedds/neddsdataforpublic.htm>. Published March 23, 2018. Accessed November 6, 2018.
2. Brody JA, Brody LC, Chapter 42. Acute Management of the Brain Injury Patient. In: DeBru TJ, Telford RL, The GC, Metlak GB, Wells BC, Pines L, eds. Pharmacotherapy: A Pathophysiologic Approach, 10th Edition. Elsevier; 2018. <http://accesspharmacy.mhmedical.com.proxy.oz.utoledo.edu/clients.aspx?bookid=4593&contextid=45310492>. Accessed November 11, 2019.
3. Carney N, et al. Guidelines for the Management of Severe TBI. 4th Edition. Brain Trauma Foundation; 2016.
4. James F. Control. Anesthesiology 2018;129(5):1159-1162.
5. Paul Brackley, et al. Pharmacotherapy 2018.

Disclosures

Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.