The Journal of Emergency Medicine, Vol. 49, No. 1, pp. 43–49, 2015
Copyright © 2015 Elsevier Inc.
Printed in the USA. All rights reserved
0736-4679/$ - see front matter

ELSEVIER

http://dx.doi.org/10.1016/j.jemermed.2014.12.028

Pharmacology in Emergency Medicine

IMPACT OF ROCURONIUM AND SUCCINYLCHOLINE ON SEDATION INITIATION AFTER RAPID SEQUENCE INTUBATION

Eric G. Johnson, PHARMD, Alex Meier, candidate, PHARMD Alicia Shirakbari, MD, Kyle Weant, PHARMD, BCPS, and Stephanie Baker Justice, PHARMD, BCPS

Department of Pharmacy Services, University of Kentucky HealthCare, Lexington, Kentucky
Reprint Address: Eric G. Johnson, PHARMD, Department of Pharmacy Services, University of Kentucky HealthCare, 800 Rose Street, H-112, Lexington, KY 40536

□ **Abstract—Background: Rapid sequence intubation (RSI) involves a rapidly acting sedative plus a neuromuscular blocking agent (NMBA) to facilitate endotracheal intubation. Rocuronium and succinylcholine are NMBAs commonly used in RSI with drastically different durations of action. Objectives: Evaluate whether patients receiving RSI with a longer-acting NMBA had a greater delay in sedation or analgesia than patients that received a short-acting NMBA. Methods: This was a retrospective review of patients presenting to the emergency department requiring endotracheal intubation. Exclusions included age < 18 years, pregnancy, prior intubation, and contraindication to sedation and analgesia. Primary endpoint was time to continuous sedation or analgesia after RSI in patients receiving rocuronium or succinylcholine. Secondary endpoints included hospital length of stay (HLOS), intensive care unit length of stay (ICU LOS), and impact of an emergency medicine pharmacist (EPh). Results: A total 106 patients met inclusion criteria, 76 patients receiving rocuronium and 30 receiving succinylcholine. Mean time to sedation or analgesia was longer in the rocuronium group when compared to the succinylcholine group at 34 ± 36 min vs. 16 ± 21 min ($p = 0.002$). In the presence of an EPh, the mean time to sedation or analgesia was 20 ± 21 min, vs. 49 ± 45 min ($p < 0.001$). Time spent on ventilator, HLOS, and ICU LOS were not significantly different between groups. Conclusions: Patients receiving rocuronium in RSI had a significantly longer time to sedation or analgesia when compared to patients receiving succinylcholine. The presence of an EPh significantly decreased the time to administration of sedation or analgesia after RSI.** © **2015 Elsevier Inc.**

□ **Keywords—rapid sequence intubation; neuromuscular blocking agent; sedation; analgesia; emergency medicine pharmacist**

INTRODUCTION

Rapid sequence intubation (RSI) is defined as the use of a rapidly acting sedative as an induction agent plus a neuromuscular blocking agent (NMBA) to create optimal conditions for endotracheal intubation (1). Two of the most commonly used NMBAs in RSI are rocuronium and succinylcholine (2). Whereas both produce a similar paralytic effect, their duration of action is dramatically different, with succinylcholine typically lasting 5–15 min, and rocuronium lasting an average of 30–60 min (3,4). In contrast, many of the rapid-acting sedatives used in RSI have a much shorter duration of action. For example, the effect of etomidate, a commonly used sedative in this scenario, has been shown to last only 3–5 min (5). This creates the potential scenario where a patient who has received rocuronium in conjunction with etomidate may remain paralyzed without sedation or analgesia if a continuous sedative or analgesia agent is not promptly initiated after RSI.

One study in a pediatric population evaluated this potential complication. The study evaluated patients receiving RSI with rocuronium as the NMBA of choice and etomidate as the induction agent. The results showed the mean

RECEIVED: 19 May 2014; FINAL SUBMISSION RECEIVED: 3 December 2014;
ACCEPTED: 21 December 2014

time to postintubation sedation was 46 min, with 63.1% of the population receiving sedatives more than 15 min after intubation, and 13.1% of patients receiving no additional sedation post intubation (6). The level of sedation in their study population was not evaluated, nor was the use of analgesics. However, based on the duration of action of the NMBA and the time to initiation of additional sedation, the study supports the authors' fear of these patients potentially remaining paralyzed with no sedation. In the critical care literature, patients with inadequate pain and sedation have been shown to have increased catecholamine activity, leading to an increased risk of myocardial ischemia and infarction (7). In addition, inadequate analgesia and sedation for an intubated patient can be uncomfortable and alarming. Awareness during anesthesia is well described in the literature (8). Inadequate sedation or analgesia is a serious complication that may have ramifications that last long beyond a patient's hospital stay. A case series on patients awakening from light anesthesia while remaining paralyzed illustrated their anxiety, irritability, preoccupation with death, and repetitive nightmares after an incidence of awareness during anesthesia (8). A possible cause for a delay in postintubation sedation or analgesia may be from the false perception of comfort that a paralyzed patient displays. Whereas patients who have received a short-acting paralytic may quickly demonstrate their physical discomfort after elimination of the agent, those who have received longer-acting paralytics, such as rocuronium, may be unable to convey their discomfort and distress for a prolonged period of time.

The emergency medicine pharmacist (EPh) has been shown to play an important role in patient care in the emergency department (ED) (9). Their expert understanding of medications, including those in RSI, provides useful assistance in the timely initiation of postintubation sedation or analgesia in this critically ill population. Through their direct involvement in RSI, we anticipate an improvement in time to initiation of sedation and analgesia after RSI.

Currently, limited data exist on time-to-sedation or analgesia for patients intubated in the ED. The objective of this study is to examine the time to postintubation sedation or analgesia between patients receiving rocuronium or succinylcholine after intubation. In addition, we sought to evaluate the impact of an EPh on time to sedation or analgesia after RSI, the time of mechanical ventilation, hospital length of stay, and intensive care unit length of stay for the rocuronium and succinylcholine groups.

METHOD

Study Design

This study was a retrospective chart review performed at a tertiary care, academic medical center in Lexington, Kentucky. The site is a 650-bed, acute care, academic hospital and Level I trauma center. The yearly census for the ED exceeds 65,000 patients. An EPh is present in the ED from 1:00 p.m.–11:00 p.m. daily. This study was approved by the IRB of University of Kentucky.

Patient Selection

Patients eligible for inclusion were intubated in the ED from October 2009 through December 2012. Exclusion criteria included pregnancy, patients who were intubated prior to arrival, those with incomplete medical records, and patients who did not receive sedation or analgesia after RSI due to contraindication. Additionally, patients younger than 18 years of age were excluded, as well as patients who did not receive an NMBA during intubation.

Data Collection, Demographics and Outcome

Baseline demographic data collection included age, sex, race, weight, mechanism of injury, indication for intubation, presence of EPh, and Glasgow Coma Scale score (GCS) upon arrival (Table 1). Additional demographics collected include sedatives used in intubation, intubation attempts, and continuous sedatives and analgesics (Table 2). Analgesics or anxiolytics received while in transit to the ED were also collected. Additionally, data on the duration of mechanical ventilation, intensive care unit length of stay, and hospital length of stay were

Table 1. Patient Characteristics

Characteristic	Rocuronium n = 76	Succinylcholine n = 30	*p*-Value
Chief complaint, n (%)			
MVC	37 (48.7)	16 (53.3)	0.925
MCC	14 (18.4)	4 (13.3)	0.945
GSW	8 (10.5)	1 (3.3)	0.418
Other	17 (22.4)	9 (30)	0.567
Female, n (%)	19 (25)	17 (56.6)	0.004*
Age, mean (SD)	38.4 (15.4)	39.6 (17.2)	0.735
Race, n (%)			
White	57 (75)	22 (73.3)	0.944
African American	10 (13.1)	2 (6.7)	0.542
Hispanic	8 (10.5)	4 (13.3)	0.944
Other	1 (1.3)	2 (6.7)	0.139
EPh present, n (%)	49 (64.5)	23 (76.6)	0.327
Indication for intubation, n (%)			
AMS	1 (1.3)	3 (10)	0.122
Airway protection	53 (69.7)	12 (40)	0.021*
Combative	5 (6.6)	4 (13.3)	0.847
Other	17 (22.4)	11 (36.7)	0.208
GCS, median (IQR)	13 (6–14)	13 (7–15)	0.704
Weight, kg, mean (SD)	81.2 (16.5)	81.2 (18.7)	0.991

MVC = motor vehicle crash; MCC = motorcycle crash; GSW = gunshot wound; EPh = emergency medicine pharmacist; AMS = altered mental status; GCS = Glasgow Coma Scale score; IQR = interquartile range.
* $p < 0.05$.

Download English Version:

https://daneshyari.com/en/article/3246246

Download Persian Version:

https://daneshyari.com/article/3246246

Daneshyari.com