Long-acting Neuromuscular Blocker Use During Pre-hospital Transport of Critically Ill Trauma Patients.

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Background

Traumatic injury is the leading cause of death in Americans under the age of 45, with over 50 million people seeking care for injury annually.[1] The most severely injured patients require placement of an endotracheal tube to support their breathing prior to transport. In some cases patients may be given long-acting neuromuscular blockers (NMB) by emergency medical providers in the field to prevent movement. This may be necessary in some circumstances when patient movement could lead to patient harm. Ideally, these patients should also be provided with adequate sedation and analgesia during transport, especially if they have been pharmacologically paralyzed. If not, these patients are at risk of being "awake" while paralyzed, which could be a terrifying experience.

At this time, one retrospective study has evaluated patient sedation during helicopter transport.[2] In this study, close to 10 percent of patients transported via helicopter and given paralytics were not given any sedatives during transport. However, even in patients who were given sedatives, the doses used and the timing of sedative use was not evaluated.

Purpose

The purpose of this study was to determine 1) the rate of long-acting NMB use in patients who are intubated in the pre-hospital setting and 2) to evaluate the concurrent use of sedatives in these patients.

Methods

Design: This was a retrospective, cohort study conducted between April 1st, 2009 and April 1st, 2011.

Setting: A tertiary care, academic emergency department in the United States.

Methods

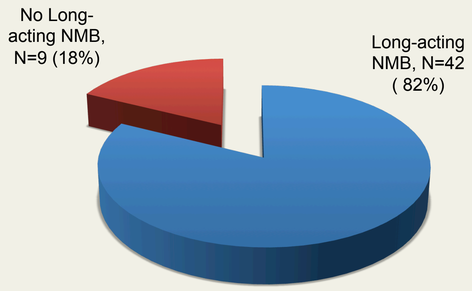
Patient Selection: Consecutive trauma patients aged 18-89 years who were intubated in the pre-hospital setting and brought to the emergency department.

Patients were excluded if they were unresponsive and therefore did not require the use of sedation for intubation or if they were first transported to an outside hospital before arrival to the emergency department

Data Analyses: The use of post-intubation sedatives was compared between the groups using a Wilcoxon rank-sum test or a Fisher's exact test for continuous or categorical variables, respectively. An a priori alpha level of 0.05 was used for all analyses.

Results

51 patients were included in the study



- NMB used to facilitate rapid sequence intubation (RSI)*
  - N=44 succinylcholine (short-acting NMB)
  - N=5 rocuronium (long-acting NMB)
  - N=2 none
- NMB used after intubation for patient movement
  - N=22 vecuronium (long-acting NMB)
  - N=16 rocuronium (long-acting NMB)
  - N=9 none

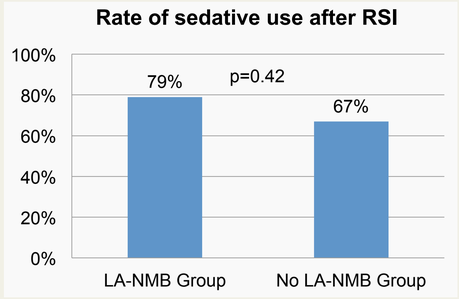
*All patients received etomidate or midazolam for RSI

Results

Demographics and Other Data

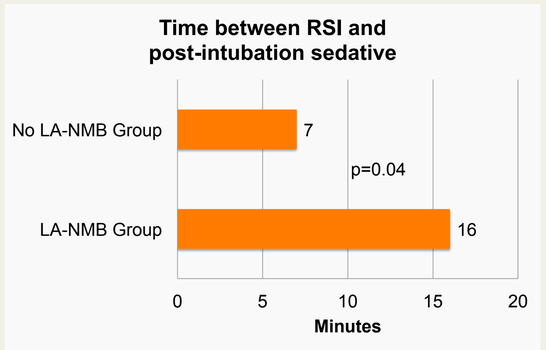
	No LA-NMB (n=9) [median]	LA-NMB (n=42) [median]	P value
Demographics			
Age (years)	63	33	0.0771
Sex (male)	77%	88%	0.592
Race White Hispanic Other	 56% 33% 11%	 36% 52% 12%	0.604
Weight (kg)	77.3	82	0.6187
Injury Data			
Mechanism MVC GSW Stab Fall Other	 56% 0% 0% 11% 33%	 52% 10% 2% 17% 19%	0.834
ISS	23.5	18.5	0.3884
Transport			
Scene time (min)	6	30.5	0.0007
Transit time (min)	17	40	0.0432
Pre-hospital Vitals			
Initial SBP	146	139.5	0.128
Lowest SBP	124	101	0.2415
Heart Rate	108	99.5	0.7994
Respiratory Rate	12	16	0.0703

MVC=motor vehicle collision; GSW=gun shot wound; ISS=injury severity score



All patients who received post-intubation sedation were given midazolam (median dose = 5 mg)

Results



Summary and Conclusions

- The use of long-acting NMB is common during the pre-hospital transport of trauma patients
- Most of this use is to prevent patient movement during transport rather than for rapid sequence intubation
- Some of these patients may not be given sedatives or may have delays in receiving sedatives after intubation
- Therefore, patients given long-acting NMBs may be at risk of being paralyzed without sedation

References

1. Xu JQ, Kochanek KD, Murphy SL, Tejada-Vera B. Deaths: Final data for 2007. National vital statistics reports; vol 58 no 19. Hyattsville, MD: National Center for Health Statistics. 2010.
2. Frakes MA, Lord WR. Sedative Use in Patients Receiving Neuromuscular Blocking Agents from a Helicopter Flight Team. Air Med J. 2006; 25(4):173-5.