Monitoring documentation of sugammadex use at a large tertiary care pediatric hospital

M Trifa, F Syed, D Tumin, JD Tobias, J Uffman

Department of Anesthesiology & Pain Medicine, Nationwide Children's Hospital, Columbus, OHIO

Background

➢ Sugammadex: novel pharmacologic agent approved for clinical use by the United States FDA to reverse neuromuscular blockade (NMB) via encapsulating the muscle relaxant (rocuronium or vecuronium)

➢ Dosing is based on the degree of the NMB (train of four [TO4] monitoring) at the time of reversal.

➢ Review of our institution's documentation revealed that TO4 assessment prior to sugammadex administration was less common than anticipated, resulting in deviation from the manufacturer's dosing recommendations.

➢ The primary purpose of this study was to improve documentation of TO4 and secondarily to ensure the correct sugammadex dosing by anesthesia providers in a large tertiary care pediatric hospital.

Methods

Design: Retrospective review of patients' charts in whom the NMB was reversed by sugammadex.

Exclusion criteria:
• Patients < 1 year of age
• MRI cases, cases staffed by an attending anesthesiologist alone, and cases staffed by the project investigators.

Baseline data collection: (December 2016)
• Sugammadex dose
• Documentation of TO4 before and after sugammadex administration (patients with 4 twitches before NMB reversal did not require further TO4 documentation)

Interventions:
• Baseline provider level compliance was shared
• Electronic health record reminder was created
• Departmental level education regarding assessment and proper dosing regimens was provided.

Post-intervention data collection: (October 2017)
• Post-intervention chart review (same parameters)

Results

• One hundred cases were reviewed as baseline data and 75 cases were reviewed after interventions were completed.

• Prior to interventions, TO4 documentation was correct in 30 of 100 cases, and this proportion improved after intervention to 34 of 75 (45%; p=0.024).

Table: Appropriateness of twitch monitoring documentation before and after administering sugammadex by provider role

Documentation		Hands-on anesthesia provider role				P
		CRNA (N=24)	SRNA (N=24)	Fellow (N=14)	Resident (N=13)	
Appropriate	Twitch monitoring before and after sugammadex administration	2 (8%)	1 (4%)	0	1 (8%)	0.761
	Twitch monitoring only before sugammadex administration with 4 responses on the TO4	10 (42%)	11 (46%)	2 (14%)	7 (54%)	0.144
Not Appropriate	Twitch monitoring only before sugammadex administration	4 (17%)	4 (17%)	4 (29%)	3 (23%)	0.781
	Twitch monitoring only after sugammadex administration	2 (8%)	1 (4%)	0	1 (8%)	0.761
	No twitch monitoring	6 (25%)	7 (29%)	8 (57%)	1 (8%)	0.046

CRNA: Certified Registered Nurse Anesthetist, SRNA: Student Registered Nurse Anesthetist

• After intervention, reasons for incorrect TO4 documentation included missing TO4 before sugammadex administration (n=26) and <4 twitches documented before sugammadex administration with no subsequent TO4 documentation (n=15). However, there were no differences in appropriateness of TO4 documentation by provider role (Table).

• Among 49 cases where TO4 was documented before sugammadex administration, the dosing was correct in only 25 cases (51%), compared to 34 of 40 (85%) cases reviewed before intervention (p=0.001).

• Among post-intervention cases with TO4 documented before sugammadex administration, sugammadex was over-dosed (>110% of recommended) in 11 cases, but under-dosed (<90% of recommended) only in 2 cases.

Discussion

• Despite increased use of TO4 monitoring, the percentage remained low (45%) after educational interventions suggesting the need for other forms of interventions such as decision support for the electronic health record.

• The dosing of sugammadex remained variable and was considered correct based on TO4 monitoring in only 51% of patients.

• Excessive dosing was the most common error with only 2 of 49 patients receiving a dose <90% of the manufacturers recommendation based on degree of neuromuscular blockade.

References

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2. Asai T, Isono S. Anesthesiology 2014;120:260-2