Adverse Event Rate in Sedation for Botulism Toxin Injection in Pediatric Patients with Spasticity

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Introduction: While average adverse event rates, among children, in deep sedation are approximately 3-5%[1] there are limited studies analyzing adverse events in specific vulnerable populations, such as children with cerebral palsy/spasticity. Botulism toxin injections can significantly improve spasticity in children with cerebral palsy. This procedure may benefit from deep sedation for better target localization[2].

Methods: Single center, retrospective study of 100 sedation encounters for botulism toxin injection, to evaluate adverse event rates in this complex population, from January-July 2017. Data gathered from medical records included age/weight/BMI, gross motor function classification scale (GMFCS 1-5), and any past history of obstructive sleep apnea or need for tonsillectomy/adenoidectomy for OSA, seizure disorder, aspiration, home CPAP use, as well as recent upper respiratory tract infection symptoms or use of albuterol.

Results: One hundred cases of procedural sedation for botulism toxin injections for spasticity were analyzed. Reasons for injections were cerebral palsy (87/100), hypertonia/arthrogryposis (6/100), torticollis (4/100), dystonia (1/100), and familial paraparesis (2/100). Patients ranged from ages 2-18y, receiving 1-11 muscle injections per procedure. 91 cases involved deep sedation (Propofol and Fentanyl in 88%), 3 moderate and 6 mild sedation. Overall adverse event rate was 26%. Adverse events were reported primarily as upper airway obstruction (17/26), desaturation below 90% for > 30 seconds (3/26), apnea (4/26) with need for additional management, oral/nasal airway (2/26), bag mask ventilation (3/26), and jaw thrust maneuver (3/26). In all 100 cases, all patient injections were completed and no patients required prolonged observation. Patient age/weight/BMI, number of injections, and GMFCS were not predictive of adverse events. Past medical history elements were demonstrated to be significantly associated with the likelihood of adverse events (Table 1).

Discussion: This study showed overall high rate of adverse events in this vulnerable population. Patient outcomes highly correlate to predisposing risk factors. History of obstructive sleep apnea and patients requiring tonsillectomy and adenoidectomy in the past placed these patients at higher risk for an adverse event.

Table 1

Past medical history	**Adverse event with positive PMHx**	**Adverse event without PMHx**	**Statistical significance**
Obstructive sleep apnea	43% (15/35)	17% (11/65)	**P < 0.005**
History of Tonsillectomy or Adenoidectomy for OSA	36% (5/14)	20% (17/86)	**P <0.001**
History of sleep study (regardless of results)	53% (8/15)	21% (18/85)	**P 0.014**
History of aspiration	33% (6/18)	24% (20/82)	P 0.305
G tube of GJ tube present	40% (6/15)	24% (20/85)	P 0.153
Seizure history	22% (10/46)	30% (16/54)	P 0.253
CPAP/BIPAP use	32% (6/19)	25% (20/81)	P 0.363
Current Upper Respiratory Infection	50% (1/2)	26% (25/98)	P 0.454
Albuterol use < 48 hrs	60% (3/5)	24% (23/95)	P 0.109
Dysphasia	32% (12/38)	23% (14/62)	P 0.222
Respiratory diagnosis (i.e. Asthma, BPD)	31% (9/29)	24% (17/71)	P 0.31
Need for home airway suctioning	0% (0/3)	27% (26/97)	P 0.401

References:

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[2] Bjornson K, Hays R, et al. Botulinum Toxin for Spasticity in Children With Cerebral Palsy: A Comprehensive Evaluation. Pediatrics 2007; 120 (1): 49-58.