

**ASA 2001 Annual Meeting
Abstract**

Title: Risk Factors for Bronchospasm in Children Receiving Rapacuronium

Authors: Caroline A. Pasquariello MD*, Donna M. Rajchert MD, Rita Jew Pharm.D and Mark S. Schreiner, MD

Abstract ID#: 651877

Introduction: Rapacuronium bromide, a new steroidal, nondepolarizing neuromuscular blocking agent with rapid onset and a short recovery time has characteristics that make it a potential alternative to succinylcholine. At a dose of 1.5-2.0 mg/kg in pediatric patients, intubating conditions are comparable to succinylcholine 1 mg/kg without the associated side effects of hyperkalemia, myalgia, and the risk of triggering malignant hyperthermia¹. Reported dose-related side effects due to histamine release include hypotension, bronchospasm, and erythema². Rapacuronium became available for clinical use at The Children's Hospital of Philadelphia in March 2000. Several cases of severe bronchospasm that appeared to be temporally related to the use of rapacuronium stimulated a retrospective cohort study of all surgical procedures where rapacuronium was administered.

Methods: Our computerized anesthesia record system was queried to find all cases where rapacuronium was administered to patients 18 years old and under between March 1, 2000 and July 31, 2000. A manual review of these anesthesia records by two independent reviewers was performed to determine which patients suffered bronchospasm on induction of anesthesia. Criteria for the diagnosis of bronchospasm included either a statement in the narrative of the anesthesia record or the use of a bronchodilator within 15 minutes after induction of anesthesia. The following data were abstracted from each anesthesia records: age, weight, sex, ASA physical status, rapacuronium dose (mg/kg), mode of induction of anesthesia [rapid or modified rapid sequence induction (RSI or MRSI) vs. inhalational and routine IV induction], IV induction drug (propofol vs. thiopental), prior history of reactive airways disease (RAD) and drug allergy. Univariate analyses were conducted using an unpaired t-test for parametric variables and Fisher's exact test for categorical variables. In addition, relative risks (RR) with 95% confidence intervals were calculated for categorical variables.

Results: Two hundred eighty seven patients who received rapacuronium were identified, of whom 12(4.2%) developed bronchospasm. Many of these 12 operative records describe an inability to move the chest following intubation and absent P_{ET}CO₂ after visual confirmation of correct positioning of the ETT. There were no significant differences between the two groups with respect to age, weight, sex, ASA physical status, rapacuronium dose, IV induction drug, or history of drug allergy. Patients undergoing RSI or MRSI and those who had a prior history of RAD had an increased relative risk of developing bronchospasm on induction of anesthesia (Table). In spite of the initial episode of severe bronchospasm, all 12 patients responded to therapy and then underwent their scheduled surgical procedures.

Conclusion: Rapid and modified rapid sequence induction of anesthesia and a prior history of reactive airways disease appear to be significant risk factors for the development of bronchospasm associated with the administration of rapacuronium.

¹Meakin, GH, et al. Anesthesiology 2000; 92:1002-9. ²Onrust SV, et al. Drugs 1999;59:887-918.

	Bronchospasm	No Bronchospasm	p-value or RR(95%CI)
N	12	275	
Age (years \pm SD)	5.4 \pm 3.8	7.0 \pm 5.1	p=0.28
Female (%)	8(66.7%)	99(36.0%)	p=.06
Rapacuronium (mg/kg \pm SD)	2.0 \pm 0.3	1.9 \pm 0.5	p=0.11
ASA 3 or 4(%)	6(50%)	81(29.5%)	RR=2.2(0.8-6.9)
RAD(%)	6(50%)	59(21.5%)	RR=3.4(1.1-10.2)
RSI or MRSI(%)	11(91.7%)	106(38.6%)	RR=17.5(2.9-98)
Propofol/Thiopental(N=164)	5/6	82/71	p=0.76

Summary:

A retrospective cohort study of all operative procedures where rapacuronium was administered to children revealed 12 cases of bronchospasm on induction of anesthesia. Rapid or modified rapid sequence induction of anesthesia and a prior history of reactive airways disease are significant risk factors, 17.5 and 3.4 respectively.