# The Effect of Sugammadex Administration on Fetal Outcomes in Pregnant Patients Who **Underwent Non-Obstetric Surgery Under General Anesthesia**

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### Background

The use of sugammadex for neuromuscular blockade reversal in the nonpregnant population results in a **30% reduction in major postoperative** pulmonary complications.<sup>1</sup>



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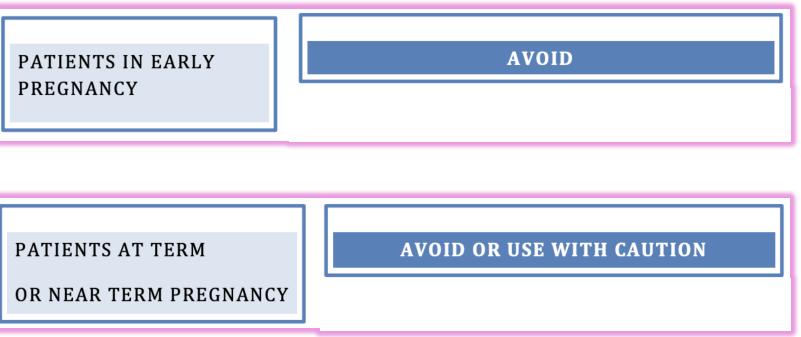
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Statement on Sugammadex during pregnancy and lactation

Ad Hoc task force: Willett, Butwick, Togioka, Bensadigh, Hofer, Zakowski

April 22, 2019

SOAP Statement on Sugammadex.<sup>2</sup>





Despite its safety in the nonpregnant population, there remain concerns about the safety of sugammadex for pregnant individuals, especially during early pregnancy.



### Introduction



Simulation-based pharmacokinetic/pharmacodynamic model: 4 mg/kg of sugammadex can decrease progestogen levels by 34%.<sup>3</sup>

- **Progestogen** is a synthetic progesterone with a distinct chemical structure from progesterone.<sup>4</sup>
- **Progesterone** is an endogenous hormone responsible for maturation of the uterus and prevention of premature contractions.

**FDA** does not approve sugammadex use in the obstetric population.<sup>4</sup>

### Noguchi et al. 2022<sup>5</sup>

- 123 patients; 73 received GA with sugammadex, 53 received GA without sugammadex.
- **No difference** in rate of miscarriage or preterm birth.

There are no case reports describing preterm labor within 2 weeks of sugammadex administration.<sup>4</sup>



Morbidity and mortality associated with incomplete neuromuscular blockade reversal after surgery. Retrospective review of anesthesia-related maternal deaths in Michigan (1985-2003): all eight deaths

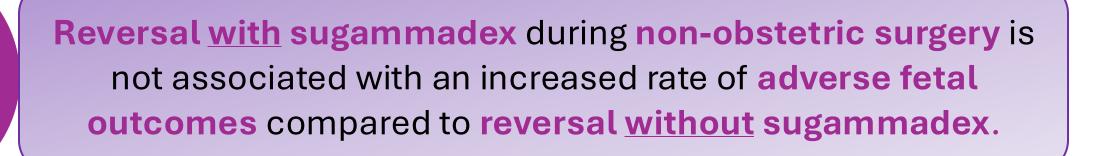
occurred during emergence, extubation, or recovery.<sup>6</sup>

**Patient Safety:** sugammadex for **rescue** of incomplete reversal of neuromuscular blockade with neostigmine.





# **Study Design and Methods**



**Retrospective chart review** of all pregnant patients undergoing non-obstetric surgery from 1/2019 – 10/2024. Approved by institutional IRB.

**Enterprise Data Warehouse** identified patients and data.

**Outcomes** 

**Hypothesis** 

**Primary:** need for **emergent cesarean delivery** within 30 days of surgery.

**Secondary:** intrauterine fetal demise within 30 days of surgery, preterm premature rupture of membranes, and preterm labor.

Surgery performed at time of delivery.

- Surgery performed without general anesthesia.
  - Surgery for fetal myelomeningocele repair.
  - Surgery for planned procedural abortion.



**Exclusion** Criteria

Design



# Results

### **Total Anesthetics Analyzed: 344**

- Sugammadex: 87
- No Sugammadex: 257

#### **Total Number of Patients: 340**

7 (2%)

Anesthetics that required sugammadex <u>after</u> reversal with neostigmine.

		n	<b>X</b> <sup>2</sup>	p
Cesarean delivery within 30 days	No sugammadex	1	0.39	0.53
	Sugammadex	0		
PPROM	No sugammadex	5	0.40	0.53
	Sugammadex	1		
Preterm Delivery	No sugammadex	28	0.38	0.54
	Sugammadex	13		



**0 cases** of intrauterine fetal demise.



# **Discussion and Conclusions**

### **Take-home Points**

- Largest retrospective study showing safety of sugammadex with respect to fetal outcomes.
- Only one emergent cesarean delivery was required in this cohort and occurred after
   neostigmine and glycopyrrolate.
- Sugammadex was required for rescue of incomplete reversal of neuromuscular blockade.

# Limitations

- Retrospective
  observational study
  design.
- Confounding factors:
  - Type of surgery
  - Number of anesthetics
  - Dosing of reversal agents
- Sample size:
  - These outcomes are rare events and may require larger sample size to observe an effect.



## **Future Directions**

- Larger multicenter study.
- Measure progesterone levels after sugammadex administration.
- Randomized controlled trial.
- Reconsider recommendations on sugammadex use during pregnancy.



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