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**.[1]

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

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Society for Obstetric Anesthesia and Perinatology

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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.[2]

PATIENTS IN EARLY PREGNANCY	AVOID
PATIENTS AT TERM OR NEAR TERM PREGNANCY	AVOID OR USE WITH CAUTION

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Introduction

Simulation-based pharmacokinetic/pharmacodynamic model: **4 mg/kg of sugammadex** can decrease **progestogen** levels by **34%**.[3]

- **Progestogen** is a synthetic progesterone with a distinct chemical structure from progesterone.[4]
- **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.[4]

Noguchi et al. 2022[5]

- 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.[4]

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**.[6]

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

Study Design and Methods

Hypothesis

Reversal with sugammadex during **non-obstetric surgery** is not associated with an increased rate of **adverse fetal outcomes** compared to **reversal without sugammadex.**

Design

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

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.

Exclusion Criteria

- Surgery performed at time of delivery.
- Surgery performed without general anesthesia.
- Surgery for fetal myelomeningocele repair.
- Surgery for planned procedural abortion.

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Results

Total Anesthetics Analyzed: 344
- Sugammadex: 87
- No Sugammadex: 257

Total Number of Patients: 340

7 (2%)
Anesthetics that required sugammadex after reversal with neostigmine.

0 cases of intrauterine fetal demise.

		n	X^2	*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		

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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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