

## Purpose

To increase knowledge among CRNAs regarding the effects of Sugammadex on women of childbearing age. The aim was to improve patient safety through enhanced understanding of potential interactions between Sugammadex and women of childbearing age, including considerations of hormonal contraceptives, pregnancy, and lactation during anesthesia procedures.

## Background

- A needs assessment identified a critical gap in CRNAs' knowledge about Sugammadex and its implications for patient outcomes, especially for women of reproductive age.
- Sugammadex is routinely used for anesthesia reversal, known for its efficacy and safety in facilitating quick recovery from neuromuscular blockade.
- The convenience and availability of Sugammadex may lead to a preference for its use over neostigmine, without consideration of potential drug interactions on hormonal contraceptives.
- Implementation of targeted educational programs and continuous training for anesthesia professionals is essential to keep them informed about advancements and interactions related to Sugammadex.

## Theoretical Framework

- Lewin's Change Theory was used to support planning strategy, dissemination approach, survey development, and participant engagement.

### The Three Stages of Lewin's Change Theory

#### Unfreeze

- Conduct a comprehensive review of literature on Sugammadex and its implications for women of childbearing age, focusing on effects beyond hormonal contraceptives, including pregnancy and lactation.
- Highlight the urgent need for action due to potential risks from insufficient understanding of Sugammadex's effects during anesthesia procedures for this demographic.

#### Change

- Create and deliver a focused educational presentation.
- Administer an electronic retrospective post-pre survey immediately following the educational presentation to evaluate anesthesia providers' knowledge.

#### Refreeze

- Re-record the educational presentation for incorporation into the hospital's internal library of DNP projects, ensuring ongoing access for CRNAs

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## Methods

- An educational presentation, including a PowerPoint, was presented to anesthesia providers at a general acute care hospital located in Phoenix, Arizona.
- A recruitment email, disclosure statement, and recorded presentation were sent by the CRNA Supervisor to 90 anesthesia providers.
- The Retrospective Post-Pre Survey was available for three weeks via Qualtrics and included six demographic questions and ten Likert scale questions.
- The post-pre-survey data was analyzed using Stats iQ in Qualtrics, enabling efficient descriptive statistics and the identification of significant patterns.
- Descriptive statistics were utilized to summarize the responses, and a paired t-test was conducted to compare the means, with a significance level set at 0.05.

## Results

- Out of the 90 anesthesia providers who were invited to participate in the study, 26 provided a response, resulting in a response rate of 29%.
- Mean scores rose across all survey questions, with the most significant increases seen in areas such as understanding hormonal interactions (1.39 points), recommendations for pregnancy and lactation (1.85 points), fetal safety (1.54 points), and the low risk of breast milk transfer (1.58 points).

Difference in Improvement by Question Before and After Educational Presentation

Survey Question	Mean BEFORE	Mean AFTER	Difference
I have a better understanding of the structural similarity between Sugammadex and progesterone/corticoids, leading to their occupation.	3.19	4.38	1.19
I have a risk of a drug of 4 mg per kilogram. Sugammadex is similar to mixing one dose of a steroid contraceptive and can reduce progesterone levels by up to 54% in women.	2.81	4.42	1.61
I know about the interaction between Sugammadex and hormonal contraceptives, including the potential impact on contraceptive efficacy for up to 7 days following administration.	4.12	4.49	0.37
I know about the recommendations from the Society for Obstetric Anesthesia and Perinatology regarding the usage of Sugammadex during pregnancy and lactation.	2.77	4.42	1.65
I have a better understanding about the theoretical concerns regarding the binding of Sugammadex to progesterone and its potential impact on pregnancy maintenance.	2.36	4.42	2.06
I have a better understanding about the potential fetal effects of Sugammadex, including its impact on fetal development and neonatal apnoea.	2.88	4.42	1.54
I have a better understanding that Sugammadex reversal of rocuronium-induced neuromuscular blockade is consistently reported to be effective in parturients, including those with profused blood, at the end of cesarean section.	3.84	4.42	0.58
I have a better understanding that Sugammadex, due to its large molecular size and low lipid solubility, has a low risk of transfer into breast milk.	2.96	4.34	1.38
The educational session has improved my awareness of potential effects of Sugammadex on women of childbearing age.	3.42	5.3	1.88
I will seek further information or resources on Sugammadex and women of childbearing age following this educational session.	3.46	4.98	1.52

- Statistically significant improvements ( $p < 0.05$ ) confirmed the effectiveness of the intervention in enhancing knowledge consistency among participants.

Effect of Intervention: Paired T-Test Statistics Before and After Educational Presentation

Survey Question	Standard Deviation BEFORE	Standard Deviation AFTER	p-value
I have a better understanding of the structural similarity between Sugammadex and progesterone/corticoids, leading to their occupation.	1	0.57	<0.00001
I have a risk of a drug of 4 mg per kilogram. Sugammadex is similar to mixing one dose of a steroid contraceptive and can reduce progesterone levels by up to 54% in women.	1.24	0.56	<0.00001
I know about the interaction between Sugammadex and hormonal contraceptives, including the potential impact on contraceptive efficacy for up to 7 days following administration.	0.7	0.61	<0.00068
I know about the recommendations from the Society for Obstetric Anesthesia and Perinatology regarding the usage of Sugammadex during pregnancy and lactation.	0.97	0.56	<0.00001
I have a better understanding about the theoretical concerns regarding the binding of Sugammadex to progesterone and its potential impact on pregnancy maintenance.	0.85	0.93	<0.00001
I have a better understanding about the potential fetal effects of Sugammadex, including its impact on fetal development and neonatal apnoea.	0.97	0.79	<0.00001
I have a better understanding that Sugammadex reversal of rocuronium-induced neuromuscular blockade is consistently reported to be effective in parturients, including those with profused blood, at the end of cesarean section.	0.96	0.88	<0.00001
I have a better understanding that Sugammadex, due to its large molecular size and low lipid solubility, has a low risk of transfer into breast milk.	1.06	0.89	<0.00001
The educational session has improved my awareness of potential effects of Sugammadex on women of childbearing age.	0.71	0.93	<0.000430
I will seek further information or resources on Sugammadex and women of childbearing age following this educational session.	0.69	0.92	<0.00111

## Discussion

- Maternal health issues, including unintended pregnancies and contraceptive failures, are significant concerns for women of childbearing age undergoing anesthesia.
- Sugammadex, a medication used for reversing neuromuscular blockade, may reduce the effectiveness of hormonal contraceptives.
- Education for anesthesia providers is essential to ensure they can inform patients of potential risks regarding Sugammadex and contraceptive efficacy.
- The educational intervention resulted in significant knowledge gains among CRNAs:
  - 71% increase in knowledge about Sugammadex's impact on hormonal contraceptive efficacy.
  - 94% increase in safe practice recommendations for pregnant and lactating women.
  - 94% increase in awareness of risks associated with unintentional fetal exposure.

## Conclusion

- Sugammadex represents a significant advancement in anesthesia by providing rapid and reliable reversal of non-depolarizing neuromuscular blockade.
- Important knowledge gaps exist among anesthesia providers regarding the implications of Sugammadex for hormonal contraceptives, pregnancy, and lactation.
- A literature review indicated a lack of research on interactions between Sugammadex and hormonal contraceptives and its effects on women of childbearing age.
- There's an urgent need for further studies to explore these interactions and establish best practices for patient safety.

## References

