

Sugammadex and the Risk of Unintended Pregnancy in Women With Vascular Anomalies, An Alert for the Team

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Abstract: This article highlights a clinically relevant and under-recognized issue: the potential interaction between sugammadex, an increasingly used anesthesia medication, and hormonal contraceptives in women with vascular anomalies receiving teratogenic therapies. With many of these women undergoing repeated procedures under general anesthesia and concurrently receiving agents such as sirolimus or thalidomide, there is a pressing need for heightened awareness around contraceptive efficacy and risk mitigation.

Keywords: anesthesiology, pregnancy, sugammadex, vascular anomalies

Women with vascular anomalies (VAs) frequently require multiple procedures throughout their lives, often necessitating general anesthesia. Recent advances in the understanding and treatment of VAs have led to the use of targeted therapies such as sirolimus, alpelisib, thalidomide, and trametinib.^{1–3} While these agents offer improved outcomes, they also pose significant teratogenic risks, making reliable contraception essential for women of reproductive age. A potential challenge arises from the increasing use of sugammadex, a selective relaxant binding agent, to reverse rocuronium-induced neuromuscular blockade in anesthetic practice. This article addresses the

critical, yet often overlooked, intersection of anesthetic agents, contraception, and potential teratogenic therapies in women with VAs.

Sugammadex offers several advantages over traditional neostigmine/glycopyrrolate combinations, including faster onset of action and shorter recovery times.⁴ However, concerns have been raised regarding sugammadex's potential interaction with hormonal contraceptives. It binds steroidal compounds, potentially reducing the efficacy of hormonal oral contraceptives, intrauterine devices, and contraceptive implants. Pharmacokinetic modeling suggests that sugammadex may decrease progesterone exposure by 34% due to increased clearance of steroid hormones. In cases where it is administered on the same day as an oral contraceptive, current recommendations suggest treating it as a missed dose and adhering to the standard backup contraception guidelines. For nonoral hormonal contraceptives, patients are advised to use an additional nonhormonal method, such as condoms, for 7 days.⁵

Despite these recommendations, robust clinical data confirming the significant impact of sugammadex on contraceptive efficacy remain limited.⁶ Further studies are required to clarify the real-world implications of this interaction.⁷ However, the potential for contraceptive interference, coupled with the teratogenic risks associated with targeted VA therapies, underscores the need for proactive measures to ensure patient safety and prevent unintended pregnancies. For instance, thalidomide requires strict contraceptive measures and monthly pregnancy testing when used for arteriovenous malformations.⁸ Although sirolimus has been used successfully to treat fetal lymphatic malformations in some carefully selected patients,⁹ the use of sirolimus during pregnancy is not recommended (FDA pregnancy category C). The effect of targeted therapies on fertility and fetal development remains under study. As a precaution, women of childbearing age receiving sirolimus, alpelisib, and trametinib should use

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highly effective contraception and avoid pregnancy during treatment.

To mitigate these risks, we recommend the following:

1. Proactive patient education and informed consent: Prioritize clear and comprehensive communication with patients regarding the potential interaction between sugammadex and hormonal contraceptives. Provide detailed information about the possible reduction in contraceptive efficacy and the importance of adhering to backup contraception methods. Document this discussion thoroughly, using standardized information forms or counseling protocols to ensure consistency. Repeat and reinforce the information to ensure understanding and address any patient concerns.^{10–12}
2. Consideration of alternative reversal strategies: In women of childbearing age who have no contraindications to neostigmine, consider using neostigmine/glycopyrrolate as an alternative to sugammadex.^{13,14} This approach may mitigate the potential risk of contraceptive interference, particularly in situations in which reliable backup contraception cannot be guaranteed.¹⁵
3. Multidisciplinary approach and enhanced communication: Foster open and collaborative communication among anesthesiologists, surgeons, interventional radiologists, oncologists, and other healthcare providers involved in the care of women with VAs. Ensure that all providers are aware of the potential risks associated with sugammadex and targeted therapies, and that they are equipped to appropriately counsel patients. This collaborative approach ensures consistent messaging and coordinated care.

In conclusion, this short communication highlights the critical,¹⁵ yet often overlooked, intersection of anesthetic practice, contraception, and potential teratogenic therapies in women with VAs. By raising awareness, encouraging proactive counseling, promoting informed decision-making, and fostering collaborative care, we can strive to enhance patient

safety and prevent unintended pregnancies in this vulnerable population.

References

1. Seront E, Hermans C, Boon LM, Vikkula M. Targeted treatments for vascular malformations: current state of the art. *J Thromb Haemost*. 2024;22(11):2961–2975.
2. Seront E, Queisser A, Boon LM, Vikkula M. Molecular landscape and classification of vascular anomalies. *Hematology Am Soc Hematol Educ Program*. 2024;2024(1):700–708.
3. Seront E, Van Damme A, Legrand C, et al. Preliminary results of the European multicentric phase III trial regarding sirolimus in slow-flow vascular malformations. *JCI Insight*. 2023;8(21):e173095.
4. Thilen SR, Weigel WA, Todd MM, et al. 2023 American Society of Anesthesiologists practice guidelines for monitoring and antagonism of neuromuscular blockade: a report by the American Society of Anesthesiologists task force on neuromuscular blockade. *Anesthesiology*. 2023;138(1):13–41.
5. Williams R, Bryant H. Sugammadex advice for women of childbearing age. *Anaesthesia*. 2018;73(1):133–134.
6. Devoy T, Smith N. Sugammadex and oral contraceptives. *Curr Opin Anaesthesiol*. 2024;37(4):338–343.
7. Devoy T, Hunter M, Smith NA. A prospective observational study of the effects of sugammadex on peri-operative oestrogen and progesterone levels in women who take hormonal contraception. *Anaesthesia*. 2023;78(2):180–187.
8. Boon LM, Dekeuleeneer V, Coulie J, et al. Case report study of thalidomide therapy in 18 patients with severe arteriovenous malformations. *Nat Cardiovasc Res*. 2022;1(6):562–567.
9. Seront E, Biard JM, Van Damme A, et al. A case report of sirolimus use in early fetal management of lymphatic malformation. *Nat Cardiovasc Res*. 2023;2(6):595–599.
10. Hartman E, Funk E, Dear G, Wellman C, Pereira K. Sugammadex effects on hormonal contraception effectiveness: implementation of uniform postoperative teaching. *J Perianesth Nurs*. 2021;36(4):351–358.
11. Lazowitz A, Dindinger E, Aguirre N, Sheeder J. Pre- and post-operative counseling for women on hormonal contraceptives receiving sugammadex at an academic hospital. *J Anesth*. 2020;34(2):294–297.
12. Hodge C, Myers A, Ceneviva GD, et al. Retrospective analysis of sugammadex use in adolescent females on progestin-containing contraceptives. *J Pediatr Adolesc Gynecol*. 2023;36(5):459–464.
13. Chung C, Szokol JW, Weigel WA, Thilen SR. New Practice Guidelines for Neuromuscular Blockade. *APSF Newsletter*. 2023;38(2):39–41.
14. Webber AM, Kreso M. Informed consent for sugammadex and oral contraceptives: through the looking glass. *Anesth Analg*. 2018;127(3):e52–e52.
15. Landau R, Burgart AM, Sutton CD. Loss of access to legal abortion in America: history, implications, and action items for anesthesiologists. *Anaesth Crit Care Pain Med*. 2022;41(5):101125.