Optimizing Oxytocin Delivery: Comparing IV and IM routes in cesarean delivery

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Background:

_ Oxytocin (Pitocin) is widely used as the first-line uterotonic agent for the prevention of postpartum hemorrhage (PPH) following labor and delivery.

_ In vaginal births, intravenous (IV) oxytocin has been shown to reduce both the incidence of PPH and the need for blood transfusion more effectively than intramuscular (IM) administration.

_ However, evidence comparing these routes of administration during cesarean delivery remains limited.

_ In the recent context of the nation wide IV fluid shortages in late 2024, IM oxytocin was increasingly adopted as an alternative during cesarean sections.

Study hypothesis:

_ IM oxytocin may provide a clinically comparable alternative to IV administration for atonic hemorrhage prophylaxis during low risk, scheduled cesarean delivery, particularly in settings where IV fluid administration is restricted, such as in patients with cardiovascular diseases or in resource-limited environments.

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Hermesch A, Kernberg A, Layoun V ...
Oxytocin: physiology, pharmacology, and clinical application for labor management
American Journal of Obstetrics & Gynecology, 2023; 230, S729-S739

Study design:

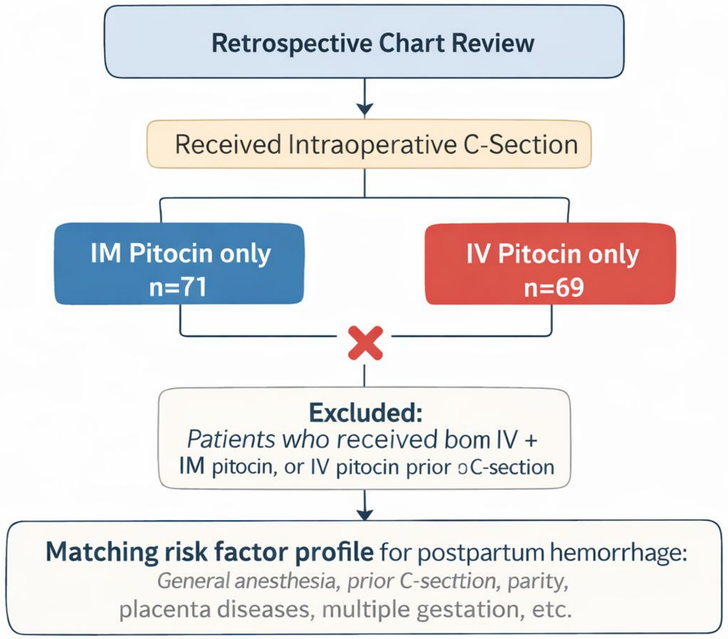

Table 1: Baseline characteristics of the study participants in both the groups.

Variable	IM Pitocin	IV Pitocin	p-value
Age (Mean ± SD)	33.35 ± 4.59	33.61 ± 5.02	0.753
BMI (Mean ± SD)	34.33 ± 7.62	33.89 ± 6.45	0.719
Delivery: Classical/Vertical	4	6	0.708
General Anesthesia	4	3	1.00
Gestational Age (weeks)	38.38 ± 1.35	37.68 ± 2.33	0.0368
Gravida (Mean ± SD)	2.60 ± 1.31	2.77 ± 1.53	0.482
Prior C-Section (Yes)	38	34	0.739
Twin	4	4	1.000
Placenta Disease	0	4	0.121
Pre-eclampsia	4	7	0.498

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Results:

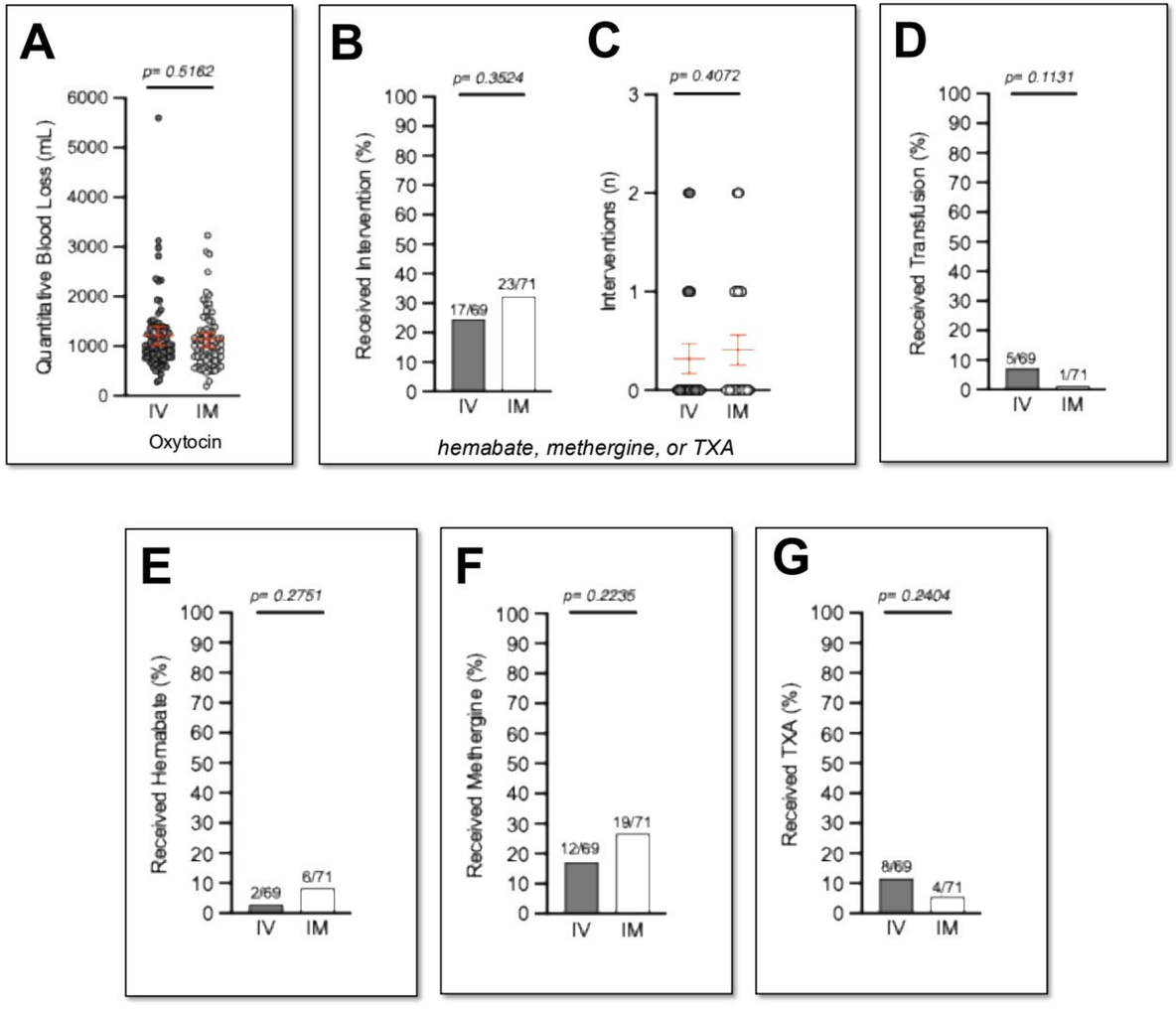

Table 2 – Outcome Comparison (IM vs IV Pitocin Routes)

Outcome Variable	IM Group	IV Group	p-value
QBL (ml) (mean ± SD)	1133.1 ± 605.0	1211.2 ± 798.7	0.516
Transfusion (n)	1 / 71	5 / 69	0.113
Hebamate Given (n)	6 / 71	2 / 69	0.275
Methergine Given (n)	19 / 71	12 / 69	0.224
TXA Given (n)	4 / 71	8 / 69	0.240

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Conclusion:

_ No significant differences were observed between groups in quantitative blood loss, transfusion rates, use of tranexamic acid, or the need for additional uterotonic agents such as methylergonovine or carboprost.

_ Additionally, no patients in the IM group required intrauterine hemorrhage control devices.

_ IM oxytocin may provide a clinically comparable alternative to IV administration for atonic hemorrhage prophylaxis during low risk, scheduled cesarean delivery, particularly in settings where IV fluid administration is restricted, such as in patients with cardiovascular diseases or in resource-limited environments.

Discussion:

_ As a retrospective chart review, this study is subject to inherent limitations, including reliance on documentation accuracy, missing data, and inability to control for confounding variables.

_ The overall sample size remains relatively small, limiting statistical power and generalizability.

_ The specific site of IM oxytocin administration (lateral thigh vs deltoid) was not consistently documented, introducing variability in drug absorption; gluteal injections may have resulted in subcutaneous rather than true intramuscular delivery due to thicker adipose tissue and use of shorter needle lengths.

_ Quantitative blood loss measurements may be subject to inconsistency and measurement error despite standardized protocols.

_ Decisions regarding administration of additional uterotonic agents and initiation of blood transfusion are provider-dependent and variable, contributing to heterogeneity in clinical management.

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