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Obstetric Abstracts

Contents

A new interdisciplinary patient support tool to reduce psychological trauma amongst women undergoing urgent or emergency cesarean sections: results from a modified delphi study

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86

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INTRODUCTION

Urgent/emergent (UE) cesarean sections (CS) are an independent predictor for the development of childbirth-related post-traumatic stress disorder [1]; high-quality supportive care may help to prevent or reduce this risk [2]. This modified Delphi study developed a new, patient-informed tool to guide the supportive care women receive from interdisciplinary health care providers *immediately before, during, and immediately after* UE CS.

METHODS

Following REB approval, a modified Delphi study design of two sequential patient panels was conducted. Two independent panels of women, representing the breadth/depth of live UE CS, were recruited $\leq$72hours delivery. Each panel completed a single round of item ratings. Iterative refinement of items occurred between panels to ensure clarity/relevance. Actionable intervention candidate items (*n*=33) were developed from the literature, our previous Phase 1 qualitative study on stressors during UE CS, and interdisciplinary UE CS experts. Participants in each panel (1) rated each item on a 7-point Likert Scale (1=*not at all important*, 7=*extremely important*), (2) ranked them by their relative importance, and (3) provided comments. Items were revised for wording/clarity between panels one and two. Consensus was defined as $\geq$70% of participants rating an item of moderate importance or higher and an interquartile range of $\leq$2. Items that reached consensus in both panels were included in the IPST. Items reaching consensus in only one panel were considered optional or context-specific.

RESULTS

Thirty women were recruited for the first panel in round one and 34 for the second panel in round two. Across both panels, the mean age of women was 33.6, with about two-thirds being primiparous (71.9%) and most delivering by urgent CS (78.1%). Of the initial 33 identified actionable intervention items, the panel reached consensus for 29 items after round one and refined them to 27 after round two. The final 27 actionable intervention items selected based on consensus ratings in round two reflected the themes of anticipatory guidance (88-100%), continuous support (94-97%), preservation of the birth experience (85-91%), and involvement of their support person (91-94%).

DISCUSSION

This study identified 27 actionable intervention items that will be included in the new Interdisciplinary Patient Support Tool, ensuring that it reflects the priorities immediately relevant to women and can guide their interdisciplinary supportive care during UE CS. Future work will pilot test the tool and its components, assess its feasibility/acceptability, as well as its impact on women's CS experiences and interdisciplinary collaboration.

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Table 1. Participant Baseline Characteristics (*n*=64)

Characteristic	% (*n*) or Mean (SD)
Age in years	33.6 (4.2)
Parity	Primiparous 71.9% (46/64) Multiparous 28.1% (18/64)
Caesarean section type	Urgent 78.1% (50/64) Emergency 21.9% (14/64)
Gestational age (weeks)	
Term (≥37)	71.9% (46/64)
Moderate-late preterm (≥32 to <37)	12.5% (8/64)
Very preterm (≥28 to <32)	6.3% (4/64)
Extremely preterm (≥24 to <28)	9.4% (6/64)
Single gestation	95.3% (61/64)
Psychiatric disorder history	31.3% (20/64)
Labored prior to caesarean section	85.9% (55/64)
Received labor pain relief	68.8% (44/64)
Received labor epidural pain relief	67.2% (43/64)
Prior caesarean section history	10.9% (7/64)
Trial of labor after caesarean section	1.6% (1/64)
Reason for caesarean section	
Fetal heart rate concerns	39.1% (25/64)
Non-progressive labor/fetal malposition/cord prolapse	37.5% (24/64)
Fetal concerns (IUGR)	9.4% (6/64)
Maternal concerns	7.8% (5/64)
Placental abruption/hemorrhage/uterine rupture	4.7% (3/64)
Preeclampsia/HELLP syndrome	1.6% (1/64)

Anesthetic management of a patient with aortic recoarctation and arch hypoplasia: a case report

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101

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INTRODUCTION

Incidence of coarctation of Aorta (CoA) is about 5-8% of all congenital heart defect that occurs with. 2:1 ratio of male preponderance. It is often missed until adulthood when it is diagnosed due to hypertension, and this may impact its true incidence (1). Recoarctation incidence varies greatly but is high in those stented when younger. Hypoplasia of the transverse arch often accompanies CoA restricting blood flow to areas distal to the hypoplasia. Pregnancy with CoA is a high-risk condition more so with recoarctation, stressing the cardiovascular system and increasing risks for both mother and the baby. There is gap in literature regarding anesthetic management of labour and delivery in such parturients as most them have an elective cesarean delivery. This is a report of the anesthetic management of a parturient with significant recoarctation and vaginal birth.

CASE PRESENTATION

A 22-year-old primiparous woman presented at 26 weeks of gestation with hypertension and history of a repaired secundum atrial septal defect, perimembranous ventral septal defect, stented CoA and transverse arch hypoplasia. She was not followed since the stenting at age 6. Her only symptom was uncontrolled hypertension. Obstetric history was unremarkable. Fetal echo showed no structural issues. A multidisciplinary meeting was held, and tinduction at 38 weeks was planned. Operative delivery mode was reserved for obstetric indications.

At induction of labour, there was significant coarctation gradient (>20 mm Hg) with following limb pressures: right upper 220/130 mm Hg, left upper 200/105 mm Hg, left lower 150/100 mm Hg. After gaining intravenous access and a 20 g left radial arterial line, the pressures were treated with hydralazine (3 doses*5 mg). The target was 110 mm Hg in the lower limbs to allow adequate placental perfusion. Induction was started after placing an epidural at L3-4 interspace. When effective analgesia was achieved, the blood pressure fell below target

and a phenylephrine infusion was titrated as required. She achieved full dilatation after 8 hrs. A live female infant was delivered with forceps assistance. Rest of the postpartum was uneventful. The phenylephrine infusion was stopped along with the epidural, a few hours after birth. The invasive pressure monitoring was discontinued after 24 hrs. The post-partum systolic BP target was 130 mm Hg in the right upper limb and 90 mm Hg in the lower limb. She was discharged to cardiology care after 72 hrs.

CONCLUSION

Recoarctation incidence varies but is high in those stented when younger than 12 years due to somatic growth of the recoarctation[1]. Preferred option is cesarean delivery in those with poorly controlled hypertension or significant residual coarctation (gradient of >20%) or both though assisted vaginal delivery maybe an alternative[2]. Difference in upper limb pressures was explained by the hypoplasia that hindered the ability of the arch to distend and perfuse distally[3]. There is paucity of literature about vaginal delivery in recoarctation with uncontrolled hypertension. Anesthetic considerations included careful management of pressures, invasive monitoring and labour analgesia to aid an assisted vaginal delivery.

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Balancing cerebral perfusion and gestational hypertensive disease: postpartum reversible cerebral vasoconstriction syndrome concurrent with pre-eclampsia after cesarean delivery

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189

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INTRODUCTION

Acute postpartum cerebrovascular syndromes are increasing with advanced maternal age and hypertensive disorders of pregnancy. Reversible cerebral vasoconstriction syndrome (RCVS) is an important cause of postpartum thunderclap headache with transient focal neurologic deficits, characterized by multifocal intracranial vasoconstriction with segmental arterial "beading" on angiographic imaging and risk of ischemic or hemorrhagic complications[1,2]. In this setting, RCVS must be rapidly distinguished from posterior reversible encephalopathy syndrome (PRES), which can present similarly but typically mandates prompt blood pressure (BP) reduction to limit vasogenic edema, whereas aggressive BP lowering during active RCVS may compromise cerebral perfusion[1]. We report a postpartum case of CTA-confirmed RCVS that subsequently met criteria for pre-eclampsia, necessitating multidisciplinary BP targets, vasodilator therapy, and tailored analgesia to balance cerebral perfusion against hypertensive emergency risk.

CASE PRESENTATION

A 31-year-old G2P1 with an IVF pregnancy complicated by gestational hypertension (labetalol BID from 36 weeks), BMI 40, and fetal hypoplastic right heart underwent cesarean delivery under spinal anesthesia at 37+5 weeks after spontaneous rupture of membranes. At ~24 hours postpartum, she developed sudden severe thunderclap headache followed by transient decreased level of consciousness and focal neurologic deficits, predominantly left-sided weakness with intermittent right facial droop/paraesthesia, with complete resolution within one hour. She remained normotensive during the acute episode. CTA performed ~90 minutes after symptom onset demonstrated mild, diffuse intracranial arterial "beading" consistent with RCVS, without hemorrhage or infarction. Over the subsequent four days she experienced recurrent thunderclap headaches with brief focal deficits and underwent two additional inpatient CTAs (three total) demonstrating dynamic vasospasm,

including interval worsening with irregular narrowing involving the posterior cerebral arteries and right ACA, followed by persistent findings with slight progression in ACA narrowing and improvement in PCA changes. On postpartum day four, a markedly elevated protein-creatinine ratio confirmed pre-eclampsia. Labetalol was discontinued and, to treat RCVS and mitigate ischemic conversion, verapamil (40 mg TID initially, then titrated incrementally as tolerated) and low-dose aspirin were initiated with a permissive systolic BP target of 120-150 mmHg. Multimodal analgesia (acetaminophen and hydromorphone) was used to control headache and minimize sympathetic BP surges. She was discharged on postpartum day six on verapamil with outpatient neurology follow-up. Written informed consent was obtained.

CONCLUSION

This case underscores the diagnostic and management implications of postpartum RCVS in the setting of hypertensive disease of pregnancy. Thunderclap headache with transient focal deficits and dynamic multifocal arterial narrowing on serial CTA supported the diagnosis and highlights the value of early neurovascular imaging, as clinical symptoms may resolve despite ongoing vasospasm. The central challenge was balancing competing hemodynamic goals. Pre-eclampsia management prioritizes BP reduction to prevent end-organ injury and PRES, whereas excessive BP lowering during active RCVS may compromise cerebral perfusion in vasoconstricted territories. For anesthesiologists, multimodal analgesia is key to reducing sympathetic driven hemodynamic lability.

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Can we use short-term, recall-based, multidimensional labor pain assessment to address the current knowledge gap in OB anesthesia research? Women's short-term recall of their multidimensional labor pain, experienced just prior to epidural insertion, is reliable 20-30 minutes after receiving neuraxial pain relief

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87

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INTRODUCTION

Use of multidimensional, condition-specific pain instruments is recommended for pain research. The lack of use of such tools in obstetrical anesthesia research and the limited study of pain relief in obstructive/late-stage labor have left significant gaps in our knowledge [1]. We hypothesized that women's short-term recall of their labor pain, experienced before epidural insertion, would be reliable 20-30 minutes after epidural drug administration using the Angle Labor Pain Questionnaire (A-LPQ). If reliable, this would permit multidimensional pain assessments over the course of labor/delivery based on short-term pain recall in women receiving epidurals, providing an almost "real-time" measurement of their pre-treatment pain. This study examined the reliability of women's short-term pain recall using the A-LPQ (primary outcome), Numeric Rating Scale (NRS), Verbal Rating Scale (VRS), and Pain Mastery Scale (PMS).

METHODS

Following REB approval/written informed consent, the A-LPQ, NRS, VRS, and PMS were administered to laboring women of mixed parity requesting epidural analgesia during three test periods. Test 1 had women rate their labor pain just before epidural insertion; Test 2 had them re-rate that same pain, based on recall 20-30 minutes after epidural drug administration. Test 3 had participants rate their labor pain after Test 2. Women were unaware that they would be asked to recall their labor pain during the study. The reliability of

women's short-term pain recall between Tests 1 and 2 using A-LPQ summary scores, A-LPQ subscales, NRS, VRS, and PMS scores was assessed using the Intraclass Correlation Coefficient (ICC); short-term recall agreement was assessed with Bland-Altman plots.

RESULTS

112 complete datasets were analyzed; 90% of women reported moderate (61/112) or severe (39/112) labor pain (VRS) before epidural insertion. Most women (71%, 80/112) described their pain as *very much improved* 20-30 minutes after epidural drug administration; 2% (2/112) reported *worsened* pain. The reliability of short-term pain recall of their pre-treatment pain at 20-30 minutes was good for A-LPQ Summary scores (ICC=0.89, 95% CI [0.85, 0.93]); Bland-Altman plots supported this finding with 95% agreement. Recall-reliability was good to excellent for all A-LPQ subscales (ICCs$\geq$0.80), with moderate reliability for Uterine Contraction Pain (ICC=0.71); NRS, VRS, and PMS scores also showed good recall reliability (ICCs$\geq$0.75).

DISCUSSION

Women's short-term recall of their labor pain, experienced just before epidural insertion, was good to excellent 20-30 minutes after epidural treatment using the A-LPQ and other pain tools. Our instrument development/validation work for the A-LPQ has demonstrated that there is a gap between the knowledge of labor pain in the literature and women's pain experiences. A-LPQ findings show that women can reliably recall their pain after receiving epidural analgesia, making multidimensional pain assessments after pain relief more feasible.

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Table 1. Participant Characteristics (n=112)

Participant Characteristics		Mean (SD) or Proportion (%)
Age (Years)		33.0 (4.0)
BMI		28.3 (4.5)
Gestational Age (Weeks)		39.1 (1.2)
Cervical Dilation at Study Entry (cm)		3.3 (1.3)
Contraction Frequency at Study Entry (min)		3.9 (2.0)
Singleton Gestation (% Yes)		100% (112/112)
Birth Weight (grams)		3418.8 (434.5)
History of Chronic Back Pain (% Yes)		8% (9/112)
Delivery Mode	**SVD**	71% (80/112)
	Mid-forceps	2% (2/112)
	C-section	10% (11/112)
	Vacuum or Low Forceps	17% (19/112)
Highest Education	**Grade School**	2% (2/112)
	High School	4% (4/112)
	Community College	11% (12/112)
	University	84% (94/112)
Martial Status	**Married**	89% (100/112)
	Common Law	9% (10/112)
	Single	2% (2/112)

Chronic pain in pregnancy: implications for labour outcomes and peripartum anesthetic management

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230

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INTRODUCTION

Chronic pain during pregnancy is common, and encompasses both pregnancy-related and non-obstetric chronic pain syndromes.[1] The impact of chronic pain on labour and delivery is highly relevant to anesthesia practice given its prevalence and the challenges it poses for peripartum pain management. Chronic pain may increase pain perception during labour and influence analgesic requirements.[1] Despite this, mechanisms remain poorly understood and existing clinical guidelines are limited. This study aims to review the literature on chronic pain in pregnancy and its impact on labour outcomes and management, including mode of delivery, peripartum analgesia use, and anesthetic complications.

METHODS

A systematic literature search and narrative synthesis was conducted and four electronic databases (Ovid, PubMed, Embase, and Cochrane) were searched from January 2000 to December 2025. Search strategies incorporated search terms to capture chronic pain disorders (e.g., fibromyalgia, low back pain, pelvic girdle pain, neuropathic pain) and obstetric outcomes (e.g., labour, delivery, mode of delivery, analgesia, cesarean section, etc.). The initial search yielded 3 550 results, which was screened by reviewers in two phases, namely title and abstract followed by full-text review. Eligible studies were fully-published human studies reporting persistent/chronic pain lasting at least three months during pregnancy (pre-existing or pregnancy-associated) and labour or delivery outcomes. Non-English studies and those reporting acute pain, acute on chronic pain, and animal research were excluded. References of included articles were also screened, which identified four additional eligible studies, resulting in thirty-nine included articles (n>106,412 across studies).

Data extraction was performed using a standardized template capturing pain type and timing, delivery mode, analgesia route, analgesia challenges, and postpartum pain management. Findings were categorized thematically into these domains and interpreted in the context of study design and methodological quality.

RESULTS

Six observational studies found chronic pain was associated with increased emergency cesarean delivery. Reported factors included pain-restricted positioning for vaginal delivery, concern for neurological deterioration in patients with spinal pathology, and patient preference due to poor pain control.[2] In those with altered spinal anatomy or hardware, clinician reluctance was cited as a factor decreasing neuraxial placement.[3] Despite these technical challenges, one systematic review reported neuraxial anesthesia was feasible in 88% of cases, with low failure and complication rates, through imaging and careful planning.[4]

Three studies suggested chronic pain is associated with increased intrapartum analgesia requirements, however this was not uniformly reported across studies. One study reported more difficult postpartum pain control, particularly in patients on opioid maintenance therapy, with inadequate analgesia associated with increased risk of withdrawal or relapse.[4] Multimodal strategies, including PCA, were most effective in patients with difficult postpartum pain control.[5]

DISCUSSION

Overall, chronic pain in pregnancy may complicate labour management and analgesia, particularly through increased emergency cesarean rates, neuraxial technical difficulty, and heightened analgesic requirements. Most evidence derived from small-medium scale observational studies, emphasizing the need for further research to improve understanding and inform clinical management.

Findings support individualized and proactive assessment of neuraxial feasibility and peripartum pain management. This is best achieved through multidisciplinary planning involving obstetricians, anesthesiologists, neurologists, addiction medicine, and other specialists.[3] Overall, a collaborative and proactive approach may improve analgesic outcomes and help mitigate factors associated with emergency cesarean delivery.

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Clinical validation of non-invasive anemia detection for screening of hemoglobin in postpartum women

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177

AUTHORS

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INTRODUCTION

Postpartum anemia affects 30-50% of women in developed countries and up to 80% worldwide.[1] This is largely attributed to peripartum blood loss, iron deficiency, and the physiologic demands of recovery following delivery.[2] Anemia impairs physical and cognitive function and is associated with poorer maternal–infant bonding, reduced breastfeeding success, and postpartum depression.[3] Current practice relies on venous complete blood count (CBC) testing, which is invasive and may be delayed in the immediate postpartum period. An alternative approach uses images of the palpebral conjunctiva analyzed with artificial intelligence algorithms in a smartphone-based application to estimate hemoglobin (Hb) levels. Prior validation studies have reported small mean differences and performance comparable to minimally invasive devices in selected populations.[4] We aim to determine the application's accuracy for screening postpartum women and explore demographic and clinical factors associated with measurement agreement.

METHODS

We conducted a prospective, observational validation study on an inpatient maternal ward. The study was approved by the local research ethics board, and participants provided written informed consent. Postpartum women aged ≥18 years who were admitted for routine postpartum care and scheduled for a CBC on day 1 postpartum were approached. Eligibility required CBC Hb measurement within 4 hours of image acquisition. Participants were photographed using a smartphone-based non-invasive Hb estimation application under ambient lighting conditions. After images were obtained by trained study personnel, Hb levels were extracted from the corresponding CBC. Demographic data included age, body mass index (BMI), and Fitzpatrick skin type. Estimated blood loss, transfusion data, use of iron, and mode of delivery were also recorded. Data from 101 participants was analyzed using R Studio 4.4.2. The laboratory and application Hb values were compared using mean

absolute error, Pearson correlation, and Bland-Altman analysis, with percentages within ±10 g/L and ±20 g/L reported.

RESULTS

101 postpartum participants were included. Mean laboratory Hb was 107.6 g/L, while the mean non-invasive estimate was 133.2 g/L. The non-invasive method consistently overestimated Hb values. Mean absolute error was 26.6 g/L and root mean squared error was 31.7 g/L, reflecting variability at the individual patient level. At clinically relevant thresholds, 17.8% of estimates were within ±10 g/L and 41.6% within ±20 g/L of the laboratory Hb value. Bland–Altman analysis demonstrated a mean bias of +25.6 g/L with limits of agreement from −10.7 to +61.9 g/L. On the Fitzpatrick Skin Type Scale, type 2 was the most common, with an even split between types 3, 4, and 5. Types 1 and 6 were under-represented. Median error did not differ by Fitzpatrick skin type (p=0.74). Age, BMI, mode of delivery, and iron supplementation did not affect the hemoglobin results.

DISCUSSION

Non-invasive Hb estimation demonstrated limited agreement with laboratory measurements and consistent positive bias, resulting in under-detection of anemia in parturients. Overestimation and wide limits of agreement indicate this approach is not yet suitable as a replacement for laboratory Hb testing in the postpartum period.

Postpartum anemia is common and clinically relevant.[1,5] Laboratory testing remains the standard of care; however, in settings with limited laboratory access, developing rapid, non-invasive testing is promising. This technology could be used to prompt confirmatory testing, but it is not currently diagnostic. Future studies should focus on algorithm refinement and validation in larger postpartum cohorts.

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Content and consistency of the informed consent process for labour neuraxial analgesia: a prospective observational study

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112

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INTRODUCTION

Neuraxial labour analgesia (NLA) is the most effective option for labour pain, yet obtaining valid informed consent in the intrapartum setting is challenging due to pain, time pressure, and evolving clinical circumstances[1]. Recent qualitative work suggests patients value clear, timely counselling and may perceive gaps in understanding when consent occurs during distress or late labour[2]. Professional guidance emphasizes shared decision-making and expectation-setting, including discussion of alternatives, the possibility of inadequate analgesia or procedural failure, and rare but serious neurologic complications[3]. Canadian medicolegal guidance similarly reinforces disclosure of material risks and careful documentation[4]. Despite this, the content and consistency of neuraxial consent discussions in labour wards remain poorly characterized. We therefore performed a prospective observational study to describe the elements included in anesthesiologists' informed consent conversations before NLA, including procedural description, alternatives, risks/complications, expected effects, and use of patient information sheets.

METHODS

Observations were performed in routine, non-emergent circumstances and involving healthy labouring patients requesting NLA on the labour and delivery unit (ASA II; age ≥19 years; English-speaking). Patients in advanced labour with significant distress or cases in which clinical events imposed time constraints or altered usual practice were excluded. Participants were informed of study participation but blinded to the specific elements under assessment to minimize practice modification. Each eligible consent encounter was directly observed by a single trained observer from first patient contact to completion of the neuraxial procedure. Data were recorded using standardized forms capturing domains of patient identity verification, pre-procedure assessment, assessment of pre-existing knowledge, procedural counselling (technique description, alternatives, risks/complications, expected effects), and total duration of the consent discussion. After

the observation, participants completed a survey describing their typical consent process. Outcomes were summarized descriptively as frequencies and type of consent elements discussed. All participants provided written informed consent.

RESULTS

18 anesthesiologists each completed one LNA consent encounter; median consent duration was 4 min (IQR 4–5; range 2–7). Consultants described the procedure before initiation in 15/18 (83%), discussed risks/complications in 18/18 (100%) with a median of 8 distinct topics per encounter (IQR 8–9; range 4–11), and explained expected effects in 17/18 (94%). Procedural counselling covered a median of 10/14 predefined elements (range 5–12), while no alternative labour analgesia options were discussed (0/18, 0%). The most consistently disclosed risks were inadequate block, post–dural puncture headache, and potential epidural replacement (each 18/18, 100%); common side effects were less frequently addressed (Table 1). Written materials were inconsistently integrated: 10/18 (56%) patients confirmed reading the information sheet. On clinician surveys (n=18), 14/18 (78%) agreed active labour patients can provide informed consent and 11/18 (61%) supported standardized guidance; 12/18 (67%) felt discussions were sufficiently detailed, yet only 1/18 (6%) believed patients are adequately educated pre-labour.

DISCUSSION

Conclusion: This prospective observational study revealed meaningful variability in the content of intrapartum LNA consent, highlighting a gap between professional/medicolegal expectations and bedside communication in a time-pressured obstetric setting. The absence of routine discussion of alternatives and inconsistent integration of written materials suggest that patient choice may be constrained by workflow and limited pre-labour education. These findings support targeted quality improvement initiatives, such as standardized consent prompts, structured use of patient information resources, and antenatal education, to strengthen shared decision-making, improve patient experience and reduce medicolegal risk.

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Table 1. Specific risks and complications discussed during the informed consent process.

Risk/Complication	Mentioned Only n/18 (%)	Briefly Described n/18 (%)	Thoroughly Described n/18 (%)
Patchy/inadequate block	**18 (100%)**	13 (72.2%)	5 (27.8%)
PDPH	**18 (100%)**	1 (5.6%)	**17 (94.4%)**
Replacement of epidural	**18 (100%)**	11 (61.1%)	7 (38.9%)
Temporary nerve injury	**17 (94.4%)**	8 (44.4%)	9 (50.0%)
Permanent nerve injury	**17 (94.4%)**	5 (27.8%)	**12 (66.7%)**
Infection around spinal cord	**15 (83.3%)**	8 (44.4%)	7 (38.9%)
Paralysis	**15 (83.3%)**	1 (5.6%)	**14 (77.8%)**
Epidural hematoma	**14 (77.8%)**	9 (50.0%)	5 (27.8%)
Shivering	5 (27.8%)	5 (27.8%)	0 (0%)
Hypotension	4 (22.2%)	4 (22.2%)	0 (0%)
Bruising at epidural site	2 (11.1%)	2 (11.1%)	0 (0%)
High block	1 (5.6%)	0 (0%)	1 (5.6%)
Cardiac arrest	1 (5.6%)	0 (0%)	1 (5.6%)
Fever	**0 (0%)**	-	-
Urinating retention	**0 (0%)**	-	-
Allergic reaction	**0 (0%)**	-	-
GA for cesarean delivery	**0 (0%)**	-	-

PDPH: Post-dural puncture headache, GA: General anesthesia.

Cortical vein thrombosis presenting after apparent resolution of post-dural puncture headache following epidural blood patch

Submission ID

173

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INTRODUCTION

Post-dural puncture headache (PDPH) is a common postpartum complication after neuraxial anesthesia and may require epidural blood patch (EBP)[1]. In obstetric cohorts, EBP performed <48 h after accidental dural puncture is associated with higher failure and repeat intervention, supporting delayed EBP when clinically feasible[2]. However, postpartum headache has a wide differential with secondary causes that can mimic PDPH, including cerebral venous thrombosis (CVT) and intracranial hemorrhage[3]. Both of which can have severe long-term sequelae[3].

CASE PRESENTATION

A healthy 34-year-old G2P1 at 39+1 weeks requested labour epidural analgesia. Placement required four attempts and unintentional dural puncture was not recognized. After uncomplicated vaginal delivery, she developed a severe positional frontal headache with neck/shoulder pain and auditory changes consistent with PDPH. Neurologic examination was normal. After counselling regarding higher early EBP failure rates, she deferred EBP until approximately 48 h postpartum. On postpartum day 2, she re-presented with persistent symptoms and underwent EBP (22 mL autologous blood and single midline L3–4 attempt) with complete symptom resolution. Within 24–48 h, she developed new left-sided sensory symptoms and mild weakness (leg > arm), most notable for impaired proprioception, without recurrence of positional headache. Neuroimaging demonstrated cortical vein thrombosis. Therapeutic low-molecular-weight heparin was initiated; she subsequently experienced a generalized tonic–clonic seizure and recurrent focal seizures despite levetiracetam and lacosamide. After CT evidence of hemorrhage, anticoagulation was held. She required brief ICU admission for seizure management and was discharged on dual antiseizure therapy with intensive physiotherapy. At 1-year follow-up she remains seizure-free on dual therapy, with mild motor recovery but persistent cognitive and word finding difficulties. Written informed consent was obtained.

CONCLUSION

Symptom resolution after EBP does not exclude evolving CVT in postpartum patients initially treated for PDPH. Although delaying EBP may improve efficacy, evidence is insufficient to determine whether delay modifies rare neurovascular risk. Postpartum patients treated for PDPH who develop new neurologic symptoms (including proprioceptive disturbance) or a change in headache phenotype after EBP should undergo urgent neuroimaging to exclude CVT and hemorrhage, and should not be presumed recurrent or refractory PDPH.

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Dexamethasone for postoperative pain after cesarean delivery under neuraxial anesthesia

Submission ID

228

AUTHORS

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INTRODUCTION

Postoperative pain in patients following cesarean delivery (CD) is an important determinant of length of hospital stay, as inadequate analgesia may prolong hospitalization. Multimodal pain management after CD relies on the cornerstone neuraxial morphine, and the addition of opioids as needed. Opioids are associated with several side effects such as sedation, nausea and vomiting, and this has increased interest in other agents for multimodal pain management. In other surgical populations, dexamethasone for post-operative pain management decreases opioid consumption. (1) Few studies have investigated the addition of dexamethasone for post-operative pain after CD while using neuraxial morphine. This double-blind controlled clinical trial aims to evaluate dexamethasone for postoperative pain management following CD.

METHODS

With institutional REB approval and written informed consent, 100 patients requiring CD under neuraxial anesthesia were randomised. Five minutes after umbilical cord clamping, patients received 8 mg IV of dexamethasone or normal saline (placebo). All patients received intrathecal morphine 0.1 mg, regular acetaminophen and NSAIDs, and hydromorphone as needed. Pain levels using a 0-10 visual analog scale (VAS) were recorded at 2, 4, 6, 12, 24 h post-operatively at rest and with activity as of 6 h. The primary outcome was pain with activity at 6 h postoperatively. Nausea and vomiting were recorded at all time-points. The intraoperative intravenous use of rescue agents, and post-operative hydromorphone use and doses, were collected. Quality of recovery outcomes were evaluated with a QoR-40 at 24 h.

The primary outcome was analyzed using independent t-test and across time with mixed-effects generalized linear models (gamma distribution, log link) to account for correlation.

Bivariate analyses used t-tests, Wilcoxon rank-sum, or Pearson's chi-square as appropriate. Mixed-effects models with robust standard errors and patient-level random effects were specified for pain and binary outcomes, and interactions between intervention and time were assessed via likelihood ratio tests. Measures of effect were estimated from predicted marginal means and probabilities.

RESULTS

Complete case analysis was performed in 87 patients with < 5% missing values and a complete primary outcome. Pain scores with activity at 6 h did not differ between placebo and dexamethasone groups (mean 3.9 ±2.4 vs. 3.6 ±2.3, p= 0.43), and the proportion with pain >4/10 with activity at 6 h was similar (43% vs. 33%, p= 0.35). At 24 h, more patients in the placebo group experienced pain >4/10 with activity (39% vs. 14%, p= 0.01). (Figure) Mixed-effects models showed dexamethasone did not significantly affect pain scores over time (–0.31 VAS points; 95%CI –0.85 – 0.24), but reduced the risk of >4/10 pain with activity by 34% (risk ratio 0.66; 95%CI 0.36–0.95). No differences were observed in pain at rest, rescue agents, post-operative nausea and vomiting, QoR-40 scores, hydromorphone use, or total dose. In the QoR-40 questionnaire, intense pain was less reported in the dexamethasone group (p= 0.04).

DISCUSSION

Dexamethasone 8 mg IV after cord clamping does not decrease pain scores with activity at 6 h postoperatively in patients receiving 0.1 mg of intrathecal morphine and multimodal analgesia. Pain scores > 4/10 with activity and intense pain at 24 h post-operatively are decreased in the dexamethasone group. As intrathecal morphine 0.1 mg may not confer an analgesic effect in all patients at 24h (2), dexamethasone may decrease intense pain at 24h due to its long duration of action >36 hours. (3) Dexamethasone 8 mg IV may be a useful analgesic adjunct for patients at risk of intense postoperative pain.

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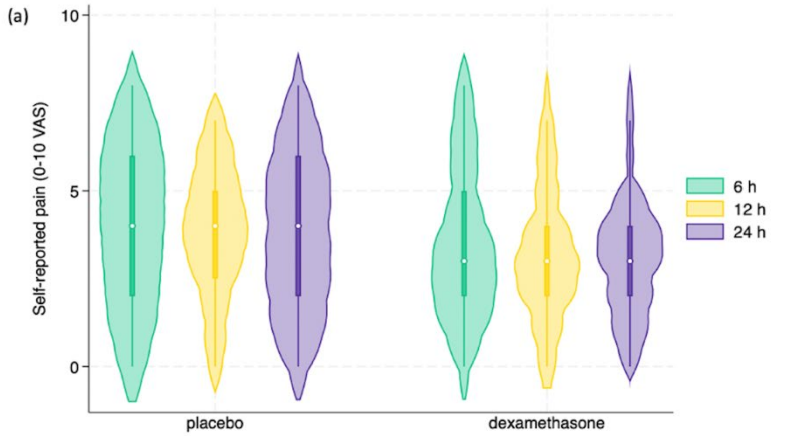
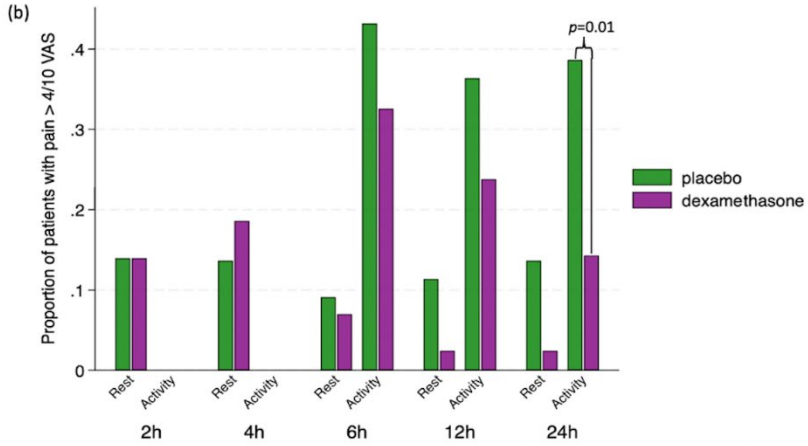
Figure. (a) Violin plots of VAS pain scores during activity at 6, 12, and 24 hours postoperatively by intervention group, showing score distribution with median, interquartile range, and minimum/maximum values. **(b)** Proportion of patients with pain >4/10 VAS by intervention group and time point. At 24 hours, dexamethasone was associated with fewer patients reporting pain >4/10 during activity (Pearson χ^2).





Effectiveness of nebulized dexmedetomidine in managing post-dural puncture headache in obstetric patients: a systematic review

Submission ID

196

AUTHORS

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INTRODUCTION

Post-dural puncture headache (PDPH) is among the most common and debilitating complications following spinal anesthesia and accidental dural puncture during epidural placement. The headache characteristically worsens in the upright position and improves when lying supine (1). Associated symptoms often include neck stiffness, nausea, photophobia, tinnitus, and cranial nerve dysfunction (1,2). The reported incidence of PDPH ranges widely from 0.5% to 28% (3,4). Pregnant women are especially at risk, and the condition can significantly increase maternal morbidity, healthcare costs, hospital stay duration, and patient dissatisfaction, while also impairing maternal–infant interaction (1,3,4). The epidural blood patch (EBP) remains the gold standard for managing PDPH due to its well-established efficacy (1), but is invasive and carries potential complications. Dexmedetomidine is a selective α_2-adrenergic receptor agonist with analgesic, anxiolytic, and sympatholytic properties, and it produces minimal respiratory depression (5). This review evaluates nebulized dexmedetomidine for obstetric PDPH.

METHODS

The review protocol has been prospectively registered in PROSPERO. A systematic literature search was conducted using MEDLINE, EMBASE, Web of Science, and Google Scholar to identify relevant studies. The search covered literature from inception up to April 2025 and utilized a combination of MeSH terms, EMTree descriptors, and keywords related to Nebulized Dexmedetomidine, Post-Dural Puncture Headache, and Neuraxial anesthesia in Obstetric patients. We included observational studies, cohort studies, case reports, randomized control trials, clinical trials, and multicenter studies. All the compiled literature

from the databases was imported into Covidence systematic review software to manage citations. Article selection was carried out by two independent reviewers with disagreements being resolved through a consensus decision. Methodological quality was assessed using the Jadad scale and the Cochrane Risk of Bias tool.

RESULTS

Our review included five studies; four studies were randomized controlled trials (RCTs), and one was a case report without a comparator. The RCTs compared nebulized dexmedetomidine against fentanyl, saline, a combination of saline and fentanyl, or neostigmine/atropine. The case report described the effects of nebulized dexmedetomidine on PDPH symptoms. The primary outcome, being pain severity, was measured using the Visual Analog Scale (VAS), which has a score range of 0-10. VAS scores were tracked at four separate timepoints: baseline, 24h, 48h, and 72h post administration of nebulized dexmedetomidine. Versus placebo, administration of nebulized DEX consistently resulted in lower VAS scores at 24-72 hours and need for additional treatment. Versus fentanyl, DEX provided superior pain control, while providing comparable pain control to neostigmine/atropine. The use of DEX was associated with fewer additional treatments. Adverse effects were infrequent and mild, but included sedation, dry mouth, and bradycardia.

DISCUSSION

This review demonstrates that nebulized dexmedetomidine is a safe, effective, and well-tolerated option for management for PDPH. Overall, nebulized Dexmedetomidine appears to be more effective than fentanyl or placebo, with comparable efficacy to that of neostigmine/atropine. Dexmedetomidine is generally considered to have a favorable safety profile, with a slight increase in drowsiness, dry mouth, and bradycardia. The need for EBP was rare following Dexmedetomidine administration, suggesting it effectively manages PDPH and reduces reliance on invasive treatments. Larger multicenter are needed to clarify role in routine prevention and treatment of PDPH.

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Epidural catheter insertion depth of 4 cm versus 5 cm for labor analgesia: a double-blind randomized controlled trial

Submission ID

98

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INTRODUCTION

Epidural analgesia is the most effective method of pain relief during labor, yet failure rates of 10–20% persist.[1,2] Epidural catheter insertion depth is a potentially modifiable factor, but guidance remains variable.[3,4] The aim of this study was to compare labor analgesia outcomes with epidural catheters inserted to 4 cm versus 5 cm within the epidural space. We hypothesized that catheters inserted to 4 cm would have a lower rate of failure compared with those inserted to 5 cm.

METHODS

This prospective, patient- and assessor-blinded randomized controlled trial was conducted after Research Ethics Board approval and written informed consent from all participants. The study enrolled laboring women with body mass index less than 40 kg/m^2 requesting epidural analgesia. Participants were randomized 1:1 to catheter insertion at 4 cm or 5 cm within the epidural space. The inserting anesthetist was unblinded; patients, bedside nurses, and outcome assessors remained blinded. Lumbar epidurals were placed using a standardized loss-of-resistance technique with a 17G Tuohy needle, catheters threaded to the allocated depth, loaded with bupivacaine 0.125% (10–15 mL) with fentanyl (50–100 micrograms), and maintained using a bupivacaine-fentanyl regimen with programmed intermittent boluses and patient-controlled supplementation.

The primary outcome was a prespecified composite of ineffective epidural after one hour, consisting of inadequate analgesia (Verbal Numerical Rating Score greater than three), insufficient block below the T10 dermatome, unilateral or patchy block, catheter manipulation or replacement, or abandonment of the technique. Secondary outcomes included pain scores, top-up requirements, catheter-related events, adequacy of conversion to surgical anesthesia, and maternal and neonatal adverse events.

Continuous variables were compared using the Wilcoxon rank-sum test, and categorical variables using the chi-squared test or Fisher's exact test, as appropriate.

RESULTS

One hundred ninety-three parturients were included in the final analysis (4 cm: n = 94; 5 cm: n = 99). Baseline characteristics were comparable between groups. The composite primary outcome occurred in 35.1% of participants in the 4 cm group and 37.4% in the 5 cm group (p = 0.859). Verbal Numerical Rating Score greater than three at any time during labor occurred in 31.9% in 4 cm group versus 32.3% in 5 cm group (p = 1.000). Rates of unilateral block, patchy block, catheter manipulation, replacement, and migration did not differ between groups.

Fifty-two participants required cesarean delivery. Conversion to surgical anesthesia using the existing epidural catheter was successful in 19 of 21 cases (90.5%) in the 4 cm group and 30 of 31 cases (96.8%) in the 5 cm group (p = 0.558). Maternal motor block and fetal bradycardia were infrequent in both groups (Table 1).

DISCUSSION

Epidural catheter insertion to 4 cm versus 5 cm within the epidural space did not result in clinically meaningful differences in analgesic efficacy, catheter performance, or safety. These findings support flexibility in catheter insertion depth within this commonly used range, with emphasis on technique and maintenance rather than small differences in in-space length.

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Table 1. Outcomes with 4 cm vs 5 cm epidural catheter depth insertion

Outcome	4 cm (n = 94)	5 cm (n = 99)	p value
Composite primary outcome (inadequate or sub-optimal analgesia), n (%)	33 (35.1)	37 (37.4)	0.859
Patchy block, n (%)	3 (3.2)	2 (2.0)	0.676
Unilateral block (greater than three dermatomes), n (%)	10 (10.6)	8 (8.1)	0.717
Block below T10 at any time, n (%)	18 (19.1)	20 (20.2)	0.998
Verbal Numerical Rating Score greater than three at any time during labor, n (%)	30 (31.9)	32 (32.3)	1.000
Catheter manipulated, n (%)	3 (3.2)	3 (3.0)	1.000
Catheter replaced, n (%)	3 (3.2)	3 (3.0)	1.000
Catheter abandoned or displaced greater than 2 cm, n (%)	0 (0)	0 (0)	Not calculated
Persistent intravascular placement, n (%)	0 (0)	1 (1.0)	1.000
Any nursing top-up required, n (%)	10 (10.6)	14 (14.1)	0.586
Any physician top-up required, n (%)	16 (17.0)	20 (20.2)	0.660
Motor block (any), n (%)	1 (1.1)	1 (1.0)	1.000
Fetal bradycardia, n (%)	0 (0)	3 (3.0)	0.247
Successful conversion to surgical anesthesia*, n (%)	19/21 (90.5)	30/31 (96.8)	0.558

*Among participants requiring cesarean delivery.

All outcomes were available for all randomized participants unless otherwise stated.

VNRS = Verbal Numerical Rating Score.

Feasibility of maintaining maternal systolic blood pressure ≥90% of baseline during elective cesarean delivery under spinal anesthesia and association with neonatal outcomes: a retrospective cohort study

Submission ID

184

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INTRODUCTION

Spinal anesthesia for elective cesarean delivery (CD) is frequently complicated by maternal hypotension secondary to sympathectomy and aortocaval compression, with clinically important maternal symptoms and potential impairment of uteroplacental perfusion[1]. Current guidance recommends tight systolic blood pressure (SBP) control, targeting SBP ≥90% of an accurately measured pre-spinal baseline[2] and avoiding decreases to <80% of baseline[1]. A recent UK multicentre audit reported SBP ≥90% of baseline in only 9.1% of cases despite routine vasopressor use; however, the baseline SBP definition may have been suboptimal, potentially inflating apparent non-adherence[3]. Accordingly, the feasibility of maintaining SBP within 10% of baseline in routine practice remains uncertain. This retrospective cohort study quantified adherence to guideline-consistent SBP targets during elective CD using documented preoperative SBP as baseline and examined associations between SBP control and neonatal outcomes.

METHODS

Consecutive ASA II–III patients undergoing elective term (≥37 weeks) CD under single-shot spinal or combined spinal–epidural anesthesia were included. Exclusions were urgent/emergent delivery, conversion to general anesthesia before delivery, multiple gestation, major fetal/placental pathology requiring nonstandard hemodynamic management, significant maternal cardiac disease, hypertensive disorders of pregnancy, clinically significant arrhythmia/autonomic dysfunction, major hemorrhage prior to delivery, or incomplete hemodynamic data. Cases were identified from scheduling records linked to electronic medical records. The primary outcome was guideline adherence, defined as all recorded SBP values from neuraxial injection to neonatal delivery remaining ≥90% of

baseline (baseline defined a priori as documented preoperative SBP). Secondary outcomes included hypotension severity (SBP 80–<90% and <80% of baseline), episode frequency/duration (min), and vasopressor use. Neonatal outcomes included umbilical arterial gases (pH, base excess), fetal acidemia (pH <7.20), Apgar scores, and unanticipated NICU admission. Research ethics approval was obtained.

RESULTS

Of 270 eligible cases, 1 was excluded for missing baseline SBP; 269 were analyzed. Guideline adherence occurred in 103/269 (38.3%; 95% CI 32.7–44.2). Any hypotension (any SBP <90% of baseline) occurred in 166/269 (61.7%), including SBP 80–<90% in 149/269 (55.4%) and SBP <80% in 84/269 (31.2%). The median proportion of intraoperative readings ≥90% of baseline was 90.3% (IQR 68.2–100.0). Among hypotension cases (n=166), mean (SD) time spent with SBP <90%, 80–<90%, and <80% of baseline was 5.5 (5.0), 4.1 (4.6), and 1.3 (2.1) minutes, respectively. Neonatal outcomes were similar between hypotension and no-hypotension groups, including umbilical arterial pH (7.27 [7.24–7.30] vs 7.28 [7.24–7.30], p=0.666), base excess (3.00 [1.00–4.00] vs 3.00 [2.00–4.00], p=0.665), 1-min Apgar (9 [8–9] vs 9 [9–9], p=0.155), 5-min Apgar (9 [9–9] in both, p=0.597), and unanticipated NICU admission. Vasopressor infusion use was recorded in 97.4% of cases.

DISCUSSION

In elective CD, maintaining SBP ≥90% of baseline throughout the pre-delivery period was difficult to achieve despite prophylactic vasopressor use, and may not accurately reflect clinically meaningful hemodynamic compromise. Similar neonatal outcomes despite frequent SBP deviations may suggest that the hemodynamic exposure most relevant to fetal well-being may be the burden of hypotension, particularly its depth and cumulative duration, rather than isolated transient deviations. Future research should emphasize time- and severity-based hypotension metrics and evaluate interventions designed to reduce cumulative hypotension exposure.

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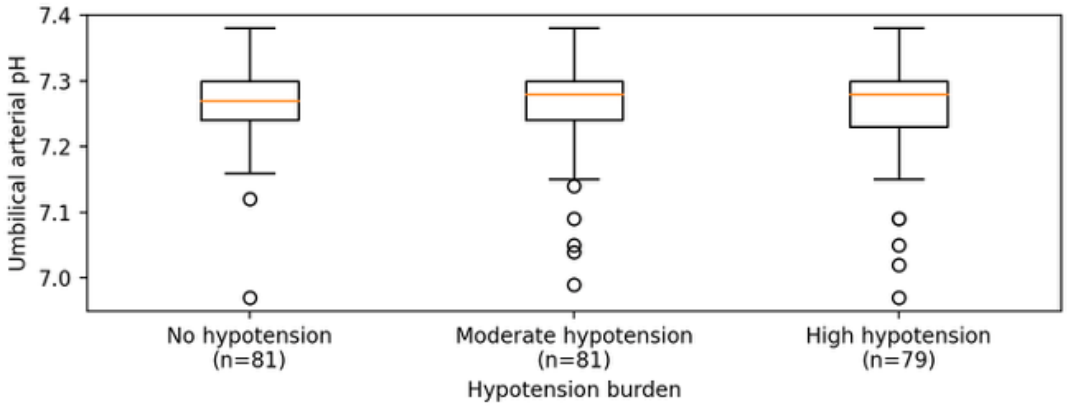
Figure 1. Neonatal umbilical pH and intraoperative hypotension burden.



Hypotension burden categories were defined using tertiles of the percentage of observed intraoperative Systolic Blood Pressure (SBP) readings <90% of baseline from time of spinal to time of neonate delivery. No hypotension = 0% events; Moderate hypotension = >0% to 22.2% events; High hypotension = >22.2% events.

Intrathecal dexmedetomidine in a parturient with severe allergy to opioids undergoing elective C-Section: A case report

Submission ID

90

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INTRODUCTION

Cesarean section (CS) is the most commonly performed surgical procedure worldwide, accounting for approximately one in five births. This proportion is expected to continue rising, reaching nearly 30% of all deliveries by 2030.

The severity of pain during the first postoperative day is associated with an increased risk of developing chronic pain. Furthermore, a retrospective study reported that among 5,000 CS procedures performed in a single year, 14.6% of patients required supplemental analgesia and/or anesthesia. Consequently, providing adequate anesthesia and postoperative analgesia remains challenging in patients with contraindications to intrathecal opioids.

Intrathecal dexmedetomidine is an accepted off-label adjuvant. Its mechanism of action involves α_2-adrenergic receptors in the dorsal horn of the spinal cord, reducing primary afferent neurotransmission and inducing hyperpolarization of spinal interneurons through G-protein–mediated potassium channels.

This case report describes the successful use of intrathecal dexmedetomidine in a patient with a severe opioid allergy undergoing elective CS.

CASE PRESENTATION

A 35-year-old patient was evaluated in the preadmission clinic for a repeat CS at 28 weeks of gestation. She was gravida 3, para 1, with one prior vaginal delivery and one previous CS. The patient was otherwise healthy, with no comorbidities and an uncomplicated pregnancy.

In 2017, following a colonoscopy complicated by an anaphylactic reaction, the patient underwent allergy testing. She also reported a severe allergic reaction during her previous CS in 2015. Allergy testing confirmed severe hypersensitivity to morphine, fentanyl, and meperidine. After extensive discussion, the patient expressed a preference for neuraxial anesthesia.

On the day of surgery, spinal anesthesia was performed using 1.8 mL (13.5 mg) of 0.75% hyperbaric bupivacaine combined with 7.5 µg of dexmedetomidine. The spinal was placed at 8:20 a.m., achieving a T2 sensory level by 8:25 a.m. The CS was uneventful, with an estimated blood loss of 400 mL and administration of 1.1 L of lactated Ringer's solution. Intraoperatively, the patient received ondansetron 4 mg, dexamethasone 6 mg, ketorolac 15 mg, and magnesium sulfate 2 g intravenously.

The patient arrived in the PACU at 9:45 a.m. Sensory block regressed to T8 by 11:00 a.m., at which time bilateral transversus abdominis plane blocks were performed using 30 mL of 0.25% ropivacaine per side. Full motor recovery occurred by 1:00 p.m.

At 24-hour follow-up, pain was reported as tolerable (4/10 at rest and 5/10 with movement). No opioid PCA was required, and no neurological complications were observed.

CONCLUSION

Based on prior evidence from Lee et al. (2020) and Zhang et al. (2022), spinal anesthesia with intrathecal dexmedetomidine was selected to prolong block duration and enhance analgesia. In this case, the patient achieved effective anesthesia and acceptable postoperative pain control without neurological sequelae at 24 hours.

Although intrathecal dexmedetomidine remains an off-label use, existing studies demonstrate reduced onset time, improved analgesia, and favorable neurological safety profiles. Further prospective data are needed to better define the safety and optimal use of this technique.

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Management of accidentally disconnected labour epidural catheters: a Canadian modified-delphi consensus study

Submission ID

80

AUTHORS

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INTRODUCTION

Accidental disconnection of labour epidural catheters presents a common yet challenging clinical dilemma in obstetric anesthesia. Clinicians must balance the pragmatic option of reconnecting the catheter, particularly in situations where replacement may be difficult, against the potential risk of neuraxial infection. In the absence of robust evidence to guide practice, significant variability exists in clinical management.[1,2] The purpose of this study was to develop consensus-based best-practice recommendations for the management of accidentally disconnected labour epidural catheters.

METHODS

After institutional ethics committee approval and participant consent, a national panel of Canadian obstetric anesthesiologists from major academic centers representing a broad geographic distribution across multiple provinces was assembled, comprising experts with obstetric anesthesia fellowship training and/or substantial clinical experience in obstetric anesthesia (>10 years). A literature review was first performed to generate candidate statements.[1-5] These pre-specified items were then iteratively refined across successive Delphi rounds. In Round 1, panelists anonymously rated key clinical considerations and

procedural approaches using a combination of open-ended and structured questions. Based on these responses, existing statements were refined and new ones generated, which were circulated for rating in Round 2. Consensus was defined a priori as ≥70% agreement or disagreement. A third round is currently ongoing to assess stability of responses.

RESULTS

Eighteen experts representing seven Canadian provinces participated in Rounds 1 and 2, after which consensus was achieved for 11 of the 18 statements (Table). Experts agreed that reconnection is acceptable following a witnessed disconnection; their decision to reconnect is influenced by the urgency to proceed with cesarean delivery, and soiled bedding favors replacement. Location of the disconnection was important: for disconnections occurring at the adapter, consensus supported disinfection (at least 10 cm) and cutting of the exposed end of a catheter (at least 5 cm from the tip or at the first window for wired catheters); for disconnections between the filter and the adapter, replacement of these parts was deemed sufficient. Experts agreed that in-hospital follow-up should occur daily for signs of infection until discharge. Consensus was not achieved regarding the optimal disinfection solution, duration of post-discharge follow-up, or other specific clinical factors influencing the decision to reconnect.

DISCUSSION

These practice recommendations for the management of accidentally disconnected labour epidural catheters will help standardize practice and support the development of a clinical protocol. Areas requiring future research are necessary where consensus could not be achieved.

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Round 2 Results: Management of Accidentally Disconnected Labour Epidural Catheters (n = 18)

Domain	*Statement*	*Agree n (%)*	*Disagree n (%)*	*Consensus Achieved*
Disconnection	**Replace filter/adapter/pump tubing if distal to filter**	**16 (89)**	**2 (11)**	**YES**
	Disinfect + cut catheter if proximal to filter/adapter	**15 (83)**	**3 (17)**	**YES**
Clinical	**Imminent cesarean delivery influences reconnection**	**17 (94)**	**1 (6)**	**YES**
	Do not reconnect if bedding visibly soiled	**17 (94)**	**1 (6)**	**YES**
	Reconnect if fully dilated and no time to replace	12 (67)	6 (33)	NO
	Reconnect if unwitnessed disconnection with adequate block	6 (33)	12 (67)	NO
Cutting	**Cut spring catheter at first window**	**14 (78)**	**4 (22)**	**YES**
	Cut catheter >5 cm from exposed tip	**15 (83)**	**3 (17)**	**YES**
	Do not cut catheter prior to reconnection	**2 (11)**	**16 (89)**	**YES**
	Cut catheter ≤5 cm from exposed tip	**2 (11)**	**16 (89)**	**YES**
Disinfection	**Disinfect ≥5 cm beyond anticipated cut**	**13 (72)**	**5 (28)**	**YES**
	Disinfect only to anticipated cut location	**3 (17)**	**15 (83)**	**YES**
Cleaning Solution	Isopropyl alcohol	11 (61)	7 (39)	NO
	Chlorhexidine 0.5% in alcohol	9 (50)	9 (50)	NO
	Chlorhexidine 2% in alcohol	12 (67)	7 (33)	NO
Follow-up	Post-discharge follow-up up to 2 weeks	7 (39)	11 (61)	NO
	Daily inpatient follow-up until discharge	**16 (89)**	**2 (11)**	**YES**

Consensus defined as ≥70% agreement or disagreement.

Figure 1

Neuraxial anesthesia and management of post-partum hemorrhage in a patient with very long chain acyl-coa dehydrogenase deficiency undergoing elective caesarean section

Submission ID

17

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INTRODUCTION

Very long-chain acyl coenzyme-A dehydrogenase (VLCAD) deficiency is an autosomal recessive disorder resulting in impaired metabolization of long chain fatty acids. Clinical severity depends on degree of residual enzyme activity, ranging from infantile cardiomyopathy and multiorgan failure to a later-onset myopathic phenotype characterized by intermittent, unexplained rhabdomyolysis.[1] Metabolic decompensation occurs with prolonged fasting or catabolic states including the peripartum and perioperative periods.[1-4] As glucose stores are depleted, fatty acids are mobilized but incompletely metabolized resulting in accumulation of toxic metabolites.[1] Thus, early glucose supplementation is a perioperative mainstay. Pharmacologically, IV lipids (propofol, etomidate) and lactated ringers are contraindicated. Succinylcholine is avoided for increases in creatine kinase (CK).[5] Volatile anesthetics are safe presuming an adequate supply of carbohydrates.[5] Despite attention to these considerations, outcomes in obstetrics are mixed,[2-3] and there are no reports of post-partum hemorrhage (PPH) management. We present a 26-year-old with VLCAD deficiency undergoing elective caesarean section.

CASE PRESENTATION

A 26-year-old G1P1 with a history of VLCAD deficiency presented for elective caesarean section at 38w+2d gestational age. She was diagnosed in her twenties following episodes of recurrent unexplained rhabdomyolysis and managed with oral levocarnitine. Caesarean section was recommended in light of previous caesarean delivery and VLCAD deficiency. Her pregnancy was notable for an LGA fetus (90-95th percentile) but otherwise uncomplicated. A comprehensive pre-operative metabolic panel was performed and reviewed by Metabolic Genetics, which included a baseline CK of 136 U/L and hemoglobin of 111 g/L. 150mL/hr IV D10-NS with 20mmol of KCl was started pre-operatively and continued intraoperatively. Baseline vital signs were BP 119/63, HR 87, SpO2 98%. Spinal anesthesia was administered with 1.6mL of 0.75% hyperbaric bupivacaine, 10mcg of fentanyl, and

100mcg of preservative free morphine. Concurrently a titrated phenylephrine infusion was started at 0.4mcg/kg/min, supplemented immediately after spinal placement with phenylephrine and ephedrine boluses to maintain baseline blood pressure. Following delivery and administration of 50mcg IV carbetocin, she did suffer a PPH with an EBL of 1.5L. This was managed with another 50mcg of carbetocin, 2g IV TXA, 0.25mg IM ergonovine, intrauterine carboprost 0.2 mg, and B-lynch sutures. A total of approximately 500mL Plasma-lyte was given intraoperatively. Despite hemodynamic stability throughout this episode, CK increased postoperatively (310). The patient did not experience metabolic decompensation, and her CK normalized by post-operative day 3 (CK 77).

CONCLUSION

Perioperative and peripartum goals for patients with VLCAD deficiency include avoidance of prolonged fasting, awareness of pharmacologic limitations, and early involvement of the multidisciplinary team, including Metabolic Genetics. Early IV glucose attenuates catabolism. PPH management is previously unreported, though theoretically hemorrhage physiology could trigger metabolic decompensation. This may explain the slight CK elevation, though we report safe utilization of uterotonics. The preferred anesthetic technique (general versus regional/neuraxial) is debated. Neuraxial anesthesia decreases sympathetic catabolism, whereas general anesthesia may protect against stress and anxiety induced catabolism.[5] We report the successful use of neuraxial anesthesia in the obstetric population.

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Predictors of delayed urinary catheter removal following enhanced recovery after cesarean delivery: a retrospective cohort study

Submission ID

47

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INTRODUCTION

Enhanced Recovery After Cesarean (ERAC) pathways endorse early postoperative urinary catheter removal to promote mobilization and reduce catheter-associated urinary tract infection (CAUTI).[1-3] The Society of Obstetric Anesthesia and Perinatology (SOAP) ERAC consensus specifically recommends removing the catheter within 6–12 hours postpartum in uncomplicated cesarean deliveries.[3] While the Enhanced Recovery Canada (ERC) pathway likewise encourages early removal, it notes ongoing uncertainty regarding the absolute optimal duration.[4] At our institution, early catheter removal is a key ERAC process measure linked to superior recovery outcomes and improved patient satisfaction. Nevertheless, recent local audit data reveal a significant implementation gap: approximately 30–40% of patients are discharged from the post-anesthesia care unit (PACU) with a catheter in situ. Prolonged catheterization may delay ambulation, increase CAUTI risk, and impair patient experience. Our study aims to identify clinical and process-of-care factors associated with delayed urinary catheter removal after cesarean delivery within our ERAC program.

METHODS

This retrospective cohort study was approved by the institutional research ethics board. All cesarean deliveries over a 12-month period at a high-volume tertiary obstetric centre with an established ERAC pathway were screened. Patients aged 18–49 years with BMI 18.5–50 $kg{\cdot}m^{-2}$ undergoing elective, urgent, or emergent cesarean under neuraxial or general anesthesia were included. Exclusion criteria included underlying renal or bladder pathology, pre-existing neurological deficits, bladder or bowel injury, postpartum hemorrhage, surgical duration >3 hours, or other clinical indications for prolonged catheterization. Data were abstracted from electronic records on demographics, cesarean urgency, anesthetic technique, neuraxial local anesthetic and opioid doses, intraoperative fluid volume, vasopressor and oxytocin use, surgical time, PACU motor block (Bromage 0–3) and sensory

levels. Catheter insertion time was defined as the start of anesthesia; removal time and any instances of recatheterization were obtained from nursing documentation. The primary outcome was delayed catheter removal, defined a priori as duration >360 minutes or the need for recatheterization. Univariate and multivariable logistic regression were used to identify independent predictors, with covariates selected based on clinical relevance and $p<0.10$ on univariable analysis.

RESULTS

Of 391 patients screened, 337 met inclusion criteria. Delayed catheter removal occurred in 151/337 patients (44.8%). Baseline age, BMI, gestational age, and cesarean urgency did not differ between groups. Delayed removal was associated with spinal (vs epidural) anesthesia, denser PACU motor block, ward (vs PACU) catheter removal, higher intraoperative fluid volumes, longer times to motor block assessment and complete motor recovery. In the final multivariable model, independent predictors of delay were PACU motor block, catheter removal setting, intraoperative fluid volume, time to motor block assessment, and time to Bromage 0. Compared with complete motor block, partial recovery (Bromage 1–2) was associated with lower odds of delay (OR 0.20 [95% CI 0.08–0.51] and 0.44 [0.20–0.95], respectively). Catheter removal in PACU markedly reduced delay (OR 0.13 [0.05–0.33]). Each 1200-mL increase in fluids tripled the odds of delay (OR 3.12 [1.53–6.35]); longer times to motor assessment and full recovery also increased risk.

DISCUSSION

Despite an established ERAC pathway, nearly half of cesarean patients experienced delayed urinary catheter removal. Our findings highlight modifiable perioperative factors including intraoperative fluid administration, timing of motor block assessment, residual PACU motor block, and the location of catheter removal that strongly influence catheter duration. Process-of-care changes, such as formalizing PACU-based catheter removal protocols, standardizing Bromage-guided assessments, and promoting fluid stewardship may enhance adherence to ERAC, SOAP ERAC, and ERC recommendations,[1–4] reduce CAUTI risk and improve early mobilization. These data support targeting motor recovery and workflow factors, rather than patient demographics, when designing patient-safety interventions for post-cesarean urinary catheter management.

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Proteomic investigation of myometrium from pregnant women with class III obesity

Submission ID

83

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INTRODUCTION

Maternal obesity, an escalating global health burden, affects nearly one in five pregnancies in North America and is associated with higher rates of cesarean delivery (CD) and postpartum hemorrhage (PPH).[1] Up to 80% of PPH cases result from inadequate myometrial contractility, classified clinically as uterine atony. Class III obesity (BMI≥40 kg/m^2) confers a particularly elevated risk of PPH.[2] In obese patients, the molecular basis of poor myometrial contractility is not well understood, while it is clearly driven by metabolic and cell signaling abnormalities. The aim of this study was to examine the molecular origin of obesity-associated myometrial dysfunction. We hypothesized that women with class III obesity would exhibit obesity-associated proteomic remodeling of the myometrium that impairs calcium handling and cellular energetics, resulting in reduced uterine contractile capacity.

METHODS

Myometrial biopsies were obtained from term pregnant non-laboring women undergoing elective CD after REB approval: 1) control: BMI<30 kg/m2 (n=8) and 2) patients with class III obesity (n=8). Samples were snap frozen in liquid nitrogen and total protein was extracted using hydrophilic interaction liquid chromatography magnetic bead-based method, followed by data-independent acquisition mass spectrometry. Data was analyzed with Spectronaut using DirectDIA for peptide and protein identification against the Homo sapiens UniProt database. Differential expression analysis was performed using a two-sample t-test with Benjamini–Hochberg correction (adj. $p < 0.05$, $|\log_2 FC| \geq 0.58$).

RESULTS

A total of 5,795 proteins were identified, of which 780 were differentially expressed between the class III obesity and control groups (527 upregulated, 253 downregulated). Gene ontology analysis revealed significant alterations in pathways governing myometrial contractility. CaMKK2, a key regulator of calcium signaling and energy homeostasis, was downregulated in the obesity group, while SERCA2/3, crucial for calcium reuptake and relaxation, were upregulated. Class III obesity also resulted in altered expression of mitochondrial enzymes (SDHC, NDUFA5), extracellular (COL4A1), cytoskeletal protein (CNN3), and inflammatory mediators (S100A8/Calgranulin, neutrophil elastase), indicating that obesity alters multiple molecular pathways contributing to impaired myometrial contractility (Fig 1).

DISCUSSION

This study provides the first comprehensive proteomic characterization of the myometrium in women with class III obesity. Our results indicate that obesity alters multiple molecular pathways contributing to impaired myometrial contractility. These characteristics may facilitate the development of new uterotonic drugs to enhance myometrial contractility and mitigate the risk of CD and PPH in this high-risk population.

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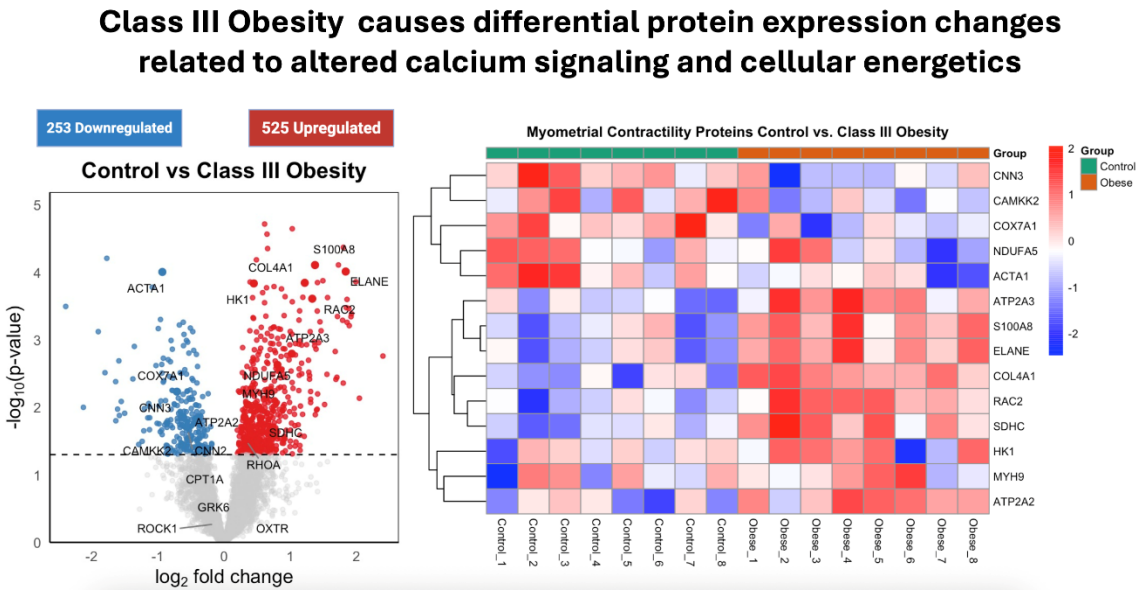

Figure 1

Somatostatin and somatostatin receptor type 2: a novel regulator of myometrial contractility

Submission ID

234

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INTRODUCTION

Myometrial contractility is essential for postpartum haemostasis, and dysfunction contributes to postpartum haemorrhage (PPH), the leading cause of maternal death worldwide. Despite widespread use of uterotonics, options remain limited in resistant cases of uterine atony, highlighting the need for new therapeutic strategies. Peptide hormone somatostatin and its receptor subtype 2 (SSTR2) have been shown to regulate contractility in inflamed pig myometrium, but their role in human pregnancy is unknown.[1] The objective of this study was to determine whether somatostatin regulates contractility of term pregnant human myometrium. We hypothesized that somatostatin promotes myometrial contractility via SSTR2 in pregnant myometrium and that inflammation enhances this response by increasing SSTR2 expression.

METHODS

After REB approval and informed patient consent, myometrial biopsies were obtained from term non-labouring women undergoing elective cesarean delivery (CD) (n=22) and dissected into multiple strips. Tissue strips (3 per patient) were then incubated for 24 hours in MOPS solution with interleukin-1α (IL-1α, 100 ng/mL) to model inflammation or without IL-1α (Control). *Ex vivo* organ bath experiments were performed to assess dose-response effects of somatostatin-14 (10^{-10}-10^{-6} M) with the following comparison groups: (1) Control without somatostatin, (2) Control with somatostatin, and (3) Inflamed with somatostatin. The primary outcome of contractility was motility index (frequency × amplitude), and the area under the curve (AUC) was analyzed as a secondary endpoint, both using mixed-effects models. Expression and localization of SSTR2 were assessed by RT-qPCR (n=6) and immunohistochemistry (n=4). Inflammatory markers were quantified by ELISA (n=5).

RESULTS

IL-1α treatment induced a robust inflammatory response compared with control without somatostatin, as confirmed by increased protein secretion of pro-inflammatory cytokines IL-6, IL-8, and CCL2 (2-3-fold increase for all, $p<0.01$). Interestingly, somatostatin-14 significantly ($p<0.01$) increased the motility index by 80–90% in both control and IL-1α-treated myometrial tissues compared with control tissue without somatostatin. Preliminary RT-qPCR analysis demonstrated a significant increase in SSTR2 expression in IL-1α-treated myometrial tissue compared with controls (~5-fold, $p<0.01$), with immunohistochemistry supporting receptor localization within the myometrium.

DISCUSSION

These findings identify the somatostatin–SSTR2 axis as a previously unrecognized regulator of contractility in term pregnant human myometrium. The potential implications of these results include the use of somatostatins during CD and in inflamed states, such as labour, to improve myometrial contractility. This pathway represents a novel therapeutic target for improving uterine tone in inflammatory states and informs the development of adjunctive strategies for PPH.

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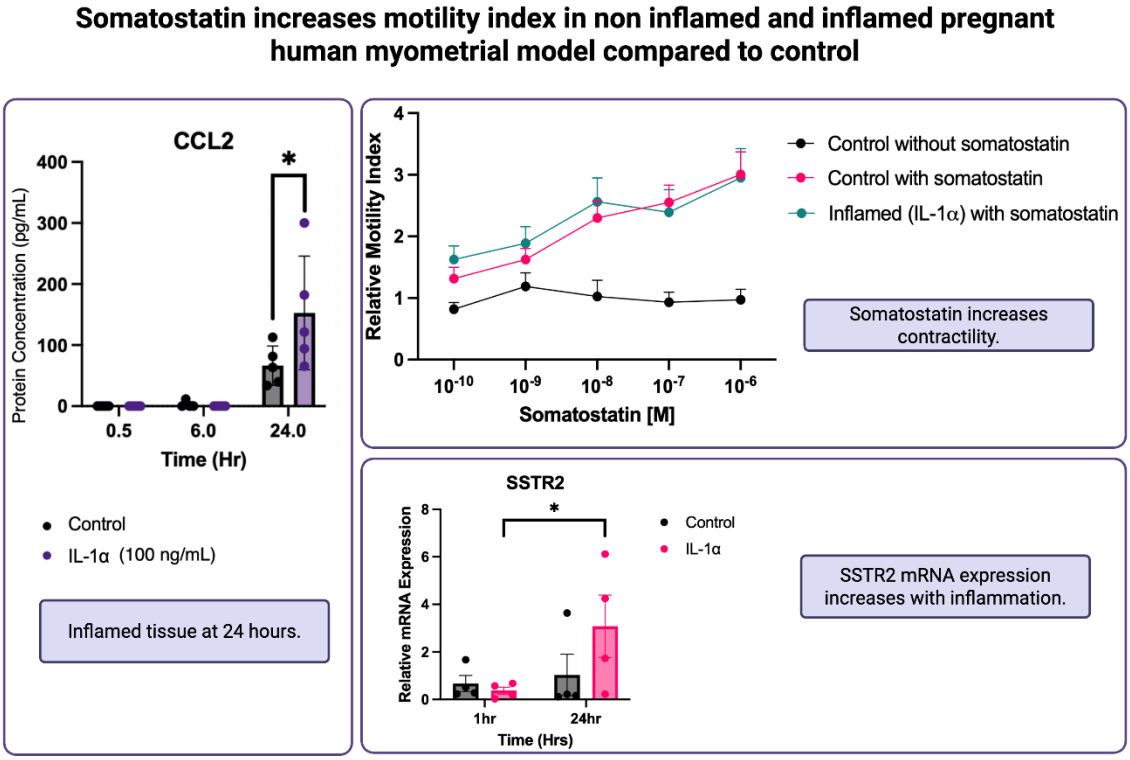

Figure 1

The effect of tranexamic acid rate of administration on maternal blood pressure: a prospective, randomized, double-blind, non-inferiority trial

Submission ID

97

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INTRODUCTION

Tranexamic acid (TXA) is widely used to reduce obstetric blood loss, yet the optimal rate of intravenous (IV) administration remains uncertain. Although the U.S. Food and Drug Administration[1] and Canadian Product Monograph[2] both recommend infusion of TXA 1g IV over 10 min (no faster than 100 mg/min) to avoid hypotension, major clinical trials and contemporary practice have employed faster administration without clear evidence of harm[3]. There is a paucity of data directly comparing different administration rates and their impact on maternal hemodynamics. We designed a randomized, double-blind, non-inferiority trial comparing effects of fast versus slow IV TXA administration on maternal blood pressure and side effects in women undergoing elective cesarean delivery (CD) under spinal anesthesia.

METHODS

After ethics committee and Health Canada approval, and informed consent, 110 healthy women undergoing elective CD were randomized to receive TXA 1 g IV over 1 min (fast) or 10 min (slow) preoperatively using a double-dummy design with matched placebo infusions. Noninvasive blood pressure was recorded at baseline, then every minute for 15 mins after TXA administration, and every 5 mins thereafter intraoperatively. Nausea, vomiting and neurological symptoms were assessed every 5 min for 15 min, then every 15 min until discharge from the post-anesthetic recovery unit. All patients received a standardized spinal anesthetic and phenylephrine infusion. The primary outcome was the maximum percent change in systolic blood pressure (SBP) from baseline within 15 min post-TXA

administration, analyzed by mixed-effects linear regression with a non-inferiority margin of 10%. Secondary outcomes included incidence of hypotension (≥20% drop from baseline), median time to hypotension and nausea, side effects (nausea, vomiting, headache, dizziness and photophobia), and neonatal outcomes (Apgar scores at 1 and 5 min, arterial cord gases, seizures and unanticipated NICU admission rate).

RESULTS

Mean maximum percent SBP decrease was similar between groups (fast 10.31% vs slow 10.33%; p=0.98; 95% CI −2.47 to 2.42). Non-inferiority was met, with the upper 97.5% CI below the 10% margin in both unadjusted (2.42) and adjusted (2.19) models. Incidence of hypotension was low with no difference between groups (7.1% vs. 5.6%, p=1.00). The median time to first hypotension post-TXA administration was similar (10.0 min vs. 9.0 min). Incidence of other side effects were similar: nausea (26.8% vs 27.8%; p=1.00), vomiting (1.8% vs 3.7%; p=0.61), dizziness (16.1% vs 11.1%; p=0.58), photophobia (12.5% vs 9.3%; p=0.76), and headache (3.6% vs 13.0%; p=0.09). Among participants who developed nausea, median time to first nausea post-TXA administration occurred significantly earlier in the fast group (5 min vs 10 min; p=0.004). No differences were observed in neonatal outcomes (Apgar scores, umbilical arterial pH, base deficit, unanticipated NICU admissions). No neonatal seizures were observed.

DISCUSSION

In healthy women undergoing elective CD under spinal anesthesia, rapid IV administration of 1g TXA over 1 min was non-inferior to slow infusion over 10 min with respect to the maximum decrease in SBP within 15 min of dosing. Nausea occurred significantly earlier following rapid administration; however, overall incidence was similar between groups. This suggests that whether nausea occurs is related to overall TXA exposure, while the rate of administration, through its effect on peak timing of TXA concentration, influences when nausea occurs. Administration of TXA before delivery was not associated with adverse neonatal outcomes at birth.

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