

Guidelines for postoperative care in cesarean delivery: Enhanced Recovery After Surgery Society recommendations (part 3)—2025 update



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Enhanced Recovery After Cesarean Delivery (ERAC) protocols include evidence-based interventions designed to improve maternal and neonatal outcomes and patient experiences while reducing healthcare-related costs. This is the first update to the Enhanced Recovery After Surgery Society guidelines for postoperative care in cesarean delivery published in 2019. Interventions were selected based on expert consensus. An updated literature search was performed in September 2024 using Embase, PubMed, MEDLINE, EBSCO CINAHL, Scopus, and Web of Science databases. Targeted searches were performed by a medical librarian to identify relevant articles published since the 2019 Enhanced Recovery After Surgery Society guidelines publication, which evaluated each postoperative Enhanced Recovery After Cesarean Delivery intervention, focusing on randomized clinical trials and large observational studies (≥ 800 patients) to maximize search feasibility and relevance. After a review of the evidence, a consensus was reached regarding the quality of evidence and the strength of recommendation for each proposed intervention according to the Grading of Recommendations, Assessment, Development, and Evaluation system. The 13 recommended Enhanced Recovery After Cesarean Delivery interventions were (1) early drinking and feeding (low evidence, strong recommendation), (2) early discontinuation of intravenous fluid (very low evidence, strong recommendation), (3) early mobilization and ambulation (low evidence, strong recommendation), (4) early removal of urinary catheter (low evidence, strong recommendation), (5) scheduled acetaminophen (moderate evidence, strong recommendation), (6) scheduled nonsteroidal anti-inflammatory drugs (high evidence, strong recommendation), (7) oral rescue opioids (low evidence, strong recommendation), (8) standardized rescue medication protocol for side effects (low to moderate evidence, strong recommendation), (9) venous thromboembolism prophylaxis (low evidence, strong recommendation), (10) anemia remediation (moderate evidence, strong recommendation), (11) breastfeeding support and education (low evidence, strong recommendation), (12) promotion of rest periods (low evidence, strong recommendation), and (13) facilitate patient-centered transition to discharge (low evidence, strong recommendation). The 13 recommended postoperative interventions should be considered in the absence of contraindications in patients undergoing cesarean delivery to optimize maternal recovery and outcomes.

Key words: cesarean delivery, postnatal care, postoperative care, postpartum care, protocol adherence, quality, safety, scheduled, unscheduled

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Introduction

Enhanced Recovery After Cesarean Delivery (ERAC) was first described in 2013. In addition, ERAC has since been widely adopted globally.¹ ERAC aims to reduce variability in practice through the implementation of evidence-based interventions designed to improve patient experience and maternal and neonatal outcomes while reducing healthcare-related costs.^{2,3}

Cesarean delivery is now the most performed inpatient operation worldwide, accounting for 20% of all deliveries.⁴ The successful implementation of the ERAC guidelines can improve the outcomes of large numbers of patients. The postpartum period, or the fourth trimester of pregnancy, has gained much attention,^{5,6} as most maternal deaths in the United States and other high-income settings, such as the United Kingdom, occur during this period and many of these deaths are potentially preventable.^{7,8}

The Enhanced Recovery After Surgery (ERAS) Society guidelines for postoperative care in cesarean delivery presented in this article provide best practice recommendations for the postoperative phase. A recent initiative led by the American Society of Anesthesiologists (ASA) included representatives from multidisciplinary professional society stakeholders across the United States (American College of Obstetricians and Gynecologists [ACOG], Society for Maternal-Fetal Medicine, Society of Obstetrician/Gynecologist Hospitalists, ERAS Society, ASA, Society for Obstetric Anesthesia and Perinatology [SOAP], American Association of Nurse Anesthesiology, and Association of Women's Health, Obstetric and Neonatal Nurses) and patient representatives.⁹ This resulted in recommendations surrounding 13 ERAC interventions in the postoperative phase, which form the basis of this guideline update.

The focus of this document is to provide an up-to-date summary of the evidence supporting the 13 postoperative recommendations. This is the first update to the ERAS Society guidelines published in 2019.¹⁰

Materials and methods

Guideline methodology and literature search

The guideline update proposal was approved by the ERAS Society Guideline Committee in September 2024. The author group was based on international expertise in the area, and the guideline methodology endorsed by the ERAS Society was followed.¹¹ A consensus ERAS cesarean delivery postoperative topic list was determined.⁹ After the topics were agreed upon, they were allocated among the group according to expertise. The literature search (January 2017 to September 2024) used Embase, PubMed, MEDLINE, EBSCO CINAHL, Scopus, and Web of Science databases to search controlled vocabulary (medical subject headings) and key words that included "Cesarean Section," "Cesarean Delivery," "Cesarean Section Delivery," and all postoperative ERAS items, focusing on randomized clinical trials and large observational studies (≥ 800 patients) to maximize search feasibility and relevance. The reference lists of all eligible articles were cross-checked for other relevant studies.

Quality assessment and data analyses

The quality of evidence and recommendations were evaluated according to the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system,¹² as used and described in previous ERAS guidelines (Table 1). Briefly, the following recommendations are given: Strong recommendations indicate that the panel is confident that the desirable effects of adherence to a recommendation outweigh the undesirable effects. Weak recommendations indicate that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects, but the panel is less confident.

Recommendations are based not only on the quality of evidence (high, moderate, low, and very low) but also on the balance between desirable and undesirable effects. In some cases, strong recommendations may be reached from low-quality data and vice versa, as determined using the GRADE

methodology (Table 1). The core ERAS cesarean delivery team (P.S., G.N., A.C., D.W., and G.M.) reviewed the evidence in detail for each section and assigned both the quality of evidence and strength of recommendation. Discrepancies were resolved by the leading and senior authors.

Results

The recommended postoperative inpatient interventions after cesarean delivery are summarized in Table 2, along with the quality of evidence and strengths of the recommendations. The following recommendations should be considered for all patients undergoing cesarean delivery. However, the recommendations should only be implemented if appropriate for a particular individual, after risk-vs-benefit analysis and needs assessment by the healthcare team. Deviations from the recommendations below should not be regarded as deviations from standard medical practice or as evidence of malpractice, particularly given the low quality of data available in this field.

A summary of the evidence supporting each recommended intervention is provided below.

Early drinking and feeding

Enhancing the recovery of patients who need to care for a neonate while recovering from laparotomy has been the focus of attention for many clinicians worldwide. However, there has been little well-conducted research in this area, and although most clinicians believe that it is worthwhile, there are multiple aspects to consider. The introduction of early feeding and drinking may benefit the patient but must be balanced against other issues, such as nausea, vomiting, and postoperative ileus, which could prolong postoperative recovery.

The use of carbohydrate (CHO) drinks before and immediately after surgery has been evaluated. Popivanov et al¹³ found that gastric emptying was not delayed by preoperative CHO drinks, as assessed by ultrasound, suggesting that ileus and gastrointestinal side effects would not increase. This finding is important for early postnatal feeding.

TABLE 1**Summary of Grading of Recommendations, Assessment, Development, and Evaluation system**

Variable	Definition
Rating quality of evidence	
Evidence level	
High quality	Further research is unlikely to change confidence in estimate of effect.
Moderate quality	Further research is likely to have an important effect on confidence in estimate of effect and may change the estimate.
Low quality	Further research is very likely to have an important effect on confidence in estimate of effect and likely to change the estimate.
Very low quality	Any estimate of effect is very uncertain.
Rating strength of recommendations:	
Recommendation strength	
Strong	When desirable effects of intervention clearly outweigh the undesirable effects or clearly do not.
Weak	When trade-offs are less certain: either because of low-quality evidence or because evidence suggests that desirable and undesirable effects are closely balanced.

Sultan. *Enhanced Recovery After Cesarean Delivery postoperative guidelines*. *Am J Obstet Gynecol* 2026.

A well-conducted randomized controlled trial (RCT) by Liu et al¹⁴ found that patients who received early CHO drinks (even as little as 100 mL) after cesarean delivery had less shivering, better patient satisfaction scores, and less hunger and thirst than those who received water only. Although they acknowledged that the clinical importance was difficult to determine given the actual temperature changes observed, there was no ill effect as a consequence of the CHO drink, and the ingestion of a greater volume of CHO drinks could have resulted in a greater effect.

Asmary et al¹⁵ conducted an important trial comparing early feeding with demand-led feeding. There was no difference in the primary outcome of vomiting within 24 hours, although the overall rates were very low. In the secondary outcomes, there were differences in the time to the first meal, first bowel sounds, and second meal. However, the clinical significance of these accelerated outcomes is unclear. Importantly, there seems to be no strong evidence that

meals should be withheld from patients who wish to eat within hours after cesarean delivery.^{3,13–16}

In summary, early ingestion of CHO drinks after cesarean delivery seems to be worthwhile. However, evidence comparing early feeding with a demand-led approach is lacking.

Recommendation

The recommendation is to resume oral diet in the postanesthesia care unit and to consider eating ice chips or water before resuming a light diet.

Quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Discontinuation of intravenous fluids

There is no consensus regarding the timing of discontinuation of intravenous (IV) fluids in the absence of complications. A SOAP consensus statement regarding ERAC states that IV poles present a barrier to mobilization and that it is recommended to discontinue IV

fluids once oxytocin infusion is complete, the patient tolerates oral fluids, and the patient has adequate urine output.¹⁷

Canadian guidelines state that once the patient is tolerating fluids (eg, able to drink and keep fluids down without nausea or vomiting) with adequate urine output and once the uterotonic infusion is complete, the IV fluid can either be removed or saline and heparin locked. In addition, IV fluid discontinuation is a recommended metric for data collection in the Canadian guidelines related to ERAC.¹⁸

In a systematic review and meta-analysis comparing an ERAC group to a control group,^{2,3} early discontinuation of IV fluid was an ERAC intervention in 6 studies.^{19–24} The target time for discontinuing fluids and definitions for start and end points of timings were heterogeneous among these studies. For example, fluids were discontinued at 6 hours,¹⁹ 12 hours if tolerating 500 mL fluid orally,²⁰ on day 1 at 8:00 AM or when tolerating >600 mL orally,²⁴ and 1 study did not define “early” IV fluid discontinuation.²² ERAC protocols in these studies included removal of IV lines at 24 hours,²¹ day 1,²³ and day 2 after cesarean delivery.²²

Although Rousseau et al²³ included the time to fluid discontinuation as an outcome measure, no study used this metric as a primary outcome measure, and none of the 3 RCTs comparing the ERAC group with the control group used this intervention in their ERAC protocols.^{25–27}

In summary, given the lack of RCTs in this area, inconsistent timing of intervention, and lack of studies reporting this outcome, early discontinuation of IV fluid is currently supported by a very low level of evidence.

Recommendation

The recommendation is to discontinue IV fluids once the patient is hemodynamically stable, tolerating fluids (eg, able to drink and keep fluids down without nausea or vomiting), and having adequate urine output. Once the uterotonic infusion is complete, the IV fluid can either be removed or saline and

TABLE 2

ERAC - a summary of postoperative interventions with GRADE level of evidence and strength of recommendation

Recommended postoperative No.	Intervention	Item	Quality of evidence	Strength of recommendation
1	Early drinking and feeding	Resume oral diet in the postanesthesia care unit. Consider ice chips or water before resuming a light diet.	Low	Strong
2	Early discontinuation of IV fluid	Discontinue IV fluids once the patient is hemodynamically stable, tolerating fluids (eg, able to drink and keep fluids down without nausea and/or vomiting), with adequate urine output, and once the uterotonic infusion is complete. The IV fluids can either be removed or saline and heparin locked. This should be at the discretion of the physician.	Very low	Strong
3	Early mobilization and ambulation	Assess motor function 6 h postoperatively. If adequate return of motor function and in the absence of contraindications, attempt ambulation under supervision. Examples of targets include the following: • 0–8 h: sit on the edge of the bed, transfer from the bed to the chair, and ambulate with the wheelchair as tolerated. • 8–24 h: ambulate as tolerated, walk ≥ 1–2 times in the hall. • 24–48 h: walk ≥ 3–4 times in the hall, aim to be out of bed for ≥ 8 h.	Low	Strong
4	Early removal of urinary catheter	Aim to remove urinary catheter 6–12 h after surgery, after the patient is walking. Exclusions include bleeding, magnesium infusions, and unsteadiness on feet.	Low	Strong
5	Scheduled acetaminophen	Scheduled regular oral acetaminophen, if tolerated during hospital stay and in the absence of contraindications.	Moderate	Strong
6	Scheduled NSAIDs	Scheduled regular oral NSAIDs (eg, ibuprofen), if tolerated during hospital stay and in the absence of contraindications.	High	Strong
7	Rescue opioids (oral preferable to IV opioids and minimize opioid consumption)	As required oral (not IV or scheduled) opioids for breakthrough pain. Limit opioid dose per 24 h (eg, 30 mg oxycodone per day). Administer only if acetaminophen and NSAIDs fail to treat pain.	Low	Strong
8	Standardized rescue medication protocol for side effects	As required IV postoperative nausea and/or vomiting medications (eg, ondansetron) and medications for shivering (eg, meperidine), pruritus (eg, nalbuphine), and respiratory depression (eg, naloxone).	Low-moderate	Strong
9	Venous thromboembolism prophylaxis	Mechanical prophylaxis (eg, compression stockings, pneumatic compression devices) should be used until fully ambulatory in the absence of contraindications. Assess need for pharmacologic therapy if deemed high risk of VTE.	Low	Strong
10	Anemia remediation	Consider transfusion in patients without cardiac disease if Hb level is < 7 g/dL or if symptomatic. Treat iron deficiency anemia with iron supplementation.	Moderate	Strong
11	Breastfeeding support and education	Encourage early skin-to-skin contact and counseling, support, and education about breastfeeding, with the availability of a dedicated lactation nurse/specialist who can comprehensively evaluate practice (latch, hold, and support during breastfeeding).	Low	Strong
12	Promotion of rest periods	Cluster interventions (eg, maternal examination, infant checks, scheduled drug administration, blood draws, and patient-appropriate postoperative monitoring) to optimize patient rest and minimize sleep disturbance.	Low	Strong
13	Facilitate patient-centered transition to discharge	Use maternal and neonatal discharge checklists; coordinate administrative tasks, referrals, tests, paperwork, education, and counseling; and provide standardized discharge instructions in the patient's preferred language.	Low	Strong

Hb, hemoglobin; IV, intravenous; NSAID, nonsteroidal anti-inflammatory drug; VTE, venous thromboembolism.

Sultan. Enhanced Recovery After Cesarean Delivery postoperative guidelines. Am J Obstet Gynecol 2026.

heparin locked. This should be at the discretion of the physician.

Quality of evidence

The quality of evidence is very low.

Strength of recommendation

The strength of recommendation is strong.

Early mobilization

Immobilization, combined with the physiological effects of surgery, can impair gastrointestinal function, lead to deconditioning, and increase the risk of thromboembolism, which is particularly relevant for patients undergoing cesarean delivery.^{28–31} Early mobilization, which can take on several forms of mobility (eg, walking, standing from a chair, or exercising), is strongly recommended after several types of surgery.^{32–35} Based on low to moderate evidence, early mobilization in other types of surgery can reduce complications and hospital length of stay.^{36,37} The inability of a patient to mobilize 6 hours after neuraxial anesthesia because of leg weakness should result in medical review and assessment to exclude neurologic complications, such as vertebral canal hematoma.³⁸

This review identified only 1 study that explored the association between early mobilization and patient outcomes after cesarean delivery.³⁹ The prospective cohort study explored the association between the number of steps taken and complications. The number of steps taken by patients after cesarean delivery in the hospital was associated with a decrease in the number of complications after discharge and demonstrated a trend toward a decrease in the number of complications in the hospital.³⁹ This prospective study did not identify any patient-related factors that accounted for these differences.

Although evidence suggesting that early mobilization improves patient outcomes after cesarean delivery is sparse and of low quality, there is strong evidence suggesting that immobilization is a risk factor for developing thromboembolism postnatally⁴⁰ and after surgery.

In summary, given the increased risk of complications, such as throm-

boembolism, after cesarean delivery,⁴¹ and the moderate evidence for the reduction of such complications,³⁹ early mobilization is recommended.

Recommendation

The recommendation is to assess motor function 6 hours postoperatively. If adequate return of motor function is achieved and in the absence of contraindications, attempt ambulation under supervision. Examples of the targets include the following:

- 0 to 8 hours: sit on the edge of the bed, transfer from the bed to the chair, and ambulate with the wheelchair as tolerated.
- 8 to 24 hours: ambulate as tolerated, and walk ≥ 1 to 2 times in the hall.
- 24 to 48 hours: walk ≥ 3 to 4 times in the hall, and aim to be out of bed for ≥ 8 hours.

Quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Early removal of urinary catheter

Neuraxial analgesia and anesthesia are often followed by placement of a urinary catheter, which can be associated with urinary retention and urinary tract infection. The method of regional anesthesia (spinal or epidural) may influence urinary retention and the timing of catheter removal. Concern has been expressed that early catheter removal may be associated with urinary retention and the need for recatheterization, particularly when associated with longer-acting neuraxial anesthetics, such as intrathecal or epidural morphine. Alekberli et al⁴² published a systematic review that included 5 studies, and although the authors determined that neuraxial anesthesia led to higher rates of urinary retention and longer catheterization times, they were unable to answer the question of whether spinal or epidural anesthesia was associated with differences in urinary catheter-related outcomes. The use of shorter-acting neuraxial opioids, such as fentanyl, can result in shorter times to urinary catheter removal than the use of a

combination of neuraxial morphine and fentanyl. However, undesirable increases in catheterization times after neuraxial morphine administration must be balanced against the superior postoperative analgesia, including reduced opioid consumption and prolonged time to first analgesia request associated with its use.^{17,18,43,44}

Routine protocols for care after cesarean delivery suggest that catheter removal should occur within the first 24 hours. The rationale for this may be related to bladder function after neuraxial anesthesia administration or may be related to the perceived advantage of not having to ambulate to the toilet within the first 24 hours. In many cases, ERAS protocols recommend early removal of the catheter at 6 hours. An RCT conducted in India showed that, in the context of long-acting neuraxial opioids as recommended by SOAP, earlier catheter removal (mean time of removal of 6 ± 1 h vs 23 ± 3 h) after ERAS protocol implementation contributed to increased satisfaction rates and earlier discharge rates.⁴⁵ The end points of early discharge and patient satisfaction may be related to any number of interventions within a specified care bundle, and the removal of a urinary catheter is certainly one of those interventions. Of note, 2 studies, 1 in Nigeria and 1 in Iran, aimed to specifically investigate the early removal of urinary catheters in the absence of long-acting neuraxial opioids. These studies demonstrated benefits of catheter removal at 12 and 6 hours compared with routine catheter removal at 24 hours, including reduced microscopic bacteriuria and time to ambulation.^{46,47}

An RCT from Malaysia randomized 400 patients who underwent spinal anesthesia with fentanyl (no long-acting neuraxial opioid/morphine) to routine catheterization or self-emptying and showed that the surgeries did not lead to more complications and that maternal satisfaction scores were significantly higher in the self-emptying group.⁴⁸ Furthermore, the times to micturition and ambulation were significantly shorter in the self-emptying group. The findings of this study could change

clinical practice. However, further trials are needed, particularly those using contemporary doses of long-lasting opioids.

In summary, in the setting of neuraxial morphine administration, early removal of the urinary catheter at 6 to 12 hours after surgery, after the patient is walking, is likely to result in increased patient satisfaction without negatively affecting bladder function. However, the precise timing of catheter removal in patients undergoing cesarean delivery after neuraxial morphine administration requires further investigation.

Recommendation

The recommendation is to remove the urinary catheter 6 to 12 hours after surgery, after the patient is walking. The exclusion criteria included excessive bleeding, magnesium infusions, and unsteadiness on feet.

Quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Scheduled acetaminophen and nonsteroidal anti-inflammatory drugs with rescue opioids

To improve the quality of postoperative analgesia after cesarean delivery, a care bundle that provides scheduled oral acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs) with the option of rescue oral opioids has been recommended by consensus recommendations from the procedure specific postoperative pain management (PROSPECT) Working Group, ACOG, and SOAP.^{17,43,49} In addition, this approach is supported for the care of adult surgical patients in guidelines produced by the American Pain Society together with partner organizations and the National Institute for Health and Care Excellence.^{50,51} The use of inpatient analgesic self-administration medication systems and processes may empower patients' self-management of their pain and may lead to better patient satisfaction.^{51–53}

There is very limited quality evidence on the efficacy of monotherapy postoperative analgesia after cesarean delivery. There is high-quality evidence,

mainly from a Cochrane review, that combined acetaminophen/ NSAIDs are more effective than their monotherapy counterparts for postoperative analgesia after non-obstetric surgery.⁵⁴ This review of the efficacy of single-dose analgesics for acute postoperative pain across all types of adult surgery included 460 double-blinded RCTs involving approximately 50,000 patients. For at least 50% maximum pain relief over 406 hours, 200 and 400 mg ibuprofen doses had a number needed to treat (NNT) of 2.9 and 2.5, respectively, which was similar to other NSAIDs and cyclooxygenase-2 (COX-2) inhibitors. A combination of 1000 mg acetaminophen and 400 mg ibuprofen showed the best efficacy (NNT of 1.5) and the lowest rates of adverse events. In addition, the combination of acetaminophen 1000 mg/ ibuprofen 400 mg had better efficacy than when the drugs were administered as monotherapy and was better than acetaminophen 1000 mg/opioid combinations.⁵⁴ The mean (or median) times to remedication with analgesia for acetaminophen 1000 mg, ibuprofen 400 mg, and acetaminophen 1000 mg/ibuprofen 400 mg were 4, 6, and 8 hours, respectively.

In patients undergoing hip arthroplasty, fewer patients report severe pain, and postoperative morphine consumption is reduced after treatment with regular scheduled acetaminophen and ibuprofen compared with monotherapy with either agent.^{55,56} A systematic review and meta-analysis that included 22 trials and 13,000 patients concluded that a combination of acetaminophen and NSAIDs was more effective in treating back pain than monotherapy with NSAIDs without increased adverse events.⁵⁷ There is no quality evidence that parenteral acetaminophen and NSAIDs are more effective analgesics than oral preparations or that COX-2 inhibitors are more effective analgesics than NSAIDs.^{51,54,58,59}

In a randomized, double-blind, parallel-group controlled trial, 204 patients undergoing cesarean delivery under spinal anesthesia received rectal suppository diclofenac 100 mg (every 8 hours for 24 hours) plus either IV

acetaminophen (1 g every 6 hours) or tramadol (75 mg every 6 hours) postoperatively. Rescue analgesic consumption was comparable between groups (13% vs 12%; $P=.87$). The pain scores were low in both groups across various time intervals, with satisfactory pain control in both groups. Nausea was significantly greater in the tramadol group than in the acetaminophen group (15% vs 2%, respectively; $P=.001$).⁶⁰ The use of NSAIDs can be used in patients with hypertensive disorders of pregnancy.⁴⁹ A meta-analysis of 22 RCTs demonstrated the analgesic efficacy of NSAIDs in patients undergoing cesarean delivery and reported that, compared with no use of NSAIDs ($n=674$), the use of NSAIDs ($n=639$) reduced 12- and 24-hour pain scores, opioid consumption, drowsiness, and sedation.⁶¹ However, the choice of NSAID and dosing regimen associated with the most favorable analgesia outcomes in the cesarean delivery setting remains unclear.⁶² There is limited evidence to demonstrate that scheduled oral analgesia has a better efficacy than on-demand oral analgesia. However, recent trials have shown a benefit with scheduled dosing of postoperative oral analgesia after cesarean delivery (lower pain scores, better satisfaction, and more breastfeeds) and oral analgesia after vaginal delivery (similar pain scores but better maternal satisfaction and higher breastfeeding rates).^{63,64}

Opioid monotherapy is not superior to acetaminophen/NSAID combination. A meta-analysis of 47 trials, mostly graded as low quality (and including 64% of patients undergoing minor nonobstetrical surgery), concluded that, compared with opioid-free analgesia, regular opioid prescribing did not reduce pain intensity on the first day after discharge but did increase adverse events.⁶⁵ If rescue opioids are required, then they should be used at the lowest effective dose for the shortest duration with medical review recommended if regular use is still required beyond 3 days.⁶⁶ It has been recommended that patients who are using opioid medications should be given a patient information leaflet on how to take opioids safely.^{67,68} The choice of rescue opioid is

contentious, particularly because of concerns about the ultrarapid metabolism of some opioid prodrugs (eg, codeine, tramadol) because of maternal genetic polymorphism in cytochrome P450 metabolism posing a risk to breastfed infants.^{69,70} Current ACOG guidelines state that breastfeeding patients should be counseled about the risk of central nervous system depression in the individual and the breastfed infant.⁴⁹ For breastfeeding patients who have taken rescue opioids, reassurance is provided by a recent large population cohort study that found no association between maternal opioid prescription after delivery and adverse infant outcomes.^{71,72} A trial comparing a weak opioid combination (acetaminophen/codeine) with a strong opioid (oxycodone) for postdischarge analgesia after surgical fixation of bone fracture reported equal analgesic efficacy despite a 6-fold higher opioid dose received in the strong opioid group.⁷³ The dichotomy between weak and strong opioids (based on their efficacy and potency) is contentious concerning their comparative safety and risk of addiction.^{74,75}

In summary, the consensus guidelines from several national organizations and research evidence support a stepwise multimodal approach to analgesia after cesarean delivery, which should include scheduled acetaminophen and NSAIDs with rescue oral opioids. Patients should have access to high-quality postoperative pain management information.

Recommendation

The recommendation is to schedule regular oral acetaminophen if tolerated during hospital stay and in the absence of contraindications.

Quality of evidence

The quality of evidence is moderate.

Strength of recommendation

The strength of recommendation is strong.

Recommendation

The recommendation is to schedule regular oral NSAIDs (eg, ibuprofen) if tolerated during hospital stay and in the absence of contraindications.

Quality of evidence

The quality of evidence is high.

Strength of recommendation

The strength of recommendation is strong.

Recommendation

The recommendation is to administer oral opioids (not IV or scheduled) for breakthrough pain, as required; to limit opioid dose per 24 hours (eg, 30 mg oxycodone per day⁷⁶); and to administer opioids only if acetaminophen and NSAIDs fail to treat pain.

Quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Rescue medication protocol for side effects

Side effects, such as nausea, shivering, and pruritus, are common after all modes of anesthesia for cesarean delivery. The prevalence of these side effects varies according to the definitions and study methodology used but has been reported in up to 80% to 85% of patients undergoing cesarean delivery.^{77–80} Clinically significant respiratory depression following contemporary dosing strategies of long-acting neuraxial opioids (such as intrathecal and epidural morphine) is a rare but serious side effect, affecting approximately 1.5 per 10,000 patients after cesarean delivery.⁸¹

As most studies focus on the prevention of nausea, there are little data to guide the best rescue antiemetic in this context, but a similar array of pharmaceutical options (5HT₃ antagonists, dopamine antagonists, anticholinergics, antihistamines, and corticosteroids) is available.⁸² In patients who have not received prophylaxis, 5HT₃ antagonists, such as ondansetron, are the first-line treatment and are considered safe in the peripartum period at antiemetic doses.^{83–86} A scopolamine transdermal patch (1.5 mg) is effective in reducing nausea after cesarean delivery and has a longer duration of action than other options. Although the safety of anticholinergics during breastfeeding is unknown, scopolamine has been used during pregnancy without an increase in fetal adverse effects.⁸⁷

Interventions to treat shivering during and/or after cesarean delivery have been the subject of several studies. The strongest evidence exists for dexmedetomidine and tramadol, but other options include nalbuphine and meperidine.^{88–90} The prevention rather than the treatment of pericesarean pruritus has been extensively studied. The findings from a network meta-analysis on the subject were recently published by Singh et al.⁸⁰ Of those interventions that may be safely administered in the postpartum period, interventions with supporting evidence in the postcesarean period include opioid antagonists (such as naloxone or naltrexone), opioid agonist antagonists (such as nalbuphine), and serotonin antagonists (such as ondansetron). Respiratory depression requires urgent assessment and management by an appropriately trained healthcare provider. When deemed appropriate and with appropriate monitoring (as recommended by SOAP), antidotes may be administered to reverse the action of drugs thought to contribute to respiratory depression (such as naloxone to reverse systemic or neuraxial opioids).⁹¹

In summary, early recognition and management of postanesthesia side effects may improve the quality of recovery, patient experience, and patient satisfaction after cesarean delivery.

Recommendation

As required, IV medications for postoperative nausea and/or vomiting (eg, ondansetron) and medications for shivering (eg, meperidine), pruritus (eg, nalbuphine), and respiratory depression (eg, naloxone) are administered.

Quality of evidence

The quality of evidence is low to moderate.

Strength of recommendation

The strength of recommendation is strong.

Venous thromboembolism prophylaxis

Estimates of peripartum venous thromboembolism (VTE) incidence range from 0.5 to 2.0 per 1000 pregnancies.^{92–97} A meta-analysis of 32 prospective studies of VTE after cesarean

delivery found a pooled incidence of 2.6 per 1000 pregnancies.⁹⁸ Options for VTE prophylaxis after cesarean delivery include mechanical methods (early ambulation, compression stockings, and pneumatic compression devices) or pharmacologic methods (unfractionated heparin [UFH] and low-molecular-weight heparin [LMWH]).

A 2021 update to a Cochrane review on VTE prophylaxis among high-risk pregnant patients examined 29 trials that included 3839 individuals and found no differences in symptomatic VTE events when comparing heparin (UFH or LMWH) with placebo (risk ratio [RR], 0.39; 95% confidence interval [CI] 0.08–1.98).⁹⁹ When restricted to patients after cesarean delivery, there were similarly no differences in symptomatic VTE events (RR, 1.30; 95% CI, 0.39–4.27), symptomatic deep vein thrombosis events (RR, 1.30; 95% CI, 0.24–6.9), or symptomatic pulmonary embolism (PE) events (RR, 1.10; 95% CI, 0.25–4.87). The small sample size of the included studies, inconsistent reporting of outcomes, and overall low quality of evidence are acknowledged as the major limitations of this body of research. Pharmacologic VTE prophylaxis after cesarean delivery has been associated with higher rates of wound separation and hematomas.^{99–102} To guide optimal pharmacologic thromboprophylaxis protocols, risk stratification models used to predict VTE after cesarean delivery have been developed. Currently, these models have not been adequately studied and are currently not widely adopted.¹⁰³

Early mobilization and prevention of dehydration in the immediate postpartum period may help reduce VTE. However, evidence supporting these measures is limited. Because of the absence of eligible trials, mechanical prophylaxis was not assessed in a Cochrane review.⁹⁹ However, a large retrospective study of maternal deaths from 2007 to 2012 noted a significant reduction in PE-related deaths after cesarean delivery following a policy of universal thromboprophylaxis using pneumatic compression devices (from 7/458,097 births to 1/465,880 births).¹⁰⁴

In summary, mechanical VTE prophylaxes, such as compression stockings and pneumatic compression devices, are low-cost and safe interventions for VTE prevention that should be used in individuals undergoing cesarean delivery until they are fully ambulatory. Universal pharmacologic VTE prophylaxis for individuals after cesarean delivery is not currently recommended.

Recommendation

Mechanical prophylaxis (eg, compression stockings and pneumatic compression devices) should be used until the patient is fully ambulatory and in the absence of contraindications. Moreover, it is recommended to assess the need for pharmacologic therapy if the patient is deemed at high risk of VTE.

Quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Postoperative anemia remediation

Maternal anemia is defined as hemoglobin levels of <11 g/dL in the first and third trimesters of pregnancy and <10.5 g/dL in the second trimester of pregnancy.¹⁰⁵ Optimal hemoglobin or hematocrit level cutoffs for postpartum anemia are less well defined. In addition to the effect of blood loss at delivery, the physiological and inflammatory changes that occur in the first week after delivery can cause dynamic shifts in hemoglobin levels, decreases in serum iron and transferrin saturations, and increases in ferritin levels.¹⁰⁶ Consensus statements from the Centers for Disease Control and Prevention, the Institute of Medicine, and the Royal College of Obstetricians and Gynaecologists have suggested using nonpregnant adult definitions after delivery (<11.8–12.0 g/dL), whereas other organizations have proposed retaining the third-trimester definition (<11.0 g/dL) until pregnancy physiology stabilizes at 6 to 8 weeks after delivery.^{106–108} In addition, lower thresholds have been proposed in the immediate postpartum period (<48 hours),^{107,108} particularly after postpartum hemorrhage.

The prevalence of postpartum anemia varies by definition but is estimated to affect between 10% and 30% of birthing people in the United States.^{106,109,110} Disparities persist in rates of postpartum anemia, with higher rates seen among people from lower socioeconomic backgrounds and developing countries.^{105,110,111} The strongest risk factors for postpartum anemia are postpartum hemorrhage and predelivery anemia.^{109,112}

The consequences of postpartum anemia include higher rates of fatigue, postpartum infections, impaired wound healing, and mental health conditions.^{106,107,113} Early recognition is an important step toward anemia remediation. Treatment options include iron supplementation via oral or IV routes, with blood transfusion reserved for more severe cases on an individualized basis.^{108,114,115} A recent meta-analysis of randomized trials demonstrated significant increases in hemoglobin concentrations at 6 weeks after delivery with IV iron administration compared with oral iron administration for postpartum anemia (mean difference, 0.9 g/dL; 95% CI, 0.4–1.3; $P<.001$).¹¹⁶ Treatment regimens and adherence varied across studies, and data were limited regarding the effect of treatment on fatigue and mental health conditions. Professional society recommendations for laboratory cutoff values for iron replacement therapy and the use of 1 treatment modality over another are currently lacking.

In summary, consensus guidelines are needed to establish thresholds for postpartum anemia that warrant treatment, optimal timing of treatment, and dosing strategy. There is high-quality evidence that postpartum iron supplementation increases iron and hemoglobin levels, although data on whether this translates to improved postpartum recovery are lacking.

Recommendation

The recommendation is to consider transfusion in patients without cardiac disease if the Hb level is <7 g/dL or if symptomatic¹¹⁷ and to treat iron deficiency anemia with iron supplementation.

Rating of quality of evidence

The quality of evidence is moderate.

Strength of recommendation

The strength of recommendation is strong.

Breastfeeding support and education

Experiences surrounding breastfeeding have been identified as a key domain of postpartum recovery in inpatient and outpatient settings.^{118,119} Early and long-term successful breastfeeding rates are desirable quality metrics.¹²⁰ Early skin-to-skin contact and feeding difficulties in the immediate postoperative period among cesarean delivery-born infants can affect these outcomes.¹²¹ ERAC programs promote early skin-to-skin care and early initiation of breastfeeding. However, pre- and postnatal education and counseling also play a central role in the continued success and achievement of long-term exclusive breastfeeding. Beake et al¹²² systematically reviewed interventions to support breastfeeding after cesarean delivery and identified 2 studies^{123,124} on early skin-to-skin contact, continued postnatal support, and education in Israel. The authors reported higher rates of exclusive breastfeeding at 10 and 16 weeks after delivery following these interventions. Ulfa et al¹²⁵ conducted a systematic review of 55 articles and found that early initiation of breastfeeding was more common in patients who underwent vaginal delivery than in those who underwent cesarean delivery. However, there was no difference in the exclusive breastfeeding rates at 3 and 6 months. Parental education, support from healthcare workers, and maternal-neonatal bonding were significantly associated with the initiation and success of exclusive breastfeeding. Li et al¹²⁶ conducted a comparative study and evaluated a postoperative enhanced recovery nursing care plan that included the management of blood pressure, temperature, and fluids, monitoring for complications, pain management, activity and rest, diet management, and breastfeeding. The intervention group had a higher breastfeeding efficacy score than the

control group (7.13 ± 0.68 vs 4.23 ± 0.86 , respectively). Zavala-Soto et al¹²⁷ conducted a prospective study of patients who underwent cesarean delivery in Mexico and found that the factors associated with prolonged breastfeeding and satisfaction included immediate skin-to-skin contact during surgery, counseling, and education on breastfeeding after birth. Ara et al¹²⁸ conducted a cluster RCT in Bangladesh and reported that peer counseling by trained community female volunteers starting in the third trimester of pregnancy to 6 months after delivery was associated with a higher proportion of patients who initiated early breastfeeding (89% vs 77%; $P=.005$) and who were exclusively breastfeeding at 5 months (73% vs 27% in the control group; $P<.005$). Saus-Ortega et al¹²⁹ identified that the variables associated with successful postpartum breastfeeding support included assessment of breastfeeding skill with the latch on, audible swallowing, type of nipple, comfort and hold positioning (LATCH) scale, performed by experienced professionals; continuous support during the hospital stay; and promotion of skin-to-skin contact and that the barriers to successful postpartum breastfeeding support included lack of maternal knowledge, lack of time or high workload from healthcare practitioners, and variations in the breastfeeding support provided by different professionals.

In summary, enhancing education about the importance of breastfeeding in the prenatal period, early skin-to-skin contact, and counseling, support, and education about breastfeeding during the postpartum period¹³⁰ with the availability of dedicated personnel with a comprehensive evaluation of practice (latch, hold, and support during breastfeeding) can optimize breastfeeding outcomes after cesarean delivery.

Recommendation

The recommendation is to encourage early skin-to-skin contact and counseling, support, and education about breastfeeding, with the availability of a dedicated lactation nurse/specialist who can comprehensively evaluate practices

(latch, hold, and support during breastfeeding).

Rating of quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Promotion of rest periods

The promotion of rest after cesarean delivery is considered a key aspect of recovery, although limited evidence directly supports its benefits. Fatigue after cesarean delivery may have negative effects on cognitive function, mood, pain management, and maternal-infant bonding. Encouraging rest and optimizing sleep can enhance emotional well-being and improve patient satisfaction.^{17,131–133}

Although early mobilization helps reduce the risk of VTE, improves bowel function, and shortens hospital stay, there is a recognized need to balance rest and activity. The potential benefits of incorporating rest periods into postcesarean delivery care are based on measures of patient satisfaction and align with a broader understanding of the physiological and psychological aspects of recovery. Rest promotes tissue healing and repair, hormonal regulation, immune function, and pain management.^{17,132,134}

SOAP supports measures to optimize rest by clustering interventions,¹⁷ such as coordinating vital sign checks with medication administration. In addition, patient-appropriate postoperative monitoring is recommended to minimize disturbances and allow longer periods of uninterrupted rest. The SOAP consensus statement⁹¹ on monitoring recommendations for respiratory depression after cesarean delivery suggests that frequent postoperative assessments may contribute to unnecessary disturbances and sleep deprivation.^{132,134} Specifically, it has been highlighted that lack of sleep after cesarean delivery is linked to several negative outcomes, such as postpartum depression, headache, perineal pain, back pain, incisional pain, mastitis, and challenges with breastfeeding.^{135–137}

Although promoting rest periods to enhance recovery after cesarean delivery is an important patient-centered

practice, evidence directly supporting the benefits of rest promotion is lacking. More research studies are needed to establish the optimal frequency and duration of rest periods, evaluate the effect of rest promotion on various maternal and neonatal outcomes, and explore specific interventions that can promote rest while maintaining the benefits of early mobilization in patients after cesarean delivery.

In summary, healthcare providers should be encouraged to cluster interventions and perform patient-appropriate postoperative monitoring to optimize patient rest and minimize sleep disturbances.

Recommendation

Cluster interventions (eg, maternal examination, infant checks, scheduled drug administration, blood draws, and patient-appropriate postoperative monitoring) are recommended to optimize patient rest and minimize sleep disturbances.

Rating of quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Facilitate patient-centered transition to discharge

The implementation of ERAS protocols for cesarean delivery has been associated with a reduction in the length of hospital stay.^{2,16,26} Multiple studies indicate that patients are satisfied with a shorter length of stay following the implementation of the ERAS pathway for cesarean delivery and feel prepared for a shorter length of stay.^{26,138} Of note, 3 small RCTs of early discharge after cesarean delivery found no significant differences in site infections, readmission rates, pain, or patient satisfaction.^{139–141} However, active surveillance of complications after discharge after cesarean delivery suggests that site infections occur in approximately 10% of patients, >80% of which develop after discharge,¹⁴² indicating a need for patients to be provided with comprehensive information on the normal discharge course, signs and symptoms of infection, activity

restrictions, and instructions on when to seek medical attention. The Perceived Readiness for Discharge After Birth Scale is a validated tool that may help clinicians identify patients who are at increased risk of problems after discharge.¹⁴³ A systematic review of 30 RCTs that evaluated discharge planning across multiple patient groups and medical specialties found that overall discharge planning may lead to a small reduction in length of stay, a reduced risk of readmission for some patient groups, and increased satisfaction for both patients and health professionals.¹⁴⁴ In addition, a prospective before-and-after study of 1219 patients found that compliance with discharge instructions in the emergency department was increased from 26% to 36% (odds ratio, 1.59; 95% CI, 1.20–2.10) with the provision of standardized written information that included information on the diagnosis, medication dosage and length of treatment, potential medication side effects, and suggested time and location of out-patient clinic follow-up.¹⁴⁴ Clear verbal and written communication about expected length of stay after cesarean delivery (and flexibility to change the plan if patients do not feel ready to be discharged home), postoperative pain management, and community resources were all identified as important patient-identified factors for discharge planning after cesarean delivery.^{138,145}

In summary, maternal and neonatal discharge checklists (containing institutional discharge criteria) and coordination of administrative tasks, referrals, tests, paperwork, education, and counseling should be used to facilitate patient transition to discharge, and standardized written discharge instructions in the patient's preferred language should be used to facilitate discharge counseling.

Recommendation

The recommendation is to use maternal and neonatal discharge checklists; coordinate administrative tasks, referrals, tests, paperwork, education, and counseling; and provide standardized discharge instructions in the patient's preferred language.

Rating of quality of evidence

The quality of evidence is low.

Strength of recommendation

The strength of recommendation is strong.

Comment

ERAC protocols reduce the length of hospital stay, pain scores, opioid consumption, time to first ambulation, and time to urinary catheter removal without increasing complication rates or hospital readmissions. The 13 recommended interventions outlined in this manuscript should be considered for patients undergoing cesarean delivery without contraindications to optimize maternal postpartum experience, satisfaction, and recovery after cesarean delivery. ■

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