Optimizing Recovery in Cesarean Delivery: Integrating ERAS Principles into Obstetric Care

Moderator

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Speaker

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Pre-admission

Items	Status				Details
Pre-admission	已執行	1st 優先	2nd 優先	3rd 優先	已執行項目（可多選）
Preadmission information, education and counselling （ERAS）	☐	☐	☐	☐	說明人員： ☐婦產科醫師 ☐麻醉醫師 ☐護理師 ☐個管師 ☐其它：
Preoperative optimization	☐	☐	☐	☐	☐產科風險評估 ☐麻醉風險評估 ☐用藥諮詢 ☐術前營養評估及介入（孕產期飲食及疾病衛教） ☐其它：
Maternal hypertension	☐	☐	☐	☐	☐飲食控制 ☐藥物控制 ☐其它：
Maternal gestational diabetes mellitus	☐	☐	☐	☐	☐生活習慣調整 ☐飲食控制 ☐藥物控制 ☐其它：
Optimal gestational weight gain management	☐	☐	☐	☐	☐體重控制（BMI < 40 kg/m2） ☐其它：
Maternal cigarette smoking	☐	☐	☐	☐	☐戒菸諮詢 ☐其它：
Maternal anemia	☐	☐	☐	☐	☐術前貧血評估 ☐術前貧血治療 ☐其它：

住院前衛教與諮詢
Preadmission education and counselling (ERAS)

- 預接受剖腹產孕婦，應於住院前接受照護團隊(包含產科醫師、麻醉科醫師、個案管理師、護理師等) 的全面性評估與療程說明。

- 對高風險孕婦，提供必要介入措施。

2025

Patient education (culturally and language appropriate). Preadmission information, education, and counselling	- Good antenatal, team-based, clinical practice should include shared care, informing the patient about the clinical care opportunities, antenatal screening and diagnosis, and, ultimately, any procedures before, during, and after the scheduled CD. - The information should be adapted and considered for scheduled CD or when there is a potential for an unscheduled CD. - This recommendation is made based on patient needs, although high-quality evidence is lacking,	Very low	Strong
Medical and surgical multidisciplinary staff education	- The organizational health service and clinical providers require collaboration and fiscal support for the introduction of maternity quality improvement interventions and implementation strategies with the aim of improving pregnant patient and neonatal outcomes after a CD.	Moderate	Strong

住院前風險評估
Pre-operative risk assessment

- 可逆危險因子應於住院前透過完整評估與檢查及早發現並進行介入。
- 建議於住院前進行產科風險評估、麻醉風險評估、藥物使用諮詢 (包含雲端藥歷查核)、術前營養評估及介入 (孕產期飲食及疾病衛教)，儘可能降低手術併發症之風險。

2025

Increasing medical co-morbidity prevalence conditions	Pregnant person comorbidity conditions are common and have increasing prevalence (congenital heart disease, maternal epilepsy, maternal auto-immune disease (systemic lupus), and asthma). The conditions and their medications for care are associated with fetal teratogenic effects, complex pregnant person antenatal effects, and an increased possibility for caesarean delivery. - Medical and surgical consideration: multidisciplinary team-based care is recommended and can modify the morbidity and mortality risks for pregnant person and fetal-neonates but the direct impact on caesarean delivery is unknown.	Moderate	Strong

妊娠高血壓之評估
Maternal hypertension

- 懷孕期間的高血壓疾病是造成孕產婦以及新生兒周產期死亡的重大原因，子癲前症發生率約 2-8%(1)。
- 針對孕期有高血壓之病患進行風險評估與監控，包含飲食及藥物控制。

2025

Chronic hypertension	- Untreated or inadequate treatment of chronic hypertension will increase the risk for superimposed preeclampsia, intrauterine fetal growth restriction, and preterm birth. - Screening: USPSTF (2021) recommends screening for hypertension in adults 18-years or older with office and outside office blood pressure measurements. - Medical care:USPSTF (2021): recommends the use of low-dose aspirin (81 mg/d) as preventive medication for preeclampsia after 12 weeks of gestation for pregnant persons who are identified to have an increased risk for preeclampsia (dosing range 81-162 mg/d with PM oral administration) USPSTF (2024): during pregnancy, recommends treating chronic hypertension at a threshold of mild-range blood pressure of 140/90 mm Hg because it is found to be a cost-effective strategy. - Chronic hypertension should be treated with the most well-studied antihypertensive agents in pregnancy (labetalol, nifedipine, hydralazine, or methyldopa), with a target blood pressure of less than 140/90 mm Hg.	Moderate	Strong

Gestational Hypertension and Preeclampsia: ACOG Practice Bulletin, Number 222. Obstet Gynecol. 2020 Jun;135(6):e237-e260.

妊娠糖尿病
Maternal gestational diabetes mellitus

- 妊娠糖尿病會增加巨嬰症、剖腹產率、肩難產以及日後變成慢性糖尿病的風險。
- 針對患有妊娠糖尿病之患者進行風險評估與疾病監控，包含生活習慣調整、飲食控制與藥物控制。

2025

Prepregnancy or gestational diabetes impacts approximately 10% of US pregnancies	- Glycemic management of diabetes mellitus in pregnancy has gestational age complexity with significant metabolic and physiological changes. The pregnancy-related glycemic targets are required to be much tighter than in nonpregnant persons because of significant adverse perinatal and neonatal consequences. - Screening:USPSTF (2021): recommend screening persons with overweight and obesity for prediabetes and type 2 diabetes in adults aged 35—70 y. USPSTF (2021): concludes with moderate certainty that there is a moderate benefit to screening for gestational diabetes at 24 weeks of gestation or later to improve pregnant persons and fetal outcomes. - Medical care:Tight glycemic control among pregnant people with preexisting or gestational diabetes should be prioritized. Medical management strategies that include both lifestyle and/or medication options are effective at achieving optimal glycemic control and reducing perinatal risks.	Moderate	Strong

ACOG Practice Bulletin No. 190: Gestational Diabetes Mellitus. Obstet Gynecol. 2018 Feb;131(2):e49-e64.

適當孕期體重管理
Optimal gestational weight gain management

- 孕期體重增加和新生兒出生體重以及產後體重留置成正相關(1)。
- 在懷孕期間適切監測體重之增加。
- 體重增加的建議依據懷孕前的BMI有所不同(2)。

Table 1. Institute of Medicine Weight Gain Recommendations for Pregnancy ⇦

Prepregnancy Weight Category	Body Mass Index*	Recommended Range of Total Weight (lb)	Recommended Rates of Weight Gain† in the Second and Third Trimesters (lb) (Mean Range [lb/wk])
Underweight	Less than 18.5	28–40	1 (1–1.3)
Normal Weight	18.5–24.9	25–35	1 (0.8–1)
Overweight	25–29.9	15–25	0.6 (0.5–0.7)
Obese (includes all classes)	30 and greater	11–20	0.5 (0.4–0.6)

Maternal obesity (BMI >30 kg/m^2)	- The risk for morbidity and mortality increases as the pregnant person's BMI increases. - Medical care: before conception or during pregnancy, people with obesity should have access to evidenced-informed interventions (medical nutrition therapy; physical activity; psychological interventions; pharmacotherapy; surgery) aimed at healthy weight gain in pregnancy. - Surgical consideration: preoperative multidisciplinary surgical planning is recommended ahead of delivery.	Moderate	Strong

2025

1.Siega-Riz AM, Viswanathan M, Moos MK, Deierlein A, Mumford S, Knaack J, Thieda P, Lux LJ, Lohr KN. A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birthweight, fetal growth, and postpartum weight retention. Am J Obstet Gynecol. 2009 Oct;201(4):339.e1-14.
2.Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines . Washington, DC: National Academies Press; 2009.

抽菸之使用
Maternal cigarette smoking

- 抽菸會增加顱顏畸形、胎兒生長遲滯、胎盤剝離、新生兒低體重的風險，也會增加周產期死亡率。

- 建議懷孕後即接受完整戒菸之諮詢與介入。

2025

Smoking (tobacco, cannabis; vaping)	- Inhaled smoke exposure (tobacco, cannabis, vaping) increases the risks for pregnancy and postoperative complications. The pregnant person's co-use of nicotine and cannabis is associated with increased pregnant person and neonatal morbidity and neonatal death when compared with use of either substance alone. - Smoking cessation or reduction should be encouraged as early as possible and supported throughout pregnancy. USPSTF (2021): Behavioral smoking cessation counseling during pregnancy was associated with fewer adverse neonatal outcomes and was cost effective.	High	Strong

Tobacco and Nicotine Cessation During Pregnancy: ACOG Committee Opinion, Number 807. Obstet Gynecol. 2020 May;135(5):e221-e229.

貧血處理與控制
Maternal anemia

- 孕期貧血會增加早產、胎兒過小和周產期死亡率，也會增加生產之併發症。

- 一般輕微的貧血，可於門診階段進行貧血之治療，包含口服鐵劑或是注射針劑；嚴重貧血患者則建議轉介至血液科評估或是安排緊急輸血。

2025

ERAC recommended antenatal, optimized care, and preoperative interventions	ERAC item	GRADE quality of evidence (references])	GRADE strength of recommendation
Anemia during pregnancy has a prevalence of 12%	- Screening: there is insufficient evidence for screening and supplementation for iron deficiency, in the presence or absence of anemia, during pregnancy to improve maternal and fetal health outcomes. - Surgical consideration: Maternal iron deficiency anemia should be identified and treated before scheduled surgeries. Intravenous iron may be more effective than oral iron, although optimal dosing regimens are still under investigation.	High	Strong

Anemia in Pregnancy: ACOG Practice Bulletin, Number 233. Obstet Gynecol. 2021 Aug 1;138(2):e55-e64.

Pre-operative

Pre-operative	已執行	1st 優先	2nd 優先	3rd 優先	已執行項目（可多選）
Preanesthetic medications	☐	☐	☐	☐	☐ Antacids and histamine H2 receptor antagonists ☐ No preoperative sedation ☐ 其它：
Preoperative antimicrobial prophylaxis and skin preparation	☐	☐	☐	☐	☐ 皮膚消毒用 Chlorhexidine-alcohol ☐ 陰道消毒用 Povidine-iodine ☐ 預防性抗生素（手術前 60 mins 給予） ☐ 其它：
Preoperative bowel preparation	☐	☐	☐	☐	☐ No oral or mechanical bowel preparation ☐ 其它：
Preoperative fasting	☐	☐	☐	☐	☐ 常規術前 2 小時澄清液禁食 ☐ 6~8 小時固體食物禁食 ☐ 其它：
Preoperative carbohydrate supplementation	☐	☐	☐	☐	☐ 術前 2hr 前口服高醣飲品（非 DM 產婦） ☐ 其它：

麻醉前藥物
Preanesthetic medications

- 建議術前給予制酸劑與H2 receptor antagonists， 降低吸入性肺炎的風險。
- 避免常規使用術前鎮靜，可能對產婦與新生兒造成不良影響。

抗生素使用以及局部消毒
Preoperative antimicrobial prophylaxis and skin preparation

皮膚消毒用 Chlorhexidine–alcohol

- 外科腹部手術前，使用chlorhexidine-alcohol 的抗感染效果稍優於優碘 (povidone iodine)[1,2]。

陰道消毒用 Povidine-iodine (chlorhexidine gluconate)

- 剖腹產前陰道如以優碘消毒，可降低子宮內膜炎發生率[3]

Intrapartum C/S or ROM

2025

No.	ERAC recommended antenatal, optimized care, and preoperative interventions	ERAC item	GRADE quality of evidence (references])	GRADE strength of recommendation
4	Preoperative skin antisepsis	- Preadmission: the use of 2% chlorhexidine gluconate cloths or soaps for preoperative showering or bathing (evening or morning or both) before the scheduled CD is a reasonable intervention to undertake because there is no or minimal risk associated with the variable preventive results related to surgical site infections	Moderate	Weak

1. Hadiati DR, Hakimi M, Nurdiati DS, Ota E. Skin preparation for preventing infection following caesarean section. Cochrane Database Syst Rev2014;17:CD007462
2. Tuuli MG, Liu J, Stout MJ, et al. A randomized trial comparing skin antiseptic agents at cesarean delivery. N Engl J Med 2016;374:647–55.
3. Haas DM, Morgan S, Contreras K. Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections. Cochrane Database Syst Rev 2014;12: CD007892

預防性抗生素 (手術前 60 mins 給予)

- 未破水的剖腹產預防性抗生素，通常使用第一代頭孢子菌素類(1)。
- 研究指出在下刀前 30-60 分鐘前施打，能減少剖腹產術後感染率(2)。
- 近期研究顯示如增加 Azithromycin，可以再降低剖腹產傷口感染率(3,4)。
- 針對肥胖的孕婦需增加 Cephalosporin 至 2g(5)。

- 2025 update:
  - Unscheduled C/S → Azithromycin 500mg IV, once
  - Obesity: Oral cephalexin + metronidazole for post-OP 48 hours

1. Smaill FM, Grivell RM. Antibiotic prophylaxis versus no prophylaxis for preventing infection after cesarean section. Cochrane DatabaseSyst Rev 2014;28:CD007482.
2. Sullivan SA, Smith T, Chang E, Hulsey T, Vandorsten JP, Soper D. Administration of cefazolin prior to skin incision is superior to cefazolin at cord clamping in preventing postcesarean infectious morbidity: a randomized, controlled trial. Am J Obstet Gynecol 2007;196: 455.e1–5.
3. Tita ATN, Szychowski JM, Boggess K, et al. Adjunctive azithromycin prophylaxis for cesarean delivery. New Engl J Med 2016; 375(13): 1231-41.
4. Sheith AE, Niu B, Valent AM, et al. Adding azithromycin to cephalosporin for cesarean delivery infection prophylaxis: a cost-effectiveness analysis. Obstet Gynecol 2017; 130(6): 1279-84.
5. Young OM, Shaik IH, Twedt R, et al. Pharmacokinetics of cefazolin prophylaxis in obese gravidae at time of cesarean delivery. Am J Obstet Gynecol2015;213:541.e1–7

術前避免常規腸道準備
Avoid routine mechanical bowel preparation

- 術前進行腸道準備並未顯示具臨床效益，反而可能導致產婦不適感。
- 不建議在剖腹產手術前進行口服或機械性腸道準備。

1. Wilson RD, et al. Guidelines for Antenatal and Preoperative care in Cesarean Delivery: Enhanced Recovery After Surgery Society Recommendations (Part 1). Am J Obstet Gynecol. 2018 Dec;219(6):523.e1-523.e15.
2. Ertas IE, et al. Influence of preoperative enema application on the return of gastrointestinal function in elective Cesarean sections: a randomized controlled trial. J Matern Fetal Neonatal Med. 2021 Jun;34(11):1822-1826.

碳水化合物補充與避免過度禁食
Carbohydrate loading and avoidance of prolonged fasting

- 過長的空腹時間可能增加脫水、低血糖、胰島素阻抗等風險。
- 對於無禁忌症之孕婦，建議可以進食固體食物至手術前6小時，可飲用清流質液體至手術前 2 小時。
- 對於無糖尿病的孕婦，考慮在手術前2小時補充口服碳水化合物飲品。

2025

Preoperative fasting	There is insufficient evidence on the relationship between fasting times for clear fluids or solid foods and the risk for pulmonary aspiration. - Preoperative fasting should be minimized irrespective of the type of anesthesia because recommendations are based on widely accepted clinical practice and professional society guidelines. - Pregnant patients should be encouraged to drink clear fluids, such as water, pulp-free juice, carbohydrate drink, and black coffee or tea without milk, up to 2 h before surgery. - A light meal up to 6 h before surgery is permissible. - After a large meal, meat, or food with a high fat content fasting, the time should be extended to 8 h	 Low Low Low	 Strong Strong Strong
Preoperative carbohydrate supplementation	- Nonparticulate carbohydrate drink (such as Gatorade or apple juice) should be provided 2 h before an elective CD. This intervention has not been shown to have clear clinically significant benefits but seems safe. It is a reasonable option based on benefits from other surgical cohorts and should be offered to women without diabetes.	Low to moderate	Weak

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ARTICLES AND ISSUES

Practice Parameter | March 2017

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures: An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration*

FREE

+ Author and Article Information

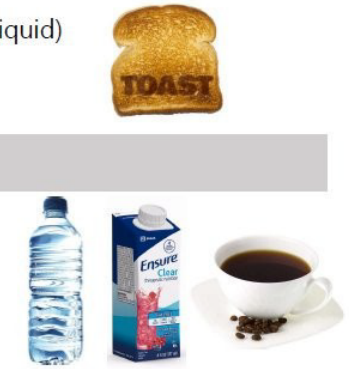
Anesthesiology March 2017, Vol. 126, 376–393.

https://doi.org/10.1097/ALN.0000000000001452

Moving Beyond "NPO at Midnight"

Healthy Patient of Any Age	Undergoing Elective Procedure	General or Regional Anesthesia
(i.e., not diabetic, obese, pregnant, ileus/SBO, difficult airway)	(i.e., not emergent)	(i.e., not merely local anesthesia)

Hours Pre-Op	Allowable Food or Beverage
>8	**Heavy foods** (fried/fatty) and meats
6	**Light meal** (e.g., toast + clear liquid) **Cow's milk** (in moderation) **Infant formula**
4	**Breast milk**
2	Non-alcoholic **clear liquids** (e.g., water, fruit juice without pulp, nutritional drinks, clear tea, black coffee)
0-2	**NPO**



Benefits of Clear Liquids up to 2 hours Pre-Op

- ✓LESS patient thirst and hunger
- ✓LOWER risk of aspiration

Intra-operative

Intra-operative	已執行	1st 優先	2nd 優先	3rd 優先	已執行項目（可多選）
Standard anesthetic protocol	☐	☐	☐	☐	☐ Regional anesthesia （Preferred） ☐ 其它：
Intraoperative fluid and electrolyte therapy	☐	☐	☐	☐	☐ Euvolemia ☐ Zero-balance ☐ Balanced crystalloids 優於 0.9% normal saline ☐ 其它：
Prevention of intraoperative hypothermia	☐	☐	☐	☐	☐ 核心體溫量測 ☐ 主動保溫 ☐ 術前預保溫 ☐ 提高開刀房溫度 ☐ 輸液加溫器 ☐ 其它：
Surgical techniques/ considerations	☐	☐	☐	☐	☐ Blunt expansion of a transverse uterine hysterotomy ☐ Closure of the hysterotomy in 2 layers ☐ Reapproximation of that tissue layer （subcutaneous tissue ≥ 2cm） ☐ The skin closure should be closed with subcuticular suture ☐ 其它：
Immediate care of the newborn infant at delivery	☐	☐	☐	☐	☐ Delayed cord clamping for at least 1 minute at a term delivery ☐ Delayed cord clamping for at least 30 seconds at a preterm delivery ☐ No routine suctioning of the airway or gastric aspiration ☐ Routine neonatal supplementation with room air ☐ Body temperature should be measured and maintained between 36.5° C and 37.5° C after birth ☐ 其它：

2025 UPDATE

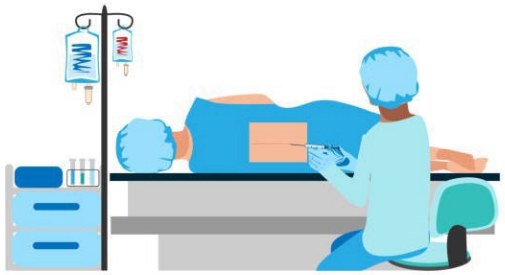
1. Use of personal support persons in OR(very low evidence, strong recommendation)
2. Prophylactic antibiotics (moderate to high evidence, strong recommendation)
3. Abdominal and vaginal preparation (moderate evidence, strong recommendation)
4. Antiemetic prophylaxis (low evidence, strong recommendation)
5. Prevention of spinal hypotension (low evidence, strong recommendation)
6. Maintenance of normothermia (moderate evidence, strong recommendation)
7. Maintenance of euvolemia (low evidence, strong recommendation)
8. Optimal use of uterotonics (moderate evidence, strong recommendation)
9. Multimodal analgesia (low evidence, strong recommendation)
10. Early initiation of skin-to-skin care (moderate evidence, strong recommendation)

標準化麻醉計畫
Standard anesthetic protocol

- 如沒有特殊禁忌症，區域麻醉 (Regional anesthesia) 是剖腹產手術的首選麻醉方式，以達到疼痛控制、降低術後暈吐風險，加速器官功能恢復等目標。

Pre- and intraoperative anesthetic management (focused element)

Regional anesthesia has been found to have a positive impact for enhanced recovery outcomes in terms of pain control, organ function, mobility, postoperative nausea and vomiting, number of days spent in hospital, and adverse events.[24] Obstetric anesthesia regional techniques are thought to be safer than general anesthesia and their increased adoption is



than a higher maternal blood loss with general anesthesia, there was no evidence that regional anesthesia was superior to general anesthesia in terms of major maternal or neonatal outcomes. This may be due to the infrequency of death and serious morbidity that leads to the inadequate power of most studies. Additionally, because of a greater potential for postoperative sedation with general anesthesia, regional anesthesia may be the preferable choice in this regard.[27–29]

Outcomes are similar for spinal and epidural anesthesia[30]; the onset time for an effective block is shorter and the incidence of intraoperative pain is lower for spinal than for epidural anesthesia.[31] Combined spinal epidural anesthesia may allow for a more rapid motor recovery than spinal anesthesia,[32] although the presence of an epidural catheter provides a capability to extend or prolong an inadequate spinal block.[33]

Summary and recommendation. Regional anesthesia is the preferred method of anesthesia for caesarean delivery as part of an enhanced recovery protocol (evidence level: low/recommendation grade: strong).

Caughey AB, et al. Am J Obstet Gynecol. 2018 Dec;219(6):533-544.

手術中輸液與電解質管理與控制
Intraoperative fluid and electrolyte therapy

- 適當輸液: 手術前、後如體液過多，會增加孕婦心臟血管負擔，並有肺水腫風險。

Keep BP> 90% of baseline

- 術中適當輸液以維持等體液容積 (euvolemia)，建議選擇平衡性晶體溶液，優於 0.9% 生理食鹽水。

Clinical scenario	Recommended fluid strategy
Low risk, stable patient	Maintenance: 1-2 mL/kg/hr of crystalloids
Spinal anesthesia planned	500-1000 mL of RS as preload or co-load(preferred)
BL > 500-1000 mL	Replace with crystalloids +/- colloids
Hemorrhagic shock	Fluid and transfusion guided by hemodynamics and Hb

2025 update: Vasopressor infusion + crystalloid

預防手術中低體溫
Prevention of intraoperative hypothermia

- 術中低體溫與可能導致傷口感染、傷口出血、心血管事件(如術後MI)、凝血功能障礙與對新生兒造成不良影響
- 建議使用核心體溫量測與恆溫系統，包含主動式充氣保溫裝置與輸液加溫器，並提高開刀房溫度(23 ℃優於20 ℃)
- 維持體溫36-37℃

Nelson G, et al. Int J Gynecol Cancer 2019;29:651–668.

手術方式考量
Surgical techniques/considerations

- 使用非利器 (剪刀或刀片) 延展子宮傷口可以降低出血量(1)。
- Tradition: Pfannenstiel skin incision + Kerr hysterotomy + bladder flap(2)
- Blunt dissection → lower OP time & blood loss(3)
  - Abdominal fascia, rectus sheath → blunt dissection + pulling
  - Parietal peritoneum → digitally, cranial-caudal direction
  - Uterus → small transverse incision → 2cm, scalpel → stretch

1. Dodd JM, Anderson ER, Gates S, Grivell RM. Surgical techniques for uterine incision and uterine closure at the time of caesarean section. Cochrane Database Syst Rev 2014;7: CD004732
2. O'Neill HA, Egan G, Walsh CA, Cotter AM, Walsh SR. Omission of the bladder flap at caesarean section reduces delivery time without increased morbidity: a meta-analysis of randomized controlled trials. Eur J Obstet Gynecol Reprod Biol 2014;174:20–6
3. Vitale SG, Marilli I, Cignini P, et al. Comparison between modified Misgav-Ladach and Pfannenstiel-Kerr techniques for cesarean section: review of literature. J Prenat Med 2014;8: 36–41

手術方式考量
Surgical techniques/considerations

- 子宮傷口縫合兩層(1,2)
- 皮下組織大於兩公分要縫合(3)
- 皮膚縫合方式使用皮下連續縫合(4,5)

1. Di Spiezio Sardo A, Saccone G, McCurdy R, Bujold E, Bifulco G, Berghella V. Risk of cesarean scar defect following singlevs double-layer uterine closure: systematic review and meta-analysis of randomized controlled trials. Ultrasound Obstet Gynecol 2017;50:578–83
2. Glavind J, Madsen LD, Uldbjerg N, et al. Ultrasound evaluation of cesarean scar after single- and double-layer uterotomy closure: a cohort study. Ultrasound Obstet Gynecol2013;42:207
3. Husslein H, Gutschi M, Leipold H, et al. Suture closure versus non-closure of subcutaneous fat and cosmetic outcome after cesarean section: a randomized controlled trial. PLOS One 2014;9:e114730
4. Mackeen AD, Khalifeh A, Fleisher J, et al. Suture compared with staple skin closure after cesarean delivery: a randomized controlled trial. Obstet Gynecol2014;123:1169–75.
5. Mackeen AD, Schuster M, Berghella V. Suture versus staples for skin closure after cesarean: a metaanalysis. Am J Obstet Gynecol2015;212:621.e1–10

新生兒出生後之照護
Immediate care of the newborn infant at delivery

- 足月兒延遲斷臍至少一分鐘可以降低貧血的比例，並促進神經學發展 (1,2)

- 早產兒延遲斷臍至少三十秒可以降低需要輸血的比例、新生兒腦室內出血和壞死性腸炎的比例(3,4)

1. Delayed umbilical cord clamping after birth. Pediatrics 2017;139:e20170957.
2. Committee Opinion No. 684 Summary: delayed umbilical cord clamping after birth. Obstet Gynecol 2017;129:232–3.
3. Ghavam S, Batra D, Mercer J, et al. Effects of placental transfusion in extremely low birthweight infants: meta-analysis of long- and shortterm outcomes. Transfusion 2014;54:1192–8
4. Rabe H, Diaz-Rossello JL, Duley L, Dowswell T. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. Cochrane Database Syst Rev 2012;8:CD003248.

新生兒出生後之照護
Immediate care of the newborn infant at delivery

- 適度刺激，使其有自發性呼吸，不常規使用抽吸(1,2)
- 在非急救狀況下，不需給予多餘的氧氣(3)
- 新生兒低體溫會增加併發症和死亡率(4)

- 2025 update: Early skin-to-skin (提高哺乳成功率)

1. Perlman JM, Wyllie J, Kattwinkel J, et al. Part 7: neonatal resuscitation: 2015 International consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. Circulation 2015;132(suppl1):S204–41
2. Foster JP, Dawson JA, Davis PG, Dahlen HG. Routine oro/nasopharyngeal suction versus no suction at birth. Cochrane Database Syst Rev 2017;4:CD010332.
3. Tan A, Schulze A, O'Donnell CP, Davis PG. Air versus oxygen for resuscitation of infants at birth. Cochrane Database Syst Rev 2005;2:CD002273.
4. Duryea EL, Nelson DB, Wyckoff MH, et al. The impact of ambient operating room temperature on neonatal and maternal hypothermia and associated morbidities: a randomized controlled trial. Am J Obstet Gynecol 2016;214:505

2025

	Category	Recommended intraoperative intervention	evidence	recommendation
1	Personal support persons in the operating room	During cesarean delivery without general anesthesia, a support person should be present in the operating room if requested by the patient.	Very low	Strong
2	Prophylactic antibiotics	First generation cephalosporins should be used for antimicrobial prophylaxis with weight-based dose adjustments and administered within 60 min prior to skin incision to prevent postpartum infections.	High	Strong
		Azithromycin should be added to the preoperative antibiotic prophylaxis regimen in patients undergoing unscheduled cesarean delivery.	High	Strong
		In patients living with obesity, antibiotic prophylaxis can include the addition of preoperative azithromycin or postoperative oral dosing of cephalexin plus metronidazole for 48 h.	Moderate	Strong
3	Abdominal and vaginal preparation	Preoperative abdominal preparation with a chlorhexidine-based preparation is recommended prior to cesarean delivery.	Moderate	Strong
		Preoperative vaginal preparation with a chlorhexidine or povidone-iodine solution is recommended for patients undergoing intrapartum cesarean delivery or with ruptured membranes, and can be considered for scheduled cesarean delivery without ruptured membranes.	Low	Strong
4	Antiemetic prophylaxis	Multitherapy (dual agent) antiemetic prophylaxis.	Low	Strong
5	Prevention and treatment of spinal-induced hypotension	Maintain maternal blood pressure with a variable rate vasopressor infusion and crystalloid coload	Moderate	Strong
		Apply left lateral tilt or other uterine displacement techniques once the pregnant person is in the supine position on the operating table	Low	Strong

6	Maintenance of normothermia	Interventions to maintain normothermia such as warmed IV fluids and forced air warming should be considered for cesarean delivery.	Moderate	Strong
7	Maintenance of euvolemia	Manage intravenous fluids to achieve euvolemia	Low	Strong
8	Optimal use of uterotonic agents	Routine administration of postdelivery oxytocin (or carbetocin) as first line agent for prophylaxis against uterine atony.	Moderate	Strong
9	Multimodal analgesia	Intrathecal morphine to improve postoperative analgesia	High	Strong
		Preoperative or intraoperative acetaminophen	Moderate	Strong
		Intraoperative NSAIDs	High	Strong
		Intraoperative dexamethasone to enhance multimodal analgesia may be considered.	Low	Weak
		Supplemental local blocks if intrathecal morphine not used	High	Strong
10	Early initiation of skin-to-skin care of neonate	Early initiation of skin-to-skin care should be implemented (birthing or nonbirthing) for breastfeeding	Moderate	Strong
		Early initiation of skin-to-skin care can facilitate a smoother postnatal adaptation	Very low	Weak

術後暈吐之預防
Nausea and vomiting prevention

- 噁心嘔吐在剖腹產是常見症狀
- 使用靜脈輸液與血管收縮劑避免低血壓，並使用多模式止吐藥：
    1. 5-HT3 antagonists (ondansetron, granisetron)
    2. Dopamine antagonists (metoclopramide)
    3. Corticosteroids (dexamethasone)

    - **建議 1+2 or 1+3**

常規使用子宮收縮藥物

- 常規使用子宮收縮藥物減少產後大出血
- **第一線藥物: Oxytocin/Carbetocin**

TABLE 3
Suggested oxytocin administration strategies

Antepartum cesarean	Initiating bolus[a]: 1 IU
	Rescue bolus[a]: 3 IU if uterine tone inadequate after 2 min
	Maintenance infusion: 2.5–7.5 IU/h
Intrapartum cesarean	Bolus[a]: 3 IU
	Rescue bolus[a]: 3 IU if uterine tone inadequate after 2 min
	Maintenance infusion: 7.5–15 IU/h

[a] Administer bolus doses at a rate no faster than 1 IU per 10 s.

多模式止痛計畫
Multimodal postoperative analgesia

- 止痛計畫可包含硬脊膜外止痛、神經阻斷、傷口局部麻醉浸潤、使用非類固醇抗發炎藥及乙醯胺酚為原則，目標減少鴉片類藥物使用
- 止痛計畫應同時涵蓋持續性疼痛與突發性疼痛的控制需求

- 2025 update:
  - Suggest **intrathecal morphine** (if no, then local blocks)
  - **Pre-OP** : Acetaminophen
  - **Intraoperative**: Acetaminophen + NSAID + dexamethasone
  - **Post-OP**: Regular acetaminophen + NSAID

Post-operative

Post-operative	已執行	1st 優先	2nd 優先	3rd 優先	已執行項目（可多選）
Chewing gum after cesarean section	☐	☐	☐	☐	☐術後嚼食口香糖 ☐其它：
Prevention of nausea and vomiting（PONV）	☐	☐	☐	☐	☐術中避免低血壓 ☐給予止吐藥物 ☐其它：
Multimodal analgesia	☐	☐	☐	☐	☐PCEA ☐NSAID（無禁忌症） ☐Acetaminophen ☐其它：
Perioperative nutritional care	☐	☐	☐	☐	☐術後及早進食 ☐術後營養評估及介入 ☐其它：
Prophylaxis against thromboembolism	☐	☐	☐	☐	☐Pneumatic compression stockings ☐其它：
Early post-cesarean delivery mobilization	☐	☐	☐	☐	☐Early mobilization ☐下床與咳嗽（打噴嚏）技巧衛教／指導 ☐哺乳姿勢與坐／站姿衛教／指導 ☐其它：
Post-cesarean delivery urinary drainage	☐	☐	☐	☐	☐術後即可 Remove Foley ☐其它：
Perioperative glucose control	☐	☐	☐	☐	☐Regular blood sugar monitor ☐Tight control of capillary blood glucose（< 145 mg/dL） ☐其它：

2025 UPDATE

(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)
(13) Facilitate patient-centered transition to discharge (low evidence, strong recommendation)

術後早期進食與營養
Early postoperative diet and nutritional care

- 剖腹產後 2 小時內恢復正常飲食
- 必要時進行術後營養評估及介入
- 2025 update: 恢復室即可進食，可考慮冰塊或水

預防血管栓塞
Prophylaxis against thromboembolism

- 靜脈栓塞好發於血流鬱滯、高凝血狀態和有血管內皮傷害者。懷孕呈高凝血狀態，因此孕產婦有較高風險發生血管栓塞
- 除了合併嚴重內外科疾病或其它需術後長久臥床外，通常剖腹產是不需注射肝素或低分子量肝素來預防靜脈栓塞(1)
- 建議術後使用下肢間歇性充氣加壓襪 (Pneumatic compression stockings) 可降低栓塞造成的死亡率(2)
- 針對高危險個案應特別評估藥理性與物理性栓塞預防措施的使用

1. Bain E, Wilson A, Tooher R, Gates S, Davis L-J, Middleton P. Prophylaxis for venous thromboembolic disease in pregnancy and the early postnatal period. Cochrane Database Syst Rev 2014;2:CD001689.
2. Clark SL, Christmas JT, Frye DR, Meyers JA, Perlin JB. Maternal mortality in the United States: predictability and the impact of protocols on fatal postcesarean pulmonary embolism and hypertension-related intracranial hemorrhage. Am J Obstet Gynecol 2014;211:32.

Early post-cesarean delivery mobilization

Early mobilization

- 手術後下床活動有助於腸胃蠕動、減少下肢靜脈栓塞和縮短住院時間，因此建議術後儘早下床。
- 2025 update: 術後六小時要恢復活動

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.

下床與咳嗽 (打噴嚏) 技巧衛教 / 指導

- 同時給予下床與咳嗽 (打噴嚏) 技巧的衛教指導以降低術後疼痛

哺乳姿勢與坐 / 站姿衛教 / 指導

Spanjersberg WR, Reurings J, Keus F, van Laarhoven C. Fast track surgery versus conventional recovery strategies for colorectal surgery. Cochrane Database Syst Rev 2011;2: CD007635

早期移除導尿管
Post-cesarean delivery urinary Drainage

- 術前的導尿管放置可以觀察術中尿量、減少泌尿系統受傷和術後尿液滯留的比例(1)。
- 不過導尿管留置過久會增加疼痛、解尿困難和尿道感染風險，建議術後即可移除(2,3)。

- 2025 update:
  - 建議6–12 hours後移除
  - 除非大出血、使用Mg、下肢無力

1. Ghoreishi J. Indwelling urinary catheters in cesarean delivery. Int J Gynaecol Obstet 2003;83:267–70
2. Schwartz MA, Wang CC, Eckert LO, Critchlow CW. Risk factors for urinary tract infection in the postpartum period. Am J Obstet Gynecol 1999;181:547–53
3. Barnes JS. Is it better to avoid urethral catheterization at hysterectomy and cesarean section? Aust NZ J Obstet Gynaecol 1998;8: 15–316

No.	Recommended postoperative 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 生命徵象穩定 可以喝水 適當的尿量	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 Hb<11 (3rd trimester)	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

Thank you!