

FIGO good practice recommendations for cesarean delivery: Prep-for-Labor triage to minimize risks and maximize favorable outcomes

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Abstract

Cesarean delivery is an abdominal surgical procedure performed for child delivery when the vaginal route is not feasible or desired due to maternal/fetal indications. All childbirth facilities should be able to safely perform a cesarean, which is not the current reality. For planned cesarean delivery, the facility must be prepared for the patient. In contrast, for unplanned arrivals at the facility, FIGO's Prep-for-Labor triage method allows rapid decision-making on whether cesarean delivery can be safely performed on site or whether transfer to an advanced care center is needed. A checklist of staff/tools for safe on-site cesarean delivery is provided to enable timely decision-making. Maternal complications following cesarean are three-fold higher than vaginal delivery. To prevent nonmedically indicated cesarean by favoring vaginal delivery, up-to-date safe and effective guidance is provided, defining labor, second stage length, and status before an arrested labor is confirmed. Whether cesarean delivery is planned or emergency, the Misgav Ladach simplified procedure is proposed as it is suitable for both low- and high-risk cases, including twins, thereby reducing both operative morbidity and postoperative recovery. A trial of labor after first cesarean (TOLAC) should be pursued when feasible, for which the indications, contraindications, safeguards, and steps of safe labor induction are delineated. Implementation of these good practice recommendations will improve childbirth by reducing excessive nonindicated cesareans, while precisely defining the resources and postoperative care required for safe performance on site. Enabling safe childbirth by cesarean and TOLAC, even at sites with low rates currently, will significantly improve maternal and fetal outcomes.

KEYWORDS

cesarean delivery, indications, LMICs, methods, prevention, rate reduction, trial of labor

1 | INTRODUCTION

Cesarean delivery is part of the standard of care for childbirth. It is an obligatory procedure widely used to save both mother and

fetus when the vaginal route is not safe, feasible, or in the setting of maternal request for cesarean. The procedure is performed for fetal and maternal and/or combined indications. Any patient in the late second or third trimester may need a cesarean, irrespective of

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whether labor has begun. Therefore, the labor and delivery suite must always be prepared to convert from an anticipated vaginal delivery to a cesarean. Consequently, FIGO's Prep-for-Labor triage method is vital. Each labor unit must be ready to perform a cesarean with the appropriate surgical equipment, skilled physicians, including the obstetrician and anesthesiologist, and skilled nursing personnel. This article delineates the requirements for successful childbirth in a clinical facility, including staff, physicians, and tools necessary to ensure favorable maternal and newborn outcomes. Emphasis is given to the necessary integration of primary with advanced care facilities for prompt patient transfer. The article describes cesarean delivery when there are clear indications, how it is performed, and whether progression toward vaginal delivery after one previous cesarean is feasible. The overall aim is to minimize nonmedically justified cesarean delivery, thereby enabling the clinical facility to attend most laboring patients and progress safe vaginal delivery.

2 | CESAREAN EPIDEMIC AND STEPS FOR RESOLUTION

An ongoing crisis exists due to the high rate of cesarean deliveries that are performed, several of which are medically unjustified. For multiple reasons, vaginal delivery is the preferred route of delivery, and a cesarean delivery rate of 20%–25% is the expected and desired rate within a population globally. However, this is not the case in reality. In countries where cesarean delivery rates are up to 70%, the procedure is frequently carried out for nonmedical indications, maternal request, and physician's convenience or choice.

For safe performance of a cesarean delivery, a clinical facility requires an operating room, surgeon, anesthesia, staff, and medications. Optimally, midwives are highly skilled and should be the primary healthcare providers of patients progressing toward spontaneous delivery. However, for patients that require instrumental delivery or a cesarean, a physician is required. An integrated care system is optimal, whereby the midwife facility is combined with a hospital that has on-site advanced care facilities to perform cesarean delivery if required. In reality, integrated and effective settings are rare, beyond in high-resource countries.¹ In the case of planned cesarean delivery, the facility's staff/tools and ability to perform the procedure has already been determined and prearranged. Furthermore, prenatal records, proper preparation of the operating room, and availability of the surgeon, anesthesia, and medications can be coordinated ahead of time.

Our focus in this paper is also applicable in low- and middle-income countries (LMICs) and remote rural areas where medically indicated cesarean delivery rates are currently low (around 5%), thereby increasing maternal and newborn morbidity and mortality. This is due to scarce care resources and staff/tools and settings that are inadequate and limited.² Therefore, a pragmatic approach is needed for limited settings, tools, and staff that still enable favorable maternal and fetal outcomes. Minimal but still acceptable standards,

where cesarean can be performed safely, must be clearly defined and implemented whenever possible.

3 | CESAREAN FROM SIMPLE TO COMPLEX SURGERY: PRIOR KNOWLEDGE IS KEY FOR A FAVORABLE OUTCOME

Cesarean delivery can be a straightforward procedure in patients with no previous scar, minimal blood loss, and the fetus in a vertex position. However, complications can arise at any step if there is inadequate attention or care. The procedure is more involved in cases of repeat cesarean where adhesions, bleeding, infection, and problems associated with delivering the child may occur. With a prior uterine scar, complication rates are increased with each cesarean performed. Therefore, decision-making on when and if to perform a cesarean must be carefully considered and minimized unless clearly medically indicated. FIGO's Prep-for-Labor 2-minute triage method to assess a patient arriving unplanned at a care site where a cesarean delivery may be required is given in [Box 1](#), as a series of questions with Y/N answers to assess the status of both mother and fetus to enable effective decision-making. In contrast, for a planned cesarean this information should already be known. Defining the patient's potential risk at arrival for care and the clinical facility's ability

BOX 1 Rapid triage method to assess patient status and risk factors at facility arrival

Patient assessment

- Age
- Stable Y/N
- Alert/responsive Y/N
- Health good Y/N
- Contractions Y/N
- Pain/where Y/N
- Respiration rate
- Pulse regular Y/N
- Fever Y/N

Fetal assessment

- Prenatal records Y/N
- >37 weeks Y/N
- Baby moving Y/N
- Fetal heart rate
- First pregnancy Y/N
- Prior vaginal delivery Y/N (number)
- Prior cesarean delivery Y/N (number)
- Rupture of membranes Y/N
- Bleeding Y/N
- Infection Y/N
- Medical therapy Y/N

to safely perform the procedure on site or transfer the patient to a higher-level center is critical to improve maternal and newborn outcomes. Circumstances can change rapidly, such as reduced access to staff, equipment, operating room, anesthesia, blood, and overburdened staff, requiring timely adjustment to the emerging local reality. Childbirth is a rapidly evolving process and the shift from vaginal delivery to the need for emergency cesarean can occur quickly. Therefore, the clinical facility must be ready to effectively transition from low to high intensity care and an emergency scenario promptly.

Early identification of any complications is key and facility staff must be ready, if the need arises, to act promptly. In contrast, if no complications arise, labor should be left to progress with minimal intervention, as is expected in more than 80% of cases leading to vaginal delivery.

4 | MULTIDISCIPLINARY SURGICAL AND STAFF SKILLS MUST MATCH COMPLEXITY OF ANTICIPATED CESAREAN

It is expected that for planned cesarean procedures, the level of complexity of the procedure, the skill level of the staff, and the chosen facility will already have been determined. However, if the surgical procedure is likely to be difficult and complications are anticipated, then the staff resources and equipment must be more advanced; for example, placenta accreta requires high-level care in specialized centers that also offer advanced blood transfusion services and the ability to perform a cesarean hysterectomy. Similarly, management of a patient with previous vertical uterine incision or previous rupture of a uterine scar may require expertise and advanced surgical set-up. Therefore, the procedure ramifications and sequelae are wide ranging.

The patient must also be informed of the risks associated with cesarean delivery, which progressively increase with each subsequent procedure. Both surgeon and patient education will help reduce the rate of unnecessary cesarean procedures. These are currently high in many parts of the world despite efforts to reduce rates, which are only partially successful.²

Although the surgeon is the lead, an assistant must be qualified and in rare cases can take over the case to complete it satisfactorily. In addition, the anesthesiologist must be aware of the patient's progress to administer appropriate care and react if surgical complications do occur. This enables a rapid shift from an elective setting (epidural/spinal) to general anesthesia and initiation of blood transfusion. Thus, the anesthesiologist is an integral part of the care team and should be familiar with the case before proceeding. Furthermore, once the child is delivered the staff must be ready and available to provide simple newborn care or advanced care for preterm babies or when there are complications. Overall, cesarean delivery is a multimember, intense, and usually short-term procedure; however, in rare cases it can last several hours if complications arise, and staff must be ready for this eventuality or promptly transfer the patient to a higher-level center if readily available. Use of the Prep-for Labor

checklist (Box 1) enables staff to identify the risk factors and act accordingly.

5 | FACILITY REQUIREMENTS FOR SAFE CESAREAN DELIVERY

Once the patient arrives at the clinical facility, the decision process is determined by whether a cesarean is elective or emergency. There must be realistic expectations of what can be performed on site and which cases require transfer. However, in rare cases, if there is no other choice, a cesarean can be performed under local anesthesia even without an anesthetist present. The definition by the American College of Obstetricians and Gynecologists (ACOG) of a level I care facility is a site where as well as cesarean delivery, blood transfusion services are also available as needed. Facilities are required to be certified by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), which is not a simple requirement.² However, both in rural areas in the USA and in LMICs, primary care facilities have limited resources, making cesarean delivery difficult, if not impossible, and frequently requiring the patient to be transferred to a higher-level center. Access to information from antenatal records is essential for pregnancy outcome; however, this information may be limited or absent. Performing an indicated cesarean with fragmentary information is risky for both mother and fetus, leading to an unpredictable outcome.

Integration of care is essential for maternal and fetal well-being. Of major consideration is the distance to the advance care site, the time required to reach the site, and the availability of staff to manage any complication that may arise. Such coordination does exist in high-resource countries, but even here rural and remote sites may not be well served. Therefore, transfer of the patient before a complex cesarean is performed is preferable, thereby reducing complication rates. Once begun, the cesarean delivery procedure cannot be stopped, therefore both surgeon and staff must be able to manage the case if it is not urgent or transfer is not required. Of course, this cannot be the case in emergency situations where the procedure must be completed before a transfer can take place.

To summarize, the correct facility and care team should be defined, able to perform the procedure only as indicated, coordinate primary with advanced care, and educate patients and staff to minimize morbidity and mortality.

6 | CONSIDERATIONS ON STAFFING AND LEVEL OF CARE REQUIRED FOR CESAREAN AND POSTOPERATIVE CARE

An additional important aspect is preservation of the staff. Performing more nonclinically indicated cesarean deliveries equates to lower quality of care given to low-risk patients since healthcare providers are diverted. Therefore, quality of care declines when a patient is at a site with only limited staff. A facility's quality of care

is judged by the appropriateness of the surgical procedures performed, including the cesarean rate which remains high. There is a major discrepancy in cesarean rates among countries where the prenatal outcome is similar, indicating that in several cases the elevated rate is not justified and must be reduced. Current efforts are ongoing to educate physicians, staff, and patients that cesarean delivery should be performed only when vaginal birth is not safely feasible. Moreover, efforts should be continued to incentivize centers to reduce cesarean delivery rates improving maternal and newborn outcomes as quality control measures, conduct health authority audits, assess hospital ranking, and adjust insurance reimbursement, among others. This is further compounded by maternal request for elective cesarean, which is strongly discouraged unless there is a clear medical indication.³

The level of care needed is significantly more involved after a cesarean than following a vaginal delivery. The patient needs to stay in hospital longer, unlike vaginal delivery where early discharge can take place if there are no foreseen complications. Thus, cesarean delivery creates a major burden on the hospital system, which has also significantly amplified due to the COVID-19 pandemic. Fortunately, infection rates continue to decrease due to utilization of vaccination, although significant improvement has not been seen in LMICs. When a patient with COVID-19 requires a cesarean there is added complexity for staff, patient, newborn, and throughout the duration of hospital stay, and particularly for the procedure itself, delivery, and the delayed recovery period.⁴

The monetary incentive for surgeons to perform a cesarean or opt for vaginal delivery should be part of a facility's quality control system and the difference in compensation for cesarean versus vaginal delivery should be minimized unless the procedure and the complexity is elevated.

7 | TYPES OF CESAREANS AND USE OF TRIAL OF LABOR AFTER CESAREAN (TOLAC) TO LOWER RATES

Types of cesarean procedure vary between the preferable low transverse, midline, to in extreme cases fundal incision (Box 2). Operative steps must be minimized since each additional step can increase complication rates. In general, under skilled hands, even in

BOX 2 Methods of cesarean delivery: Alternative methods rarely advocated as the Misgav Ladach method is preferable

- Low transverse abdominal and uterine scar
- Low transverse abdominal and vertical uterine scar
- Vertical abdominal and uterine scar
- Vertical abdominal and low transverse scar
- Fundal incision—anterior invasive placenta

low-resourced settings, an emergency low transverse cesarean can be performed. The surgeon is responsible for the decision on how to proceed. It is essential that a surgeon performing a cesarean delivery is familiar with anatomy and can identify the proper structures. The size of the incision should be minimized. Presence of scar/adhesions can make access to the uterus difficult. Determining whether the fetus is in the vertex position and whether the presenting part is impacted will facilitate surgery. Avoiding bladder flap creation will reduce the risk of bladder injury. In case bleeding does occur, appropriate medications and instruments must be readily available to minimize blood loss and consider blood transfusion. After infant delivery and placental removal, the uterine scar is closed, and the patient is transferred to recovery if they are stable. The operative steps have been clearly refined over the years, but unforeseen circumstances can still occur. The following sections describe the currently utilized methods for cesarean where the Misgav Ladach method appears to provide the most satisfying approach, in terms of speed and safety for mother and fetus, with minimized surgical steps.

Consideration of trial of labor after cesarean (TOLAC) is an effective method to reduce rates after one previous cesarean. The staff training and skill set required for effective TOLAC while reducing the likelihood of uterine rupture is not simple but should be strongly considered in the right setting. Successful vaginal birth after cesarean (VBAC) has advantages both in the short and long term and should be part of the quality care measurement of labor and delivery in any clinical facility that performs cesarean delivery. The careful steps and indications/contraindications in achieving this important goal are described in section 10.

8 | DELIVERY BY CESAREAN: MINIMIZE STEPS, MAXIMIZE FAVORABLE OUTCOME

Performance of a primary or repeat cesarean when indicated, when vaginal delivery is not feasible, is evaluated on a case-by-case basis. Advancing toward vaginal delivery is clearly preferable but it must be recognized that it requires long hours compared with the rapidity of cesarean delivery. Education on why vaginal delivery is preferable in the short and long term is needed. Cesarean delivery is not a convenience for the patient or surgeon, but a decision based on clinical necessity at that specific time point, while recognizing that circumstances can rapidly change and therefore adaptation to need should be paramount. Currently there is no effective method that can fully determine whether a TOLAC will be successful. The prediction improves if the patient is already in active labor. Since at any point during cesarean delivery the case can become technically challenging, the patient should always be in stirrups to enable access by additional staff for additional support as well to enable to push/dislodge the head upward.

The Misgav Ladach (Joel Cohen) simplified cesarean delivery method utilized worldwide is safe and effective, facilitating both surgery and postoperative recovery. An integrated stepwise approach beyond the surgery itself is given as a practical checklist in Box 3. This

method is also suitable in LMIC settings. Importantly, this method can be used for planned low-risk procedures to high-risk cesareans and even twins. Multiple studies have compared this procedure with the standard Pfannenstiel procedure (low transverse). In all aspects comparing the two procedures, the Misgav Ladach method was superior, including: time to complete the procedure reduced from 19 to 13 minutes; less equipment and suturing required; reduced perioperative morbidity, fever, endometritis, and requirement for antibiotics; and faster postoperative recovery.⁵ Consequently, it is the preferred method for cesarean delivery used worldwide.

Before considering a cesarean, the staff must rapidly review the checklist in [Box 4](#) to confirm whether suitable staff and resources are readily available on site. However, when facility access is remote, the procedure must be performed on site to improve maternal and fetal outcomes. Irrespective of whether the procedure is a primary or repeat cesarean, the Misgav Ladach method is always preferable. However, there may be exceptions, where alternative cesarean procedure types may be acceptable ([Box 2](#)); for example, in cases of placenta accreta that involves a different incision (sometimes vertical) and difficulty in performing both uterine incision and placenta

BOX 3 Integrated stepwise approach modified from the Misgav Ladach method^{6,a}

1. Patient consent signed and identity confirmed
2. Surgical team/staff/instruments/laboratory are available (see [Box 4](#))
3. Anesthesia is confirmed
4. Operative field cleaned, no shaving
5. Patient is in stirrups to enable access from below
6. Skin incision is 3 cm above the standard Pfannenstiel method
7. Subcutaneous tissue dilated manually
8. Fascia incised and spread manually
9. Manual opening of peritoneum
10. No bladder flap
11. Small horizontal uterine incision above bladder enlarged manually
12. Baby delivered
13. Placenta removed
14. Uterine incision closed by single layer/locking
15. Hemostasis confirmed
16. Peritoneum is not closed
17. Fascia closed by continuous suture
18. Skin closed by single layer absorbable suture
19. Local analgesic skin infiltration to reduce postoperative analgesia use
20. Minimal dressing

^aAdded steps provide an integrated approach for patient management beyond the technique itself.

BOX 4 Checklist to determine feasibility for on-site cesarean delivery and safe newborn care

1. *Effective triage:* Early identification triaging and integration of care significantly reduce morbidity and mortality
2. *Communication:* Ongoing communication system with a high-risk center. Consult and, in case of need, transport patient prior/after cesarean
3. *Define gestation:* Singleton or multifetal—high-risk
4. *Team experience:* Surgeon, anesthesia, and team experience low- or high-risk cases
5. *Educate patient:* Patient education materials are provided throughout antenatal care when and if cesarean is warranted (benefits/risks explained)
6. *Staff available 24/7.* Experienced to manage low- and high-risk patients
7. *Basic onsite needs:* Operative room, preoperative blood available and/or hemoglobin values and supplies, surgeon, anesthetist, nurses/midwives, recovery area, postoperative care
8. *Basic supplies:* surgical instruments, intravenous lines, antibiotics, oxygen, oxytocin/tranexamic acid/prostaglandins, analgesics, anesthetics, anticoagulants, resuscitation
9. *Blood bank, laboratory facilities*
10. *Fetal heart rate monitor*
11. *Ultrasound/radiology* to confirm fetal position
12. *Intensive care unit Y/N* or partial advanced care? Define respiratory support
13. *Neonatal intensive care unit Y/N* or partial advanced care? Define respiratory support
14. *Transfer feasible.* Effective patient/newborn transfer means are available—Ambulance/other is it close to high-risk center?

removal, which can lead to major blood loss and consequently the need to perform a cesarean hysterectomy.

9 | PURSUE VAGINAL DELIVERY UNLESS CONTRAINDICATED

The ongoing aim is to reduce the alarming rate of cesarean delivery. A key element is the revised mode of management of both the first and second stages of labor. Increasing the duration of both stages increases the likelihood that vaginal delivery will ensue with minimal intervention. This prevents declaring too early that there is an arrest in labor progress and avoiding proceeding to cesarean too early when the patient is stable and has a good probability of progressing to vaginal delivery. The clinical conditions where such delay is

feasible and warranted are delineated for both primiparous and multiparous women, in which the time and management are expected to be different. In addition, risk factors that may reduce the probability of vaginal delivery are described. Maternal mortality and morbidity rates are three times higher for cesarean compared with vaginal deliveries, including anesthesia complications, infections, thromboembolism, renal failure, shock/hemorrhage, transfusions, and surgical complications leading to hysterectomy.⁷ Labor progress is not linear and can be affected by multiple maternal and/or fetal factors that can change as labor progresses.

9.1 | First stage of labor revised

Until recently, active labor lasting more than 20 hours in nulliparous women with less than 1.2 cm/hour cervical dilatation, and more than 14 hours in multiparous women with less than 1.5 cm/hour dilatation, was considered failure to progress. In addition, labor arrest was defined as regular contractions at 4 cm dilatation with no further cervical dilatation for more than 2 hours.^{6,8,9} Such strict criteria have increased cesarean rates. Box 5 provides updated management criteria when labor is protracted in the first stage of labor, including cervical dilatation, length of labor, and when there is failure to progress.

9.2 | Second stage of labor revised

Once the cervix is fully dilated, the second stage of labor proceeds and any delay in progress should be weighed against maternal and fetal conditions. Delay causes maternal infection, perineal laceration, and hemorrhage. For the fetus, delay causes infection, birth trauma, and NICU admission. Overall, the length of this stage of labor has been extended from the customary 2–3 hours of active pushing to around 4–5 hours. This also enables periods of rest and

BOX 5 Updated definitions of labor progress and arrest

Protracted active phase for nulliparous and multiparous women: wait/reassess

- ≥ 6 cm cervical dilatation
- Progress less than 1 cm in nulliparous or 2 cm in multiparous women over 2 hours
- Cervical exam is performed every 4 hours

Failure to progress in labor: Proceed to cesarean

- ≥ 6 cm of cervical dilatation
- No cervical change
- 4 hours of regular contractions and no change
- Rupture of membranes
- 6 hours after oxytocin administration and no change

prevents patient exhaustion. This timeframe can also be prolonged if regional anesthesia is used. Box 6 provides updated guidance on the risk factors that increase failure and require close observation. In addition, the time allowed for pushing is increased, corrective measures are described to increase the likelihood of vaginal delivery, and when cesarean becomes inevitable after all corrective steps have failed. These measures have been shown to decrease cesarean delivery rates.^{8,9}

10 | INDICATIONS FOR CESAREAN DELIVERY AND VAGINAL DELIVERY WHEN FEASIBLE¹⁰

10.1 | Elective cesarean for high-risk pregnancy (requires significant expertise)

- *Placenta previa*
 - *Plan cesarean at 36–38 weeks.* Placenta covers the internal os documented by ultrasound.
 - *Offer vaginal delivery.* Placenta does not cover internal os.
 - *Offer vaginal delivery.* Placenta < 2 cm from the internal os (the shorter the distance between the placenta and the internal os, the higher the probability of bleeding).
- *Placenta accreta spectrum (PAS)*
 - *Plan cesarean delivery at 35–37 weeks:* If a low-lying placenta is suspected on second trimester ultrasound in a woman with a previous cesarean, repeat ultrasound at 32–34 weeks to assess PAS. Attempt to confirm by magnetic resonance imaging (MRI), which is seldom available. Complications of PAS (hysterectomy, blood transfusion, maternal mortality, fetal mortality, fetal morbidity). PAS should already have been confirmed in the early third trimester.¹¹
- *Vasa previa*
 - *Plan cesarean delivery:* Perform at 34–37 weeks as soon as diagnosis is made.

10.2 | Cesarean delivery indications with option for vaginal delivery

- *Pre-eclampsia*
 - *Offer vaginal delivery:* Even in the case of severe features. Induce and augment labor to advance delivery. When there is a low likelihood of vaginal birth, plan a cesarean.¹² Overall, the birth modality should be decided on a case-by-case basis.
- *Prenatal infections*
 - *Plan cesarean delivery: HIV:* Counsel HIV-positive women regarding the mode of birth early in pregnancy. Cesarean is recommended when HIV RNA load is greater than 1000 copies/mL diagnosed at 34 weeks, and when hepatitis C and HIV coinfection is present, or a woman is not taking/not responding to the antiretroviral therapy. Level 1 evidence supports cesarean

BOX 6 Updated management of the second stage of labor, identifying risks to maximize the safety of vaginal delivery in nulliparous/multiparous women

Stage 2: Factors that increase risk for cesarean

- Nulliparity
- BMI above 30
- Narrow pelvis
- Occiput posterior/transverse position
- Fetal weight >4000g
- High fetal station, position
- Delayed pushing
- Epidural anesthesia

Stage 2: Effective requirements/management

- Manual rotation as needed
- Vertex position
- Delivery vacuum/forceps with experience
- Reassuring fetal heart rate
- Progressive descent

Proceed to cesarean: Nulliparous/multiparous

- >4 h of pushing
- Vertex no progress in descent
- Approximately 5 h with epidural anesthesia
- Failed correction of fetal position in a multiparous patient

delivery at 38 weeks prior to labor onset and rupture of membranes since it reduces the risk of transmission to the fetus.¹³

- Offer vaginal delivery: *Hepatitis B virus (HBV)*: Offer HBV-positive women vaginal delivery since vertical and horizontal transmission is reduced by immunoglobulin and vaccination. The potential advantage of cesarean delivery in protecting against HBV transmission is not supported by high-level evidence.¹⁴
- Offer vaginal delivery: *Hepatitis C virus (HCV)*: Offer HCV-positive women vaginal delivery since viral transmission can occur either during vaginal birth or during the cesarean. In case of HCV-HIV coinfection, the decision must depend on the status of the patient's HIV infection at 34 weeks.¹⁵
- Offer vaginal delivery: *SARS-Cov-2*: For positive women with mild/moderate symptoms, offer vaginal delivery since vertical transmission is low. In severe or critical COVID-19 patients, cesarean delivery may follow owing to concern for acute maternal and/or fetal decompensation and because long induction is difficult to organize logistically.⁴
- Plan cesarean delivery: *Active herpes simplex virus (HSV)*: At start of labor/rupture of membranes also with history of third-trimester genital HSV with symptoms: visible active genital lesions/symptoms; burning/itching/pain may cause viral shedding.

- Offer vaginal delivery: Rupture of membranes >6 hours or no visible herpes lesions: no clear advantage of a cesarean for the neonate.
- Offer vaginal delivery when there are no active genital lesions/symptoms. Active but nongenital lesions should be covered during labor and delivery.
- *Obesity. Pursue vaginal delivery*
 - Offer vaginal delivery with a body mass index (BMI) <50 kg/m². Associated risks of cesarean delivery are infection and delayed recovery, while with induction of labor and TOLAC the risks are postpartum hemorrhage. Consequently, each birth unit should develop protocols for the timing of delivery in obese women approaching term, considering the increased risk of stillbirth after 40 weeks of gestation.
- *Cardiac diseases. Pursue vaginal delivery unless obstetric indications*¹⁶
 - Plan cesarean delivery in absence of epidural analgesia.
 - Plan cesarean delivery when patient on warfarin/anticoagulant with a therapeutic international normalized ratio (INR), increased risk of fetal hemorrhage.
 - Perform emergency cesarean in case of aortic dissection.
 - Plan cesarean delivery in presence of progressive ascending aortic enlargement >45 mm in a patient with Marfan syndrome.
 - Perform cesarean delivery when a patient requires rapid intervention and stabilization.
- *Myasthenia gravis*
 - Offer vaginal delivery in the absence of other obstetric indications for cesarean delivery.

10.3 | Offer only cesarean delivery: Maternal pelvic pathologies¹⁷

- *Congenital uterine anomalies (CUA)*
 - Plan cesarean delivery for prior extensive transmyometrial uterine surgery and reconstructive surgeries used to repair congenital uterine anomalies.
 - Plan cesarean delivery for septate uterus (class U2), bicorporal (class U3), or hemi-uterus (class U4) due to the increased rate of malpresentation.¹⁸
- *Pelvic mechanical obstacle*
 - Plan cesarean delivery for previous severely displaced pelvic fracture.
 - Plan cesarean delivery for large cervical fibroid and/or lower uterine segment fibroids that distort the uterus.
- *Prior myomectomy*
 - Plan cesarean delivery for prior extensive myomectomy at 36–37 weeks, less extensive at 39 weeks.
- *Invasive cervical cancer*
 - Plan cesarean delivery
- *Bowel and pelvic floor indications*
 - Plan cesarean delivery for active perianal inflammatory bowel disease.

- Plan cesarean delivery for history of repair of a rectovaginal fistula or pelvic organ prolapse.

10.4 | Cesarean delivery (offer option for vaginal delivery) for fetal size/position/risks¹⁹

- **Breech presentation: expertise required for vaginal delivery or external cephalic version (ECV)**
 - Discuss options and assess ECV. For patients presenting in breech presentation, the pros and cons of a vaginal birth following ECV versus an elective cesarean should be discussed. Adopting a unified protocol for breech presentation will provide unified management protocols and will offer options to the patient before labor, thereby reducing adverse operator variability.
 - Offer ECV for uncomplicated single breech pregnancy after 36⁺⁰ weeks. If the first attempt fails, ECV may be repeated.
 - Assess ECV contraindications: patient in labor, compromised fetal condition, rupture of membranes, vaginal bleeding, and other conditions requiring cesarean delivery (placental abruption, pre-eclampsia, etc).¹⁶
 - Plan cesarean delivery if breech is confirmed by ultrasound after 39⁺⁰ weeks.
- **Transverse fetal lie ECV versus cesarean delivery**
 - Assess delivery modality based on diagnosis. Patient is/not in labor or membranes have ruptured, singleton or twin pregnancy, and fetus is alive or not.
 - Offer ECV: Intact membranes, singleton fetus, before/early labor. Offer ECV at 37 weeks, repeat at 38–39 weeks if it fails, followed by cesarean at 39 weeks.
 - Perform urgent cesarean delivery if the patient is in active labor.
 - Perform urgent cesarean delivery if singleton fetus >34 weeks with ruptured membranes.
 - Offer ECV: Transverse lie of second twin after delivery of first twin. Based on expertise, consider internal version to breech presentation followed by breech extraction. Cesareans are also an option.
 - Offer ECV: Fetal demise or previable fetus. Convert to vertex regardless of membrane status, followed by induction of labor or augmentation.
 - Perform urgent cesarean delivery for cord prolapse fetal and distress.
- **Offer vaginal birth: Intrauterine growth restriction:** There is no convincing evidence indicating that cesarean delivery reduces the risk of hypoxia/asphyxia during labor or even at early gestational age (23 weeks).
- **Suspected fetal macrosomia: Vaginal versus cesarean delivery approach. Ultrasound has limitations:** The major concern is shoulder dystocia while being aware that ultrasound measurements can be inaccurate, leading to wrong clinical decisions and excess cesareans performed despite normal fetal weight. **Shoulder dystocia risk prediction is inaccurate:** At least 50% of

pregnancies complicated by shoulder dystocia have no identifiable risk factors and most risk factors are weakly predictive of morbidity from shoulder dystocia. Patient/physician should coordinate care.²⁰

- Plan cesarean delivery: fetus >5000 g—nondiabetics. Per ACOG guidance, this approach is reasonable. Optimally, ultrasound will estimate fetal weight within 1 week prior to birth, while being aware of inherent errors in ultrasound measurements. Dystocia risk >20%.
- Plan cesarean delivery: Prior shoulder dystocia and severe neonatal injury. The risk of repeat dystocia is low (around 10%). However, additional risk factors such as increased fetal weight and diabetes in the current pregnancy may lead toward cesarean delivery.
- Plan cesarean: >4500 g fetus—diabetics: estimated risk of shoulder dystocia >15%.¹⁷
- **Mechanical obstacle to vaginal birth (macrocephaly)²¹**
 - Offer vaginal birth: Fetal ventriculomegaly, but normal head circumference measured, and in the absence of other obstetric indications.
 - Plan cesarean delivery: Fetal macrocephaly, only when the head circumference is >40 cm, large head.¹⁹
- **Twin/multifetal pregnancy: vaginal versus cesarean delivery**
 - Offer vaginal delivery: Diamniotic twins when at onset of labor the presenting twin is cephalic and there is expertise in internal and external version and/or vaginal breech delivery in the birth unit.
 - Plan cesarean delivery: Diamniotic twins with a noncephalic-presenting twin, monoamniotic twins, and in the presence of other obstetric indications for cesarean.

11 | PREVIOUS CESAREAN: SUPPORT TOLAC PROGRESSING TO VBAC AS SUCCESS RATES ARE HIGH

A trial of labor after cesarean (TOLAC) is a viable option for most women with one previous low-segment transverse cesarean after the physician has discussed the risks of maternal and neonatal morbidity and mortality. Current data support TOLAC since success rates are high.²² Prenatal evaluation of the case, when records are available, is essential for the decision process. Also important is the indication for the previous cesarean and outcome, benefits/risks related to the elective repeat cesarean versus TOLAC followed by VBAC, and the facility's own experience. After prior cesarean there is a preferred interdelivery interval through VBAC. In contrast, the risks associated with successive cesarean delivery are progressively increased and therefore indications should also be evaluated carefully. Overall, a previous successful vaginal birth, or the patient entering labor spontaneously will increase VBAC success. This was recently documented even after two previous cesarean deliveries.²³

Ultrasound measurement value for TOLAC is limited. The uterine thickness cut-off to allow TOLAC has not yet been defined, although

an association between uterine wall thinning and rupture has been reported²³ Thus, ultrasound measurements should not be used as a reliable tool to evaluate if a woman can attempt TOLAC.

- **TOLAC indications**
 - Determine gestational age, fetal weight, and potential placental abnormalities.
 - Document previous cesarean mode and outcome. Obtain details as much as possible.
 - Discuss risks/benefits of TOLAC versus repeat cesarean. In contrast with TOLAC, repeat cesarean deliveries progressively increase the incidence of scar formation, adhesions, bowel injury, placental abnormalities previa and accreta, blood transfusions, infection, and need for hysterectomy.
 - Discuss future pregnancy plans: Whether more than two pregnancies are planned and TOLAC or elective repeated cesarean (ERCD) is to be chosen.
 - Twin pregnancy vertex can proceed to TOLAC.
 - Plan TOLAC: written ahead of time and with an agreed final plan.
- **TOLAC contraindications**
 - Vertical scar or T incision should undergo ERCD.
 - Single uterine layer closure in previous cesarean increases the risk of uterine rupture.
 - Previous uterine rupture: perform ERCD.
- **VBAC associated risks**
 - Maternal death: lower rate than ERCS, but both risks are low.
 - Uterine rupture: rate low after one cesarean (<0.5%), but risks increase with >2 previous cesareans.
 - Gestational age: >40 weeks increased risk of uterine rupture.
 - Breech presentation: VBAC not supported by current data.
 - <18 months since previous cesarean poses an increased risk of uterine rupture.
 - Surgical morbidity after ERCS: rates up to four times higher therefore VBAC is preferable.
- **Factors decreasing VBAC success**
 - Maternal age: ≥35 years compounding maternal factors.
 - Maternal weight: BMI >30 increases risk of macrosomia, difficult delivery.
 - Fetal weight: >4000g increases the risk of dystocia.
 - Pre-eclampsia/infection requiring advanced maternal/fetal management.
 - Previous dystocia requiring prior cesarean delivery.
- **Labor induction methods for VBAC success**
 - Foley catheter introduced into cervix and inflated—no increased uterine rupture.
 - Cervical balloon following specific instructions—no increased uterine rupture.
 - Careful oxytocin infusion induction and augmentation to reduce uterine rupture risk.
 - Rupture of membranes only in active labor—no increased uterine rupture.
 - No prostaglandins—use contraindicated.

- **Recommendations during TOLAC in the delivery room**
 - Staff in the birth unit should be aware of the presence of a patient undergoing TOLAC (not only the gynecologist, but also anesthesiologist, neonatologist, midwives, surgery room staff).
 - The birth unit should be ready for emergency cesarean if required.
 - Continuous electronic fetal monitoring is mandatory.
 - One-to-one midwife assistance during TOLAC should be considered.
 - Consider offering childbirth analgesia.
 - Blood should be available for transfusion.
 - Labor progress—line of action: lack of progress with correct uterine contractility for 2–3h needs reassessment for the possibility of cesarean delivery.
- **Training to increase VBAC safety**
 - Train young gynecologists during counseling and prenatal evaluation of women with a previous cesarean.
 - Train midwives in counseling women with a previous cesarean in special classes during childbirth training courses (explaining that electronic fetal monitoring is mandatory, but immobilization is not recommended, possibility of telemetry use, involvement of the partner).
 - Identify signs of uterine rupture: clinical and cardiotocographic.
 - Organize audits and collect data on all cases of TOLAC, both those ending in VBAC or emergency cesarean delivery.

12 | ELECTIVE CESAREAN ON MATERNAL REQUEST: MINIMIZE OCCURRENCE BY ENGAGING IN EFFECTIVE DIALOG

The article in this Supplement by Ramasauskaite et al.²⁴ discusses this in more detail. Developing an effective dialog between obstetrician and patient is crucial for understanding the risks or potential advantages.

- Not medically justified: A cesarean delivery performed without a medical or obstetric indication is ethically questionable. If a woman requests a cesarean, it is necessary to investigate and discuss this request, considering age, body mass index, accuracy of estimated gestational age, reproductive plans, personal values, cultural context, and previous trauma, violence, or poor obstetric outcomes.
- Fear of labor: If the choice for a cesarean is motivated by fear of labor, it is advisable to offer adequate psychological support as soon as possible during pregnancy and to propose and discuss an eventual epidural analgesia during labor.
- Right to refuse care: It is important to emphasize that in the absence of a correct maternal or fetal indication, a plan for vaginal delivery is safe and should be recommended. A clinician has the right to refuse the request for a cesarean delivery and, in this case, the woman should be offered the possibility of a second opinion.
- Cesarean after 39 weeks. Cesarean delivery on maternal request should not be performed before 39 weeks. Neonatal respiratory

morbidity rate, transient tachypnea, respiratory distress syndrome, and persistent pulmonary hypertension are increased in cases of elective cesarean compared with vaginal delivery when delivery is earlier than 39 weeks.¹⁰

- Patients should be counseled on the risks of placenta previa, placenta accreta spectrum, and hysterectomy, which increase with each subsequent cesarean delivery.²⁰

13 | CONCLUSION

In summary, performing a cesarean delivery is more complex than vaginal delivery. Any site that offers childbirth services should be able to perform cesarean delivery. However, the current reality is different. The optimal scenario is a midwife-led birth center close to a hospital where cesarean delivery can be performed. This is because for a low-risk woman in labor, vaginal delivery can take place with minimal intervention. This enables the hospital to take care of patients who require advanced care, including cesareans. However, in LMICs and rural centers, even in the USA, these facilities are limited since many hospitals have fewer than 500 deliveries per year. The aim of the present paper was to define the minimal facilities, staffing, surgical tools, nursing care, blood bank, laboratory resources, and newborn care that are required for safe management of maternal and fetal outcomes. These minimal requirements significantly reduce poor outcome rates. If these basic elements are not available, alternative options should include the ability to transfer patients in a timely manner to a facility previously identified to perform cesarean delivery. The indications for planned and emergency procedures are described, including that the low transverse approach using the Misgav Ladach method is preferable. Furthermore, management of the patient based on the Prep-for-Labor criteria is described, enabling effective decision-making. Finally, the specific indications that may lead to cesarean or TOLAC are discussed. Defining the conditions and the decision-making process will enable the practitioner to rapidly identify which underlying maternal and fetal conditions will lead to a decision to proceed with a cesarean or a TOLAC. Overall, it is expected that by better defining when to proceed with a cesarean, the epidemic of cesarean delivery will be reduced toward the estimated desired rate of 20%. This will go a long way to improving current childbirth management.

AUTHOR CONTRIBUTIONS

Eytan R. Barnea conceived the article. Eytan R. Barnea, Annalisa Inversetti, and Nicoletta Di Simone prepared the draft.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed.

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APPENDIX A

FIGO CHILDBIRTH AND POSTPARTUM HEMORRHAGE COMMITTEE

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