# Cesarean Delivery & Vaginal Birth after Cesarean Delivery Guidelines

Compared with vaginal delivery, a properly performed cesarean delivery (CD) carries no increased risk for the fetus; however, the risk of maternal morbidity and mortality is higher. Cesarean delivery is preferred when the benefits for the mother, fetus, or both outweigh the risk of the procedure for the mother.

Recent studies reaffirm earlier recommendations of the world health organization (WHO), about optimal C-section rates, addressing that the best outcomes of mothers and babies appear to occur with CD rates of 10-15%, while rates above 15% seem to do more harm than good. [1]

Caesarean delivery rate had been increased all over the world and Iraq is one of them with the latest Iraqi MOH report for 2014, it has been shown that the overall percentage of CS in the public hospitals was 33.4%, where it could approach 40% in some governorates as Baghdad. [2]

## Indication for Cesarean Delivery: [3, 4]

- **Planned CS:**

**1- Breech presentation:** For uncomplicated singleton breech pregnancy, external cephalic version need to be offered at 36 weeks' gestation (If there is an experience in that) and no contraindications for version. Otherwise pregnant women with a singleton breech presentation at term, for whom external cephalic version is contraindicated or has been unsuccessful, should be offered CS because it reduces perinatal mortality and neonatal morbidity.
While in multiparous woman with spontaneous onset of labour and when she has no contraindications for vaginal breech delivery with availability of experienced attendant, vaginal breech delivery could be allowed.

2- **Multiple pregnancy**: Women with either cephalic/cephalic-presenting twins or cephalic/noncephalic presenting twins should be counseled to attempt vaginal delivery. But in twin pregnancies where the first twin is not cephalic the effect of CS in improving outcome is uncertain, but current practice is to offer a planned CS.

3- **Preterm birth**: CS should not routinely be offered as there is uncertain decrement in neonatal morbidity and mortality.

4- **Small for gestational age**: improvement of neonatal outcome with planned CS in uncertain so routine CS in such cases is unnecessary.

5- **Placenta praevia**: should offer CS for minor or major placenta praevia.

6- **Morbidly adherent placenta**: CS need to be done for these cases. For proper management of such cases (please see placenta praevia & placenta accrete protocol).

**Mother-to-child transmission of maternal infections**: [7]

* **HIV**: There is insufficient evidence that a CD prevents mother-to-child transmission of HIV. Offer a CD to women with HIV who:

- Are not receiving any anti-retroviral therapy.

-Women on highly active anti-retroviral therapy (HAART) with a viral load of more than 400 copies per ml.

- Women on any anti-retroviral therapy with a viral load of more than 50 copies per ml.

***Hepatitis B virus**: Pregnant woman infected with this virus, should not offer a planned CD. Mother-to-child transmission of hepatitis B can be reduced if the baby receives immunoglobulin and vaccination.

* **Hepatitis C virus**: Pregnant woman infected with this virus, should not offer a planned CD.

* **Pregnant women who are co-infected with hepatitis C virus and HIV:** should be offered a planned CD because it reduces mother-to-child transmission of both hepatitis C virus and HIV.

***Herpes simplex virus (HSV)**: Women with primary genital herpes simplex virus (HSV) infection occurring in the third trimester of pregnancy should be offered a planned CD, but not for recurrent cases of HSV.

8- **CD on request:**

If a woman requests a CD when there is no other indication, discuss the overall risks and benefits of CD compared with vaginal birth and record that this discussion has taken place. Include a discussion with other members of the obstetric team (including the consultant obstetrician and anesthetist) if necessary to explore the reasons for the request, and ensure the woman has accurate information.

Cesarean delivery on request is not recommended in Iraq, as being a country with a high fertility rate.

9- **Previous classic cesarean section delivery.**

**10- Previous myomectomy with entrance into the uterine cavity.**

11- **Previous uterine reconstruction surgery.**

12- **Past history of repair of vesico-vaginal or recto-vaginal fistula or stress incontinence.**

**13- Previous uterine incision dehiscence.**

**14- Obstructive pelvic mass.**

**15- Invasive cervical cancer.**

- **Dystocia and failed induction of labor (Intrapartum):**

  **Note to remember:**

  - Do not use clinical pelvimetry alone in decision making about mode of birth because it is not useful in predicting 'failure to progress' in labour.
  - Do not use shoe size, maternal height and estimations of fetal size (ultrasound or clinical examination) to predict 'failure to progress' during labour because they do not accurately predict cephalopelvic disproportion.

1- Cephalopelvic disproportion with failure to descend, or arrest of descent or dilation.
2- Failure to progress in normal-size infant, usually because of fetal malposition or posture.
3- Failed forceps or vacuum extractor delivery.
4- Certain fetal malformations that may obstruct labor (i.e., large hydrocephalus, sacrococcygeal tumor).
5- Fetal malpresentations (Shoulder, brow, face – mentoposterior)

- **Emergent conditions that warrant immediate delivery:**

1-Abruptio placentae with antepartum or intrapartum hemorrhage.

- With alive fetus at viable gestation and early in labour.
- For maternal sake regardless of fetal status with severe vaginal bleeding while expecting long duration of labour.

2- Umbilical cord prolapse.
3- Pathological fetal heart tracing in the form of: [5]

  - Base line rate: < 100 bpm.

- Variability: reduced, increased or sinusoidal pattern.
- Decelerations: repetitive late or prolonged for > 30 min (or > 20 min if reduced variability) or one prolong deceleration > 5 min.

In those cases where fetal hypoxia/acidosis is anticipated or suspected, an action is required to avoid adverse neonatal outcome, this does not necessarily mean an immediate CD or instrumental vaginal delivery. The underlying cause for the appearance of the pattern can frequently be identified and the situation reversed, with subsequent recovery of adequate fetal oxygenation and the return to a normal tracing. Otherwise the mode of delivery will be determined depend on the stage of labour. (see appendix I)

4- Intrapartum fetal acidemia, with intrapartum scalp pH of less than 7.20.

5- Uterine rupture.

6- Perimortem CD. (see appendix II)[6]

## Factors affecting likelihood of CS during intrapartum care:

**Factors that can safely reducing the likelihood of primary CS:** [3, 4]

***First stage of labor*:**

1- Offer induction of labour beyond 41 weeks,to women with an uncomplicated pregnancy because this reduces the risk of perinatal mortality and the likelihood of CD.

2- Continuous support during labour from women with or without prior training (family member, relative or friend) reduces the likelihood of CD.

3- A prolonged latent phase (eg, greater than 20 hours in nulliparous women and greater than 14 hours in multiparous women) should not be an indication for CD.

4- Slow but progressive labor in the first stage of labor should not be an indication for CD.

5- Cervical dilation of 6 cm should be considered the threshold for the active phase of most women in labor. Thus, before 6 cm of dilation is achieved, standards of active phase progress should not be applied.

6- A partogram with a 4-hour action line should be used to monitor progress of labour of women in spontaneous labour with an uncomplicated singleton pregnancy at term. Cesarean delivery for active phase arrest in the first stage of labor should be reserved for women at or beyond 6 cm of dilation with ruptured membranes who fail to progress despite 4 hours of adequate uterine activity, or at least 6 hours of oxytocin administration with inadequate uterine activity.

7- Consultant obstetricians (or more senior doctors) should be involved in the decision making for primary CD, since this reduces the likelihood of CD.

5- Electronic fetal monitoring is associated with an increased likelihood of CD. When CD is contemplated because of an abnormal fetal heart rate pattern, in cases of suspected fetal acidosis, fetal blood sampling should be offered if it is technically possible and there are no contraindications.Scalp stimulation can be used as analternative method for assessing fetal acid–base status when abnormal or indeterminate (formerly, nonreassuring) fetal heart patterns (eg, minimal variability) are present.

6-Amnioinfusion for repetitive variable fetal heart rate decelerations may safely reduce the rate of cesarean delivery, (though still not available in Iraq).

*Second stage of labor*:

1- A specific absolute maximum length of time spent in the second stage of labor beyond which all women should undergo operative delivery has not been identified.

2- Before diagnosing arrest of labor in the second stage, if the maternal and fetal conditions permit, can allow for the following (As long as labour being progressing):

- At least 1 hours of pushing in multiparous women (2 hours with epidural analgesia).
- At least 2 hours of pushing in nulliparous women (3 hours with epidural analgesia).

3- Operative vaginal delivery in the second stage of labor by experienced and well trained obstetrician should be considered a safe, acceptable alternative to CD. Training in, and ongoing maintenance of, practical skills related to operative vaginal delivery should be encouraged.

4- Manual rotation of the fetal occiput in the setting of fetal malposition in the second stage of labor is a reasonable intervention to consider before moving to operative vaginal delivery or CD. In order to safely prevent CDs in the setting of malposition, it is important to assess the fetal position in the second stage of labor, particularly in the setting of abnormal fetal descent. (This need an experience in doing the maneuver).

*Induction of labor*:

1- Cervical ripening methods should be used when labor is induced in women with an unfavorable cervix.

2- If the maternal and fetal status allow, CDs for failed induction of labor in the latent phase can be avoided by allowing longer durations of the latent phase (up to 24 hours) and it can be repeated in another session. If the membrane ruptured, then oxytocin can be administered for at least 12–18 hours before deeming the induction a failure.

**Factors has no influence on the likelihood of CD:**

These factors have no influence on the likelihood of CD, although they may affect other outcomes:

1-Walking in labour.
2- Non-supine position during the second stage of labour.
3- Epidural analgesia during labour.
4- Active management of labour.
5- Early amniotomy.

## Preoperative care:

**1- Patient consent: (see appendix III)**

**2- Eating during labour:** Women should be informed that eating a low-residue diet during labour (toast, crackers, low-fat cheese) results in larger gastric volumes, but the effect on the risk of aspiration if anaesthesia is required is uncertain.
Having isotonic drinks during labour prevents ketosis without a concomitant increase in gastric volume.

**3- Timing of antibiotic administration:**

- Offer women prophylactic antibiotics at CD before skin incision. Inform them that this reduces the risk of maternal infection more than prophylactic antibiotics given after skin incision, and that no effect on the baby has been demonstrated. It should be administered within 60 minutes before the start of planned CD and for emergent one it should be given as soon as it is feasible.

- Choose antibiotics effective against endometritis, urinary tract and wound infections, which occur in about 8% of women who have had a CD.

- A 1-g cefazolin is an efficacious and cost effective choice and 2-g for obese woman, or can use extended spectrum penicillin. In case of allergy to penicillin or cephalosporin, then single dose 600 mg clindamycin with aminoglycoside, or any appropriate alternative available.

- Do not use co-amoxiclav when giving antibiotics before skin incision.

## Procedural aspects of CD

- **Timing of CD:**

**1- Timing of planned CD:**

To decrease the risk of respiratory morbidity in the delivered babies, the planned CD should not be carried out before 39 weeks (Unless otherwise indicated), and antenatal corticosteroids should be given to all women for whom an elective CD is planned prior to 38+6 weeks of gestation.

**2-Timing of unplanned CD:**

**Classification of urgency:**

The previous classification of emergency & planned CD had been replaced by planned and unplanned CD.

Determine the urgency of CDand decision to delivery interval according to the following CD grades, where unplanned CD include grade 1 & 2:

1- **Immediate threat to the life of the woman or fetus** (**Category 1 CD**)and delivery need to be accomplished within 30 minutes (cases as acute fetal bradycardia, cord prolapse, uterine rupture, fetal blood sampling less than 7.2).
2- **Maternal or fetal compromise which is not immediately life-threatening** (**Category 2 CD**)and delivery need to be accomplished within 30 and 75 minutes (as antepartum haemorrhage, failure to progress in labour with maternal or fetal compromise).
3- **No maternal or fetal compromise but needs early delivery** (i.e. woman booked for planned CD who is admitted with prelabour spontaneous rupture of membraneor failure to progress with no maternal or fetal compromise).
4- **Delivery timed to suit woman or staff**, including all elective CD that will carried out at planned time.

**Preoperative testing and preparation for CD:**

1- Blood test:
   - Complete blood pictureassessment before CD to identify those who have anaemia. Although blood loss of more than 1000 ml is infrequent after CD (it occurs in 4–8% of CD) it is a potentially serious complication.Caesarean delivery for antepartum haemorrhage, abruption, uterine rupture and placenta praevia are at increased risk of blood loss of more than 1000 ml and should have the CD carried out at a maternity unit with on-site blood transfusion services.
   - Grouping and saving of serum.
   - Cross-matching of blood.

- Blood sugar.
- General urine exam.
- Renal function tests.
- Clotting screening for complicated cases.

2- Preoperative ultrasound for localization of the placenta.
3- Urinary catheter to be inserted with regional anaesthesia to prevent over-distension of the bladder because the anaesthetic block interferes with normal bladder function.

**Anaesthesia for CD:**

- **Regional anaesthesia**: should be offered because it is safer and results in less maternal and neonatal morbidity than general anaesthesia. This includes women who have a diagnosis of placenta praevia.
- Women who are having a CD under regional anaesthesia should be offered intravenous ephedrine or phenylephrine, and volume pre-loading with crystalloid or colloid to reduce the risk of hypotension occurring during CD.
- **General anaesthesia**: for unplanned CD should include preoxygenation, cricoid pressure and rapid sequence induction to reduce the risk of aspiration.
- Each maternity unit should have a drill for failed intubation during obstetric anaesthesia.
- To reduce the risk of aspiration pneumonitis women should be offered antacids and drugs (such as H2 receptor antagonists or proton pump inhibitors) to reduce gastric volumes and acidity before CD.
- The operating table for CD should have a lateral tilt of 15°, because this reduces maternal hypotension.

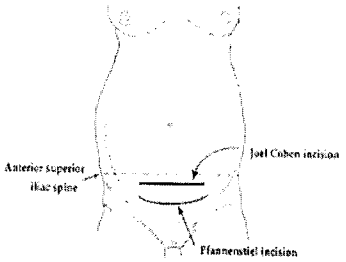
**Accommodate women's preferences for the birth atmosphere where possible**:
As music playing in theatre, lowering the screen to see the baby born, or silence so that the mother's voice is the first the baby hears.

**Surgical techniques for CD:**

1- **Methods to prevent HIV transmission in theatre**: Healthcare professionals should wear double gloves when performing or assisting at CD on women who have tested positive for HIV, to reduce the risk of HIV infection of healthcare professionals during surgery. Otherwise general recommendations for safe surgical practice should be followed at CD to reduce the risk of HIV infection of staff.

2- **Abdominal wall incision:**a transverse abdominal incision need to be used because this is associated with less postoperative pain and an improved cosmetic effect compared with a midline incision.

The transverse incision of choice should be the **Joel Cohen incisiona** straight skin incision, 3 cm above the symphysis pubis or **Pfannenstiel incision**; subsequent tissue layers are opened bluntly and, if necessary, extended with scissors and not a knife, because it is associated with shorter operating times and reduced postoperative febrile morbidity.




**3-Extension of the uterine incision:** With a well-formed lower uterine segment, blunt rather than sharp extension of the uterine incision should be used because it reduces blood loss, incidence of postpartum haemorrhage and the need for transfusion at CD.

**4- Fetal laceration:** risk of fetal lacerations is about **2%.**

**5- Use of forceps:** Forceps should only be used at CD if there is difficulty delivering the baby's head.

**6- Use of uterotonics:** Oxytocin 5 IU by slow intravenous injection should be used at CD to encourage contraction of the uterus and to decrease blood loss.

**7- Method of placental removal:** Placenta should be removed using controlled cord traction and not manual removal at CDas this reduces the risk of endometritis.

**8- Exteriorization of the uterus:** Is not recommended because it is associated with more pain and does not improve operative outcomes such as haemorrhage and infection.

**9- Closure of the uterus:** The uterine incision should be sutured with two layers. The effectiveness and safety of single layer closure of the uterine incision is uncertain.

**10- Closure of the peritoneum:** Neither the visceral nor the parietal peritoneum should be sutured at CD because this reduces operating time and the need for postoperative analgesia, and improves maternal satisfaction.

**11- Closure of the abdominal wall:** In the rare circumstances that a midline abdominal incision is used at CD, mass closure with a slowly absorbable continuous sutures should be used because this results in fewer incisional hernias and less dehiscence than layered closure

**12- Closure of subcutaneous tissue:** Routine closure of the subcutaneous tissue space should not be used, unless the woman has more than 2 cm subcutaneous fat, because it does not reduce the incidence of wound infection.

**13- Use of superficial wound drains:** Superficial wound drains should not be used at CD because they do not decrease the incidence of wound infection or woundhaematoma.

**14- Closure of the skin:** Effects of different suture materials or methods of skin closure at CD are not certain.

**15- Umbilical artery pH measurement:**Umbilical artery pH should be performed after all CD for suspected fetal compromise, to allow review of fetal wellbeing and guide ongoing care of the baby.

**Postoperative care:**

**1-Recovery following CD:** Give the woman the opportunity to discuss with healthcare professionals the reasons for the CD and provide both verbal and printed information about the birth options for any future pregnancies.

**2- Thromboprophylaxis for CD:** Women having a CD should be offered thromboprophylaxis because they are at increased risk of venous thromboembolism. The choice of method of prophylaxis (for example, graduated stockings, hydration, early mobilisation, low molecular weight heparin) should take into account risk of thromboembolic disease.

**3 - Care of the baby born by CD:** An appropriately trained practitioner skilled in the resuscitation of the newborn should be present at CD performed under general anaesthesia **or** where there is evidence of fetal compromise. Thermal care for babies born by CD is needed as those babies are more likely to have a lower temperature.

**4-Early maternal baby contact (skin-to-skin)**: is encouraged and facilitated since it improves maternal perceptions of the infant, mothering skills, maternal behaviour, and breastfeeding outcomes, and reduces infant crying.

**5- Breast Feeding:** Women who have had a CD are less likely to start breastfeeding in the first few hours after the birth, but when breastfeeding is established, they are as likely to continue as women who have a vaginal birth, so she need additional support to start early breast feeding.

**6- Intensive therapy unit admission:** it is rare for women to need intensive care following childbirth, this occurs more frequently after CD (about 9 per 1000).

**7- Routine monitoring after CD:** After CD, women should be observed on a one-to-one basis by a properly trained member of staff until they have regained airway

control and cardiorespiratory stability and are able to communicate. After recovery from anaesthesia, observations (respiratory rate, heart rate, blood pressure, pain and sedation) should be continued every half hour for 2 hours, and hourly thereafter provided that the observations are stable or satisfactory. If these observations are not stable, more frequent observations are recommended.

**8- Pain management after CD:** Providing there is no contraindication, non-steroidal anti-inflammatory drugs should be offered post-CD as an adjunct to other analgesics, because they reduce the need for opioids.

**9- Early eating and drinking after CD:** Women who are recovering well after CD and who do not have complications can eat and drink once the bowel activity regained.

**10- Urinary catheter removal after CD:** Removal of the urinary bladder catheter should be carried out once a woman is mobile after a regional anaesthetic.

**11- Respiratory physiotherapy after CD:** Routine respiratory physiotherapy does not need to be offered to women after a CD under general anaesthesia, because it does not improve respiratory outcomes.

**12- Length of hospital stay and readmission to hospital:** Length of hospital stay is likely to be longer after a CD (an average of 3–4 days) than after a vaginal birth (average 1–2 days). However, women who are recovering well, are apyrexial and do not have complications following CD should be offered early discharge (after 24 hours) from hospital and follow-up (if possible) at home, because this is not associated with more infant or maternal readmission.

**Recovery following CS**: In addition to general postnatal care, women who have had a CD should be provided withspecific care related to recovery after CD:

- **Analgesia**: Women encouraged to take regular analgesia for postoperative pain, using for severe pain, co-codamol with added ibuprofen (500 mg twice daily). For moderate pain, co-codamol (1-2 tab. Four times daily) and for mild pain, paracetamol (1000 mg twice daily).

- **CD wound care**: Should include removing the dressing 24 hours after the CD, specific monitoring for fever, assessing the wound for signs of infection (such as increasing pain, redness or discharge), separation or dehiscence. Encouraging the woman to wear loose, comfortable clothes and cotton underwear and gently cleaning and drying the wound daily. If needed, planning the removal of sutures.

-**Urinary symptoms**: If any develop, then should consider the possible diagnosis of, urinary tract infection, stress incontinence (occurs in about 4% of women after CD), urinary tract injury (occurs in about 1 per 1000 CD).

- **Vaginal bleeding:** If it isheavy and/or irregular should consider that this is more likely to be due to endometritis than retained products of conception.

- **Pay attention to chest symptoms** (such as cough or shortness of breath) or **leg symptoms** (such as painful swollen calf). As women with CD are at increased risk of thromboembolic disease (both deep vein thrombosis and pulmonary embolism).

- **Activities**: As driving a vehicle, carrying heavy items, formal exercise and sexual intercourse can be resumed once they have fully recovered from the CD.

## Vaginal birth after cesarean birth (VBAC):[7]

### Planned VBAC:

Refers to any woman who has experienced a prior caesarean birth who plans to deliver vaginally rather than by ERCD (elective repeat caesarean delivery).A vaginal birth (spontaneous or assisted) in a woman undergoing planned VBAC indicates a successful VBAC. Birth by emergency caesarean delivery during the labour indicates an unsuccessful VBAC.

Previous cesarean delivery is no longer a contraindication to subsequent labor and a vaginal birth. All women who are candidates should be counseled adequately and encouraged to attempt a vaginal birth and a final decision for mode of birth should be agreed between the woman and her obstetrician before the expected / Planned delivery date (ideally by 36 weeks of gestation) and labour plan should be documented.

### Candidates for a Trial of Labor:

**1-Type of Prior Uterine Incision:** A transverse scar confined to the lower uterine segment have the lowest risk of symptomatic scar separation during a subsequent pregnancy.

**2-Prior Uterine Rupture:** A previous uterine rupture increased the risk for recurrence during a subsequent attempted VBAC.

**3- Closure of Prior Incision**: A single-layer closure associated with nearly a fourfold increased risk of rupture compared with a double-layer closure.

**4-Interdelivery Interval:** complete uterine involution and restoration of anatomy may require at least 6 months. A threefold increased risk of uterine rupture in women with an inter pregnancy interval of less than 6 months. However, inter

pregnancy intervals of 6 to 18 months did not significantly increase the risk of uterine rupture or maternal morbidity.

**5- Number of Prior Cesarean Incisions:** The risk of uterine rupture would be increased with the number of previous CDs.

**6- Prior Vaginal Delivery:** Any previous vaginal delivery, particularly if VBAC is the single best predictor of successful VBAC and associated with a planned VBAC success rate of 85 -90%. Previous vaginal delivery is also independently associated with a reduce risk of uterine rupture.

**7- The indication for the previous cesarean delivery**: VBAC is more successful if the cause is not repetitive, for example; breach presentation or fetal distress compared to dystocia.

**8- Fetal Size:** It has not been conclusively proven that increasing fetal size increases the risk for uterine rupture with VBAC.

**9- Maternal Obesity:** Obesity decreases the success of VBAC.

## Factors need to be considered in selecting a candidate for VBAC:

- One previous prior low-transverse cesarean delivery.
- Clinically adequate pelvis.
- No other uterine scars or previous rupture.
- Obstetrician immediately available throughout active labor capable of monitoring labor and performing an emergency CD.
- Availability of anesthesia and personnel for emergency CD.

## What are the specific risks and benefits of VBAC:

- **The woman should be informed that, overall, the chances of successful planned VBAC are 72–76%.**
- **Women considering the options for birth after a previous caesarean should be informed about the followings:**

1- Planned VBAC carries a risk of uterine rupture of 1/200. There is virtually no risk of uterine rupture in women undergoing ERCD.
2-Planned VBAC associated with an additional 10/ 10000 prospective risk of antepartum stillbirth beyond $39^{+0}$ weeks of gestation (recommended timing for ERCD).

3-Absolute risk of birth-related perinatal loss (i.e. intrapartum stillbirth or neonatal death) associated with VBAC is extremely low; 4/10000 and comparable to the risk for women having their first birth and one third of death are due to uterine rupture.
4-Neonatal hypoxic ischaemic encephalopathy, affected 8 / 10000 planned VBACs & 60 % of cases are due to uterine rupture.
5- Planned VBAC compared with ERCD carries around 1% additional risk of either blood transfusion or endometritis.
6- ERCD compared with planned VBAC increased the risks of transient tachypnea of newborn (4- 5% versus 2–3%)and rates for respiratory distress syndrome ( 0.05% versus 0.5%) especially if the ERCD deliver done before $39^{+0}$ weeks of gestation and when antenatal corticosteroid is not used.
7- ERCS may increase the risk of serious complications in future pregnancies especially in countries where high parity is desired as placenta praevia&/or accrete and pelvic adhesions.
8- Increased risk of maternal death with ERCD in comparison to planned VBAC (13/ 100000 versus 4/100000).
9- Woman should be informed that there is 2-3 fold increased risk of uterine rupture and 1.5 fold increased risk of CD in induced &/or augmented labour compared with spontaneous VBAC delivery.

## Planned VBAC in special circumstances: [7]

*1- Preterm birth:* Planned preterm VBAC has similar success rates to planned term VBAC but with a lower risk of uterine rupture.

*2- Twin gestation, fetal macrosomia, postdate, antepartum still birth, maternal age of 40 years and more, obesity and short inter-delivery interval (less than 12 months since the last delivery):* there is uncertainty in the safety and efficacy of a planned VBAC in such situations but they are not contraindicate VBAC, and need to take them seriously when induction or augmentation of labour is used.

## Intrapartum support and intervention during planned VBAC: [7]

1- Planned VBAC should be conducted in a suitably staffed and equipped delivery suite, with continuous intrapartum care and monitoring and available resources for immediate CD and advanced neonatal resuscitation.
2- Epidural anaesthesia is not contraindicated in planned VBAC.
3- Continuous electronic fetal monitoring should be available following the onset of uterine contractions for the duration of planned VBAC.

4- Continuous intrapartum care is necessary to enable prompt identification and management of uterine scar rupture. The following peripartum findings should raise the concern of the possibility of this event:

- Abnormal CTG.
- Severe abdominal pain, especially if persisting between contractions.
- Chest pain or shoulder tip pain and sudden onset of shortness of breath.
- Acute onset scar tenderness.
- Abnormal vaginal bleeding or haematuria.
- Cessation of previously efficient uterine activity.
- Maternal tachycardia, hypotension or shock.
- Loss of station of the presenting part.

5-The routine use of intrauterine pressure catheters for the early detection of uterine scar rupture is not recommended.

## Factors that could associate with unsuccessful VBAC:

1- No previous vaginal birth.
2- BMI more than 30.
3- Previous CD for dystocia.
4- Postdate.
5- Increase fetal body weight.
6- Cervical dilatation less than 4 cm at admission.
7- Short stature.
8- Male infant.

## Contraindication for VBAC:

1- Previous classical CD.
2- Two or more CD.
3- History of Previous rupture uterus.
4- Other absolute contraindications for vaginal birth irrespective of the presence or absence of a scar (as major placenta praevia).

**References:**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# Appendices:

## I. Fetal Hear monitoring:

**CTG classification**

**2015 revised FIGO guidelines on intrapartum fetal monitoring**

| | Normal | Suspicious | Pathological |
|---|---|---|---|
| **Baseline** | 110-160 bpm | Lacking at least one characteristic of normality, but with no pathological features | < 100 bpm |
| **Variability** | 5-25 bpm | | Reduced variability. Increased variability. Sinusoidal pattern. |
| **Decelerations** | No repetitive* decelerations | | Repetitive* late or prolonged decelerations for > 30 min (or > 20 min if reduced variability). Deceleration > 5 min |
| | | | |
| **Clinical management** | No intervention necessary to improve fetal oxygenation state | Action to correct reversible causes if identified, close monitoring or adjunctive methods | Immediate action to correct reversible causes, adjunctive methods, or if this is not possible expedite delivery. In acute situations immediate delivery should be accomplished |

*Decelerations are repetitive when associated with > 50% contractions.
Absence of accelerations in labour is of uncertain significance.

## II. Perimortem cesarean delivery:

Maternal arrest included trauma, pulmonary embolism, cardiac causes, sepsis, and eclampsia may occur during labour. In such cases performing perimortem cesarean delivery ( PMCD) can improve mother's chance of survival during the collapse. Despite the paucity of data, PMCD infant survival rates as high as 70% have been reported; more recently, successful maternal resuscitations related to expedited delivery of the infant have been reported.it can save the life of both the mother and the infant.

**Indications:**

Several factors must be considered in deciding whether to undertake PMCD:

1- How to estimate the gestational age of the fetus. This information is sometimes difficult to obtain in an emergency situation, and allowing time to perform an ultrasonographic estimate is not practical. Thus, a gross visual estimate may be necessary. As a general rule, the uterus reaches the umbilicus at 20 weeks of gestational age and grows at a rate of approximately 1 cm in length for every week thereafter. Thus, in a relatively thin woman, a fundal height of 8 cm above the umbilicus would likely represent a pregnancy of 28 weeks' gestation.

2- At which gestational age need to be done: Such CD need to be perform during the third trimester as the cardiovascular effects of pregnancy are less pronounced before 28 weeks, and delivery therefore will not achieve dramatic maternal cardiovascular improvement, meanwhile fetal salvageability will be amenable at this gestational age. Before 23 weeks of gestation, aggressive maternal support is the only indicated intervention and if the gestational age is in between 23 and 28 weeks and the institution's nursery has never had a newborn of this early gestational age survive, PMCD is probably not indicated for the sake of the fetus.

3- The length of time between arrest and delivery. The best outcomes in terms of infant neurologic status appear to occur if the infant is delivered within 5 minutes of maternal cardiac arrest. This means the decision to operate must be made and surgery begun by 4 minutes into the arrest. But since infant survivals in deliveries occurring more than 15 minutes after maternal cardiac arrest, then PMCD is worth do it even if there has been some delay after a diagnosed cardiac arrest.

4- Adequate chest compressions and displacement of the gravid uterus off the venous return from the lower extremities are both proven to improve maternal oxygenation. The fetus lives on the steep portion of the oxygen dissociation curve; therefore, relatively minor maternal changes may result in dramatic changes for the fetus. Resuscitative efforts also must include postcesarean infant resuscitation.

5- Documenting fetal heart tones before PMCD is not required, partly because it is time consuming and may negatively impact the baby's outcome and partly because maternal indications for the procedure are emergency concerns regardless of fetal status.

6- Though it is an emergency life saving measure but for potential medicolegal considerations and because of fear of litigation, then the family consent better to be obtained.

**Contraindications:**

- Known gestation less than 24 weeks.

- Return of spontaneous circulation after brief period of resuscitation.

## III. CONSENT FORM:

**1. Name of proposed procedure:**
Caesarean delivery.
**2. The proposed procedure:**
Describe the nature of CD.
**Note:** If any other procedures are anticipated, these must be discussed and a separate consent obtained as decision for sterilization.
**3. Intended benefits:**
To secure the safest and/or quickest route of delivery in the circumstances present at the time the decision is made, where the anticipated risks to mother and/or baby of an alternative mode of delivery outweigh those of caesarean section.
**4. Serious and frequently occurring risks:**

- Woman should be informed that presence of the following conditions will increase the risk during CD:
  - Obesity
  - Presence of significant pathology
  - Previous surgery
  - Pre-existing medical condition
- Complication rates for all caesarean sections are very common.
- Complication rates from CD performed during labour have overall complication rates greater than during a planned procedure (24 / 100 compared with 16 / 100).
- Complication rates are higher at 9–10 cm dilatation when compared with 0–1 cm (33 / 100 compared with 17 / 100).

| Serious Risks | | |
|---|---|---|
| **Uncommon** | **Rare** | **Very rare** |
| **Maternal risks At time of CD** | | |
| Emergency hysterectomy, 7-8/ 1000 | Thromboembolic disease, 4–16 / 10 000 | Death, approximately 1/12 000 |
| Need for further surgery at a later date, including curettage, 5/1000 | Bladder injury, 1/ 1000 | |
| Admission to ICU (highly dependent on reason for caesarean. section), 9/1000 | Ureteric injury, 3/ 10 000 | |
| **Future pregnancies** | | |
| Increased risk of uterine rupture during subsequent pregnancies/deliveries, 2-7/ 1000 | | |
| Increased risk of antepartum stillbirth, 1-4/ 1000 | | |

| | | |
|---|---|---|
| Increased risk in subsequent pregnancies of placenta praevia and placenta accreta, 4-8/1000 | | |
| **Frequent risks** | | |
| **Maternal** | | |
| **Common** | **Very common** | **Uncommon** |
| Persistent wound and abdominal discomfort in the first few months after surgery, 1/100 | Increased risk of repeat caesarean section when vaginal delivery attempted in subsequent pregnancies, 1/4 | Haemorrhage, 5/ 1000 |
| Readmission to hospital, 5/ 100 | | |
| Infection, 6/100 | | |
| **Fetal** | | |
| lacerations, 1-2/ 100 | | |

**5. Any extra procedures which may become necessary during the CD:**

- Hysterectomy
- Blood transfusion
- Repair of damage to bowel, bladder or blood vessels.

**6. CD procedure, benefit and risk of alternative procedure:**

- Delivery of the baby or babies and placenta or placentas through an open approach through an abdominalincision and an incision into the uterus.
- Both incisions are usually transverse. If either a midline abdominalincision or a classical uterine incision is being considered, the woman must be informed of the reasons and theadded risks.
- Sometimes forceps are used to deliver the head, especially with breech presentations.
- The reasonfor the CD must be clearly discussed.
- The risks to mother and/or baby of not performing CD.
- An informed, competent pregnant woman may choose the no-treatment option; that is, she may refuse CD, even when this would be detrimental to her own health or the wellbeing ofher fetus.

**7. Statement of patient: procedures which should not be carried out without furtherdiscussion:**

Other procedures, which may be appropriate but not essential at the time, such as ovarian cystectomy/oophorectomy, should be discussed and the woman's wishes recorded.

**8. Anaesthesia**

- Where possible, the woman must be aware of the form of anaesthesia planned and should be given anopportunity to discuss this in detail with the anaesthetist before surgery.

- It should be noted that, with obesity, there are increased risks, both surgical and anaesthetic.

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