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# Operative Deliveries & c-section

## Objectives:

- Identify the incidence of operative delivery.
- Mention the indications for operative deliveries including the pre-requisites to be fulfilled before applying forceps or ventouse.
- Identify the rate of caesarean deliveries, their mortality and fetal and maternal morbidity.
- Discuss the types of cesarean deliveries and their complications.
- Indicate when a trial of normal labor may be offered after caesarean section delivery.
- Describe the measures to reduce Caesarean section rates.
- Describe common measures for the prevention of infections, deep vein thrombosis and other complications of operative delivery.
- List the key components of postoperative care.

**References:** 435 lecture and notes, Hacker and moore's, Kaplan, 428 booklet, 433 team.

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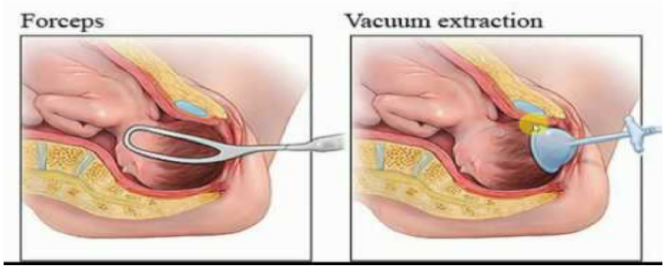
# 1. Operative Vaginal Deliveries:

## ★Definition:

- It is the delivery of the fetus using an *instrument* through the vaginal route.
  (a non-natural "non-spontaneous vaginal" form of delivery)
- Incidence of operative vaginal deliveries is 3.5 %.




## ★Instruments used in operative vaginal delivery:

1. **Forceps**[1] (provide traction and rotation of the fetal head):

   Forceps application is classified according to the station and position of the presenting part at the time the forceps are applied:

   - **Outlet forceps:**[2] The scalp is visible at the introitus without separating the labia "the perineum is extended by the fetal head but the women can't get the head out"
   - **Low forceps:** The leading part of the fetal skull is at station +2 cm or more but didn't reach the pelvic floor.
   - **Mid forceps:** The fetal head is engaged, but fetal head station is between 0 and +2

2. **Vacuum** (ventouse extractor)[3]: a suction cup that is applied to the fetal head and allow it to follow the normal extension > internal rotation as it comes underneath the pubic bone

   - Pup off of the vacuum: when your strength of pulling exceeds the vacuum's suction > NOT GOOD
   - The *vacuum extractor* is **contraindicated in preterm delivery bc the head and scalp are more prone to injury**

We have 4 stages of delivery:
**1st-** Latent (regular contractions) and active phase (acceleration of cervical dilation) to the fully dilatation of the cervix
**2nd-** From the fully dilated cervix to delivery. When this stages becomes too prolonged, we can use operative delivery, instruments, or cesarean, depending on the cervical findings and patient's situation
**3rd-** begins with delivery and ends with expulsion of the placenta
**4th-** The hour immediately following delivery.

forceps vs vacuum
-forceps is more traumatic to the mother but less on the baby
-vacuum is more traumatic to the baby but less on the mother

For example, if I have a Multigravida mother i'd use forceps as she has a roomy pelvis and the forceps wouldn't that much of a damage to her compared to the fetus.

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[1] اخترعها أبو القاسم الزهراوي لإخراج الأجنة المتوفاة من رحم الام
[2] Lower risk of all forceps and the most used nowadays .
[3] Flexion of the fetal head must be maintained to provide the smallest diameter to the maternal pelvis > place the suction cup close to the posterior fontanelle and start suction > **stop if no progress with 3 tractions over 3h of pushing > in favor of a cesarean delivery**.

## ★Indications of operative delivery (including the instrumental and CS):

| Maternal | Fetal |
|---|---|
| • **Prolonged or arrested 2nd stage labor[4] (the biggest indication) for maternal benefit** (pushing can be hazardous to the patient), especially in Maternal cardiac disease or pulmonary disease.<br>• **Poor maternal effort** (exhaustion).<br>• **Patients with retinal detachment or post op for similar ocular conditions.** Which could be caused by increased ICP during labor; forceps can be used as instrumental delivery | • Prolonged 2nd stage due to posterior occiput fetal presentation " it's harder to push out."<br>• Fetal distress Category III fetal heart rate patterns (EFM: bradycardia, repetitive deceleration).<br>• Prematurity (use Forceps only).<br>Ventouse is contraindicated in preterm <34 weeks.<br>• Certain malpositions e.g. occipitoposterior.<br>You can operate cesarean directly when presentation is abnormal, or use your instruments to **rotate the baby if position is e.g. occipito transverse** |

## ★Prerequisite for forceps and ventouse:

| | |
|---|---|
| • **Cervix has to be *fully dilated*.**<br>• **Membranes ruptured.**<br>• **Head has to be engaged (0 station).**<br>• Head position known[5]<br>• **Vertex** (cephalic) presentation<br>  ○ Forceps can also be used to stabilize the coming head in breech presentation<br>  ○ Ventouse can only be applied on the head[6]<br>• Mandatory clinical assessment to determine the level of the presenting part, an estimate of the fetal size, and the adequacy of the maternal pelvis. | **Conditions to be fulfilled:**<br>• **Adequate analgesia** *(mostly epidural, and local for episiotomy)*<br>• Experienced operator<br>• **Empty bladder** (to prevent damage to that structure and to provide more room to facilitate delivery).<br>• **Adequate episiotomy** *to prevent complications of laceration or extention* |

**Prerequisites mnemonic [ABCDEFGHIJ]**

- A: Anesthesia.
- B: Bladder should be empty.
- C: Cervix should be fully dilated and effaced /membrane should be ruptured.
- D: Dilated cervix
- E: equipment > know your forceps.
- F: phantom application.
- → Lt. Blade, Lt. Hand, maternal Lt Side pencil grip & vertical insertion with Rt. thumb directing blade.
- → Rt. blade , Rt. hand, maternal Rt. side pencil grip & vertical insertion with Lt. thumb directing blade
- G: Gentle traction.

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[4] Usually in primigravida, in the second stage we can wait up to 2 hours (with epidural 3 hours), as for the multiparous we can wait 1 hour (with epidural 2 hours). Prolonged time will require instruments or CS.

[5] This evaluation is performed by palpation of the sutures and fontanels in comparison to the maternal pelvis.

[6] **The vacuum extractor is suitable for all vertex presentations, but unlike forceps, it must never be used for delivery of fetuses presenting by the face or breech.**

- H: Hand elevated, Head is engaged, and Head in vertex or face presentation (also breech).
- I: Incision (consider episiotomy).
- J: withdraw forceps if Jaw is reachable

### ★ Complications Of Instrumental Delivery:

| Maternal | Fetal |
|---|---|
| • **Genital tract lacerations (Cervix, vagina)** "due to entrapment using ventouse"<br>• Hemorrhage.<br>• Extensions of episiotomy (may reach the anus)<br>• Sphincter lacerations. 3rd or 4th (into the rectum) degree of injury[7] > Fecal and flatus incontinence. (more with the forceps)<br>• Injury to rectal mucosa. | • Skull fractures forceps<br>• **Cephalohematoma** > ↑ ICP ventouse<br>• Caput succedaneum[8] ventouse<br>• **Facial Palsy** forceps<br>• Scalp laceration both > Neonatal jaundice arises from scalp bleeding<br>• Intracranial hemorrhage both (more with ventouse) & subgaleal hematoma<br>• Infant death. |

The failure rate for forceps is 7%, whereas the failure rate for vacuum extraction is 12%. In general, forceps deliveries cause higher rates of maternal injury, and vacuum extraction causes higher rates of fetal morbidity. **Sequential use of one instrument followed by the other isn't recommended.** If progress of the fetal head is not obtained with appropriate traction (failed forceps), the procedure should be abandoned in favor of a cesarean delivery

# 2. C-section:

### ★ Caesarean Section (CS):

- Is delivery of the fetus through an incision in the maternal abdomen and uterus.
- Rate » 25%
- Maternal mortality: 5 – 6 / 100,000 C/S mainly due to **hemorrhage**
- Perinatal mortality: 3/1000 in USA & 7/1000 in the U.K mainly due to **fetal distress**

★ **C. S. Could be:**

- **Elective C/S:** Planned and timed, In:
  1. **Previous 2-3 or more CS** ( should be scheduled before labor onset)
  2. **Previous upper segment incision**
  3. **Non cephalic presentation,** most commonly **breech presentation**
  4. **Cannot do vaginal,** due to Cephalopelvic disproportion (which is the most common indication for C.S)
  5. **Placenta previa**, these patients should be prepared well because they are high risk of hysterectomy

[7] **Perineal lacerations, with or without episiotomy, may be classified as follows:**
a. First degree: a laceration involving the vaginal epithelium or perineal skin
b. Second degree: a laceration extending into the subepithelial tissues of the vagina or perineum with or without involvement of the muscles of the perineal body
c. Third degree: a laceration involving the anal sphincter
d. Fourth degree: a laceration involving the rectal mucosa
[8] Edema above the skull

- **Emergency C/S:** Unplanned during labor or before the onset of labor. During fetal distress, or she came into labor early but she's actually booked for cesarean for any indication previously mentioned.

## ● Different Methods Of Performing different Types Of C/S:

| SKIN INCISION | UTERINE INCISION |
|---|---|
| ● Low transverse (Pfannenstiel incision[9]). Most common skin incision<br>● Midline.<br>○ Need for quick exposure in placenta previa, accreta, percreta, or increta. Explained next page<br>○ Hysterectomy | ● Upper Segment (**Classical**)[10]: made in the **contractile** fundus of the uterus and is less commonly performed[11].<br>- transverse.<br>- vertical.<br>● Lower segment: through the **noncontractile** portion of the uterus, usually performed at the level of isthmus of uterus<br>- Transverse[12] incision of choice. Why? Less bleeding, less risk of rupture in a future labor, and less extension, peritonitis, paralytic ileus, and bowel adhesions.<br>- Vertical the incision extends into the upper segment. |

## ★Caesarean Section complications:

| ★ COMPLICATIONS OF UPPER SEGMENT: | ★ COMPLICATIONS OF LOWER SEGMENT: | ★ COMMON POST OP COMPLICATION: |
|---|---|---|
| ● Bleeding[13] ↑ ↑<br>● Organ injury:<br>- Bowel.<br>- Bladder.<br>- Ureter.<br>● Adhesions formation.<br>● **Rupture scar in future pregnancy higher than lower segment scar.**<br>● More difficult to repair because it requires repair of 3-4 layers of muscle | ● Haemorrhage (less than upper)<br>● Organ injury:<br>- Bladder(less than upper)<br>- Bowel. (less than upper)<br>- Ureter. (more in lower)<br>● Adhesions **specially bladder**.<br>● Ruptured scar. (less than upper)<br>● Abnormal placentation in future pregnancy, either previa or Accreta, increta, and percreta. [14]<br>● Extension of incision: | ● **Atelectasia** happens during day 2 post delivery, especially for those who undergo general anesthesia. As treatment, we can use a spirometer for lung exercise, or refer them to Physiotherapy<br>● **Infections:**<br>- Endometritis.<br>- Wound.<br>- UTI.<br>- Pneumonia (3rd and 4th day) |

[9] A **Pfannenstiel incision**, **Kerr** incision, **Pfannenstiel-Kerr** incision or pubic incision is a type of abdominal surgical incision that allows access to the abdomen. It is used for gynecologic and orthopedics surgeries, and it is the most common method for performing Cesarean sections today.

[10] The common indications for a classical cesarean **include preterm breech in a woman with an undeveloped lower uterine segment**, **transverse back-down fetal position**, **poor access to the lower segment because of myomas or adhesions**, or **a planned cesarean hysterectomy**. The presence of cervical cancer is a rare indication.

[11] Although it easier bc there is no need for bladder dissection, it is not common due to the Risk of uterine rupture both before labor as well as in subsequent labor which is so significant (5%)

[12] the uterine incision is made transversely in the lower uterine segment after a bladder flap is established.

[13] Because we are entering the uterus through the thick layers of muscle

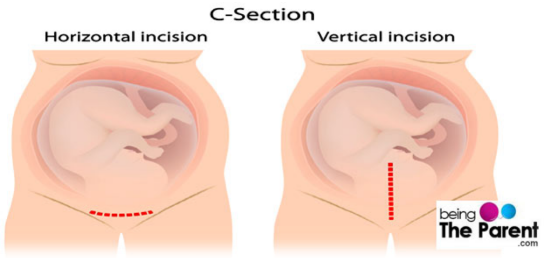
[14] This could be a result of recurrent c-sections, since Accreta, Increta, and percreta is related to the previous scar.

| | | |
|---|---|---|
| | - Lateral & Downwards (never go upwards) | ➔ Give prophylactic Ab 30 mins prior to cs<br>● **DVT & PE.** |

**Abnormal placentation:**

- **Placenta accreta** – The placenta attaches itself too deeply and too firmly into the uterus.
- **Placenta increta** – The placenta attaches itself even more deeply into the muscle wall of uterus.
- **Placenta percreta** – The placenta attaches itself and grows through the uterus, sometimes extending to nearby organs, such as the bladder.

- Most of the time, the doctor decides to perform a cesarean hysterectomy when hemorrhage becomes life-threatening. Hysterectomy is not performed for placenta accreta unless hemorrhage is uncontrolled even after using intrauterine balloon tamponade.
- Placenta previa is more common in lower segment incision
- **Low lying placenta previa:** placenta is low; can be less than 2 cm from the internal os
- **Placenta totalis:** placenta covers the os




Estimated **Risks for Uterine Rupture** in Women with a Prior Cesarean Delivery

| Prior Uterine Incision | Estimated Rupture (%) |
|---|---|
| Classical | 4 – 9 |
| T-Shaped | 4 – 9 |
| Low Vertical | 1 – 7 |
| Low Transverse | 0.2 – 1.5 |

T-shape incision is a inverted T, when we have difficulty delivering the baby, especially the breach, we make a transverse incision. If difficulty in delivery continues, then we can go upwards and create the inverted T incision.

## ★Measures to reduce C.S. RATE:

**1. Proper antenatal care for early detection and management of conditions that lead to ↑ C.S. rate** e.g.:

- Controlling macrosomia in diabetes.
- Early detection of HTN. reduces the risk of pre-eclampsia and eclampsia
- Post term. Induce them because risk of fetal distress will be higher due to meconium[15]

**2. Performing ECV (external cephalic version) for breeches.**

- This procedure consists of externally manipulating the gravid abdomen without anesthesia to turn the fetus from transverse lie or breech presentation.
- If patient **reaches 37 weeks or more,** the incidence of breech presentation is only 3% [16].

[15] The **meconium** stool mixes with the amniotic fluid. The baby may then aspirate the **meconium** and amniotic fluid mixture into their lungs. This is known as **meconium aspiration**.

[16] Recall from Abnormal Presentation lecture: in preterm babies the incidence of breech presentation is much higher. Before 28 weeks, approximately 25% of fetuses are presenting as a breech and by 34 weeks gestation, most fetuses have assumed the vertex presentation position

- We can perform an **external cephalic version** in delivery room, i.e. we rotate the baby in the labor room by pushing the head towards the pelvis under US guidance. Doing this before labor gives a 70-80% success rate for vaginal delivery. A tocolytic may be given to decrease uterine tone.

**3. Vaginal birth after Cesarean (VBAC)** is a trial of labor that is offered after:

1. **Non recurrent** indications e.g. fetal distress, cord prolapse, placental abruption, and breech presentation. The chance of delivery after cesarean will be 80-85%. Keep in mind that Vaginal delivery is better to avoid complications of CS
2. Pelvic adequacy is confirmed by proper clinical *radiological* methods as needed. There's no method to rule out pelvic inadequacy but there are hints like sharp pubic angle and prominent ischial spines.
3. Lower Segment scar. (vertical or transverse)
   **NOT in Upper segment scar**[17]: for example in previous myomectomy, patient goes immediately for cesarean because the incision is usually found on the body of the uterus
4. Placental localization. E.g. VBAC isn't offered for a pt. With **Low lying placenta (previa)**
5. Scar integrity is assured by taking proper post operation history.
6. One previous C/S only and not multiple.
7. Safe set up: Tertiary care center which can perform emergency C.S as needed.
8. Patients approval.

**4. Trial of instrumental delivery before C-section:**

- Should be performed in O.R. with anesthetist, C.S. nurse, and pediatrician to resuscitate.
- All teams ready to proceed to C.S. in case failed instrumental delivery.

If you're not sure she can do vaginal delivery, you can do a trial but has to be in OR with all teams ready to proceed to CS if she fails within 30 min.

## ★POST Delivery CARE:

1. Vital Signs hourly then x 4 hours.
2. I.V. fluids. Until patient tolerates orally
3. Analgesia. helps early mobilization
4. Checking Fundus + Lochia[18] (The blood that comes after delivery)
5. Check uterus for contraction to be sure she doesn't have **atony,** because it's the most common cause of postpartum hemorrhage and death
6. Urine output + catheter care. We ask patient to void
7. Wound care. Exposed, dry, clean, without applying anything on it
8. Prevent infections:

- Prophylactic Ab.
- Aseptic technique.
- Prevention of anemia.

9. To prevent DVT:
   - TEDS[19] stocking (foot stocking)
   - Apply pneumatic pressure (IPEC) for those at high risk, which is mechanical compression device providing leg massage in the OR

[17] Why is the Upper segment so dangerous? Because of the contractions, the strong contractions can open the scar, since it's fibrotic, once you have thick fibrotic tissue, the scar opens easily
[18] **Iochia** is the vaginal discharge after giving birth (puerperium) containing blood, mucus, and uterine tissue. **Lochia** discharge typically continues for 4 to 6 weeks after childbirth, which is known as the postpartum period. What's abnormal? Picture
[19] Thromboembolism-deterrent (TED) stocking

- Thromboprophylaxis. After delivery, start the patient on anticoagulants as a prophylactic dose. For those who came in electively, continue for 3 days until discharge. For those who came in as emergency cases, continue Rx for 10 days even as outpatient.
- Early ambulation.

10. Breast care and breastfeeding. To prevent mastitis and breast abscess


★ **Q1: A G9P8+0 lady at 42 weeks is having a prolonged second stage of labor. The presentation is vertex occiput posterior with head at 1 cm above ischial spine and cervix is 8cm dilated. What is an absolute contraindication for vacuum delivery in this case?**

A. Head station.
B. Parity.
C. Vertex occiput posterior presentation.
D. Gestational age.

The Answer is: A

★ **Q2: A 41-weeks pregnant lady G2P1 with previous cesarean section due to failure to progress. She has been in the second stage of labor for 55 minutes and the fetal head is at -2 station. The fetal heart is showing bradycardia for 10 minutes deceleration. What would be the best option for management?**

A. Augmentation with oxytocin.
B. Emergency cesarean section.
C. Forceps delivery.
D. Vacuum extraction.

The Answer is: B

★ **Q3: You are examining a primigravida woman in labour and you found the presentation is face mento anterior. Which of the following is a part in her management to deliver this baby vaginally?**

A. Deliver the head with more extension.
B. Episiotomy is contraindicated since it may injure fetal face.
C. You can use forceps to deliver the baby.
D. Use ventouse only after crowning of the head.

The Answer is: C