Obstetric operations: induced abortion, forceps delivery, vacuum extraction, cesarean section

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Obstetric operations

Before the 24th week

Induced abortion

1st trimester
- D & C

2nd trimester
- Medical induction, oxytocin infusion, curettage

After the 24th week

Delivery

At the 1st stage of labor
- Cesarean section

At the 2nd stage of labor
- Forceps delivery
- Vacuum extraction (at term)
Induced abortion
Induced abortion

(abortus arteficialis, interruptio graviditatis):

An induced abortion is the medical or surgical termination of pregnancy before 24 weeks of gestation (before the time of fetal viability).
Indications

Non-medical indications

- Until the 12th week
  - „Social” indication

- Until the 18th week
  - Crime (rape)
  - Partial or total legal incapacity
  - Misdiagnosis of pregnancy
  - Youthful pregnant (<18 years of age)
Medical indications

- **Maternal indication** (Termination of the pregnancy may be permitted *at any time* when serious illness threatens the mother’s life.)

- **Fetal indication** (When the risk of serious genetic disease or malformation in the fetus is between 50% and 100%, and there is no possibility of treatment, termination may be permitted *until the 20th week*. When a late diagnosis is made because of laboratory delay and not through any negligence on the mother’s part, termination may be permitted *up to the 24th week*.)

- **Anomalies fatal in the postnatal period** (Termination of the pregnancy may be permitted *at any time*.)

- **Genetical, teratologic indication** (When the risk of genetic disorder or teratogenic damage to the fetus exceeds 10%, and the disorder/damage is likely to be severe, termination *up to the 12th week* of pregnancy is permitted.)
Abortion techniques

Induced abortion for early pregnancies (up to the 6th week)

- „Menstrual aspiration” („mini-suction”)
- Medical abortion
  - Mifepristone (RU-486) and adjuvant prostaglandine
  - Methotrexate
Induced abortion in the 1st trimester
(up to the 12th week)

Cervical dilatation
- Metal/Mechanical dilators (metal Hegar-dilators)
- Hygroscopic dilators (Laminaria, Dilapan)
- Chemical (Rivanol, Prostaglandins)

Evacuating the pregnancy
- Vacuum aspiration
- Curettage
Induced abortion in the 2nd trimester
(up to the 24th week)

Medical induction
(extraamnial Rivanol, Laminaria, vaginal prosztaglandin pill)

Abortion due to oxytocin infusion

Curettage
Complications

- Intraoperative complications:
  - perforatio uteri
  - hemorrhage
    - injury
    - uterine atony
    - retention
    - coagulopathy

- Early postoperative complication: infection

- Late postoperative complication: infertility (Asherman-syndrome: intrauterine synechiae due to injury of the basal layer of the endometrium)
Operative vaginal delivery
At the second-stage labor operative vaginal delivery (forceps or vacuum extraction) is indicated in any condition threatening the mother or fetus that is likely to be relieved by delivery, whereas at the first-stage labor cesarean section is the choice (partus cum operatione obstetrica).
Operative vaginal delivery

Forceps delivery
The forceps

Basically consist of two crossing branches; components: handle, lock, shank, blades.

The cephalic curve conforms to the shape of the fetal head, the pelvic curve corresponds more or less to the axis of the birth canal.
Types

- **Pajot-Naegele-forceps.** Outlet forceps, has cephalic and pelvic curve.

- **Kielland-forceps.** Able to rotate the head. Can be used for all forceps deliveries as it has cephalic curve only.

- **Piper-forceps.** Can be used in breech presentation to deliver the fetal head.

- **Shute-forceps.** Has cephalic and pelvic curve. Used in preterm deliveries. Here the goal is not to pull out the fetal head, but to protect the fragile head of the preterm fetus by pushing the tissues of the birth canal away.
Prerequisites for forceps application

- Trained obstetrician in forceps deliveries
- Completely dilated cervix
- Ruptured membranes
- The fetal head must be engaged (the greatest transverse diameter in an occiput presentation passes through the pelvic inlet)
- The size and consistence of fetal head is suitable for a forceps delivery
- Living fetus
- No suspicion of cephalopelvic disproportion
Indications for forceps delivery

**Prophylactic**
- Maternal diseases (CNS vascular malformations, aortaaneurysm, heart disease, etc.)
- Previous operations on the uterus (CS, metroplasty)
- Prolonged second-stage labor
- Threatened intrauterine fetal asphyxia

**Vital**
- Heart failure, pulmonary edema
- Eclampsia
- Severe hemorrhage, DIC
- Definite fetal asphyxia
Overall rules of forceps delivery

**Preparation**
- Mother in lithotomy position, disinfect and isolate the area of the operation.
- The bladder should be emptied
- The exact position of the fetal head must be checked once again with inner examination
- Episiotomy in regional analgesia

**Steps**
- Check in front of the vaginal inlet how the forceps will stay in the birth canal.
- Application of the blades
- After positioning, the branches are articulated. Closure. Traction probe
- Traction
Types of forceps delivery I.

Outlet forceps delivery

- Scalp is visible at the introitus without separating the labia
- Fetal skull has reached pelvic floor
- Sagittal suture is in anterioposterior diameter or rotation does not exceed 45 degrees
1. **The blades of the forceps are applied**
   - The left blade comes first
   - 2-4 fingers of the right hand are introduced inside the left posterior portion of the vulva and into the vagina beside the fetal head. The handle of the left branch is then grasped between the thumb and two fingers of the left hand.
   - The tip of the blade is then gently passed into the vagina between the fetal head and the palmar surface of the fingers of the right hand
   - Application of the right blade

2. **Make blades parallel and lock**
   - (ensure that maternal soft tissue entrapment has not occurred)
   - Traction probe (will the head follow the forceps?)

3. **Traction**
   - Gentle, intermittent traction at the time of contraction
   - Pull downwards until the perineum begins to bulge
   - Continue as the vulva is distended by the occiput
   - Additional horizontal traction is applied and the handles are gradually elevated, eventually pointing almost directly upwards as the parietal bones emerge. As the handles are raised, the head is extended
   - Midwife protects the perineum as usual

For outlet forceps delivery: Pajot-Naegele forceps
If rotation is necessary: Kielland forceps
Types of forceps delivery II.

Low- and midforceps operations

- If the greatest transverse diameter of the fetal head passes through the pelvic inlet
- Leading point of fetal skull is at the interspinal plane. This is point „0”.
- Position of the head in the birth channel is the distance in cm from this point: +1, +2, +3, +4, +5. (If the leading point is above the interspinal plane: from -1 to -5.)
**Low forceps operation**
- Leading point of fetal skull is at station $\geq +2$ cm

**Midforceps operation**
- Station is between 0 and $+2$ cm
1. the blades of the forceps are applied
2. make blades parallel and lock
   - check
   - traction probe
3. traction
   - Mimic the remaining rotation of the head. With intermittent traction rotate the minor fontanella in front and pull downwards until the sagittal suture is in the anterioposterior diameter, and the subocciput is under the symphysis
Types of forceps delivery III.

🌟 Forceps delivery in breech presentation

- Piper forceps
- Assistant holds the fetal legs and body horizontal to avoid abnormal extension of the neck
- After episiotomy first the left then the right blade is applied
- Traction is applied upwards
Complications of forceps operations

Mostly at midforceps operations; these should be performed by trained obstetricians

In the mother: vaginal, bladder, perineal rectal injuries

In the fetus: cephalhaematoma, facial paresis, skull fraction, intracranial hemorrhage

After forceps operation it is necessary to check the uterine cavity and the vagina for injuries
Operative vaginal delivery

Vacuum extraction
Developed by Malmström Swedish obstetrician (1954)

Vacuum extraction contains a suction unit, a flexible tubing and a cup (metal or plastic).

Vacuum be created gradually until a negative pressure of 80 kPa (0.8 kg/cm²) is reached. Traction should be intermittent and coordinated with maternal expulsive efforts.

Negative pressure can be increased to 0.8 kg/cm² in 1-2 minutes.
Contraindications include malposition of the fetal head, such as face and brow presentation. In these cases cesarean section is indicated.

Vacuumextraction is contraindicated in preterm delivery.
Indications of vacuum extraction

Same as for forceps delivery.
Technique of vacuum extraction

- Check if your vacuum delivery system is working.

- Proper cup placement is the most important determinant of success. The center of the cup should be over the saggital suture and about 3 cm in front of the posterior fontanella toward the face. (Anterior placement can result in cervical spine extension. Asymmetrical placement may worsen asynclitism.)

- The full circumference of the cup should be palpated both before and after the vacuum has been created to ensure that maternal soft tissue entrapment has not occurred.
Technique of vacuum extraction

Traction should be intermittent and coordinated with maternal expulsive efforts. The fingers of one hand are placed against the suction cup, while the other hand grasps the handle of the instrument. No data are available regarding the number of pulls required to effect delivery.

When the head is delivered, turn off the suction.
Complications of vacuum extraction

- Scalp lacerations, subgaleal hematomas, cephalohematomas, subconjunctival hemorrhage, retinal hemorrhage, hyperbilirubinaemia.
Cesarean delivery
(sectio caesarea)
If the cervix is not fully dilated, or if the cervix is fully dilated but the head is not engaged, to finish the delivery fast cesarean section is the safest choice.
Prerequisites for cesarean section

- No absolute prerequisite and
- No absolute contraindication

This is due to precise operation techniques, antibiotics, blood transfusion possibilities and safe anaesthesia.

Only prerequisite is, that the *fetal head is not engaged.*
(If contracted outlet is diagnosed after fetal head engagement, cesarean section should be performed; during the operation the head should be pushed back via a vaginal examination, and pulled out from the pelvis by grabbing the shoulders.)
Indications of cesarean section

- **Absolute indication**: no possibility for vaginal delivery

- **Relative indication**: possibility for vaginal delivery, but higher risk of fetal and/or maternal mortality and morbidity without the cesarean section.

- **Vital indication**: if done to prevent an immediate life threatening situation.

- **Prophylactic indication**: if done to prevent complications.
Indications of cesarean section

Prophylactic

- maternal
- fetal
- maternal/fetal

Vital

- maternal
- fetal
- maternal/fetal
Prophylactic maternal indications

- Maternal illnesses
- Previous operations on the uterus (previous cesarean section, metroplasty, etc.)
- Contractions of the pelvis (diminished pelvic capacity)
- Late primiparity (≥30 years primipara)
Prophylactic fetal indications

- Threatened fetal asphyxia (scalp pH 7.21-7.25)
- Placental dysfunction, hypoxia
- Fetal illnesses, and risk of it (fetopathy, Rh-isoimmunisation, operable anomalies)
- Pregnancy after infertility treatment
Prophylactic maternal/fetal indication

- Damning gestational history
- Dystocia, prolonged labor
- Fetopelvic disproportion, malpresentation or position of the fetus
- Some cases of twin pregnancy
Vital maternal indications

- Heart failure
- Pulmonary edema
- Severe hemorrhage (i.e. vital maternal/fetal indications)
- DIC
**Vital fetal indications**

- Fetal asphyxia (scalp pH < 7.21)
- Prolapse of the umbilical cord
- Neglected transverse lie (after a while also is a vital maternal indication)
- Ascending infection, fetal pneumonia
Vital maternal/fetal indications

- Eclampsia
- Uterine rupture
- Placenta praevia
- Placental abruption
Technique for cesarean delivery

**Intratracheal narcosis** or **regional** (spinal or epidural) **anaesthesia** is performed

**Abdominal incision**

- Vertical incision (**lower median**) or
- suprapubic transverse incision (**Pfannenstiel**) is used to open the abdominal cavity
  - Pfannenstiel incision is made at the level of the pubic hairline and it is extended somewhat beyond the lateral borders of the rectus muscles.
  - The skin and subcutaneous tissue are incised, dissection is continued to the level of the fascia.
  - Fascia is incised.
  - The rectus muscles are separated.
  - The underlying peritoneum is opened.
**Uterine incision**

- „Classical” (corporal longitudinal) *incision* is a vertical incision above the lower uterine segment and reaches the uterine fundus.

(Seldom used today. Indications: transverse lie of a large fetus, very small fetus especially if breech and the lower uterine segment is not thinned out, some cases of placenta previa with anterior implantation, leiomyoma occupies the lower uterine segment, etc.)

- *Transperitoneal cervical transverse* („t.c.t.”) *incision* is easier to repair, is located at a site least likely to rupture during a subsequent pregnancy, and does not promote adherence of bowel or omentum to the incisional line.
The loose vesicouterine serosa is grasped and incised transversely.

The lower flap of peritoneum is elevated and the bladder is gently separated from the underlying myometrium.

The uterus is entered through the lower uterine segment (1 cm below the upper margin of the peritoneal reflection). The incision should be made large enough to allow delivery of the head and trunk of the fetus. If the placenta is encountered in the line of incision, it must be either detached or incised.
If membranes are still, we rupture them

(In a cephalic presentation) the head is elevated gently with the fingers and palm through the incision, aided by modest transabdominal fundal pressure

Eliminate mucus from fetal mouth

After clamping and cutting the umbilical cord the fetus is given to the neonatologist

Intravenous and/or intramyometrial oxytocin is given to contract the uterus satisfactory and help the detachment of the placenta

The placenta and membranes are then delivered (manual removal or spontaneous delivery), afterwards the uterine cavity is inspected (check manually for remnants, or abnormalities (injuries, myomas, etc.))
If the cervix is closed, we have to dilate it to let the lochia to go through

(Hegar dilators, from the uterine cavity through the cervix into the hand of the assistant doctor, who performs a vaginal examination and protects soft tissue injury with his fingers. Easier to use Zangemeister-dilator, a horn-shaped instrument to dilate the cervix. It is pulled out by the assistant who performs the vaginal examination.)
The uterine incision is then closed in one or two layers (muscular and seromuscular)

Closure or nonclosure of visceral peritoneum

After the sponge and instrument counts are found to be correct, the abdominal incision is closed in layers. If the subcutaneous tissue is at least 2 cm thick, it should be closed and drained.

Patient is observed in a postoperative ward.
Complications of cesarean section

Nowadays complications of cesarean section are rare. The risk is higher, if

- The pregnant is obese, or having preeclampsia
- The presenting fetal part is in a very low or very high position
- The operation is after preterm membrane rupture
- There is severe haemorrhage
- The pregnancy is preterm
- The operation is done „fast”, in a rush
- The obstetrician is not well trained, or the professional surveillance is lacking
**Bladder injury 0,3%**
- Transurethral injected methylene blue dye can help visualisation, should be sutured in double-layer, Foley-catheter should be used until microscopic hematuria is present, antibiotic-prophylaxis is recommended

**Ureter injury <0,1%**
- Consult with urologist

**Bowel injury 0,2%**
- Should be closed in double layer, consult with surgeon
Hemorrhage
Infection
Pulmonary embolism

Fetal injuries: very rare. If the delivery of the fetus is complicated, bone- or nerve injuries can be expected.

Anaesthesiological complications are very rare after the introduction of regional anaesthesia
Postpartum hysterectomy

Hysterectomy performed at or following delivery may be lifesaving if there is severe obstetrical hemorrhage. It can be carried out in conjunction with cesarean delivery or following vaginal delivery. *Postpartum hysterectomy (Porro-operation)* is done from a laparotomy.
Major complication is increased blood loss (pelvic vessels are appreciably hypertrophied). The morbidity rate associated with emergency hysterectomy is substantively increased as compared to a planned operation.

In most cases blood transfusion is necessary.

In severe bleeding ligation of the hypogastric arteries can be used.
Postpartum hysterectomy should be considered

- Severe hemorrhage (uterine atony, uterine rupture, DIC, coagulation problems)
- Abnormal placentation (placenta accreta, increta, percreta)
- Severe infection, sepsis, septic shock
- Gynecological malignancy
After cesarean section, the uterine incision should be closed before hysterectomy.

Postpartum hysterectomy can be supracervical or total hysterectomy using standard operative techniques. The operation should be done by the most trained obstetrician.

In case of invasive cervical cancer, radical hysterectomy (Wertheim-operation) should be performed.
Obstetric operations

Before the 24th week

- Induced abortion
  - 1st trimester: D & C
  - 2nd trimester: Medical induction, oxytocin infusion, curettage

After the 24th week

- Delivery
  - At the 1st stage of labor: Cesarean section
  - At the 2nd stage of labor: Forceps delivery, Vacuum extraction (at term)
Thank you for your attention!