Abnormalities of labour and delivery and their management

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Dystocia

- **Eutocia**: normal labour
- **Dystocia** literally means difficult labour and it is characterized by abnormally slow progress of labour
- **Abnormal labour**: disproportion between the presenting part of the fetus and the birth canal
- It is the consequence of **four** distinct abnormalities existing singly or in combination
Dystocia

1. Abnormalities of the **expulsive forces** – either uterine forces insufficiently strong or inappropriately coordinated to efface and dilate the cervix (uterine dysfunction); inadequate voluntary muscle effort during the second stage of labour

2. Abnormalities of the **maternal bony pelvis**
3. Abnormalities of presentation, position or development of the fetus

4. Abnormalities of soft tissues of the reproductive tract that form an obstacle to fetal descent
Dystocia

These abnormalities can be simplified into three categories:

1. Abnormalities of the power (uterine contractility and maternal expulsive effort)
2. Abnormalities involving the passenger (fetus)
3. Abnormalities of the passage (pelvis)
Common clinical findings in women with ineffective labour

- Inadequate cervical dilation or fetal descent
  1. Protracted labour (slow progress)
  2. Arrested labour (no progress)
  3. Inadequate expulsive effort (ineffective “pushing”)

- Fetopelvic disproportion
  1. Excessive fetal size
  2. Inadequate pelvic capacity
  3. Malpresentation or position of the fetus

- Ruptured membranes without labour
Inadequate labour I. - Uterine dysfunction

- **Propulsion and expulsion** of the fetus: contractions of the uterus, reinforced during the second stage by voluntary or involuntary muscular action of the abdominal wall ("pushing")

- **Uterine dysfunction**: low intensity contractions; common with significant disproportion, because the uterus does not often self-destruct when faced with mechanical obstruction
Inadequate labour I. - Uterine dysfunction

Three significant advances in the treatment:

- **Realization** that undue prolongation of labour may contribute to perinatal morbidity and mortality
- Use of dilute intravenous infusion of oxytocin in certain types of uterine dysfunction
- More frequent use of Caesarean delivery rather than difficult midforceps delivery when oxytocin fails
Inadequate labour I. - Type of uterine dysfunction

1. Hypotonic uterine dysfunction
   - more common
   - no basal hypertonus
   - uterine contractions have a normal gradient pattern
   - the slight rise in pressure during a contraction is insufficient to dilate the cervix

2. Hypertonic uterine dysfunction
   - either basal tone is elevated or the pressure gradient is distorted
   - complete asynchronism of the impulses originating in each cornu
Inadequate labour I. - Causes of uterine dysfunction

- **Chorioamnionitis**
- Maternal position during labour (different results; no evidence for or against walking during labour)
- Birthing position in second-stage labour (no evidence for or against different positions during the second stage)
- Immersion in water
Inadequate labour I. - Treatment of uterine dysfunction

1. Oxytocin infusion
2. Glucose infusion
3. Mobilization
4. Cervix dilatation
   - Prostaglandins
   - Drotaverin + Opiates
   - Paracervical block
   - Epidural analgesia
5. Perineal relaxation
   - Pudendal block
   - Epidural analgesia
   - Spinal analgesia
Inadequate labour II. – Fetopelvic disproportion

- **Contracted pelvic inlet:**
  - shortest AP diameter < 10 cm; or the greatest transverse diameter < 12 cm
  - Prior to labour fetal BPD has been shown to average 9,5-9,8 cm
  - Small woman → small pelvis → usually smaller infant
  - In women with contracted pelvis, face and shoulder presentations are encountered 3 times more frequently, cord prolapse occurs 4-6 times more frequently

- **Contracted midpelvis**
  - more common than inlet contraction
  - tranverse diameter: 10,5 cm - anteroposterior diameter: 11,5 cm - posterior sagittal: 5 cm
  - contracted midpelvis: tranverse+posterior sagittal diameter < 13,5 cm
Pelvic diameters
Inadequate labour II. – Fetopelvic disproportion

- **Contracted pelvic outlet**
  - interischial tuberous diameter < 8 cm
  - outlet contraction without concomitant midplane contraction is rare

- **Pelvic fractures**
Inadequate labour II. - Fetopelvic disproportion

- Excessive fetal size
  - seldom is an explanation for failed labour
  - maternal gestational diabetes is a risk factor
  - planned Cesarean section in case of an estimated fetal weight exceeding 4250 g
Inadequate labour III. – Ruptured membrane without labour

- Rupture of membrane without spontaneous uterine contractions occurs in about 8% of term pregnancies
- Stimulation of contractions indicated when labour did not begin after 6-12 hours
  - Prostaglandins for cervical ripening
  - Induction of the contractions by oxytocin
  - Laboratory examination (WBC, CRP) - chorioamnionitis
  - Temperature
  - Antibiotic treatment - prevention
Maternal-fetal effects of dystocia

- Intrapartum infection
- Uterine rupture
- Pathological retraction ring (ring of Bandl)
- Fistula formation
- Pelvic floor injury
- Caput succedaneum
Fetal presentation

- Cephalic presentation 96.5%
  - vertex presentation
  - poorly flexed presentation
  - brow presentation
  - face presentation
- Breech presentation 3.0%
- Transverse or oblique lie 0.5%
Abnormal presentation, position and development of the fetus

- Deflexion of the head
- Persisted occipito-posterior or transverse position
- Breech presentation
- Transverse or oblique lie (shoulder presentation)
Abnormal presentation, position and development of the fetus – Face presentation

- **Incidence:** 0.15-0.20%
- **Diagnosis:** vaginal examination; palpation of mouth, nose, orbital ridges
- **Etiology:** enlargement of the neck; cord coil around the neck, anencephalus
- **Management:** Cesarean section

[Diagrams showing face presentation: A. Chin anterior, B. Chin posterior]
Abnormal presentation, position and development of the fetus – Brow presentation

- **Incidence**: 1/1400-1500 delivery
- **Diagnosis**: vaginal examination; frontal sutures, large anterior fontanel, eyes can be felt, but neither mouth, nor chin is within reach
- **Etiology**: the same as those for face presentation
- **Management**: persistent brow presentation: C/S
Abnormal presentation, position and development of the fetus – Breech presentation I.

- **Incidence:** 3%
- **Types:**
  - Frank breech (extended legs; 65%)
  - Complete breech (flexed legs; 25%)
  - Incomplete breech (footling or knee presentation; 10%)
- **Characteristic:** at the 30th week 25% of the fetuses in breech presentation; after the 36th week no change in position
Abnormal presentation, position and development of the fetus – Breech presentation II.

- **Etiology:**
  - Prematurity
  - Fetal anomalies
  - Uterine anomalies
  - Pelvic anomalies
  - Umbilical cord complications
  - Twin pregnancy
  - Placenta previa

- **Diagnosis:**
  - Leopold examination
  - Vaginal examination
  - US
Abnormal presentation, position and development of the fetus – Breech presentation III.

- **Vaginal delivery:**
  - In frank or complete breech
  - Episiotomy
  - Oxytocine infusion
  - CTG-registration
  - Bracht maneuver
  - Müller maneuver
  - Mauriceau-Smellie-Veit maneuver

- **Bracht maneuver:** The breech is allowed to deliver spontaneously to the umbilicus. The fetal body then is held against the maternal symphysis. The suspension of the fetus in this position coupled with the effect of uterine contractions results in spontaneous delivery.
Abnormal presentation, position and development of the fetus – Breech presentation IV.

- **Mauriceau-Smellie-Veit maneuver**: the index and middle finger of one hand are applied over the maxilla to flex the head, while two fingers of the other hand are hooked over the fetal neck and grasping the shoulders; downward traction is applied until suboccipital region appears under the symphysis.
Abnormal presentation, position and development of the fetus – Breech presentation V.

Indication for Cesarean section

- Breech presentation +
  - Preterm delivery
  - 1\textsuperscript{st} delivery
  - PROM
  - Incomplete breech
  - Twin pregnancy
  - Large fetus
Abnormal presentation, position and development of the fetus – Tranverse lie

- **Incidence**: 0,25-0,3%
- **Diagnosis**: palpation: no fetal pole in the fundus and above the symphysis; vaginal examination: no fetal pole to be reached; US
- **Etiology**: preterm fetus, placenta previa, abnormal uterus, excessive amniotic fluid, contracted pelvis
- **Management**: high risk of uterine rupture; C/S
Abnormal presentation, position and development of the fetus – Tranverse lie
Abnormal presentation, position and development of the fetus - Compound presentation

- **Definition**: an extremity prolapses alongside the presenting part
- **Incidence**: 0.05-0.1%
- **Etiology**: conditions that prevent complete occlusion of the pelvic inlet by the fetal head
- **Management**: perinatal loss is increased due to preterm delivery, prolapsed cord (knee-chest position, elevating fetal head, emergency C/S)
Prolapse of umbilical cord
Abnormal presentation, position and development of the fetus – Persistent occiput posterior or transverse position

- The rotation of the head is opposite or no rotation occurs
- Most often undergo spontaneous anterior rotation followed by uncomplicated delivery
- Forceps delivery, manual rotation of forceps rotation are possible when necessary
- When neither can be done with relative ease C/S is performed
Abnormal presentation, position and development of the fetus – Shoulder dystocia I.

- **Incidence**: 0.6-1.4%
- **Definition**: The shoulder is not delivered after the head during the next contraction
- **Risk factors**: obesity, multiparity, diabetes → increased birthweight
- **Maternal consequences**:
  - Postpartum haemorrhage
  - Uterine atony
  - Injuries
- **Fetal consequences**:
  - Brachial plexus injury
  - Clavicular fracture
Abnormal presentation, position and development of the fetus – Shoulder dystocia

II. (incidence according to birthweight grouping)

<table>
<thead>
<tr>
<th>Birthweight group</th>
<th>Shoulder dystocia (%)</th>
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<tbody>
<tr>
<td>&lt; 3000 g</td>
<td>0%</td>
</tr>
<tr>
<td>3001 - 3500 g</td>
<td>0,3%</td>
</tr>
<tr>
<td>3501 - 4000 g</td>
<td>1,0%</td>
</tr>
<tr>
<td>4001 - 4500 g</td>
<td>5,4%</td>
</tr>
<tr>
<td>&gt; 4500 g</td>
<td>19,0%</td>
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Abnormal presentation, position and development of the fetus – Shoulder dystocia III. (management)

- **Suprapubic pressure**
- **McRoberts maneuver:** (the thighs sharply flexing upon the abdomen)
- **Woods maneuver:** (progressively rotating the posterior shoulder 180 degrees in a corkscrew fashion → the impacted anterior shoulder could be released)
- **Rubin maneuver:** the fetal shoulders are rocked from side to side by applying force to the abdomen
Abnormal presentation, position and development of the fetus – Shoulder dystocia IV. (management - Wood and Rubin maneuver)
Abnormal presentation, position and development of the fetus – Shoulder dystocia V. (management)

- **Hibbard maneuver**: pressure to be applied to the fetal jaw and neck in the direction of maternal rectum, with strong fundal pressure. *Complication rate: 77% - not recommended*

- **Gunn-Zavanelli maneuver**: cephalic replacement in the pelvis and C/S

- **Cleidotomy**: cutting the fetal clavicle with scissors

- **Symphysiotomy**
Abnormal presentation, position and development of the fetus – Shoulder dystocia

VI. (emergency management algorithm)

- Shoulder dystocia
  - Patient stops pushing
    - McRoberts maneuver
      - Not successful
        - Rubin maneuver
          - Not successful
            - Woods maneuver
              - Not successful
                - Gunn Zavanelli maneuver
Premature rupture of membrane (PROM) I.

- Amniorrhexis (spontaneous rupture); before onset of labour

<table>
<thead>
<tr>
<th>AMNIOCHORION MATRIX AND MATRIX DEGRADING ENZYME</th>
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<tbody>
<tr>
<td><strong>CELL TYPE</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Amniotic Epithelium</td>
</tr>
<tr>
<td>Amniotic Basement Membrane</td>
</tr>
<tr>
<td>Compact Layer</td>
</tr>
<tr>
<td>Fibrous Layer</td>
</tr>
<tr>
<td>Spongy Layer</td>
</tr>
<tr>
<td>Reticular Layer</td>
</tr>
<tr>
<td>Chorionic Pseudobasement Membrane</td>
</tr>
<tr>
<td>Chorion</td>
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<td>Decidua</td>
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Premature rupture of membrane (PROM) II. - Etiology

Mechanical:
- cervix incompetence
- previous operation on the cervix
- polyhydramnios
- tranverse lie
- uterine malformations
- frequent vaginal examination
- amnioscopy

Infection:
- Bacterial vaginosis
- Trichomonas vaginalis
- Chlamydia
- Others (Streptococcus agalactiae, Listeria monocytogenes)
Premature rupture of membrane (PROM) III. - Diagnosis

- Anamnesis
- Vaginal examination
- US
- arborisation
History suggestive of preterm PROM

Physical examination
Check for pooling of amniotic fluid.

Check for leakage from the cervical os with coughing or fundal pressure.
Perform speculum examination for dilation.
Perform ultrasonography for fluid index and instillation of indigo carmine, if indicated.

No PROM
Discharge home if reassuring fetal heart tracing and no evidence of preterm labor.

Preterm PROM confirmed
Deliver if evidence of intra-amniotic infection, nonreassuring fetal heart tracing, significant abruption, cord prolapse, or active labor.

24 to 31 weeks’ gestation
Administer corticosteroids.
Administer antibiotics.
Deliver at 34 weeks’ gestation, or at 32 to 33 weeks’ gestation if lung maturity is indicated by amniocentesis.

32 to 33 weeks’ gestation
Administer corticosteroids.
Administer antibiotics.
Consider amniocentesis or deliver at 34 weeks’ gestation.

34 to 36 weeks’ gestation
Administer antibiotics for group B streptococcus prophylaxis; then deliver.
Premature rupture of membrane (PROM) IV. – Consequences and symptoms

- Preterm labour
- Abruption of placentae
- Prolapse of umbilical cord
- Chorioamnionitis
- Leukocytosis
- CRP elevated
- Amniotic fluid infected
- Maternal temperature 38,0 °C or more
- Fetal tachycardia
- Danger of IRDS
Pathways Leading From Intrauterine Bacterial Infection to Preterm Delivery
Premature rupture of membrane (PROM) V. – Management

- Laboratory examinations (WBC, CRP)
- Controll of maternal temperature
- Antibiotic treatment (Ampicillin 2 g intravenously in every 6 hrs)
- Antenatal corticosteroid therapy (Dexamethasone 5 mg intramuscularly every 12 hrs for 4 doses)