Aberant liqour
Polyhdromnios & Oligohydrmnios

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Amniotic fluid

the clear or slightly yellowish liquid surrounding the fetus in the amniotic sac

normally has a **pH of 7.0-7.5.**

is mainly **water** with **electrolytes**, but by about the 12-14 week the liquid also contains proteins, carbohydrates, lipids and phospholipids and urea, all of which aid in the growth of the fetus.

Origin & Production

The fluid is produced by the mother's placenta during the first trimester and the early part of the second trimester, until the baby's kidneys are mature enough to take over the task at about 16 weeks

The baby swallows the fluid as they breathe and then excretes it again as urine, thus maintaining the constant circulation of the fluid.

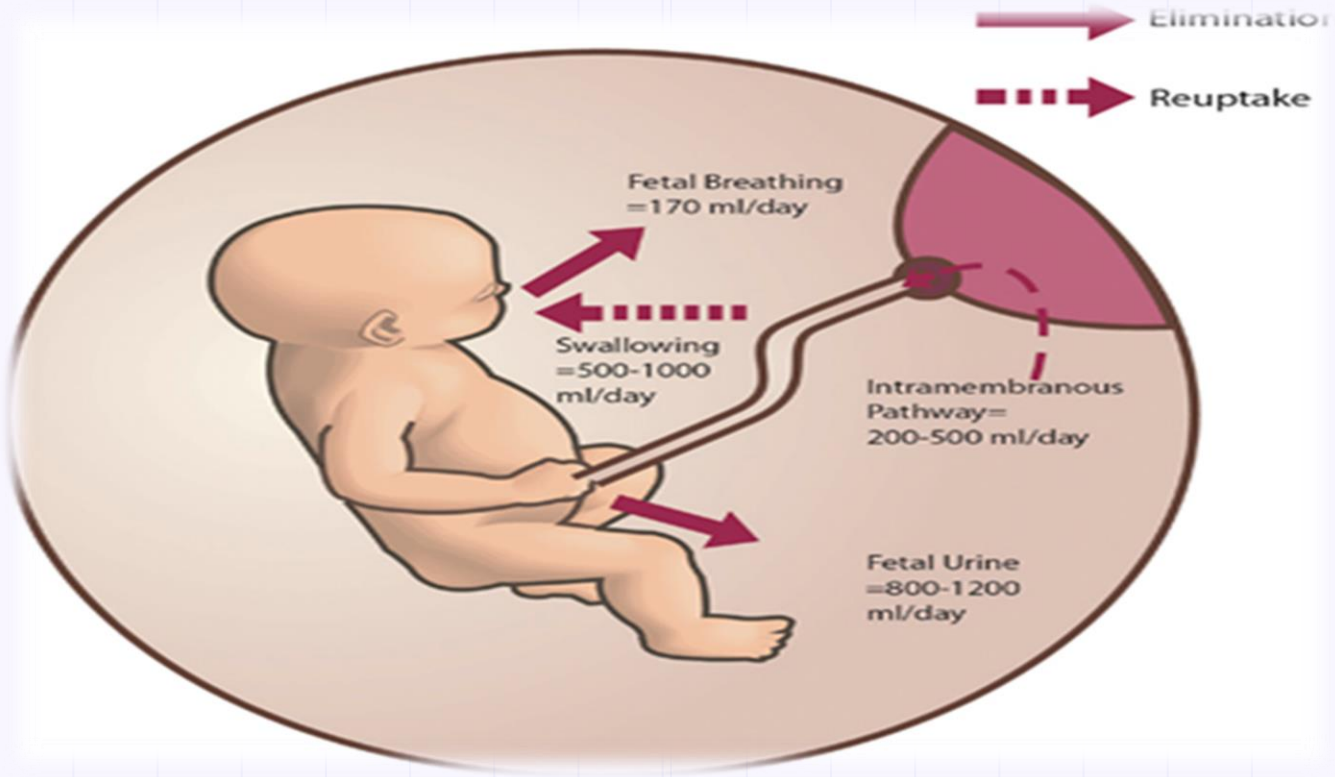
Origin & Production

In late gestation, the primary sources of **amniotic fluid production** are:

1. Fetal urination
2. Secretion of Lung fluid
3. Oral and Nasal secretions (minimal contributions)

The main routes of **amniotic fluid removal** are:

1. Fetal swallowing
2. Absorption via the intra-membranous pathway.


Elimination
Reuptake
Fetal Breathing
=170 ml/day
Swallowing
=500-1000
ml/day
Intramembranous
Pathway=
200-500 ml/day
Fetal Urine
=800-1200
ml/day

Amniotic fluid : functions

protection

forming a cushion around it.

uniform growth

of the body parts and organs of the baby.

Movement

Allows the baby to **move** inside the uterus

Prevents the umbilical cord from being squeezed.

Development

Lung ,digestive and kidney maturity and develpment

Temperature

Maintaining a constant temperature to keep the baby healthy

Infection control

Amniotic Fluid Volume (AFV)

- The volume of amniotic fluid **increases with the growth of fetus** until reaching the peak then gradually goes down
- **10-20 week,** it increases from 25-400 ml approximately.
- Its volume continues to increase until the **34-36 week** of pregnancy (peak is 800-1000 ml).
- The fluid volume then gradually goes down to roughly 400 ml **at 42 weeks**.

Amniotic Fluid Assessment (AVF)

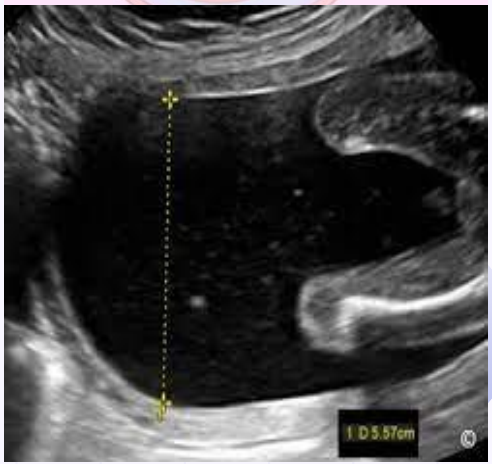
1- maximum vertical pocket (single deepest pocket)

Can be used all through the pregnancy. (before and after 24 weeks).

How to measure ?

1. Find the largest pocket of amniotic fluid ,free of cord and fetal parts
2. Measure the greatest vertical dimension with ultrasound transducer perpendicular to the uterus .
3. The horizontal component ≥1 cm.

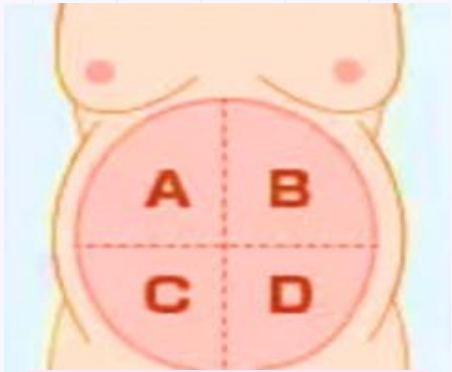
Normal measurement 2 to 8 cm

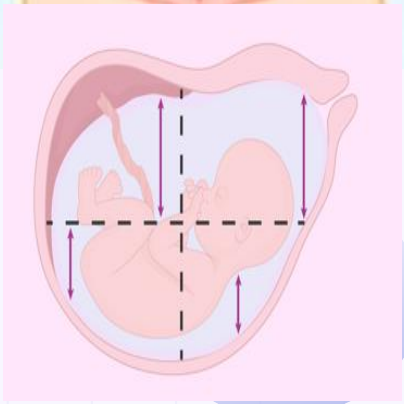


Amniotic Fluid Assessment (AVF)

2- Amniotic fluid index

Used in singleton pregnancies 24 weeks or more

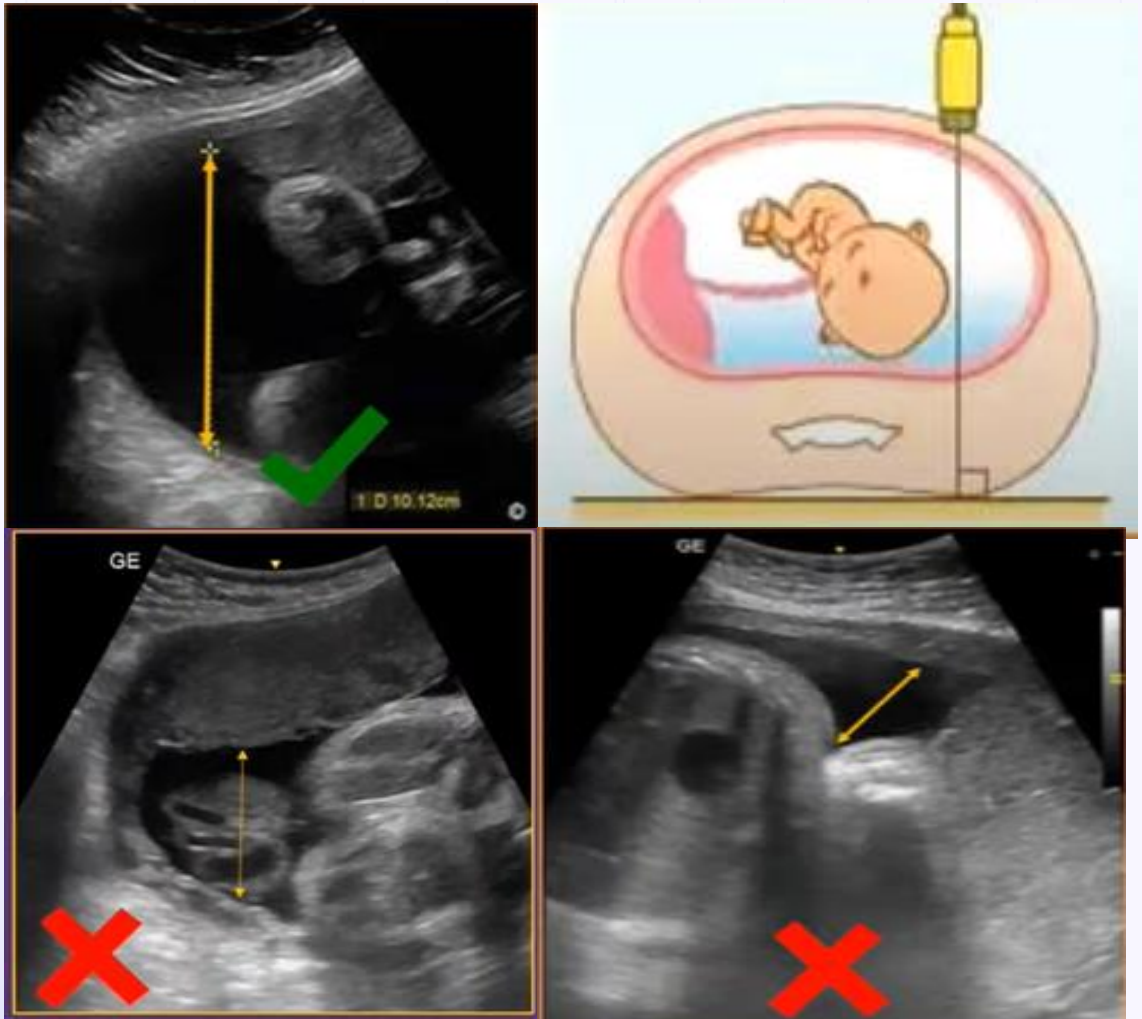




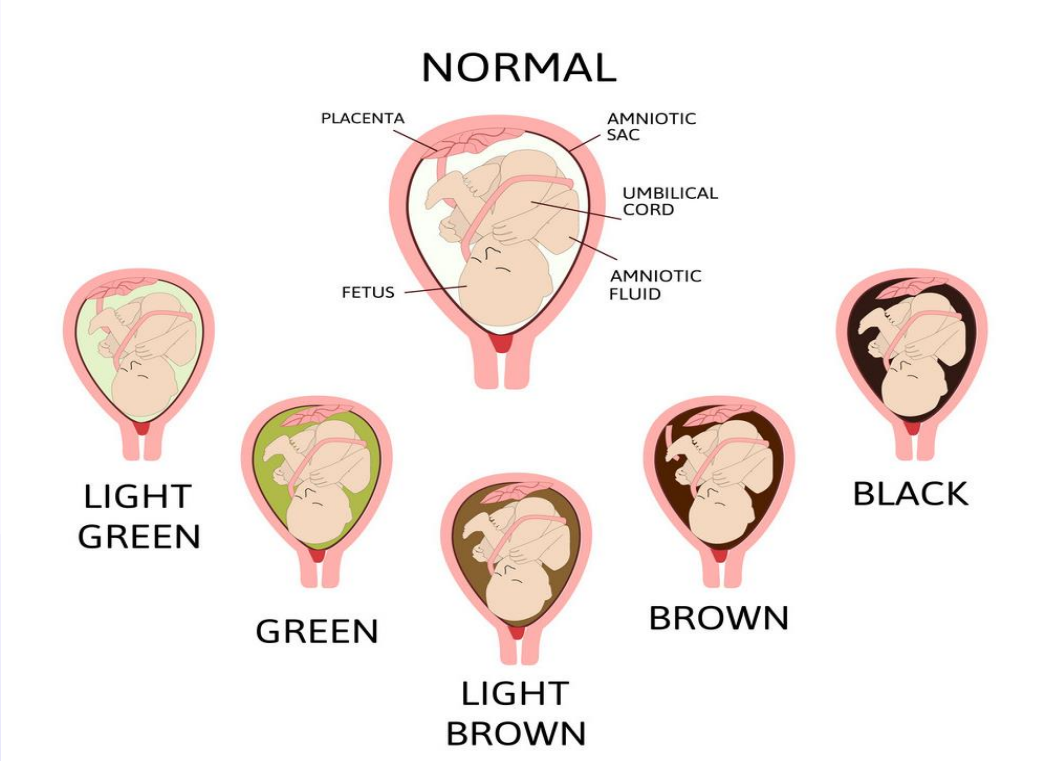
How to measure ?

1. Divide the abdomen by drawing two perpendicular lines through umbilicus into 4 equal quadrants
2. Measure the deepest vertical pocket of fluid in each quadrant
3. Pocket should be free of cord or fetal parts
4. Add the 4 measurements together

Normal measurement 5-25


1 D 10.12cm
GE
GE

Clinical assessment of AF



Clinical assessment of AF

- **This is usually done during labour:**
- **Normal AF** is watery, slightly yellowish in colour.
- **Golden yellow:-** In Rh incompatibility patients (iso-immunization)
- **Greenish yellow:-** In post-maturity patients
- **Dark maroon:-** Due to altered blood in accidental hemorrhage.
- **Dark brown:-** In presence of retained dead fetus
- **Blood stained:-** In abruption, vasa previa.

02

Polyhydramnios

Polyhydramnios

Excess of amniotic fluid in the amniotic sac which AFI more than 25 cm (AFI above 95th centile for gestation on us examination) and single deepest pocket more than 8 cm.

Incidence

- The incidence of polyhydramnios in a general obstetric population generally ranges from 1-2%

Etiology

<table>
<tr><th>Maternal factor</th><th>Materno-Fetal Etiology</th><th colspan="2">Fetal etiology</th></tr>
<tr><td rowspan="2">Maternal DM

⇶ Fetal hyperglycemia
→ fetal polyuria</td><td rowspan="2">1. Multiple gestation
Twin gestation with twin-to twin transfusion syndrome
(increased amniotic fluid in the recipient twin and decreased amniotic fluid in the donor)
or
multiple gestations affect 10% of MCDA due to vascular anastomosis and blood flow imbalance</td><td>swallowing defect
Central nervous system abnormalities and neuromuscular diseases that cause swallowing dysfunction
Ex : anencephaly</td><td>Extrinsic intestinal compression
(diaphragmatic hernia or masses within the thorax and mediastinum)</td></tr>
<tr><td>Congintal anamolies
1.Esophageal atresia (associated with
2.tracheoesophageal fistula
Tracheal agenesis

3.Duodenal atresia

4.intestinal atresias</td><td>Infectious
Congenital syphilis Viral hepatitis Parvovirus b19
CMV</td></tr>
<tr><td rowspan="2"></td><td>2. Chorioangioma.</td><td rowspan="2">Fetal akinesia syndrome
with absence of swallowing</td><td rowspan="2">Chromosomal Disorders;
• Trisomy 18
• Trisomy 21 also 13</td></tr>
<tr><td>3. Blood incompatibilities (Rh iso-immunization)</td></tr>
</table>

Criteria for mild, moderate, and severe polyhydramnios

	Mild	Moderate	severe
Single deepest pocket	8 – 11.9 cm	12 – 15 cm	>= 15cm
Amniotic fluid index	24 – 29.9 cm	30 – 34.9 cm	>= 35 cm

History & Physical Examination

History	Physical examination
Usually **asymptomatic** ; However, the gravida may experience : 1. **Press symptoms** (Persistent S.O.B, hydronephrosis) 2. **Uterine irritability and contractions** 3. **Abdominal discomfort** 4. **Lower limb edema**	• The abdomen markedly **enlarged stretched tense abdomen** and the skin is tense and shiny **with increased stria gravida** • **Large uterine size for gestational age** Difficulty palpating fetal parts and hearing fetal heart. But could be felt by dipping. • **Unstable presentation.**

Diagnosis & Investigations

Sonographic Visualization By US

- Deepest vertical pocket (DVP) more than 8 cm
- Amniotic Fluid Index (AFI) more than 25 cm
- fetal number and Chorionicity
- severity of polyhydramnios
- fetal growth.
- If there is any obvious fetal anomaly

Diagnosis & Investigations

1- **Diabetes screening**

2- **Serological testing** to exclude underlying alloimmunization

3- **Serological testing if underlying infectious cause is suspected**

4- **karyotype** : Assessment of structural and chromosomal anomalies if diagnosed less than 30 week's gestation (fetal medicine referral)

5- **Nonstress test**

6- **Biophysical profile.**

7- **Doppler ultrasound**

Antepartum fetal monitoring

Why?
The increase in risk of adverse pregnancy outcomes
Two- to five-fold increase in risk of perinatal mortality.

- Mild To Moderate Polyhydramnios:
(NST) and **(BPP)** upon diagnosis
every 1 to 2 weeks until 37 weeks
Then weekly from 37 weeks to delivery

- Severe Polyhydramnios:
NST and BPP every week until delivery

Complications

1. **General abdominal discomfort** and **slight dyspnea** (in mild cases) Marked respiratory distress and severe abdominal symptoms (moderate to severe)
2. **premature rupture of membranes** so preterm labor and Premature birth.
3. **Placental abruption**
4. **Umbilical cord prolapse.**
5. **Macrosomia**
6. **Maternal respiratory compromise.**
7. **Fetal malposition and mal-presentation**
8. **Cesarean delivery and NICU**
9. **Still-birth and Perinatal Mortality**

Management Of Polyhydramnios

“The goal is to relieve the significant maternal discomfort and avoid iatrogenic preterm birth for maternal indications.”

—Someone Famous

Management Of Polyhydramnios

Asymptomatic patients and patients with mild symptoms

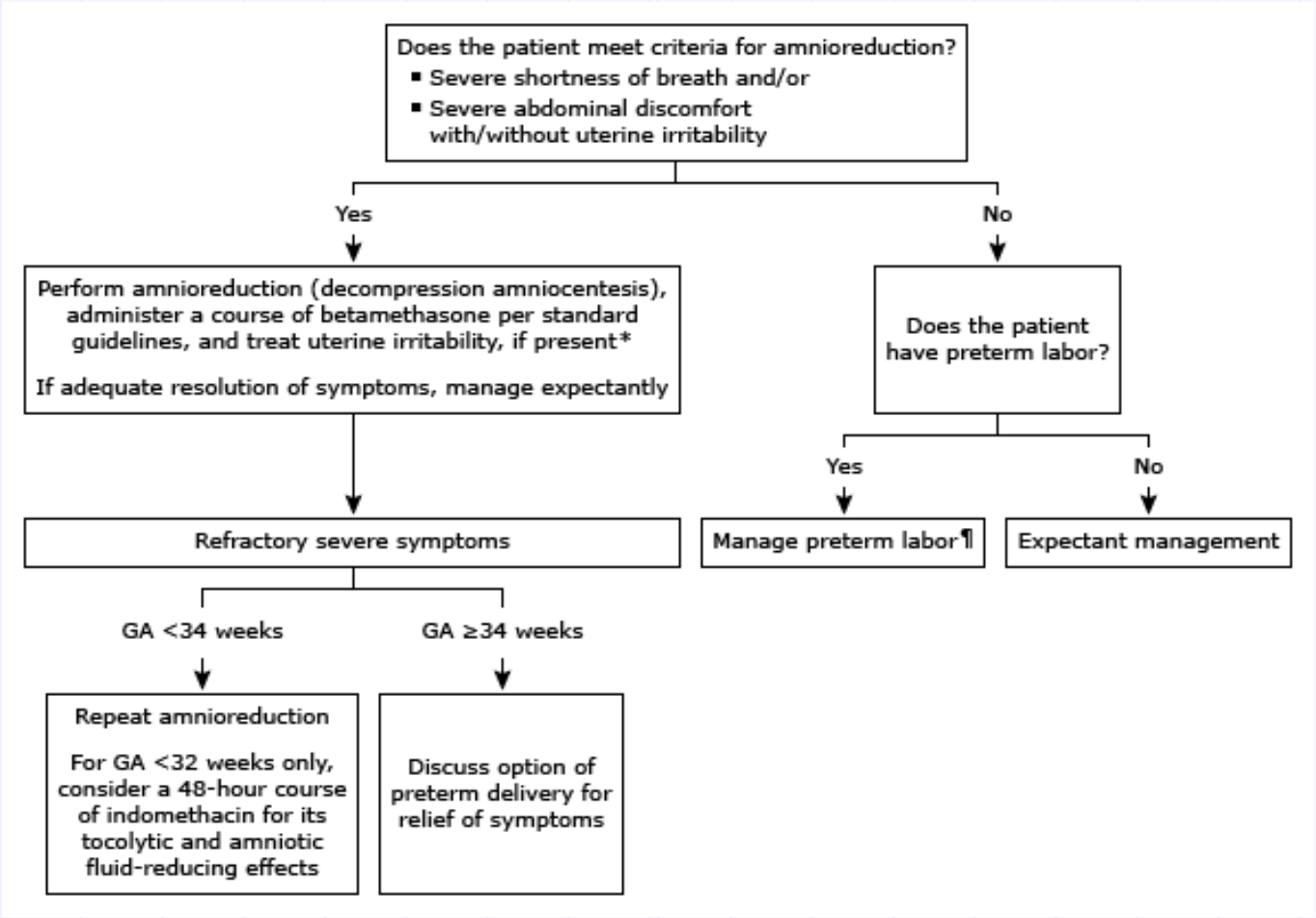
not candidates for intervention as they typically do not experience severe symptoms related to polyhydramnios, pregnancy outcome may not be adversely affected, and there are no interventions that improve pregnancy outcome

EXPECTANT MANAGMENT

patients with severe polyhydramnios

The decision to **intervene depends on symptom severity**.

Our approach is discussed in the next slide and shown in the algorithm


Does the patient meet criteria for amnioreduction?
Severe shortness of breath and/or
Severe abdominal discomfort with/without uterine irritability
Yes
No
Perform amnioreduction (decompression amniocentesis), administer a course of betamethasone per standard guidelines, and treat uterine irritability, if present*
If adequate resolution of symptoms, manage expectantly
Does the patient have preterm labor?
Yes
No
Refractory severe symptoms
Manage preterm labor¶
Expectant management
GA <34 weeks
GA ≥34 weeks
Repeat amnioreduction
For GA <32 weeks only, consider a 48-hour course of indomethacin for its tocolytic and amniotic fluid-reducing effects
Discuss option of preterm delivery for relief of symptoms

Role of Amniocentesis

Amniocentesis (Amnioreduction)

Amnioreduction ONLY if polyhydramnios is both severe and symptomatic (associated with significant maternal discomfort or preterm labor) and if idiopathic and after fetal assessment.

A Reasonable Guideline is:.

Remove the fluid NO faster than 1000 mL over 20 minutes
NOT to remove more than 5 liters at one time.

The procedure is terminated when:.

the AFI is normalized (generally 15-20 cm)
intra-amniotic pressure is less than 20 mmHg.

Role of Amniocentesis

Complication:

rates in small series are generally low, ranging from 1 to 10 percent of procedures.

***most common complications** :

preterm labor & prelabor rupture of membranes

***less common**

abruption, intraamniotic infection, and hypoproteinemia

Post procedure follow-up :

monitor AFV every one to three weeks as indicated by the progression and severity of the amniotic fluid reaccumulating process.

Role of Indomethacin

SMFM recommends not administering indomethacin for the sole indication of reducing amniotic fluid .

Initial dose of 25 mg orally four times daily
If NO reduction in AFV after 2-3 days, the dose is gradually increased up to 2-3 mg/kg per day.

Effects	Side effects
Reduce fetal urinary production	Constriction of the ductus arteriosus (risk increases with exposure exceeds 72h & **advancing gestational age > 32 w**
Increase fluid movement across fetal membrane	Necrotizing Enterocolitis (NEC)
Enhance absorption and **decrease fetal lung amniotic production**	Periventricular Leukomalacia

Management of Labor

- During labor, the **fetal position is checked frequently to confirm vertex presentation** as the excess amniotic fluid allows greater fetal mobility. Conversion to a breech, compound or transverse presentation may occur.

- Spontaneous rupture of membranes can cause sudden severe uterine decompression **with risk of cord prolapse** or **abruption.**
- Gradual abdominal or transcervical amnioreduction with a needle may prevent these complications during labor

- **Continuously FHR monitored** due to increased risk of abnormalities.

NO absolute contraindication to use of Oxytocin or Prostaglandins (but used with Caution, can cause Marked increase in the incidence of post-partum hemorrhage related to atony in patients with polyhydramnios).

Timing Of Delivery

Mild to Moderate polyhydramnios with normal NST and BPP

Induce labor at 39-40 weeks

- Due to the risk of fetal death appears to increase significantly at term.

Severe Polyhydramnios

Induce labor at 37 weeks

minimize the risk of umbilical cord prolapse and/or abruption upon rupture of membranes.

Severe Polyhydramnios with intolerant maternal symptoms before 37 weeks

Amniocentesis as early as 34 weeks & deliver if the fetal lungs are mature

03

Oligohydramnios

Oligohydromnios

"Too little amniotic fluid"

Oligohydramnios is defined as a decreased volume of amniotic fluid relative to gestational age, typically diagnosed when the

1- amniotic fluid index (AFI) is ≤ 5 cm

2- the maximum vertical pocket (MVP) is < 2 cm on ultrasound.

Etiology

1. Placental Insufficiency
IUGR , Preeclampsia , HTN

2. Post-term Pregnancy (>42 weeks)

3. PPROM / PROM

4. Fetal Renal Anomalies
Renal agenesis ,PCKD , Urinary tract obstruction

5. Drugs: NSAIDs
Indomethacin
6.Twin to Twin Transfusion syndrom

☐ 1. History

Maternal symptoms
↓
.decrease Fetal movement
.Leaking fluid?
↳ PPROM
.Pain / contractions?
↳placental abruption
,preterm labor
.Headache, vision changes, epigastric pain
↳ Preeclampsia

Pregnancy history
↓
Accurate dating؟
↳ LMP + early US؟
Previous IUGR / oligohydramnios
Twin pregnancy TTTS

Medical and Drug History
↓
HTN, Lupus, Kidney disease؟
Use of NSAIDs / ACE inhibitors؟

Infection risks
↓
Fever, discharge → chorioamnionitis؟

2. Physical Examination

□ A) General Exam

.Vital signs:
↑ BP → preeclampsia
Fever → infection

□ B) Abdominal Exam

Abdominal tenderness (infection or abruption)

Fundal height:
Small for gestational age

Excessive fetal parts felt → ↓ AFI
↓ Liquor = easy to feel limbs
Fetal lie:
Malpresentation more likely

Auscultation (FHR):
Variable Decelerations,
↓ variability

□ C) Speculum Exam (ROM)

Pooling of fluid؟

Diagnosis

Ultrasound

1. Amniotic Fluid Index (AFI)
Oligohydramnios = AFI ≤ 5 cm

2. Maximum Vertical Pocket (MVP)
.Oligohydramnios = MVP < 2 cm.

Investigations

1. Detailed Fetal Ultrasound
- Renal anomalies (kidneys, bladder)
-IUGR
-Structural abnormalities
In early-onset oligohydramnios
2. Non-Stress Test (NST)/CTG
3. Biophysical Profile (BPP)
4. Fetal Doppler Studies :assess placental blood flow
Umbilical artery: ↑ resistance → placental insufficiency
-MCA: brain sparing
-Ductus venosus
5. Check for ROM (Rupture of Membranes)
Speculum exam: pooling
6. Maternal Blood Tests
CBC: signs of infection
CRP : if chorioamnionitis is suspected
7.Preeclampsia labs: HTN , Proteinuria uric acid, LFT, platelet count.
-hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome.
8.Amniocentesis if chromosomal anomalies suspected

Management

1.Hospitalization

2. Initial Assessment :History and exam

3 . Fetal Monitoring :CTG

4. Ultrasound Evaluation:
Assess fetal growth.
Evaluate placental position and condition.
Perform Doppler ultrasound to assess umbilical artery blood flow.

5. Investigations for Etiology

6. Management Approach

7.Amnioinfusion
Consider amnioinfusion during labor to improve amniotic fluid volume around the umbilical cord and reduce cord compression.

8. Delivery Planning
Decide on timing and mode of delivery based on fetal and maternal condition.
Immediate delivery (often by cesarean section) if signs of fetal distress or worsening oligohydramnios.
If fetal condition is stable, pregnancy can be prolonged with close monitoring up to 40 weeks.

9. Post-Delivery Care
Monitor mother and newborn closely after delivery.
Investigate and manage underlying causes to reduce recurrence risk in future pregnancies.

If mild and no fetal compromise,,,
Close outpatient or inpatient monitoring with frequent reassessment.
Repeat amniotic fluid measurements regularly.
Advise maternal hydration and rest.
Monitor fetal movements

If moderate to severe or fetal compromise
Intensive fetal monitoring (continuous CTG).
Prepare for delivery if pregnancy is ≥ 37 weeks or if fetal status deteriorates.
If preterm (< 37 weeks), administer corticosteroids to promote fetal lung maturity.

If PROM / PPROM:
34 >weeks → expectant + steroids

34–36 weeks → may require delivery

Give:

Corticosteroids

Antibiotics (latency)

Monitor for chorioamnionitis

Complications

Fetal Complications

Umbilical cord compression → variable decelerations in FHR, fetal distress.

Intrauterine growth restriction (IUGR) → due to placental insufficiency.

.

(stillbirth) in severe untreated cases

- Potter sequence :

Pulmonary hypoplasia (lethal),

Oligohydramnios (origin),

Twisted facies,

Twisted skin,

Extremity deformities,

Renal agenesis (classic form).

Neonatal Complications

Perinatal asphyxia.
NICU admission for respiratory distress

Maternal Complications

Prolonged labor.
Increased rate of cesarean

Potter sequence

Etiology and pathophysiology

↓ Fetal urine output (e.g., due to bilateral renal agenesis, ARPKD, obstruction of posterior urethral valves)

Chronic placental insufficiency

Chronic amniotic fluid leakage

Oligohydramnios

Intrauterine compression,
↓ Amniotic fluid ingestion,
↓ Space for fetal development

Internal and external fetal malformations (Potter sequence)