

# Aberrant liquor volume oligohydramnios and Polyhydramnios

- **Supervised by**
  - Dr. Ashwaq Tarawneh
- **Done by**
  - Ahmad Rababah
  - Farah Al-Taweel
  - Huda Hdayat
  - Sara Dmour
  - Aleen Nazar

# Amniotic fluid

**Definition** : A clear, slightly yellowish liquid that surround the fetus during pregnancy and It is contained in the amniotic sac.

## **Function:**

- Essential for fetal growth and development.
- Low resistance environment > freedom of movement > musculoskeletal development.
- Protection from external forces and infection
- Maintain temperature.
- Barrier against infection

# Clinical importance:

- Screening of fetal malformation (amniocentesis)
- Assessment of fetal well-being.
- Diagnostic tool
- Assessment of fetal lung maturity (Lecithin /Sphingomyelin ratio) 32-33 w
- Guiding clinical intervention

# Amniotic fluid constituents

- Water and electrolyte
- urea
- Creatinine
- Uric acid
- Desquamated fetal cells
- Proteins, lipids and phospholipids

# Sources

## Total AF volume = inflow + outflow into amniotic space

- ❖ Before **16 w** early pregnancy: AF osmolality = coelomic fluid = maternal plasma osmolality=maternal circulation
- ❖ Maintain AFV requires removal of AF **fetal skin (major osmotic pathway )** till keratinized after **22-25 w** .
- ❖ **8-11 w** > fetal urine present, reaching 1000-1200ml/day at term
- ❖ Respiratory tract secretion.
- ❖ Fetal swallowing (200-1500ml/day)
- ❖ **Intramembranous transport** (200-500ml/day) between AF and fetal blood across fetal placental surface Direct fluid movement from maternal blood into amniotic cavity .
- ❖  **Transmembranous** flow (10ml/day) Between AF and maternal blood within the uterine wall

# Amniotic fluid homeostasis:

At **12 weeks'** gestation, the average volume is **60 ml**.

By **16 weeks**, when genetic amniocentesis is often performed, the mean volume is **175 ml**.

From **20 weeks** on, there is greater variance of amniotic fluid volume (**-600 ml**).

Amniotic fluid volume increases steadily throughout pregnancy to a **maximum** of 400–1200 ml at **34–38 weeks**.

**Reduction** in total AFV observed with rapid decline from **41w**

# AFV assessment

## **The single deepest vertical pocket:**

measured vertically in the AP plane at any location in the amniotic cavity as long as the umbilical cord or fetal parts are excluded.

- **Oligohydramnios DP < 2 cm**
- **Normal DP 2.1 - 8 cm**
- **Polyhydramnios DP > 8 cm**

## **Amniotic fluid index:**

measured after 20w by dividing the amniotic cavity into 4 quadrants using the maternal linea nigra as the midline, the DVP without fetal part or cord is ascertained for each quadrant and then the 4 measurement are summed

- **Oligohydramnios — 0 to <5 cm**
- **Normal — 5 -25 cm**
- **Polyhydramnios — > 25 cm**



# Polyhydramnios

✓ Definition : excess of amniotic fluid more than expected for gestational age which causes uterine distention

Should be suspected clinically , when uterine size is large for gestational age

✓ Deepest vertical pocket > 8 cm

✓ Amniotic fluid index > 25 cm

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

# Classification

	Deepest vertical pocket	Amniotic fluid index
Mild	8-12 cm	25- 30 cm
Moderate	12-15 cm	30-35 cm
Sever	>15 cm	>35 cm

# Etiology

✓ Typically idiopathic ~ 70% of cases

✓ Fetal Etiology

Gastrointestinal (esophageal atresia , duodenal atresia and stenosis )

Neuromuscular : anencephaly ( leads to impaired swallowing of amniotic fluid ,leakage of cerebrospinal fluid ) muscular dystrophy , fetal akinesia

Respiratory : cystic lung malformations

Chromosomal abnormalities : trisomy 21 followed by trisomy 18 and trisomy 13

Bartter syndrome

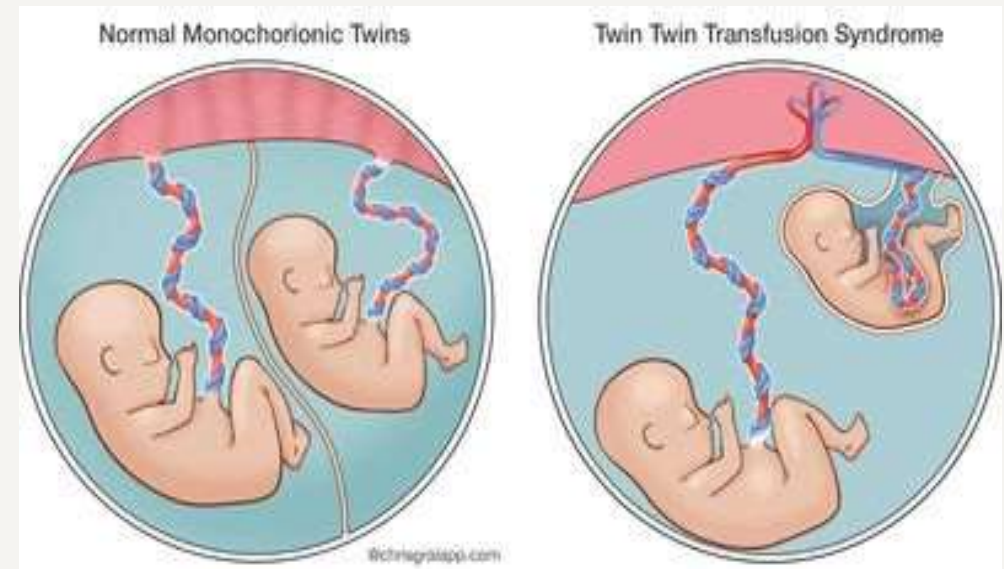
Fetal anemia

Multiple pregnancy : twin-to twin transfusion syndrome

Intrauterine infection : syphilis ,viral hepatitis , parvovirus b19

✓ Maternal conditions :

Diabetes mellitus



# Approach of polyhydramnios

- History

1. Pressure symptoms (Persistent SOB, hydronephrosis, heart burn, indigestion)
2. Uterine irritability and contractions
3. Abdominal discomfort
4. Lower limb edema

# Physical examination

- **Large uterine** size for gestational age (symphysofundal height) with
- **stretched tense abdomen** and increased stria gravida.
- **Difficulty** palpating fetal parts and hearing fetal heart.
- Unstable **presentation**

# Investigation and workup

1- Diabetes screening

2-Serological testing if underlying infectious cause if suspected

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

4- 4d ultrasound for needed cases

5- Nonstress test, Biophysical profile, Doppler ultrasound.

# Antepartum fetal monitoring

- **Mild to Moderate Polyhydramnios:**

(NST) and (BPP) upon diagnosis

every 1 to 2 weeks until 37 weeks

weekly from 37 weeks to delivery

- **Severe Polyhydramnios:**

NST and BPP every week until delivery



# Complications

- ✓ Preterm rupture of membranes
- ✓ preterm labour
- ✓ Placental abruption and cord prolapse
- ✓ Maternal haemorrhage secondary to uterine atony
- ✓ Perinatal mortality
- ✓ Fetal malposition & malpresentation
- ✓ General abdominal discomfort and slight dyspnoea (in mild cases)
- ✓ Marked respiratory distress and severe abdominal symptoms (moderate to severe)

# Management

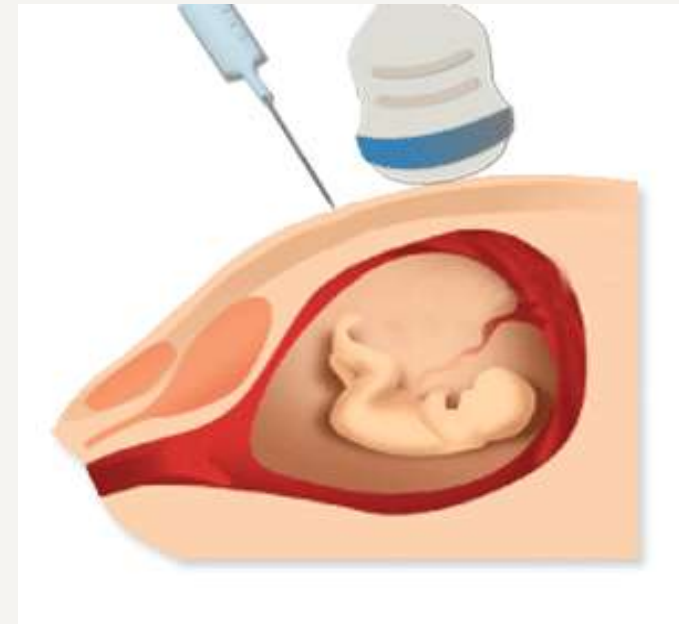
- **Interventions**
  - Amniocentesis (Amnioreduction)
  - Indomethacin
- **Management of Labor**
- **Induction of Labor**
- **Timing of Delivery**

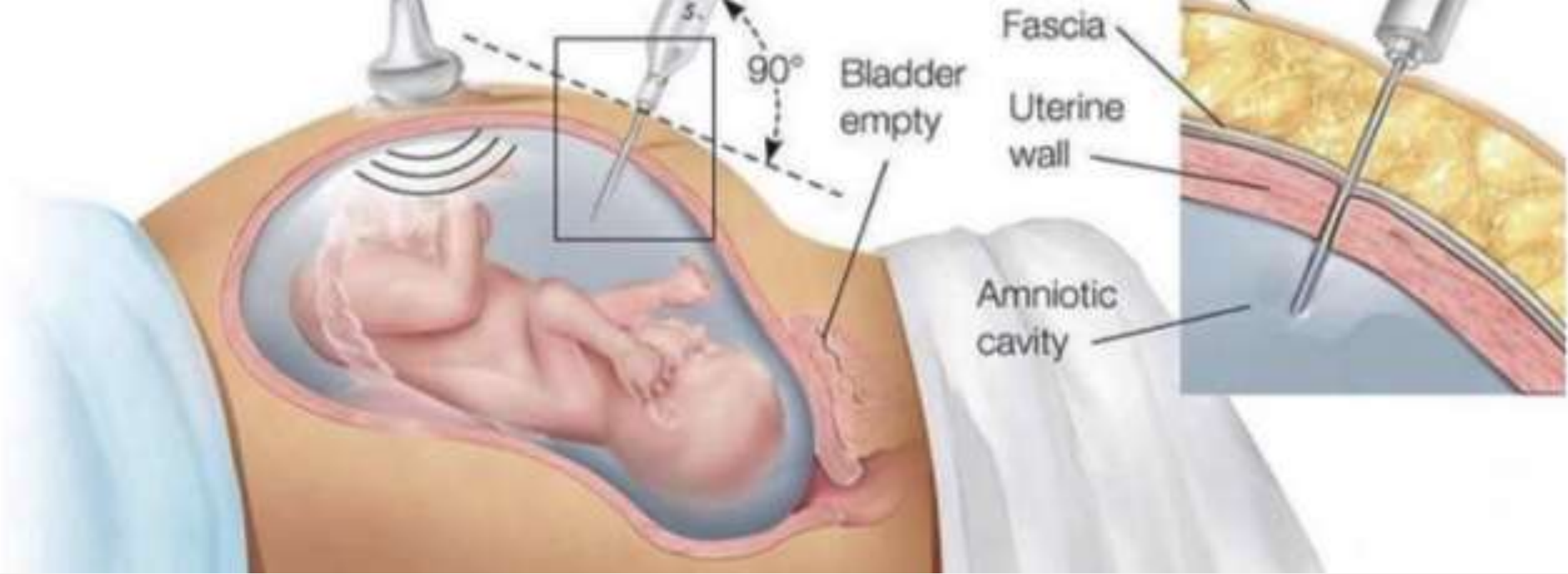
## Amniocentesis (amnioreduction)

- *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**





## Complications

- Amniotic sac infection
  - Preterm Labor
- Placental abruption
- Respiratory distress
- Fetal deformities

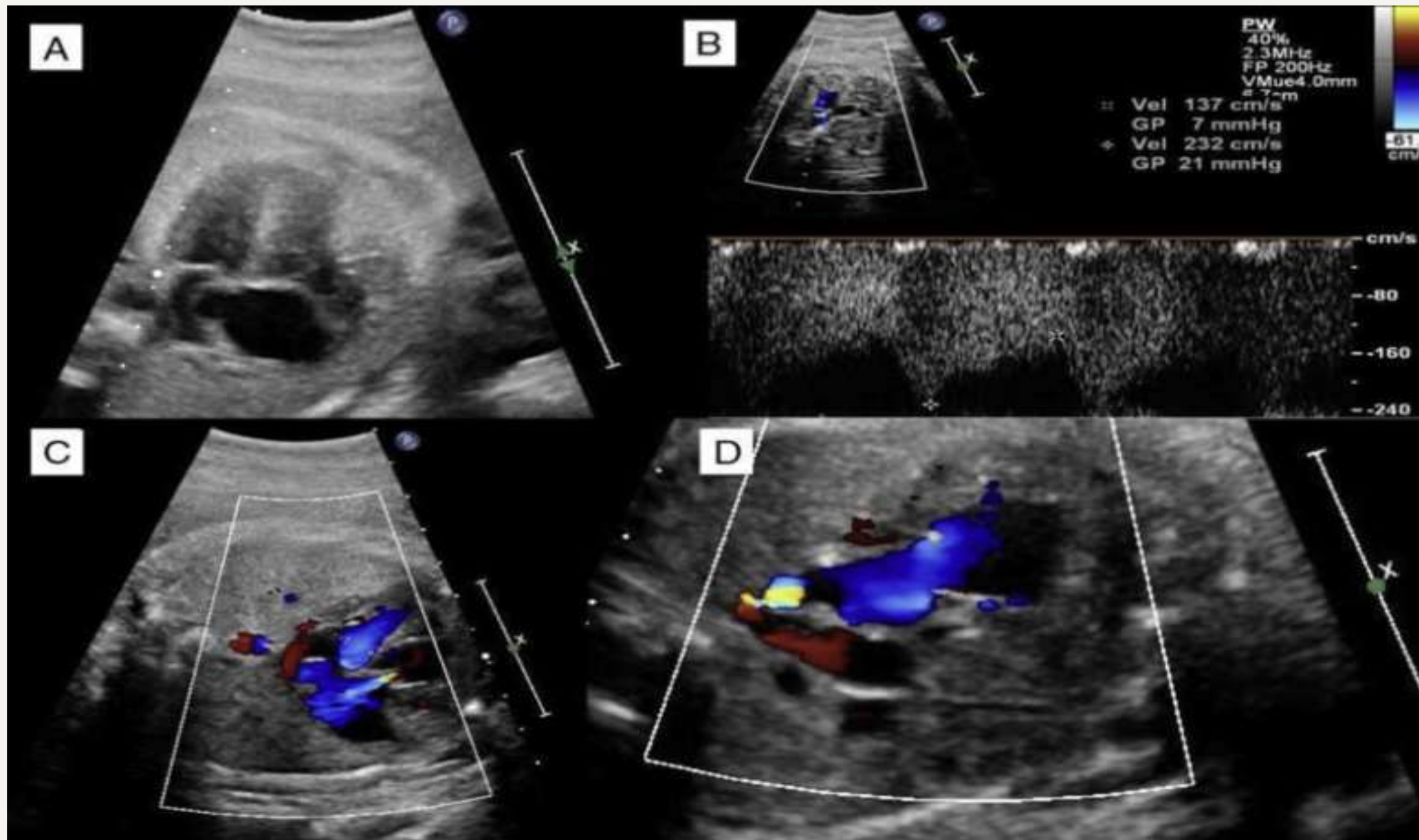
# Indomethacin

- **At less than 32 weeks** to reduce maternal symptoms and prolong gestation.
- **Mode of action:** PG synthetase inhibitor and it also reduces fetal urine production and subsequent AFV more widely recognized for its role as a tocolytic in the prevention of preterm labor.
- **The dose:** according to total AF (ranging from 50 mg/day to 200 mg/day)

Effect	Side effects
Reduce fetal urinary production	Constriction of the ductus arteriosus (risk increases with exposure exceeds 72h and advancing gestational age > 32 w)
Increases fluid movement across fetal membrane	Necrotizing enterocolitis (NEC)
Enhance absorption and decrease fetal lung amniotic production	Periventricular leukomalacia

If duration of therapy exceeds 48 hours and the pregnancy is > 24 weeks of gestation, serial fetal ECG evaluation with Doppler velocimetry at intervals of 2 days to 1 week.

- Sonographic signs of ductal narrowing include tricuspid regurgitation and right ventricular dysfunction.





# Management of Labor

## ☐ Check Fetal Position

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.

## ☐ So What to do?

Gradual abdominal or trans cervical amnioreduction with a needle may prevent these complications during labor Fetal Heart Rate monitored continuously due to increased risk of abnormalities.

**What about IOL?** No absolute contraindication to use of oxytocin or prostaglandins  
These agents should be used with Caution: marked increase in the incidence of postpartum hemorrhage related to atony in patients with polyhydramnios

# Timing of delivery

- 1. Mild to Moderate polyhydramnios with normal NST and BPP; induce labor at 39-40 weeks;** risk of fetal death appears to increase significantly at term.
- 2. Severe Polyhydramnios; induce labor at 37 weeks** to minimize the risk of umbilical cord prolapse and/or abruption upon rupture of membranes.
- 3. Severe Polyhydramnios with intolerant maternal symptoms before 37 weeks; amniocentesis** as early as 34 weeks and **deliver if the fetal lungs are mature.**

- **Medical Consultation**

- **1.Symptomatic** (When the pregnant woman notices that her belly is getting large very quickly).

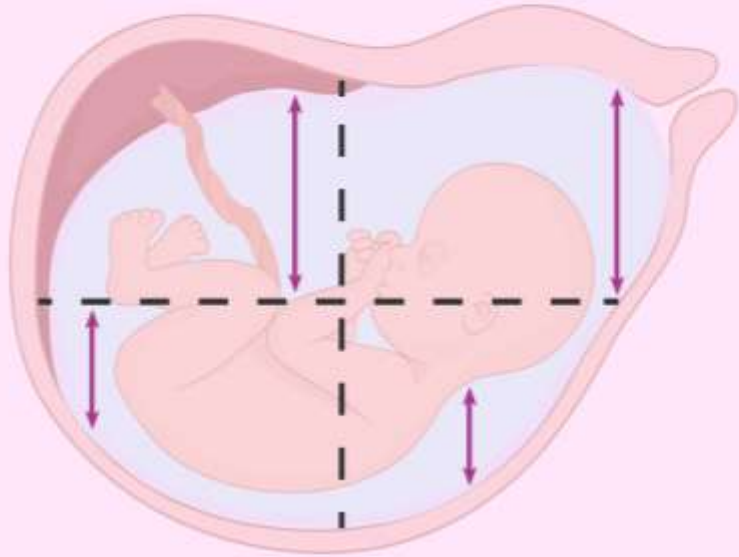
- **2.Associated conditions and Complications.**

# Oligohydramnios

is amniotic fluid disorder resulting in decreased amniotic fluid volume for gestational ( less than expected for gestational age → AFI < 5cm

→ DVP < 2cm

- **NOTE :-**
- **The AFI (in cm) is therefore associated with some degree of error. In general, however, it is possible to differentiate subjectively on ultrasound between ‘too much’, ‘too little’ and ‘normal looking**



Calculate the amniotic  
fluid index (AFI)

- The AFI is an ultrasound estimation of amniotic fluid derived by adding together the deepest vertical pool in four quadrants of the abdomen.

**normal AFI: ((5-25))cm**

**INCIDENCE**

**0.5%-5%**

# Etiology

<b>Too Little production</b>	
Renal agenesis	U/S (no renal tissue, no bladder)
Multicyclic kidney	U/S (enlarged kidney with multiple cysts no visible bladder)
Urinary tract abnormality / obstruction	U/S (kidney may be present but urinary tract dilatation)
FGR and placental insufficiency	clinical reduced SFH reduced fetal movement Possibly abnormal CTG ultrasound FGR abnormal fetal doppler waveform
Maternal drug (NSAIDs)	withholding NSAIDs may allow amniotic fluid to reaccumulate
Postdate pregnancy	
Leakage (PROM)	speculum examination pool of amniotic fluid on posterior blade

# Etiology

## Fetal :

- IUGR
- TTTs
- RENAL AGENESIS,  
PCKD
- URETHRAL  
OBSTRUCTION  
(posterior urethral valve)

## DRUGS:

- Indomethacin
- ACE INHIBITORS

Idiopathic

## PREGNANCY

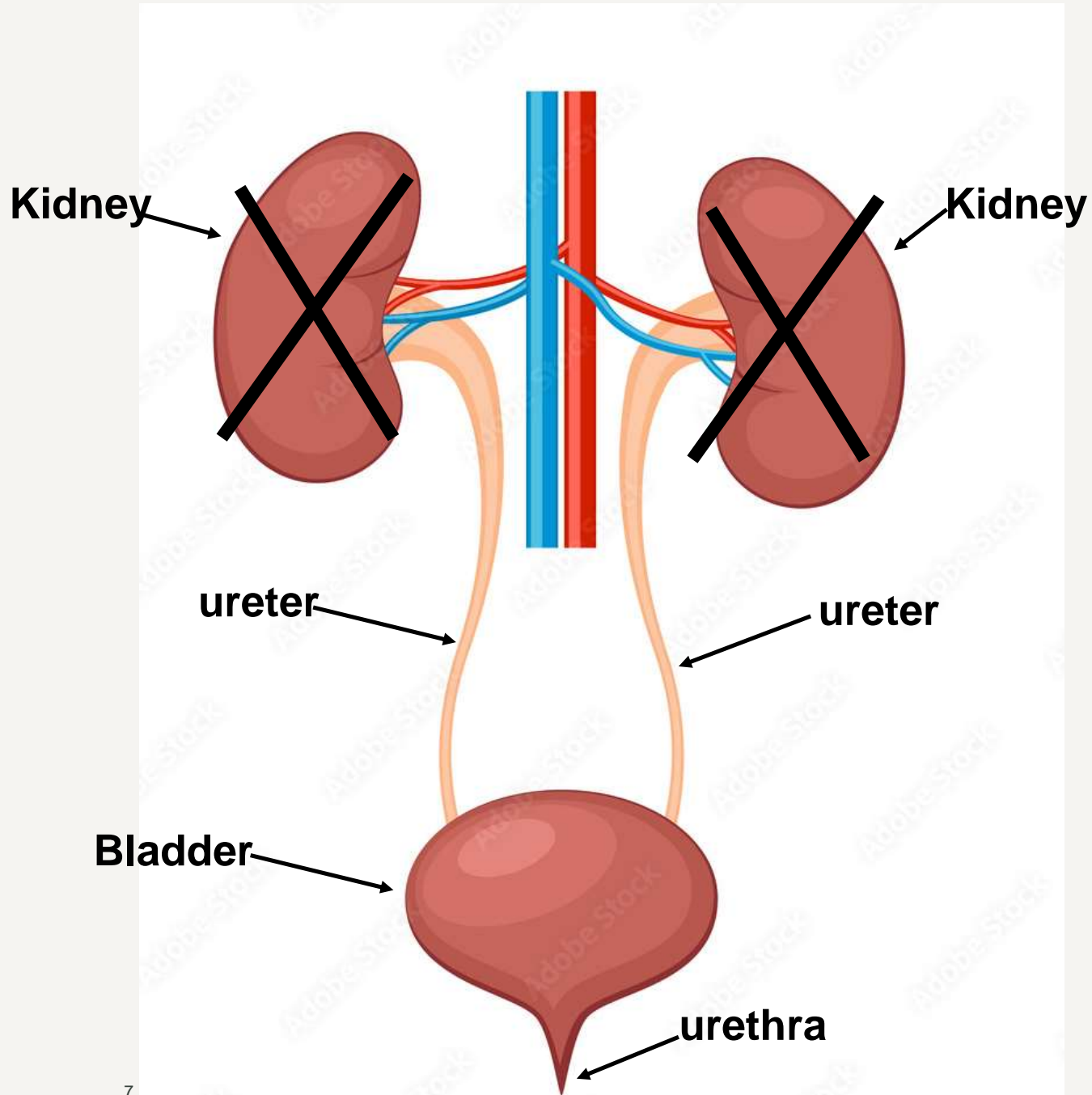
### COMPLICATION:

- PPROM (common  
cause)
- PROM
- POSTTERM  
PREGNANCY (>42W)

## MATERNAL:

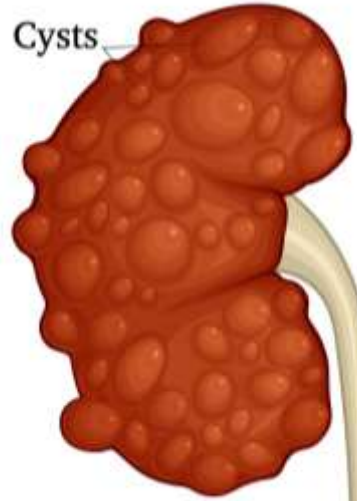
- HTN (PET)/ SLE-  
placental  
insufficiency
- Maternal DM
- CHRONIC KIDNEY  
DISEASE
- MATERNAL  
DEHYDRATION





## 1-renal agenesis

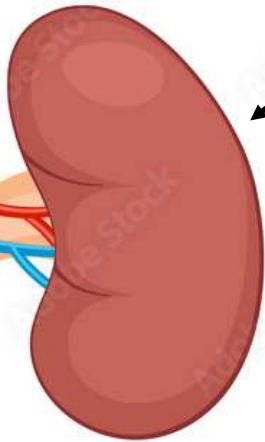
**Kidney**



Polycystic

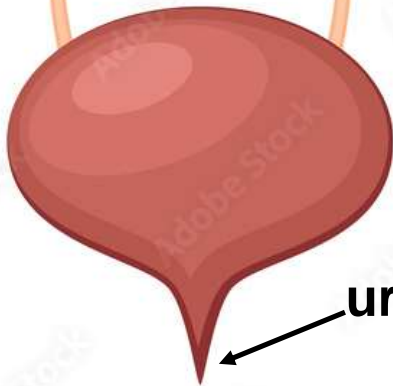
ureter

**Kidney**



ureter

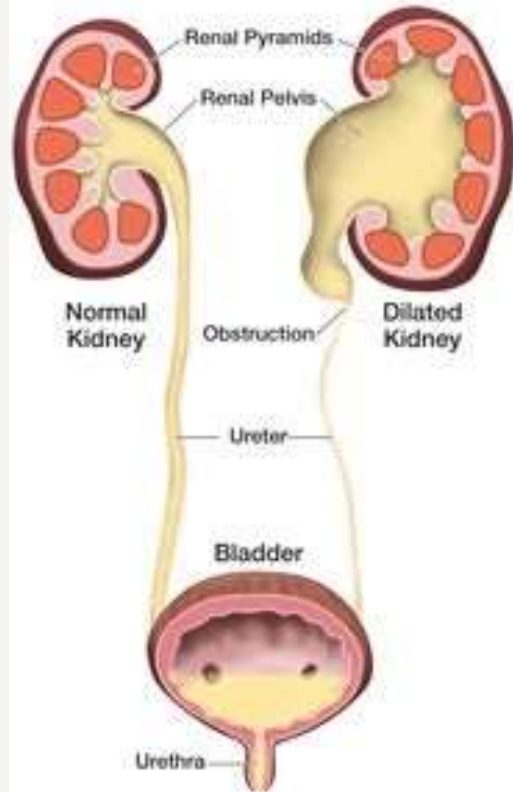
**Bladder**



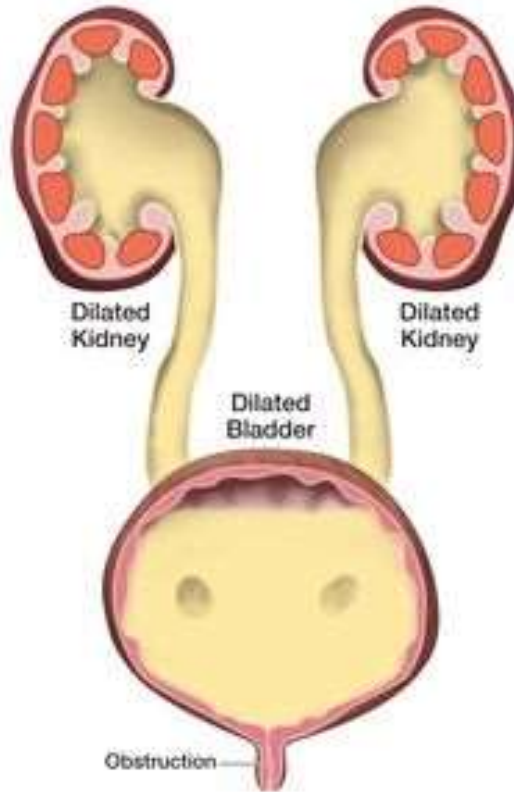
urethra

## 2-polycystic kidney disease

### Upper Urinary Tract Obstruction



### Lower Urinary Tract Obstruction



## U/S: Urinary tract dilatation

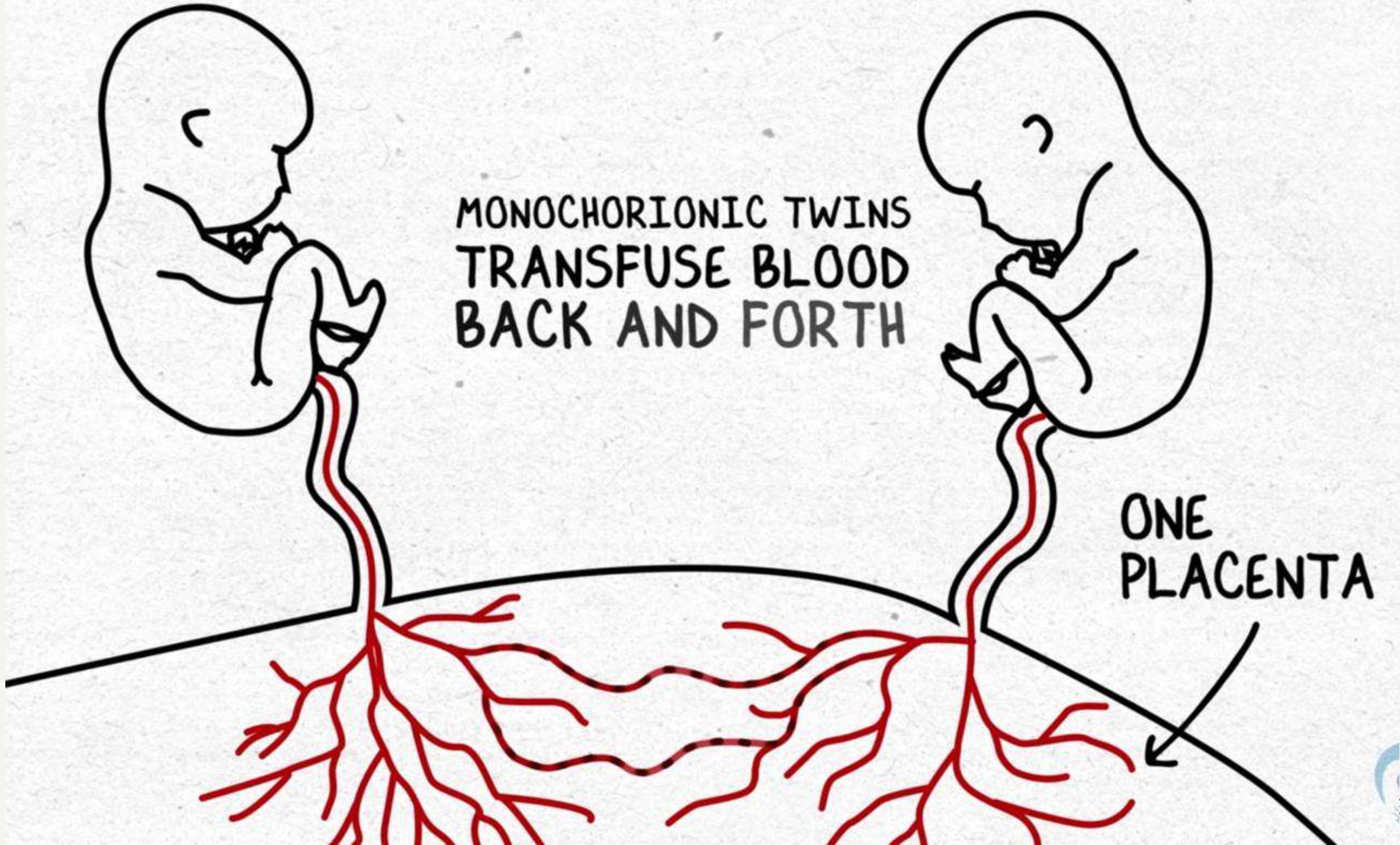
# 2-Multiple pregnancies

## ( Twin-to-Twin Transfusion Syndrome)

- blood is continuously shunted from one twin to the other through vascular anastomoses on the shared placenta, posing a risk to both fetuses:
- **Recipient** twin: 1)polycythemia
- 2)hypervolemia
- 3)polyhydramnios in diamniotic pregnancies
- **Donor** twin: 1)anemia
- 2)growth retardation
- 3)hypovolemia, dehydration (stuck twin or cocooned appearance)
- 4)oligohydramnios in diamniotic pregnancies

MONOCHORIONIC TWINS  
TRANSFUSE BLOOD  
BACK AND FORTH

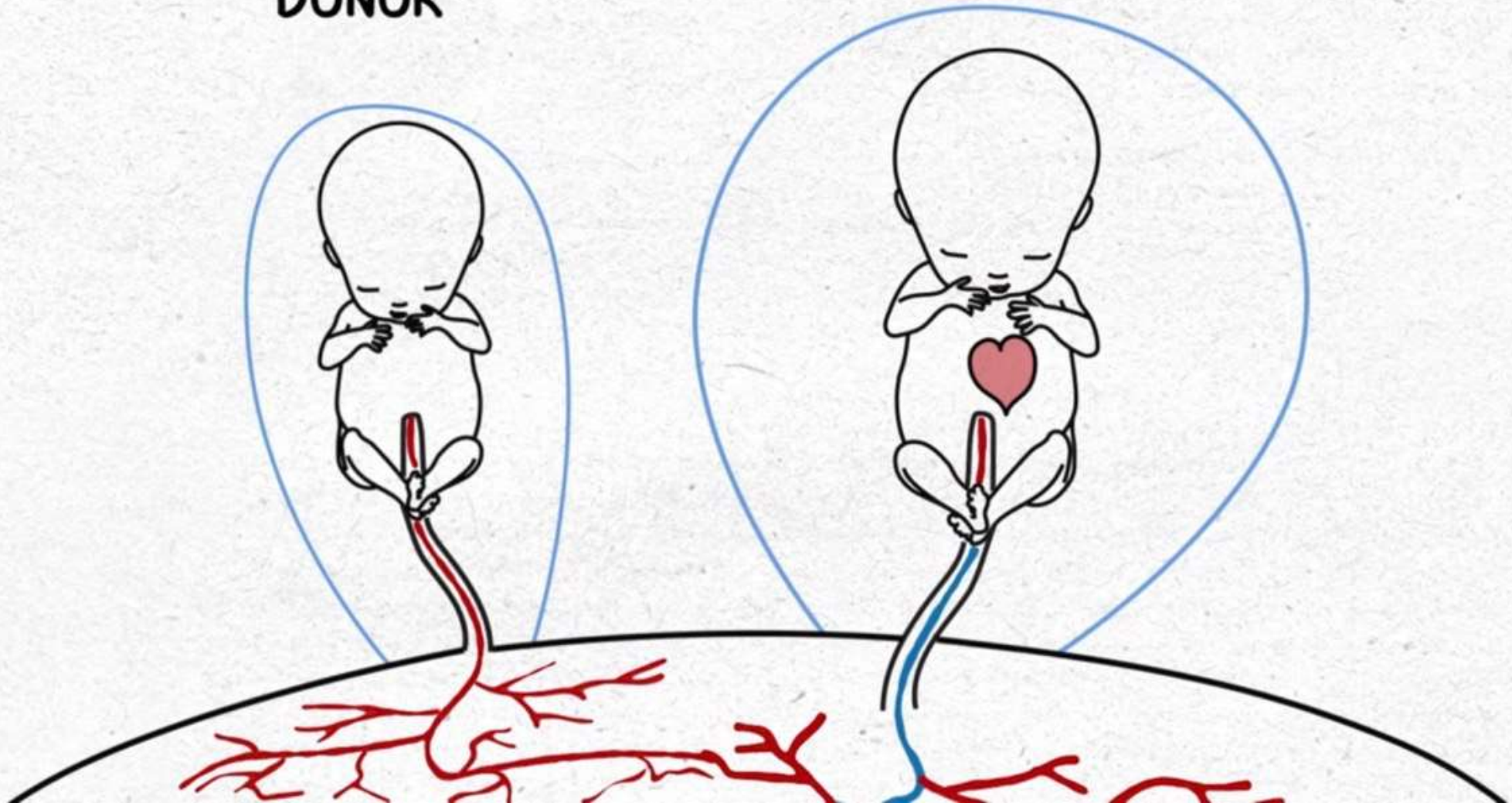
ONE  
PLACENTA



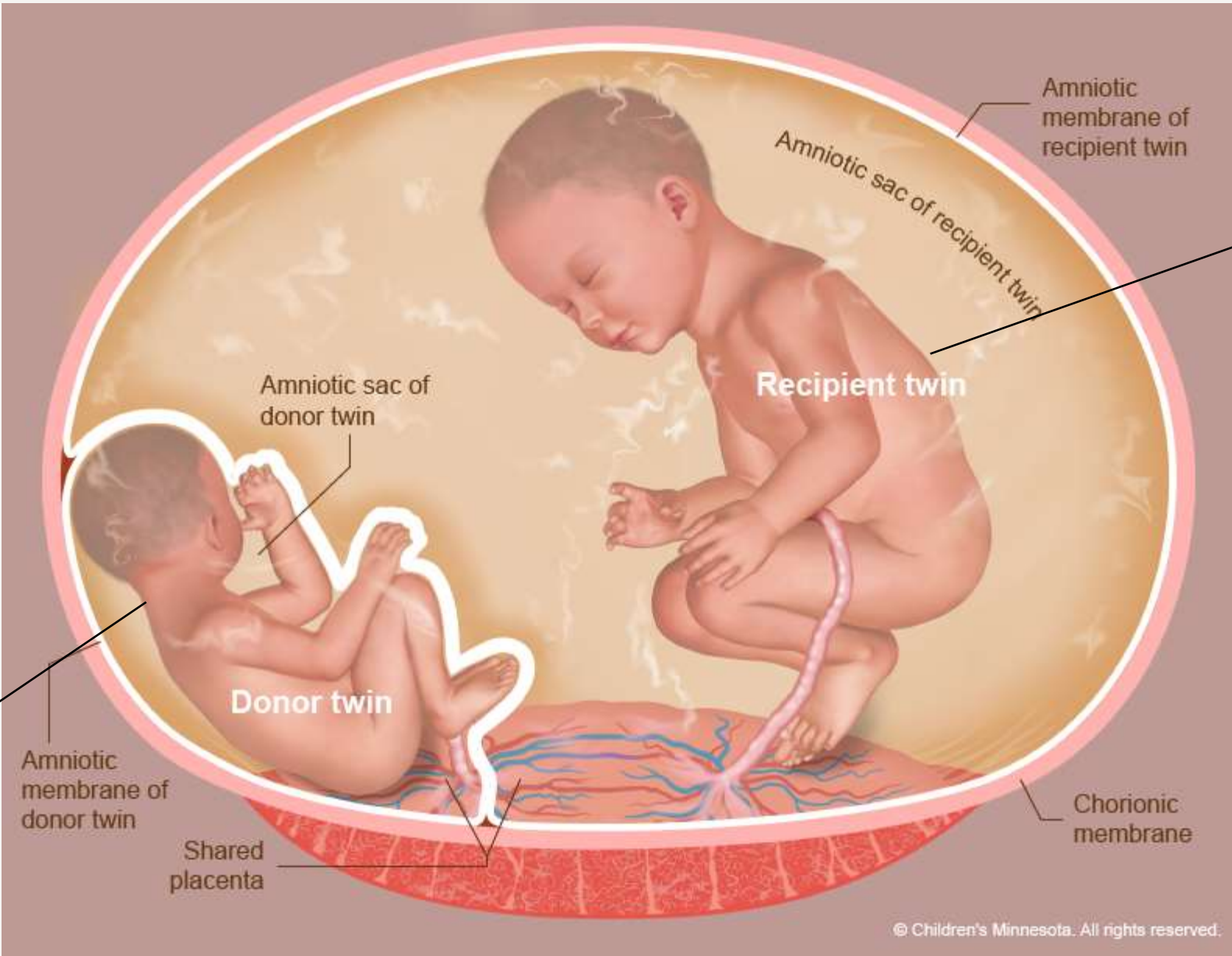
# IN Artery to Vein anastomosis

TWIN A  
DONOR

TWIN B  
RECIPIENT



**A**



**B**

# Etiology

## Fetal :

- IUGR
- TTTs
- RENAL AGENESIS,  
PCKD
- URETHRAL  
OBSTRUCTION  
(posterior urethral valve)

## DRUGS:

- Indomethacin
- ACE INHIBITORS

Idiopathic

## PREGNANCY

### COMPLICATION:

- PPROM (common  
cause)
- PROM
- POSTTERM  
PREGNANCY (>42W)

## MATERNAL:

- HTN (PET)/ SLE-  
placental  
insufficiency
- Maternal DM
- CHRONIC KIDNEY  
DISEASE
- MATERNAL  
DEHYDRATION



# 1-PPROM

## (Preterm Prelabor Rupture Of Membranes):

- Rupture of the membrane before the onset of labor <37 week
- ● PPROM complicates 2-4% of all birth and 30-40 of all preterm births
- ● **Associated with inflammatory reaction +- infection**
- It could be spontaneous or iatrogenic

Main cause :  
Inflammation  
Idiopathic

- risk factors include:
- prior PPRM or PTL of any cause, bleeding in any trimester, genital tract infection, collagen disease, tobacco exposure(affect tensile stress of amniotic sac).

- complications: infection (chorioamnionitis), placental abruption, retained placenta, prolonged maternal hospitalisation, early onset neonatal sepsis, higher neonatal morbidity and mortality; Fetal Pulmonary hypoplasia depending on gestational age.

# Clinical evaluation

## By history:

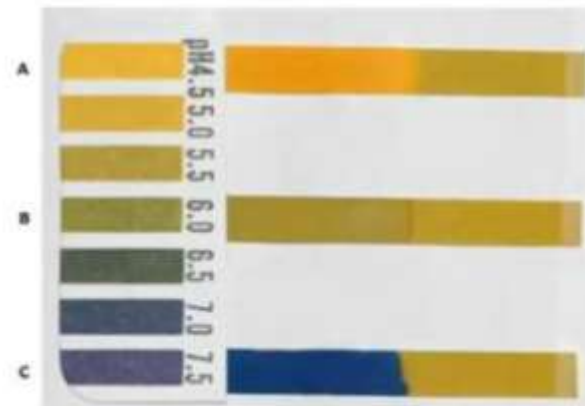
- sudden gush of fluid , soaking clothes, mistaken urinary incontinence)
- Odour and color and amount
- time
- Abdominal pain , contractions
- Mild pyrexia , feeling unwell , abnormal vaginal discharge
- Vaginal bleeding
- Dysuria
- Cord prolapse (by speculum)

# Differential diagnosis

1. Urinary incontinence: leakage of small amounts of urine is common in the last part of pregnancy
2. Normal vaginal secretions of pregnancy
3. Increased sweat or moisture around the perineum
4. Increased cervical discharge
5. Semen
6. Douching

## Diagnosis

### Nitrazine

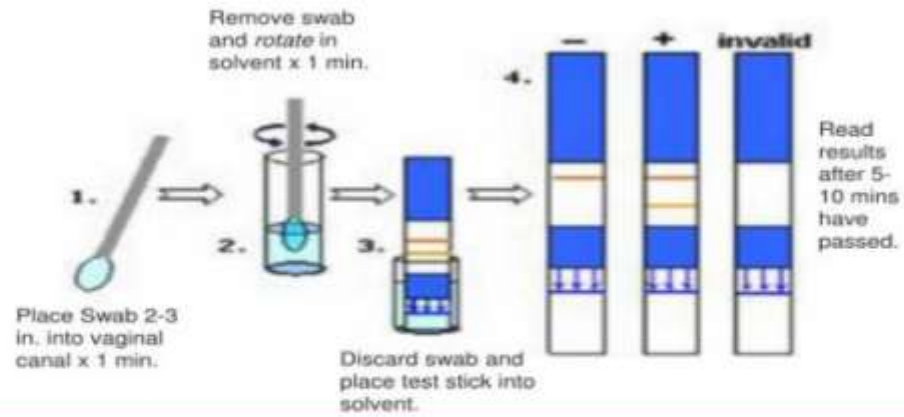


Not used

### Ferning



# PPROM Diagnosis



**Amnisure** –sensitivity 94-99% specificity 87-100%

non-invasive **strip test** for the detection of the placental **alphamicroglobulin-1 protein**

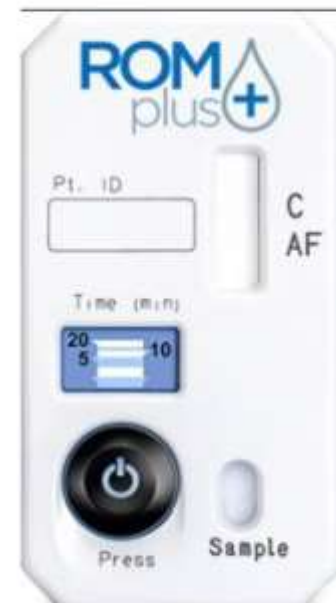
# Actim PPRM



**Actim-PPROM sensitivity 95-100%**  
**Specificity 93-98%**

rapid test that reliably detects PROM, even before any visible signs can be detected

# ROM Plus



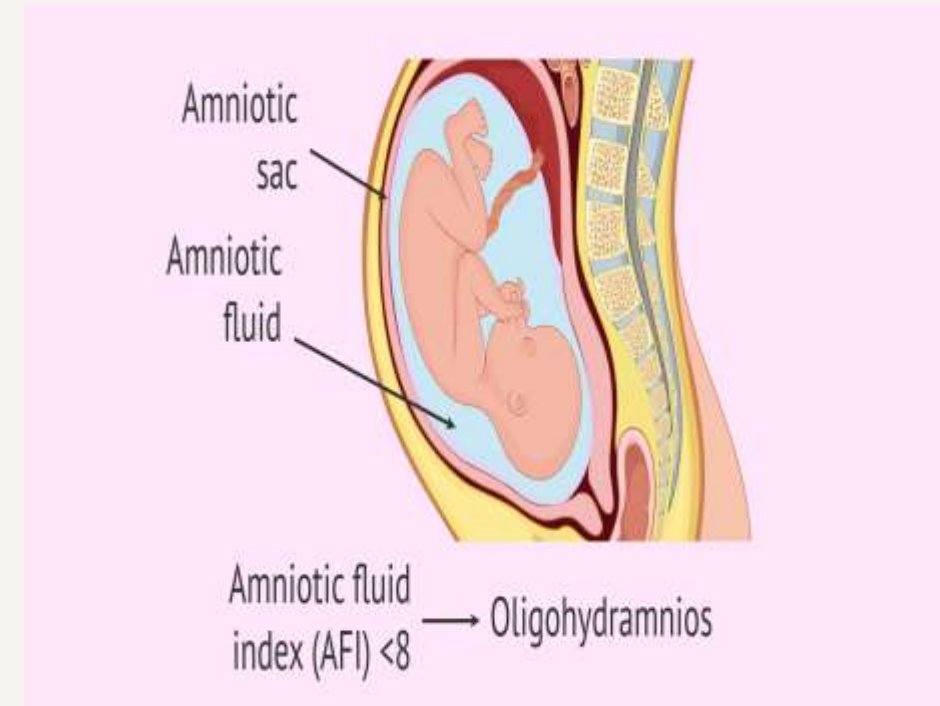
- **Sensitivity 99% specificity 91%**
- Detect **IGFBP-1 and AFP**

# Management

- **Screening for infection including GBS**
- **Antenatal corticosteroids**
- **Tocolysis only to achieve benefit of corticosteroids**
- **Antibiotics prolong latency based on numerous trial**  
**(penicillin plus macrolide)**
- **Fetal monitoring NST, AFV and fetal growth**
- **Maternal monitoring for infection or labor (CRP 2/w)**
- **Timing of delivery –dependent on NICU capability**

# ❑ SIGNS AND SYMPTOMS of oligohydramnios:

- \*NO SPECIFIC SYMPTOMS
- \*leaking of watery discharge
- \*Less fetal movements
- \*Uterus – small for date



# APPROACH TO OLIGOHYD





# APPROACH TO OLIGOHYDRAMNIOS:

## HISTORY

- no specific symptoms
- \*leaking of watery discharge
- \*less fetal movements
- \*uterus – small for date

## PHYSICAL EXAMINATION

- smaller uterine size for gestational age (symphysofundal height) .
- Difficulty palpating fetal parts and hearing fetal heart.
- Malpresentation



# TESTS AND DIAGNOSIS

- **Sonographic visualization by US:**
  - **Deepest vertical pocket (DVT)**
  - **Amniotic Fluid Index (AFI)**
  - **fetal number and Chorionicity**
  - **severity of oligohydramnios**
  - **fetal growth (IUGR,IUFD).**
  - **If there is any obvious fetal anomaly (empty bladder, absence kidney...)**
  - **Nonstress test, Biophysical profile, Doppler ultrasound.**



# INVESTIGATION AND WORKUP:

- **1- confirm PPRM.**
- **2- test for SLE**
- **3- evaluate for PET**
- **Test for elevated blood pressure, proteinuria, elevated uric acid levels,**
- **increased liver function test results, and low platelet count.**
- **hemolysis, elevated liver enzymes, and low platelet count (HELLP)**
- **syndrome.**
- **4- Amniocentesis if chromosomal anomalies suspected**

# COMPLICATIONS:

- **Fetal complication :**
  1. **Intrauterine growth restriction ( due to diminished mobility of the fetus )**
  2. **Birth complication : umbilical cord compression**
  3. **IUFD**
  4. **PREMATURITY**
  5. **Potter sequence**

## POTTER SEQUENCE :

**P**ulmonary hypoplasia

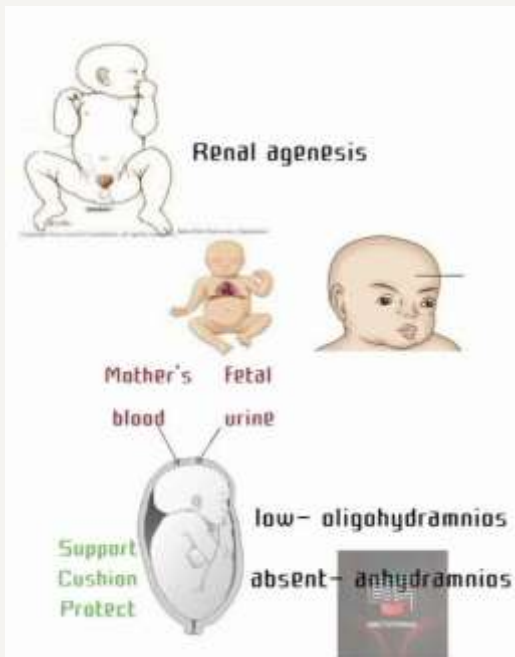
**O**ligohdrominous

**T**wisted face

**T**wisted skin

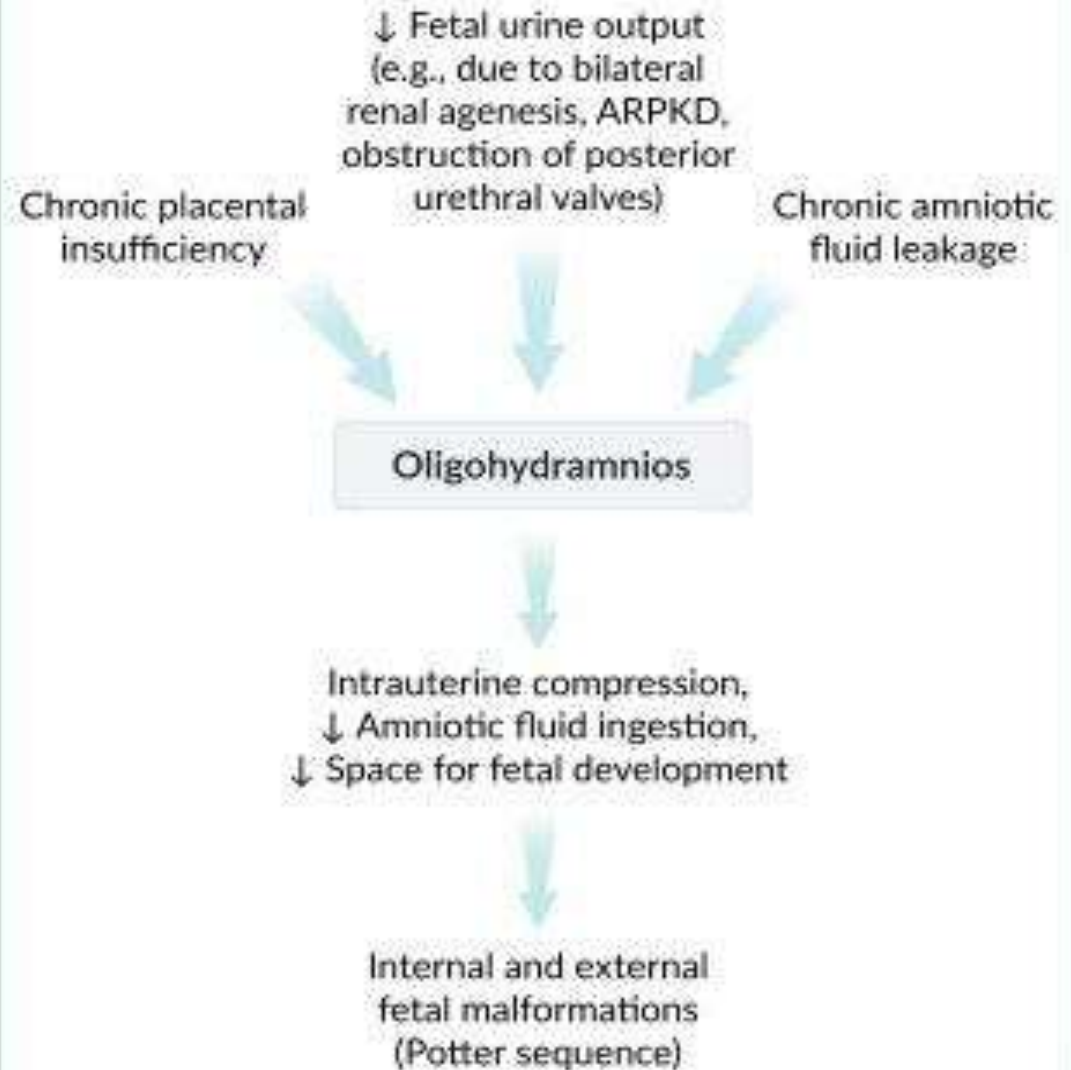
**E**xxtremity deformities

**R**enal agenesis



## Potter sequence

### Etiology and pathophysiology



# POTTER SEQUENCE



*Figure 1. Potter syndrome overall characteristics.*



# MATERNAL COMPLICATION



- **\*increased morbidity**
- **\*prolonged labour: uterine inertia**
- **\*increased operative intervention**

# MANAGEMENT

- **▪ DEPENDS UPON**
- **AETIOLOGY**
- **GESTATIONAL AGE**
- **SEVERITY**
- **FETAL STATUS & WELL BEING**



# MANAGEMENT:

- **Adequate rest** – decreases dehydration
- **Hydration** – oral/iv hypotonic fluids (2 lit/d)  increase in AFI-30%
- **Serial USG** – monitor growth, AFI, BPP
- **IOL or CS :**
  - Lung maturity attained
  - Lethal malformation
  - Fetal jeopardy
  - Severity of IUGR
  - Severity of oligohydramnios.



Pregnancy control



Rest



Fluids

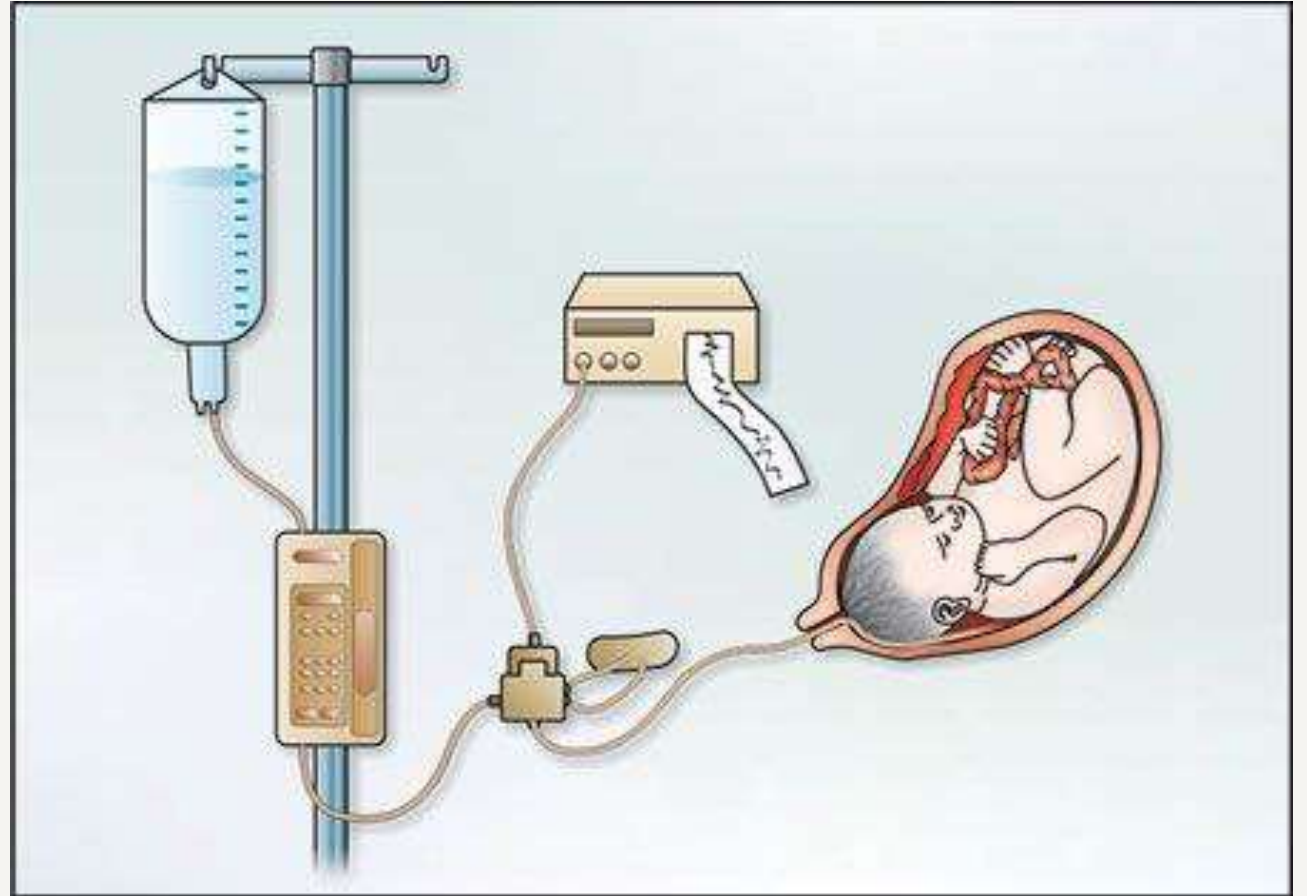
# MANAGEMENT

□ **Amnioinfusion:** The transcervical instillation of isotonic sodium chloride

solution at the time of delivery reduces the risk of cord compression, fetal

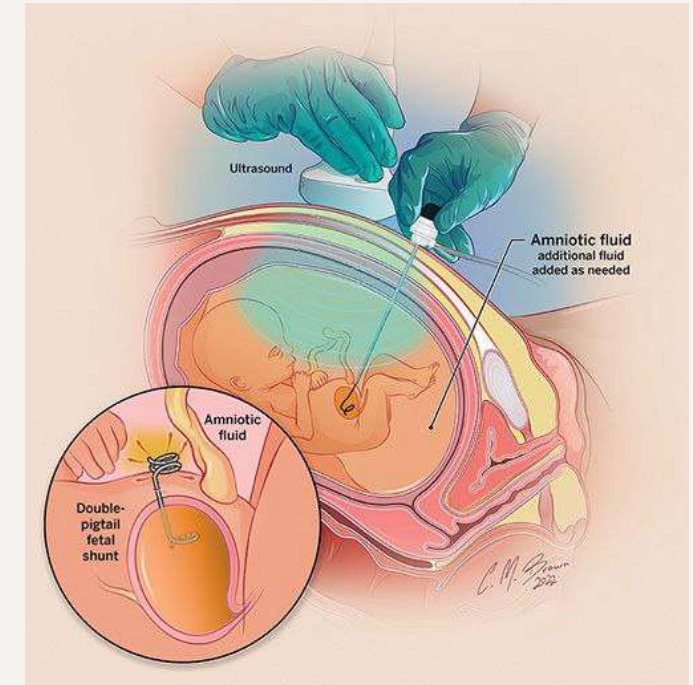
distress, and meconium dilution. It also reduces the potential need for

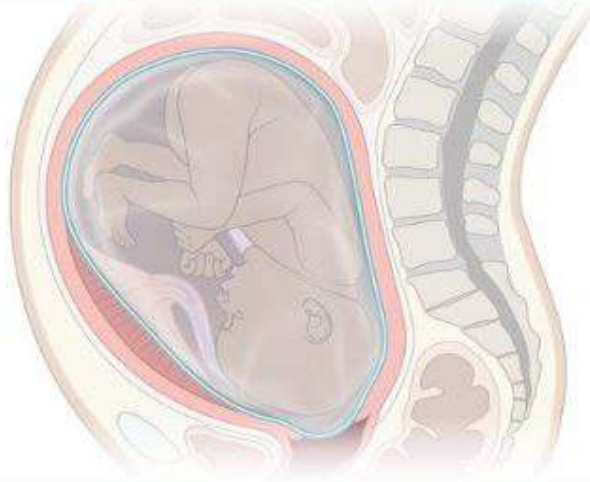
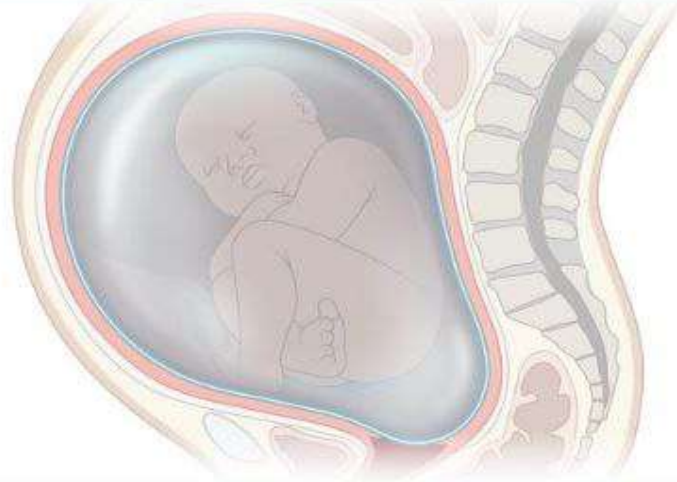
cesarean delivery



# TREATMENT ACCORDING TO CAUSE:

- o Drug induced – STOP IT
- o term PROM – IOL
- o PPRM – Antibiotics, steroid – Induction
- o Fetal surgery
- VESICO AMNIOTIC SHUNT
- Laser ablation for TTTS



	Oligohydramnios	Polyhydramnios
		
<b>Definition</b>	<ul style="list-style-type: none"> <li>Amniotic fluid volume is less than expected for gestational age</li> </ul>	<ul style="list-style-type: none"> <li>Amniotic fluid volume is more than expected for gestational age</li> </ul>
<b>Etiology</b>	<ul style="list-style-type: none"> <li>Idiopathic (most common cause of mild oligohydramnios)</li> <li>Fetal anomalies, e.g., urethral obstruction, bilateral renal agenesis, autosomal recessive polycystic kidney disease</li> <li>Maternal conditions, e.g., placental insufficiency, late or postterm pregnancies (&gt; 42 weeks of gestation), premature rupture of membranes</li> </ul>	<ul style="list-style-type: none"> <li>Idiopathic (most common)</li> <li>Fetal anomalies, e.g., gastrointestinal (esophageal atresia, duodenal atresia and stenosis), CNS (anencephaly, meningomyelocele), pulmonary (cystic lung malformations), twin-to-twin transfusion syndrome, fetal anemia</li> <li>Maternal conditions, e.g., diabetes mellitus, Rh incompatibility</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>Decreased fundal height</li> <li>Ultrasound: amniotic fluid index &lt; 5 cm, fetal anomalies</li> </ul>	<ul style="list-style-type: none"> <li>Increased fundal height</li> <li>Ultrasound: amniotic fluid index ≥ 25 cm, fetal anomalies</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>Amniotransfusion</li> <li>Treat underlying cause</li> </ul>	<ul style="list-style-type: none"> <li>Amnioreduction</li> <li>Treat underlying cause</li> </ul>
<b>Complications</b>	<ul style="list-style-type: none"> <li>Intrauterine growth restriction</li> <li>Birth complications</li> <li>Potter sequence: pulmonary hypoplasia, craniofacial abnormalities, wrinkling of the skin, limb anomalies</li> </ul>	<ul style="list-style-type: none"> <li>Fetal malposition</li> <li>Umbilical cord prolapse</li> <li>Premature birth</li> </ul>



*Thank you*