

# **Amniotic fluid analysis**

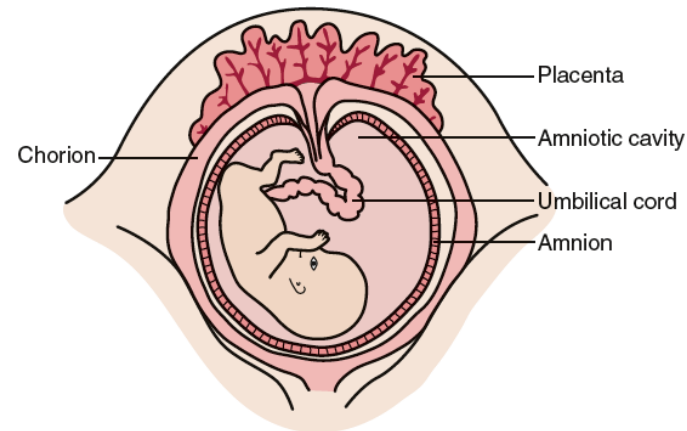
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By  
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# Amniotic fluid analysis

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- Contained in the amniotic sac - Clear, slightly yellowish liquid that surrounds the unborn baby during pregnancy
- Fetus floats in the amniotic fluid.
- Volume of amniotic fluid increases as the fetus grows. Almost 1 lit. of amniotic fluid surrounds the fetus at full term



# Amniotic fluid analysis

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- **Function :**
- Acts as cushion and protects from injury
- Offers freedom of fetal movement and permits musculoskeletal development
- Maintains constant temperature distribution
- Source of oral fluid to the fetus
- Allows symmetrical growth
- Has bacteriostatic activity
- Short term nutrient supply

# Amniotic fluid analysis

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- **Formation :**
- It is composed of different substances that reach or removed from amniotic cavity
- Contains products of fetal metabolism
- Fetal urine appears in the fluid
- Pulmonary secretion
- Oro-nasal secretions
- Fetal skin
- Intramembranous secretions

# Amniotic fluid analysis

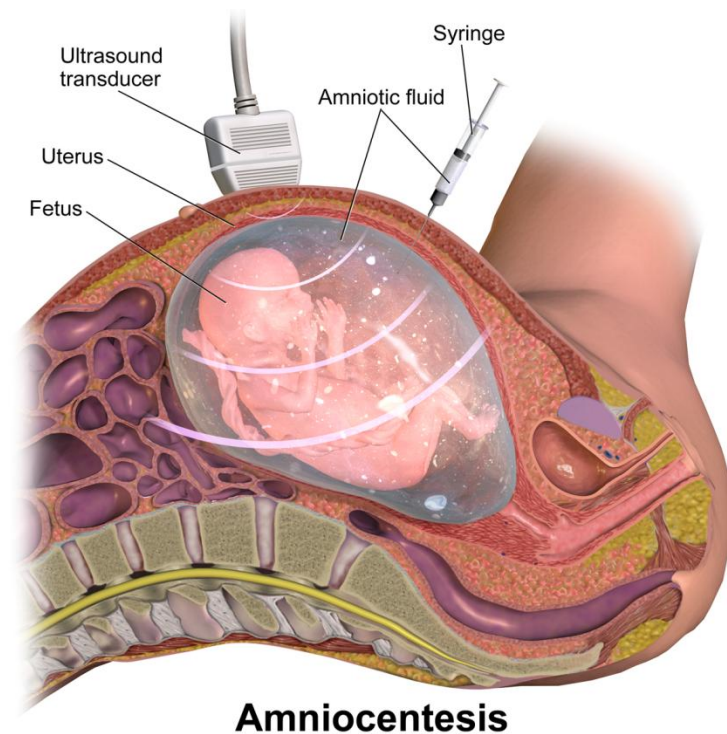
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- **Volume:**
- Amniotic fluid volume increases throughout pregnancy up to 800-1200ml
- In 3<sup>rd</sup> trimester decreases gradually prior to delivery
- If more than 1200 ml – polyhydramnios
- If less than 800 ml – oligohydramnios

# Amniotic fluid analysis

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- **Amniocentesis:**
- Removal of a sample of fluid is called amniocentesis
- AFT – amniotic fluid test



# Amniotic fluid analysis

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- **Amniocentesis:**
- Can be done at the 14<sup>th</sup> week of pregnancy to
- Predict the severity of hemolytic disease of the newborn by erythroblastosis fetalis
- To assess fetal maturity before cesarean section
- To detect fetal sex
- To discover genetic disorders in high risk patients
- To assess pulmonary maturity (phospholipids are tested)

# Amniotic fluid analysis

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- **Amniocentesis: 2<sup>nd</sup> trimester**
- For genetic and developmental disorders (Downs syndrome, CF)
- Can also detect cleft lip, heart problems
- **Amniocentesis : 3<sup>r</sup> trimester**
- Detect the sex of the fetus



**Table 13–2**    **Indications for Performing Amniocentesis**

Amniocentesis may be indicated at 15 to 18 weeks' gestation for the following conditions to determine early treatment or intervention:

- Mother's age of 35 or older at delivery
- Family history of chromosome abnormalities, such as trisomy 21 (Down syndrome)
- Parents carry an abnormal chromosome rearrangement
- Earlier pregnancy or child with birth defect
- Parent is a carrier of a metabolic disorder
- Family history of genetic diseases such as sickle cell disease, Tay-Sachs disease, hemophilia, muscular dystrophy, sickle cell anemia, Huntington chorea, and cystic fibrosis
- Elevated maternal serum alpha-fetoprotein
- Abnormal triple marker screening test
- Previous child with a neural tube disorder such as spina bifida, or ventral wall defects (gastroschisis)
- Three or more miscarriages

Amniocentesis is indicated later in the pregnancy (20 to 42 weeks) to evaluate:

- Fetal lung maturity
- Fetal distress
- HDN caused by Rh blood type incompatibility
- Infection

# Amniotic fluid analysis

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- **Sample collection**
- Ultra sound imaging is used to guide the procedure
- Withdrawal of small amount (25-35 ml) of fluid by inserting needle in to the abdomen
- **Container** : amber plastic transport tube with amber stopper or transparent tube covered with Al.foil.

# Amniotic fluid analysis

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- **Storage**
- Can be frozen and transported
- Stable refrigerated up to 1 week
- Need to protect from light
- Avoid repeated freeze thaw cycles
- If using for culture... need to be stored at 37 temperatue

# Amniotic fluid analysis

Physical examination	Color
Color	Normal amniotic fluid is colorless to pale yellow

## Abnormal colors

- **Yellow – orange – is indicative of blood incompatibility and the presence of bile pigment released from RBC lysis**
- **Brown – due to severe hemolysis**
- **Green – due to contamination with meconium**

Turbidity : may be turbid because of presence of different cell types

**Table 13-3 Amniotic Fluid Color**

Color	Significance
Colorless	Normal
Blood-streaked	Traumatic tap, abdominal trauma, intra-amniotic hemorrhage
Yellow	Hemolytic disease of the newborn (bilirubin)
Dark green	Meconium
Dark red-brown	Fetal death

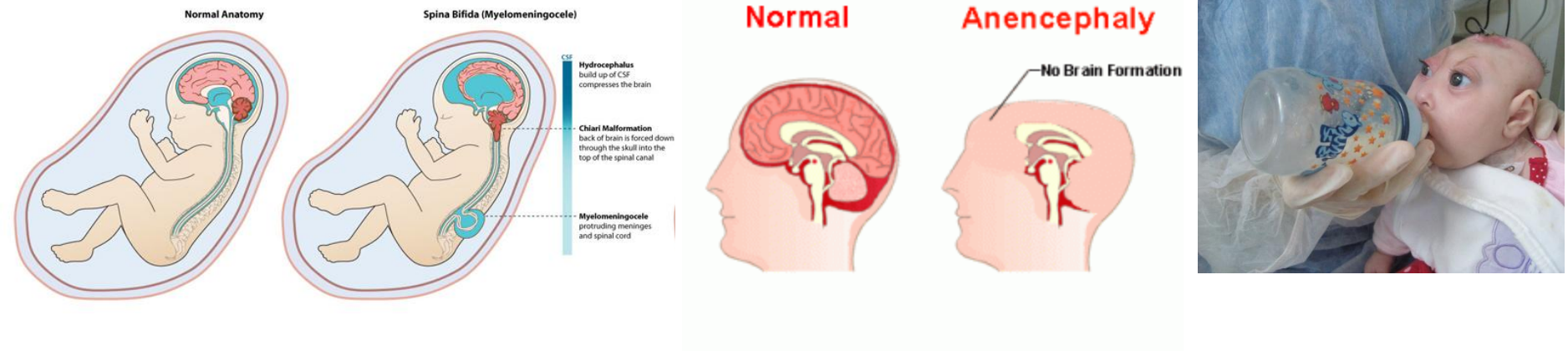
# Amniotic fluid analysis

## Amniotic fluid Supernatant analysis – 2<sup>nd</sup> trimester

### 1. Alpha-fetoprotein (AFP)

AFP helps to determine neural tube defects such as spinal bifida or anecephaly

An increase in AFP indicates neural tube defects



# Amniotic fluid analysis

## Amniotic fluid Supernatant analysis – 2<sup>nd</sup> trimester

### 2. Assessment of fetal maturity – Respiratory distress syndrome

If the fetus is mature enough to breath on it own then immideate delivery may be of choice

Get to know by analyzing the surfactants of lungs in amniotic fluid  
If the surfactants are low, this will cause the alveoli of lung to collapse leading respiratory distress

Lecithin/sphingomyelin ratio (phospholipids)

When L/S ratio is 2 it is safe to deliver preterm

**Foam stability test is also done to assess lung maturity**

## PROCEDURE 13-1

### Foam Shake Test

1. Mix equal parts of amniotic fluid with 95% ethanol.
2. Vigorously shake for 15 seconds.
3. Allow to sit undisturbed for 15 minutes.
4. Observe for the presence of a continuous line of bubbles around the outside edge.



# Amniotic fluid analysis

**Table 13-1 Tests for Fetal Well-Being and Maturity**

Test	Reference Values at Term <sup>7</sup>	Significance
Bilirubin scan	$\Delta A_{450} > .025$	Hemolytic disease of the newborn
Alpha-fetoprotein	$< 2.0$ MoM	Neural tube disorders
Lecithin-sphingomyelin ratio	$\geq 2.0$	Fetal lung maturity
Amniostat-fetal lung maturity	Positive	Fetal lung maturity/phosphatidyl glycerol
Foam Stability Index	$\geq 47$	Fetal lung maturity

# Next class....

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- Seminal fluid analysis