



Amniotic Fluid

• Introduction

- Specific gravity - 1.008 to 1.010
- Osmolarity - 250 mosm/L
- pH - 7.2 to 7.4 (alkaline)
- Rate of turnover - 500ml/hr
- Volume is maximum at 34 weeks of pregnancy.
(If range asked - 32 to 34 wks)

* As pregnancy advances after 40 weeks, volume of amniotic fluid decreases rapidly.

• Major Contributors

Period of gestation

- Early (1st trimester)
- 12-20 wks
- >20 wks

Major Contributors

- Maternal Plasma (ultrafiltration)
- Fetal Skin (Transudation)
- Fetal urine

- Overall major contributor $\Rightarrow$ Fetal urine

* Urine production begins in fetus at 12 weeks

* Keratinisation of fetal skin occurs between 22-25 wks of preg.

• Colours

Normally amniotic fluid is colourless.

↳ at term - Straw coloured.

Colour	Seen in
• Green (Meconium)	- Fetal distress - Breech presentation / Transverse lie - Listeria infection
• Golden (Bilirubin)	Rh incompatibility
• Tobacco juice / Dark brown	Intrauterine death
• Saffron / yellowish green	Post dated pregnancy
• Dark coloured	Abruptio Placenta

• Composition

99% water.

- Beside producing amniotic fluid, fetus also swallows it.
That's how amniotic fluid is kept in balance.

• Functions

• During pregnancy

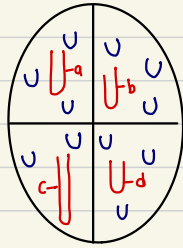
- ① Shock absorber
- ② Maintains even temperature.
- ③ Distends amniotic sac → allows growth & free movement of fetus.
- ④ No nutritive functions.

• During labour-

- ① Amnion & chorion combine to form a hydrostatic wedge
↳ helps in dilatation of cervix.
- ② Prevents interface with placental circulation during uterine contraction till membranes remain intact.
- ③ Guards against umbilical cord compression.
- ④ Flushes birth canal at end of 1st stage of labour.
- ⑤ Protects fetus against ascending infections

- Measurement

a) USG



Divide abdomen in 4 quadrants.

Measure length of largest vertical amniotic fluid pocket in each quadrant

$$\text{length of } (a+b+c+d) = \text{AFI}$$

Amniotic Fluid Index (AFI) $\Rightarrow$ 5-24 cms (N)

If, < 5 cms - Oligohydroamnios

≥ 25 cms - Polyhydroamnios.

* Difficult to find AFI in twin pregnancy.

- Best / most Sensitive marker

Measure single largest vertical pocket (pocket c in diagram).

Normal length = 2-8 cms

< 2 cms Oligohydroamnios	≥ 8 cms Polyhydroamnios
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- Volume of amniotic fluid, < 200 ml - Oligohydroamnios
 ≥ 2 L - Polyhydroamnios.

Oligo/Poly hydroamnios

	<u>Oligohydroamnios</u>	<u>Polyhydroamnios</u>
	• AF volume $< 200\text{ml}$ • AFI $< 5\text{cms}$ • Single largest vertical pocket length $< 2\text{cms}$	• AF volume $\geq 2\text{L}$ • AFI $\geq 25\text{cms}$ • Single largest vertical pocket length $\geq 8\text{cms}$.
• <u>Causes</u>	• <u>Most common causes -</u> a) mild - Idiopathic b) Severe - Congenital Malformations (Renal anomalies) ↳ Bilateral renal agenesis • <u>Other Causes</u> • Drugs - Indomethacin - ACE inhibitors • IUGR • Leak following amniocentesis • Maternal PIH ↓ ↓ blood flow to fetus ↓ ↓ fetal RBF ↓ ↓ QFR → Oligohydroamnios • Premature rupture of membranes • Post term pregnancy • Amnion nodosum • Chromosomal abnormalities ↳ Triploidy, Trisomy 13 • Renal Abnormalities	• <u>Most common causes -</u> a) mild - Idiopathic b) Severe - Congenital Malformations • GIT malformations • Neural Tube Defects (2nd MC) • <u>Other Causes</u> 1) Multifetal pregnancy 2) Maternal DM ↳ Fetal hyperglycemia ↳ Polyuria → Polyhydroamnios. 3) High Fetal Cardiac Output. a) Fetal Anaemia ↳ Rh incompatibility ↳ Parvovirus infection ↳ Hemolysis b) α - Thalassemia c) Fetal Barrier Syndrome 4) Swallowing defect a) Oesophageal atresia b) Duodenal atresia c) Cleft Lip/palate d) Intestinal obstruction e) Trisomy 21 f) Trisomy 18 → IUGR + Polyhyd. 5) CSF leak into Amniotic fluid 6) Cholangioma of Placenta 7) TORCH infections

• Effect on pregnancy

a) Oligohydramnios

- If occurs Early in pregnancy

(i) Less space

↓
fetal parts will not be able to grow properly

MC ⇒ Pulmonary Hypoplasia.

(ii) Amniotic band sequence.

↓ amniotic fluid

↓
Amnion wraps around some body structure like a band.

↓
Devascularisation of that part.

M/C - will lead to Limb amputation. > Craniofacial defects.

If occurs late in pregnancy

* Organogenesis is already complete.

(i) Less space

↓
Cord gets compressed

↓
Blood supply to fetus ↓

↓
Fetal distress

↓
Fetus passes meconium in amniotic fluid

↓
Meconium Aspiration Syndrome

(ii) Congenital talipes equinovarus [CTEV]

↓
Compression defect

Mx Oligohydramnios - Amnio infusion with normal saline.

*** Time for delivery in Idiopathic Oligohydramnios ⇒ 37-38 weeks + 6 days

b) Polyhydramnios

- 1) Membranes get stretched └ Preterm labour
PROM
- 2) Mother experiences Respiratory Distress
- 3) Abruptio Placenta
- 4) Cord prolapse
- 5) Malpresentation
- 6) Amniotic fluid embolism
- 7) PPH (tone of uterus ↓)

Mx Polyhydramnios:

- 1) Serial amniocentesis
↳ Only if pregnant female is having lot of Respiratory distress.
- 2) Indomethacin
↳ Should not be used beyond 32 wks of pregnancy.
↳ leads to closure of ductus arteriosus.