



## The Fetal Membranes

(1) **The chorion:** is the outer membrane. It is in contact with the uterine wall. It is attached to the margins of the placenta.

Histologically, it is composed of 4 layers:

- i) Cellular layer
- ii) dense reticulum
- iii) pseudo - basement membrane
- iv) outer trophoblast.

(2) **The amnion :** is a transparent grayish membrane which lines the chorion. It covers the fetal surface of the placenta and the umbilical cord. The amniotic sac contains the fetus swimming in the liquor amnii.

Histologically, it is composed of 5 layers:

- i) cellular layer
- ii) basement membrane,
- iii) compact layer
- iv) fibroblast layer
- v) outer spongy layer adherent to the cellular layer of the chorion.

## THE AMNIOTIC FLUID ( THE LIQUOR AMNII)

Nature:

- It is a clear pale, slightly alkaline ( pH 7.2) fluid.

- It is about 400 ml at mid pregnancy, reaches about 1000 ml at 36-38 weeks then decreases later on to be scanty in post-term pregnancy.

***Composition:***

- Water (98-99%),
- carbohydrates ( glucose and fructose), proteins ( albumin and globulins), lipids, hormones (oestrogen and progesterone), enzymes ( alkaline phosphatase),
- minerals (sodium, potassium and chloride),
- suspended materials as vernix caseosa, lanugo hair, desquamated epithelial cells and meconium.

**Circulation of amniotic Fluid:**

The amniotic fluid is not in a static state but is in a continuous turn over, 500 ml of it are replaced each hour.

**Origin:**

(1) Foetal:

- a. Active secretion from the amniotic epithelium.
- b. Transudation from the foetal circulation.
- c. Foetal urine.

(2) Maternal :

Transudation from maternal circulation.

- The foetal origin contributes more in the production of the amniotic fluid.
- Uptake of amniotic fluid is by absorption through the amnion to the maternal circulation and by foetal swallowing.

**Functions:**

(A) During pregnancy:

1. Protects the foetus against injury.
2. A medium for free foetal movement.
3. Mantains the foetal temperature.
4. Source for nutrition of the foetus.

5. A medium for foetal excretion.

(B) During Labour:

1. The fore-bag of water helps the dilatation of the cervix during labour.
2. It acts as an antiseptic for the birth canal after rupture of the membranes.

Abnormalities..\*polyhydramnios ...excessive amount of AF

\*oligohydramnios..Decreased amount of AF

## **Polyhydramnios and Oligohydramnios**

### **POLYHYDRAMNIOS**

#### **Definition**

An amount of amniotic fluid more than 2000 ml.

#### **Incidence**

About 1:200.

#### **Aetiology**

Increased production or decreased consumption of amniotic fluid will result in polyhydramnios.

#### **(A) Foetal causes:**

*(I) Congenital anomalies:*

1- Anencephaly: accounts for 30-50% of the cases. This is due to:

- i. transudation of the cerebro-spinal fluid from the exposed meninges.
- ii. absence of swallowing of the liquor.

iii. foetal polyuria resulting from lack of antidiuretic hormone or irritation of the exposed centres.

2- Atresia of the oesophagus or duodenum enable the foetus to swallow the liquor.

*(II) Uniovular twins:*

Due to interconnecting vascularity in the placenta, one foetus obtains more circulation so that its heart and kidneys hypertrophy leading to increased urine production. So one amniotic sac only is affected.

*(III) Increased placental mass:*

i) Oedema of the placenta due to :

- hydrops foetalis resulting from Rh-incompatibility, severe anaemia, haemoglobinopathies particularly a-thalassaemia major and cytomegalovirus infection.

- true knot of the cord causes obstruction of venous return with placental congestion.

- foetal liver cirrhosis as in syphilis.

ii) Chorio-angioma and large placenta.

**(B) Maternal causes:**

*(I) Diabetes mellitus* due to:

i. increased osmotic pressure of the liquor amnii due to its high sugar content,

ii. foetal polyuria resulting from hyperglycaemia.

*(II) Pregnancy induced hypertension:*

Due to oedema of the placenta.

*(III) Severe generalised oedema:*

Cardiac, hepatic or renal.

## **Clinical Varieties**

### **(I) Acute hydramnios:**

- Very rare,
- rapid accumulation of liquor,
- occurs before 20 weeks,
- the commonest cause is uniovular twins but foetal anomalies are also common.

### **(II) Chronic hydramnios:**

- More common,
- accumulation of liquor is gradual,
- it occurs in late pregnancy,
- the condition may end by preterm labour.

## **Clinical Picture**

### **(A) Symptoms:**

1. Abdominal discomfort and pain in acute hydramnios.
2. Pressure symptoms: dyspnoea, palpitation, indigestion, haemorrhoids, oedema and varicosities of the lower limbs.

### **(B) Signs:**

*1-General examination:*

may reveal pregnancy-induced hypertension.

*2- Abdominal examination:*

a- Inspection: overdistended abdomen.

b- Palpation :

- The fundal level is higher than gestational age.
- The uterus is tense cystic.
- The fetal parts are felt with difficulty by dipping.
- Fluid thrill can be elicited.
- Malpresentation and nonengagement are common.

c- Auscultation: faint FHS.

## Investigation

*Ultrasonography* can reveal:

- Excessive amount of liquor.
- Malpresentations.
- Multiple pregnancy.
- Congenital anomalies.
- Intrauterine foetal death.

## Differential Diagnosis

1. Causes of over sized pregnant uterus
2. Ovarian cyst with pregnancy.
3. Ascites.

## Management

### (A) Acute hydramnios:

Termination of pregnancy by high artificial rupture of membranes. This allows gradual escape of liquor thus shock and separation of the placenta are avoided.

Shock results from rapid accumulation of blood in the splanchnic area after sudden drop of intrauterine pressure.

Separation of the placenta occurs due to sudden drop of intrauterine pressure and shrinkage of the placental site following this. Drew Smythe catheter is used for rupture of hind water in such conditions.

### (B) Chronic hydramnios:

*(I) During pregnancy:*

1. Termination of pregnancy by high artificial rupture of membranes if the fetus is dead or malformed.
2. Expectant treatment if the fetus is healthy.

- rest,

- sedative,

- salt restriction,
- treatment of the underlying cause as diabetes and toxoplasmosis.
- Termination of pregnancy if the condition is not improved or get worse.

3- Repeated amniocentesis may be indicated in premature foetus with marked pressure symptoms. 1.5-2 litres can be aspirated in a rate not exceeding 500 ml/hour under sonographic control. However, the amniotic fluid is rapidly reaccumulating and there is risk of premature labour, injury to the foetus or umbilical cord vessels.

*(II) During labour:*

1. Malpresentation, cord presentation and / or cord prolapse should be detected and the labour is managed according to the condition.
2. When the cervix is half dilated Drew Smythe catheter is passed to rupture the hind water. This will initiate uterine contractions which can be enhanced by oxytocins.
3. Active management of third stage is carried out to guard against postpartum haemorrhage.

*(III) Care of the newborn:*

- Congenital anomalies should be excluded. Oesophageal atresia can be excluded by passing a soft rubber catheter down to the stomach of the newborn.
- Care of newborns to diabetic mothers (see diabetes).
- Care of newborns to Rh-incompatibility mothers (see Rh-isoimmunization).
- Care of preterm babies (see prematurity).

## **Complications**

### **(I) Maternal :**

*(a) During pregnancy:*

- (1) Abortion.
- (2) Preterm labor.
- (3) Pregnancy-induced hypertension.

(4) Pressure symptoms.

(5) Malpresentation.

*(b) During labor:*

(1) Premature rupture of membranes.

(2) Cord prolapse.

(3) Abruption placentae.

(4) Shock.

(5) Postpartum haemorrhage.

**(II) Foetal:**

(1) Prematurity.

(2) Asphyxia due to cord prolapse or placental separation.

## **OLIGOHYDRAMNIOS**

### **Definition**

Reduction of amniotic fluid volume below 500 ml. Anhydramnios is complete absence of amniotic fluid which is very rare.

### **Incidence**

1:750.

### **Aetiology**

1. Placental insufficiency: as in severe pre-eclampsia and post-term pregnancy.
2. Urinary tract malformations: as renal agenesis (detected by empty foetal bladder on serial ultrasonic scanning) and obstruction of the urinary tract.

### **Clinical Picture**

1. Uterus is small for date.



2. The foetus is in hyperflexed attitude and breech presentation is common.

## Investigations

1. *Ultrasound*: shows small (<1x1cm) amniotic fluid locules. It is important to exclude congenital anomalies, growth retardation and identifies foetal presentation.
2. *X-ray*: shows hyperflexion of the foetal spines.

## Complications

1. *Pulmonary hypoplasia*: as the amniotic fluid is essential for lung distension.
2. *Abnormal fetal development*: due to compression of uterine wall and adherent fetal parts.
3. *Abnormal attitude and presentations*.

## Management

- *In post-term*: Termination of pregnancy is indicated.

- *During labor*: Observe for fetal distress as it is more common, if occurs do immediate vaginal or abdominal delivery according to the circumstances.

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