

The Placenta & Fetal Membranes

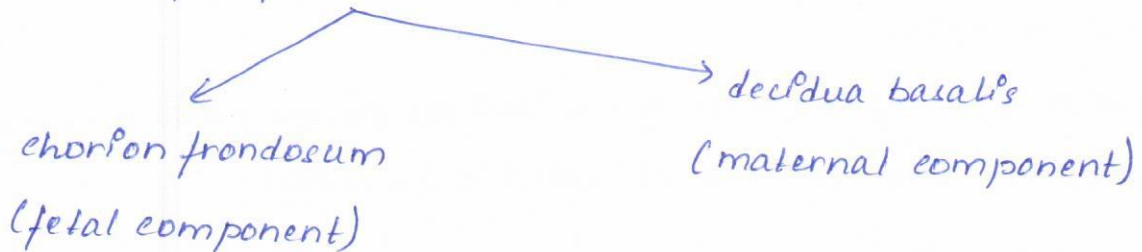
ANM 2nd GNM 3rd Gynaecology

w) The Placenta :

- The human placenta is discoid because of its shape, haemochorial, because of direct contact of chorion with maternal blood and deciduate, because maternal tissue is shed at parturition.

→ Development :

- Placenta is developed from 2 sources.



- It begins at 6th week & is completed by 12th week.

→ Placenta at term :

- Placenta at term with a circular diameter of 15-20cm & thickness of about 2.5cm at centre
- Its thin towards the edge
- It feels spongy & weighs about 500gm
- The proportion to weight of baby roughly 1:6 at term & occupies about 30% of uterine wall.
- It present 2 surfaces : - fetal & maternal
- peripheral margin

a) Fetal surface :

- It is covered by smooth & glistening amnion with umbilical cord attached at or near its centre.

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- The amnion can be peeled off from the underlying chorion except at insertion of cord
- At term, about 4/5th of placenta is of fetal origin.

b) Maternal surface:

- It is rough & spongy.
- Maternal blood gives it a dull red colour
- A thin greyish, shaggy layer which is the remnant of decidua basalis
- Maternal surface have 15-20 lobes or cotyledons.

c) Peripheral margin:

- peripheral margin of placenta is limited by fused basal & chorionic plates & its continuous with the chorion laeve & amnion.
- the placenta is usually attached to upper part of body of uterus.

Placenta separates after the birth of baby & the line of separation is through the decidua spongiosum

→ Structures:

- Placenta is limited internally (fetal aspect) by the amnion membrane & chorionic plate (maternal aspect) by basal plate & in between these 2 lines the space containing the stem villi, space being filled with maternal blood.
- Amniotic membrane: It consists of single layer of cuboidal epithelium

→ Placental circulation:



a) Utero-placental circulation: (Maternal circulation)

- It concerns with circulation of maternal blood through the intervillous space
- Mature placenta has a volume of about 500ml of blood, 350ml being occupied in villi system & 150ml lying in intervillous space.
- Intervillous space is completely replaced about 3-4 times per minute.
- The villi depend on maternal blood for their nutrition.
- About 120-200 spiral arteries open into the intervillous space by piercing basal plate at numerous sites
- Spiral arteries are converted to large utero-placental arteries
- During uterine contraction, the veins are occluded but arterial blood is forced into intervillous space, while uterine relaxation facilitates venous drainage.
- During contraction, larger volume of blood is available for exchange even though the rate of flow is decreased.

b) Feto-placental circulation:

- 2 umbilical arteries carry the impure blood from the fetus
- They enter the chorionic plate underneath the amnion, each supplying one half of placenta
- Arteries breakup into small branches which enter stem of chorionic villi
- Each in turn divides into primary, secondary & tertiary vessels of the villi
- Maternal & fetal blood streams flow side by side, but in opposite direction
- Fetal blood flow through placenta is about 400ml per minute.

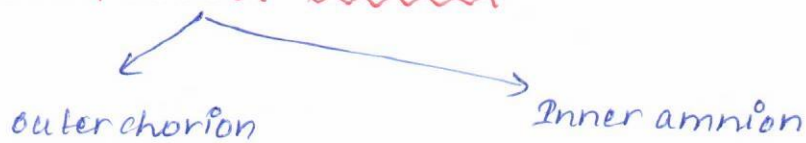
→ Placental Function:

- Transfer nutrients & waste products between the mother & fetus.
- Produces or metabolises the hormones & enzymes necessary to maintain the pregnancy

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- Barrier function
- Immunological function

* The fetal Membranes :



a) chorion :

- It represents the remnant of chorion laeve & ends at margins to placenta.
- It is thick than amnion, friable & shaggy on both the sides.
- chorion contains no vessels or nerves

b) amnion :

- It is the inner layer of fetal membranes
- Its internal surface is smooth & shiny & is in contact with liquor amnii.
- amnion can also be peeled off from the fetal surface of placenta except at the insertion of umbilical cord.

* Amniotic cavity, Amnion & Amniotic Fluid :

- Formation of amniotic cavity & its lining membrane amnion with development of inner cell mass
- Fluid accumulates, but ultimately fluid filled cavity becomes large enough to obliterate the chorionic cavity
- amnion has got neither blood nor nerves supply nor any lymphatic system.

→ Amniotic Fluid :

→ origins :

- is a transudate from the maternal serum across the fetal membranes or from maternal circulation in placenta

- Its transudate across the umbilical cord or from fetal circulation in placenta or secretion from amniotic epithelium.
- Transudate of fetal plasma through permeable fetal skin before at 20 wks.
- contribution from fetus.

→ Circulation :

- water in amniotic fluid is completely changed & replaced in every 3hrs.
- presence of lanugo & epithelial scales in meconium shows that the fluid is swallowed by fetus

→ Volume :

- Amniotic fluid measures about 50ml at 12 weeks
400ml at 20 weeks
1L at 36-38 weeks
- The amount diminishes, till at term it measures about 600-800ml.
- further reduction to extend at about 200ml at 43 wks.

→ Physical features :

- The fluid is faintly alkaline.
- In early pregnancy, it is colourless but near term
- It becomes pale straw coloured due to presence of lanugo & epidermal cells from fetal skin
- It may look turbid due to the presence of vernix caseosa.
- Abnormal labour :
 - Meconium (green) = fetal distress
 - Golden colour = Rh incompatibility
 - Greenish yellow = post maturity
 - Dark colour = haemorrhage
 - Dark brown = IUD

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→ Composition :

- water (98-99%)

- solid (1-2%)



- suspended particles : - lanugo, exfoliated squamous epithelial cells from fetal skin

- vernix caseosa

→ The Umbilical Cord :

- The umbilical cord or funis forms connecting link between the fetus & placenta through which fetal blood flows to & from placenta

- It extends from fetal umbilicus to fetal surface of placenta.

→ Development :

• umbilical cord is developed from the connective stalk or body stalk which is band of mesoblastic tissue.

→ Structures :

1) covering epithelium : It is lined by a single layer of amniotic epithelium

2) Wharton's jelly : protective function to umbilical vessels

3) Blood vessels : - There are 2 arteries & 2 veins

- Right one disappears by 4th month, leaving behind 1 vein

4) Remnant of umbilical vesicle

5) Allantosis

6) obliterated coelom.

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→ Characteristics :

- It is about 50cm in length
- Diameter = 1.5cm
- Umbilical arteries do not possess an internal elastic lamina but have got well developed muscular coat.

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