

Twins and higher multiple gestations

Definitions:

Multiple pregnancies consist of two or more fetuses.

There are rare exceptions to this, such as twin gestations made up of a singleton viable fetus and a complete mole.

Pregnancies with three or more fetuses are referred to as “higher multiples”.

Incidence :

Multiple pregnancies composes 3% of live births.

Twins make up the vast majority(nearly 99 percent) of multiple gestations.

According to Hellin's rules, the mathematical frequency of multiple birth is, twins 1 in 80 pregnancies, triplets 1 in 80^2 , quadruplets 1 in 80^3 and so on.

The actual incidence of multiple pregnancy has increased significantly at present. This is due to early detection by ultrasound as well as increasing use of induction of ovulation and assisted reproductive techniques (ART).

Classification:

The classification of multiple pregnancy is based on:

- number of fetuses: twins, triplets, quadruplets, etc.
- number of fertilized eggs: zygosity
- number of placentae: chorionicity
- number of amniotic cavities: amnionicity.



According to the zygosity twins are either:

1) dizygotic: It is the most common (80%) and results from the fertilization of two ova.

Most likely ruptured from two distinct Graafian follicles usually of the same or one from each ovary, by two sperms during a single ovarian cycle.

Their subsequent implantation and development differ little from those of a single fertilized ovum.

The babies bear only fraternal resemblance to each other (that of brothers and sisters from different births) and hence called fraternal twins.

the placentae can become anatomically fused together and appear to the naked eye as a single placental mass.

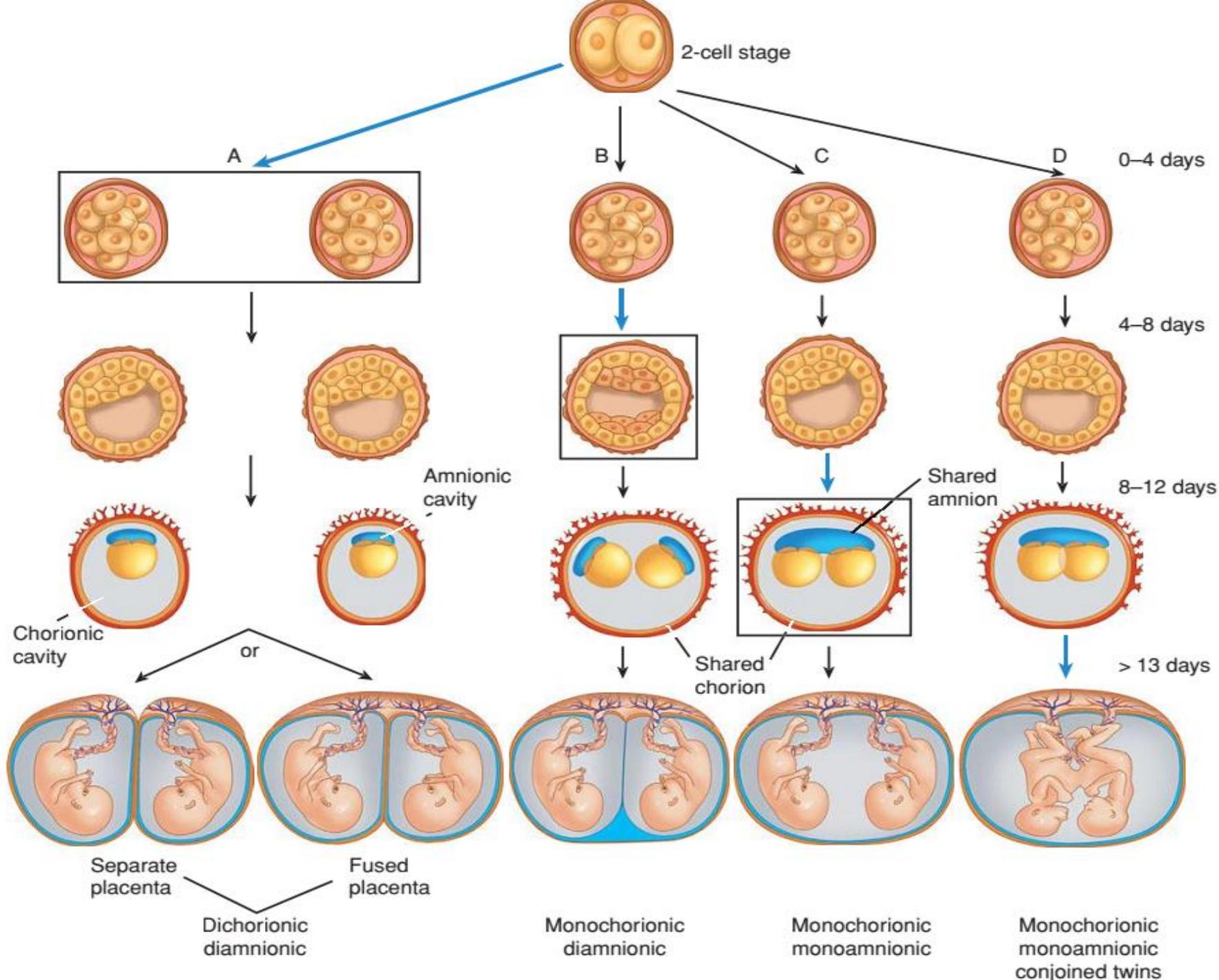
They always have separate amniotic cavities (diamniotic) and the two cavities are separated by a thick three-layer membrane (fused amnion in the middle with chorion on either side).

The fetuses can be either same-sex or different sex pairings.

In Monozygotic twins 20% (Syn: identical, uniovular), arise from fertilization of a single egg and are always same-sex pairings.

It is of various types depending on the timing of division of the fertilized ovum:

- If the division takes place within 72 hours after fertilization (prior to morula stage) the resulting embryos will have two separate placentas, chorions and amnions (diamniotic-dichorionic or D/D - 30%).



2-cell stage

0-4 days

4-8 days

8-12 days

> 13 days

A

B

C

D

Amniotic cavity

Chorionic cavity

or

Shared chorion

Shared amnion

Separate placenta

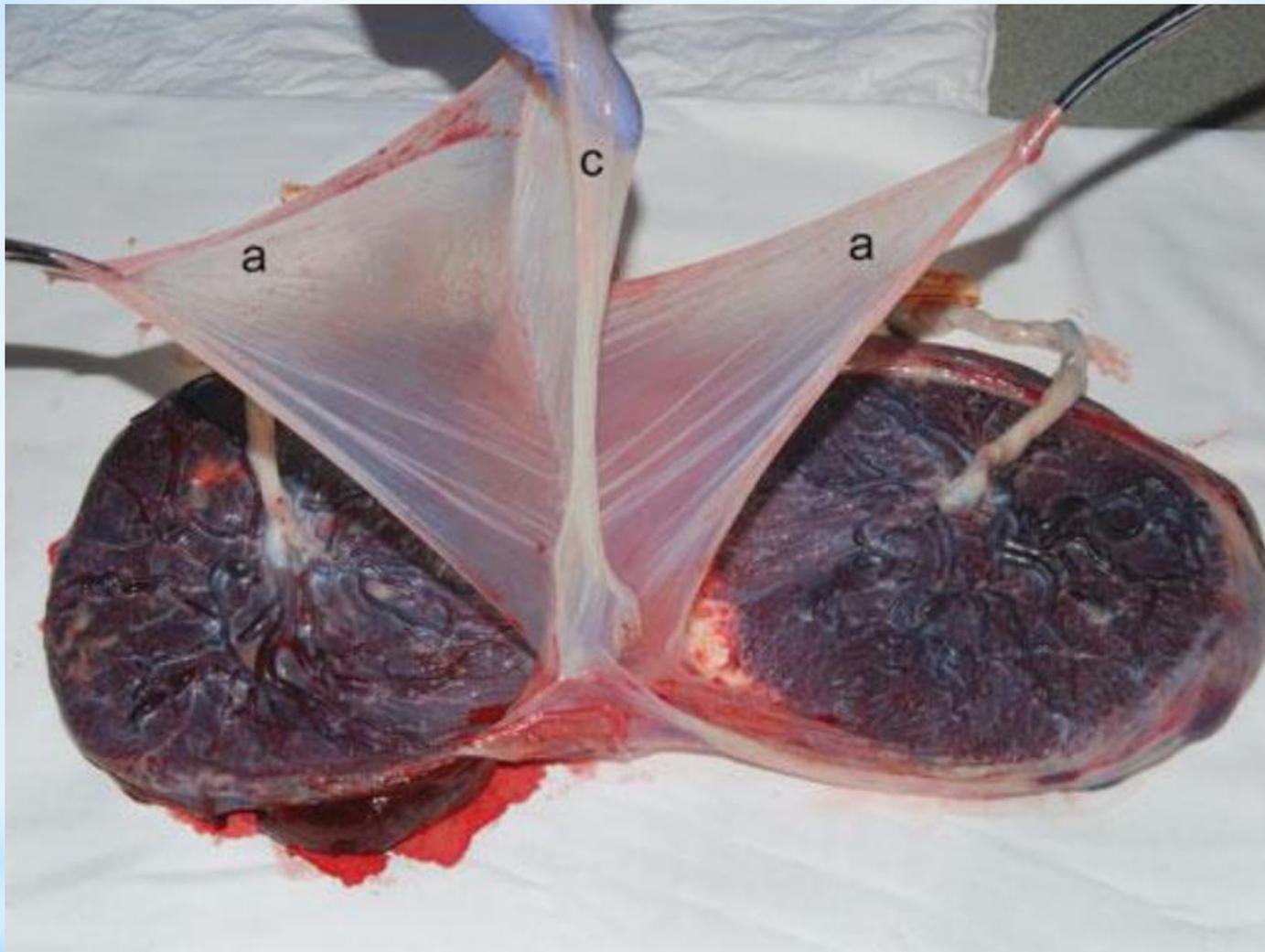
Fused placenta

Dichorionic diamniotic

Monochorionic diamniotic

Monochorionic monoamniotic

Monochorionic monoamniotic conjoined twins



Placentas of diamniotic dichorionic twin *

- If the division takes place between the 4th and 8th day after the formation of inner cell mass when chorion has already developed-diamniotic monochorionic twins develop (D/M - 66%).

- If the division occurs after 8th day of fertilization, when the amniotic cavity has already formed, a monoamniotic-monochorionic twin develops (M/M - 3%).



- On extremely rare occasions, division occurs after 2 weeks of the development of embryonic disc resulting in the formation of conjoined twin (<1%) called—Siamese twin. Four types of fusion may occur:

(i) Thoracopagus (most common), (ii) pyopagus (posterior fusion), (iii) craniopagus (cephalic) and (iv) Ischiopagus (caudal).



- Not all dichorionic pregnancies are dizygotic.
- All monochorionic pregnancies are monozygotic.

ETIOLOGY:

The cause of twinning is not known. The frequency of monozygotic twins remains constant throughout the globe and is probably related to maternal environmental factors.

Prevalence of dizygotic twins is related to:

Race: The frequency is highest amongst Negroes, lowest amongst Mongols and intermediate amongst Caucasians.

Hereditary: There is hereditary predisposition likely to be more transmitted through the female (maternal side).

Advancing age of the mother:

. Increasing maternal age is one of the key risk factors for multiple pregnancy, with multiple pregnancy occurring in approximately 1 in 10 women aged over 45 giving birth in the UK.

Influence of parity: The incidence is increased with increasing parity specially from 5th gravida onwards.

Iatrogenic:

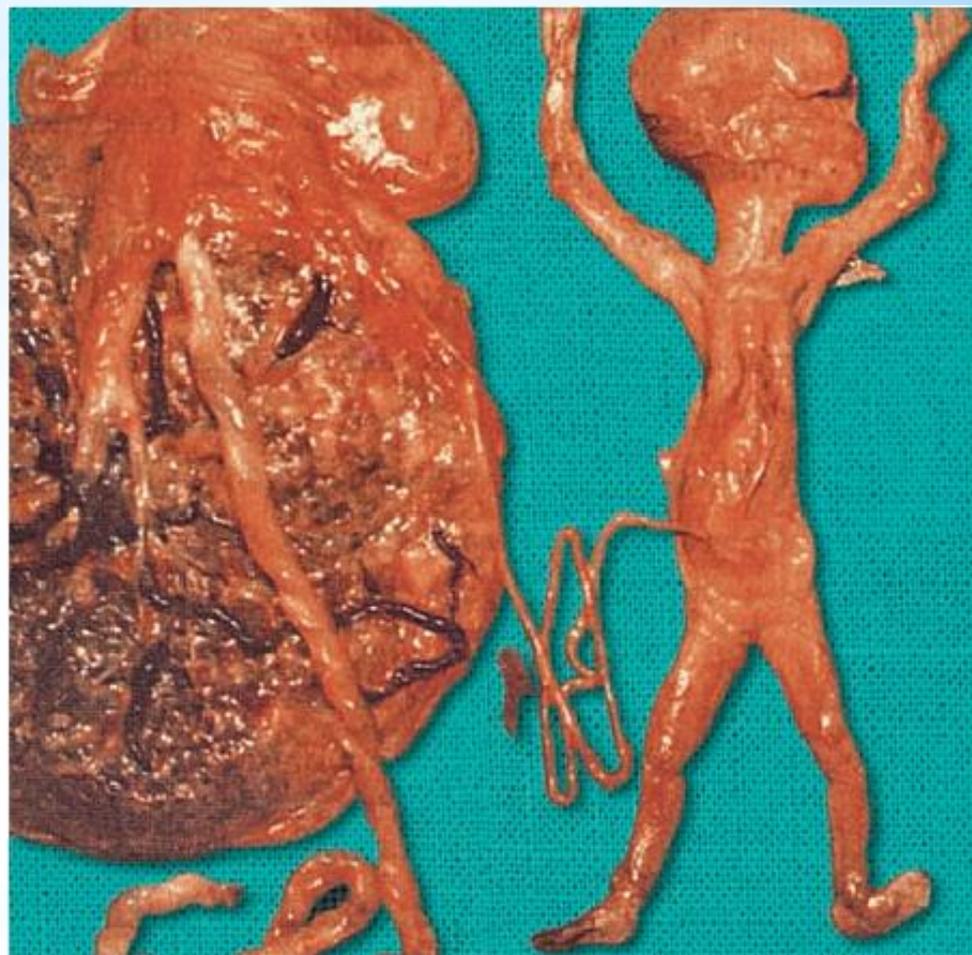
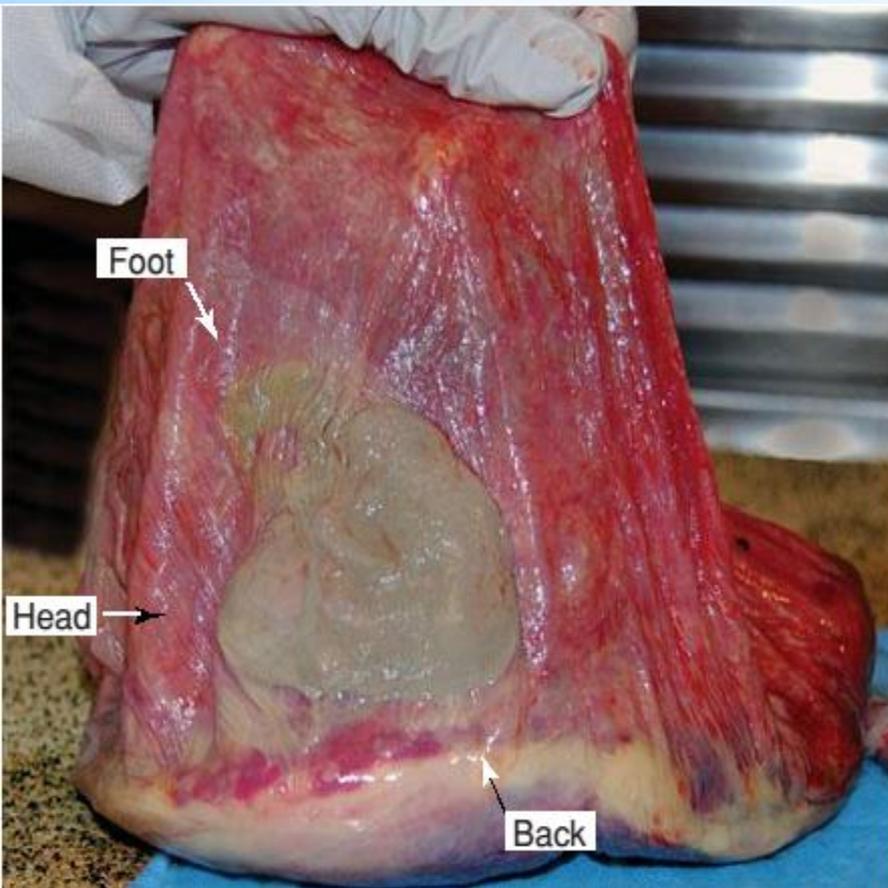
Drugs used for induction of ovulation may produce multiple fetuses to the extent of 20-40% following gonadotrophin therapy, although to a lesser extent (5-6%) following clomiphene citrate.

Special definitions:

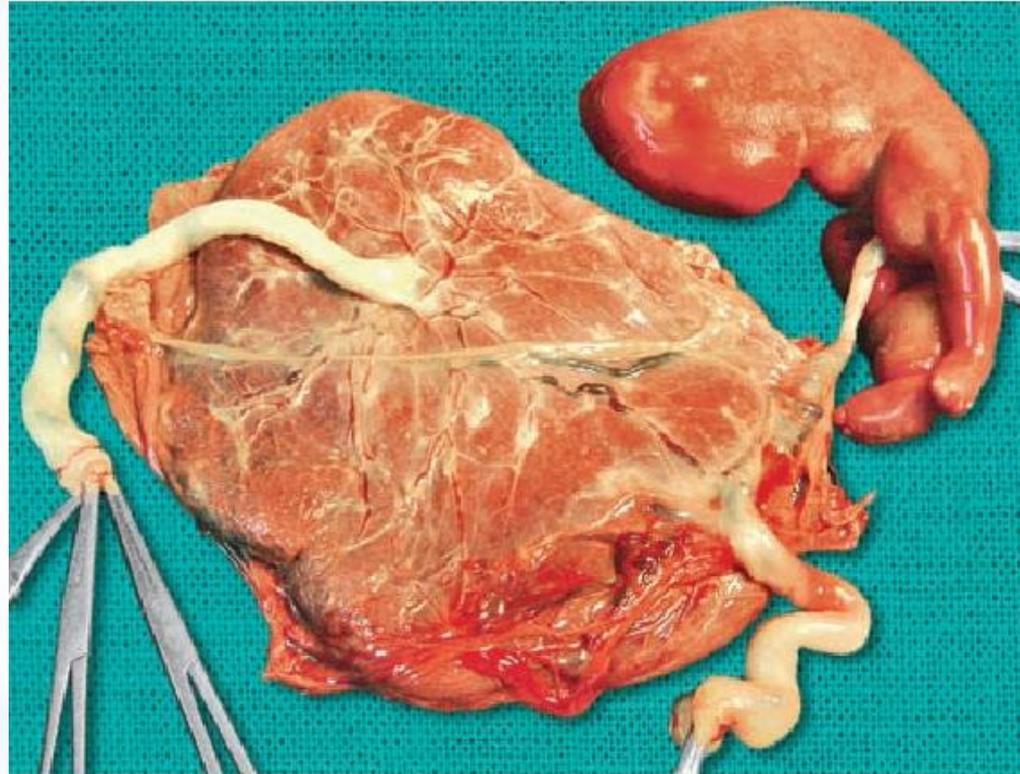
- **Superfecundation** is the fertilization of two different ova released in the same cycle, by separate acts of coitus within a short period of time.



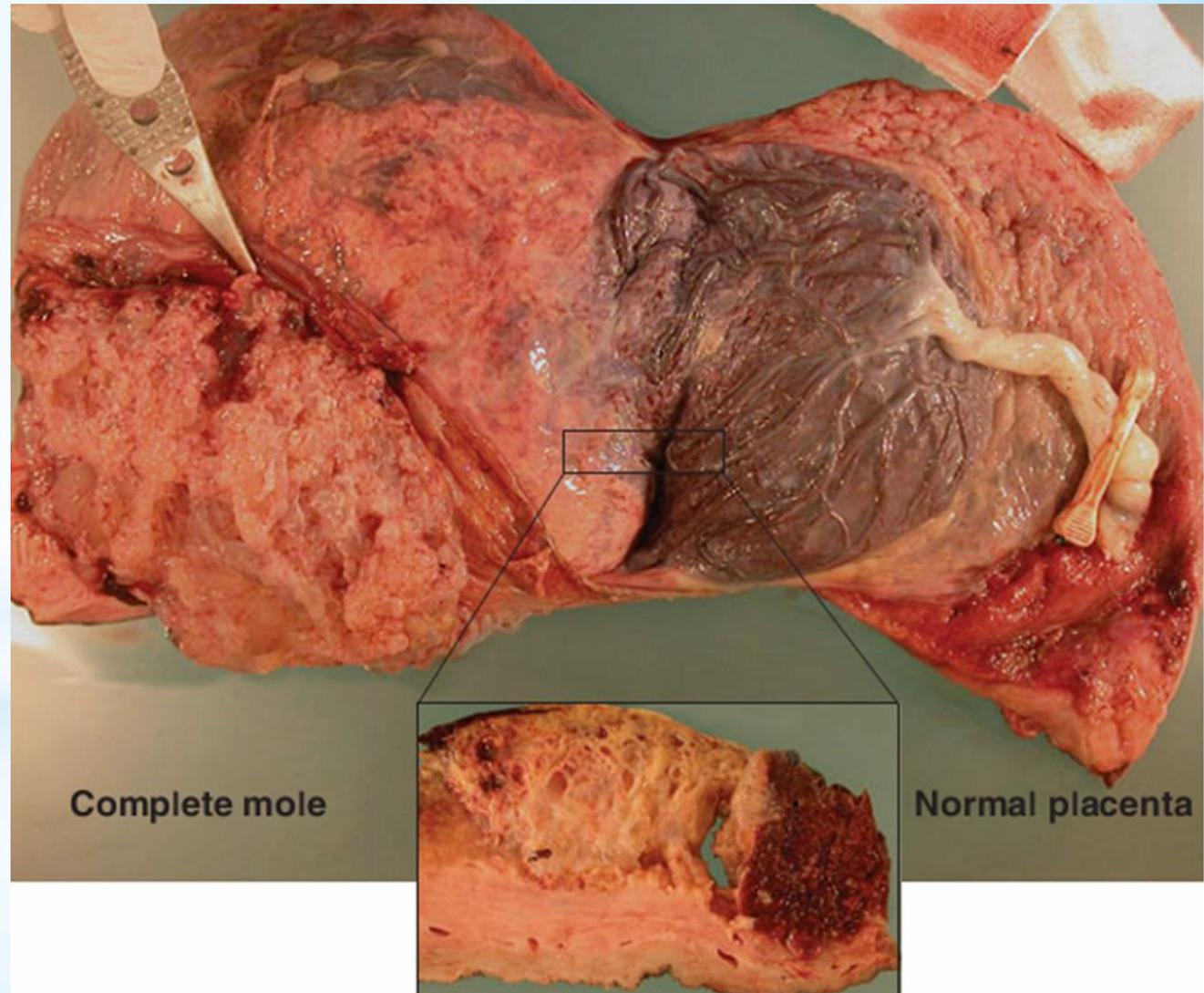
- **Superfetation:** is the fertilization of two ova released in different menstrual cycles. The nidation and development of one fetus over another fetus is theoretically possible until the decidual space is obliterated by 12 weeks of pregnancy.
- **Fetus papyraceous or compressus:** is a state which occurs if one of the fetuses dies early. The dead fetus is flattened, mummified and compressed between the membranes of the living fetus and the uterine wall. It may occur in both varieties of twins, but is more common in monozygotic twins and is discovered at delivery or earlier sonography.



- **Fetus acardiacus:** occurs only in monozygotic twins. Part of one fetus remains amorphous and becomes parasitic without a heart.



- **Hydatidiform mole:** (from one placenta) and a normal fetus and placenta (from the other conceptus) have been observed ultrasonographically.



- **Vanishing twin:**

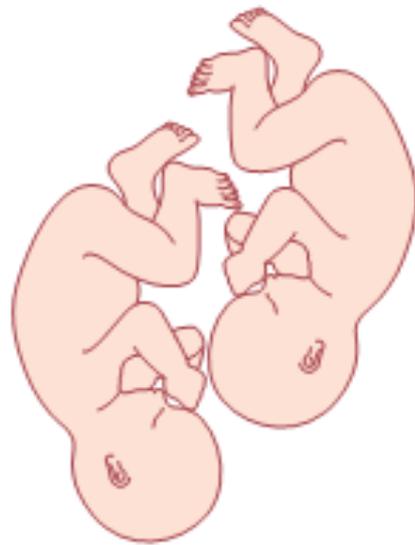
Serial ultrasound imaging in multiple pregnancy since early gestation has revealed occasional death of one fetus and continuation of pregnancy with the surviving one. The dead fetus (if within 14 weeks) simply 'vanishes' by resorption.

Complications relevant to multiple pregnancy:

*) maternal:(pregnancy,labour, perperium) :

A) pregnancy:

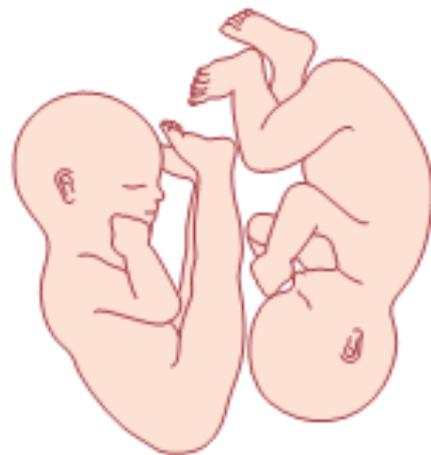
1. Nausea and vomiting (hyperemesis gravidarum).
2. anemia.
3. preeclampsia(25%).
4. polydramnios (10%) is more common in monozygotic twins and usually involves the second sac.
5. Antepartum hemorrhage (both placenta previa and placental abruption).
6. malpresentation.



Cephalic/Cephalic (60%)



Cephalic/Breech (20%)



Breech/Cephalic (10%)



Breech/Breech (10%)

7. Preterm labour (50%).

8. Mechanical distress

B) labour:

1. Early rupture of membrane and cord prolapse.

2. Prolonged labour.

3. Intrapartum haemorrhage.

4. Increased operative interventions.

5. Postpartum haemorrhage. Due to: (i) Atony of the uterine muscle due to overdistension of the uterus,
(ii) A longer time taken by the big placenta to separate.
(iii) Bigger surface area of the placenta exposing more uterine sinuses.

(iv) Implantation of a part of the placenta in the lower segment which is less retractile.

C) During puerperium:

There is increased incidence of:

(1) Subinvolution—because of bigger size of the Uterus.

(2) Infection— because of increased operative interference, pre-existing anaemia and blood loss during delivery.

(3) Lactation failure—this is minimized by reassurance and giving her additional support.

***)Fetal complications:**

1. Increase miscarriage rate.
2. prematurity.
3. Discordant twin growth (20%)— some degree of discordant growth is normal in dizygotic twins. Cases of true pathological discordance involve estimated weight difference of 25% or more. This may be due to twin-twin transfusion syndrome, Placental insufficiency, IUGR or from structural anomalies occurring in one fetus.



4. Intrauterine death of one twin especially in monochorionic twin.

The deaths are due to cord compression, competition for nourishment or congenital malformation.

5. Increase congenital abnormalities (2-4%) more in monochorionic twins.

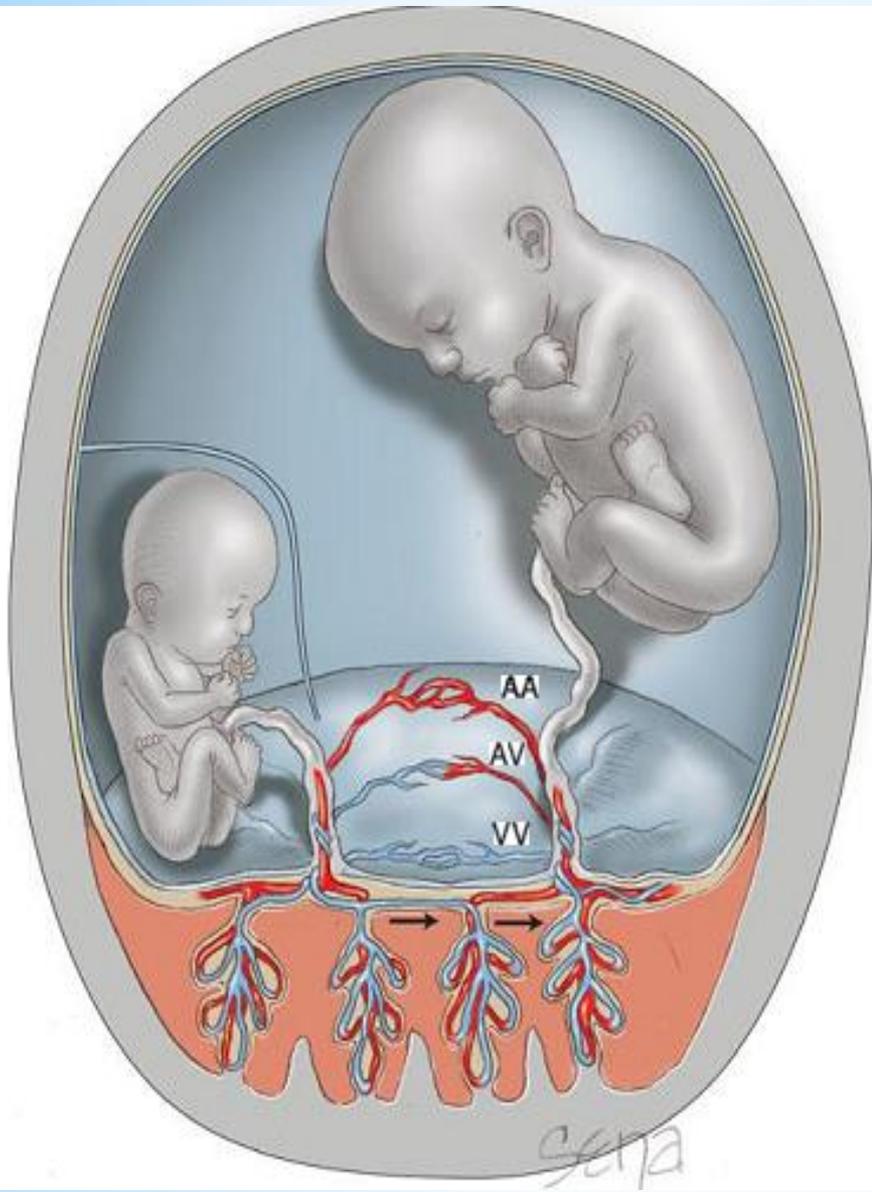
6. Birth asphyxia and still birth.

7. Locked twin.

8-complication specific to monochorionic twins:

In all monochorionic twin pregnancies there are placental vascular anastomoses present, which allow communication between the two fetoplacental circulations. In approximately 15 per cent of monochorionic twin pregnancies, imbalance in the flow of blood across these arteriovenous communications results in twin-to-twin transfusion syndrome (TTTS). One fetus becomes overperfused and the other underperfused. The development of mild, moderate or severe TTTS depends on the degree of imbalance.

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The growth-restricted donor fetus suffer from hypovolaemia and becomes oliguric.

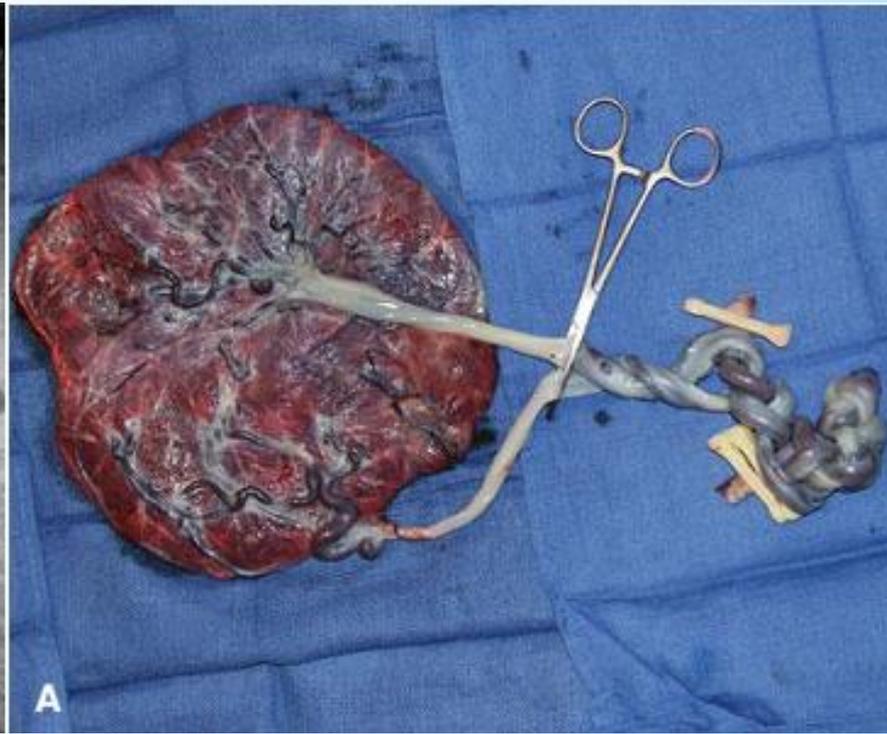
As fetal urine is the major component of amniotic fluid, this fetus develops oligohydramnios.

The recipient fetus becomes hypervolemic leading to polyuria and polyhydramnios. There is also a risk of myocardial damage and high output cardiac failure.

9- Complications specific to monoamniotic twins:

Monoamniotic twins share a single amniotic cavity, with no dividing membrane between the two fetuses. They are at increased risk of cord accidents, predominantly through their almost universal **cord entanglement**.

Many clinicians advocate elective delivery by Caesarean section at 32-34 weeks gestation, as this complication is usually acute, fatal unpredictable.



COMPLICATIONS OF MULTIFETAL PREGNANCY

Maternal

- Nausea, Vomiting
- Anemia
- PIH and Pre-eclampsia
- Polyhydramnions/
oligohydramios
- Preterm Labor
- Malpresentation
- Antepartum hemorrhage
- Mechanical distress (dyspnea,
palpitation)
- Prolonged labor
- Operative interference
- Post partum hemorrhage
- (↑) Postnatal support

Fetal

- Abortion
- Vanishing twin/Fetus
papyraceous
- Preterm birth
- Fetal anomalies
- Discordant growth
- Intrauterine death of one fetus
- Twin transfusion syndrome
- Cord prolapse
- Locked twins
- (↑) Perinatal mortality
(complications are more in
monozygotic twins, [redacted])

Diagnosis:

HISTORY: (i) History of ovulation inducing drugs specially gonadotrophins, for infertility or use of ART.

(ii) Family history of twinning (more often present in the maternal side).

SYMPTOMS: Minor ailments of normal pregnancy are often exaggerated. Some of the symptoms are related to the undue enlargement of the uterus:

(i) Increased nausea and vomiting in early months

(ii) Cardiorespiratory embarrassment which is evident in the later months—such as palpitation or shortness of breath.

(iii) Tendency of swelling of the legs, varicose veins and hemorrhoids is greater.

(iv) Unusual rate of abdominal enlargement and excessive fetal movements may be noticed by an experienced parous mother.

GENERAL EXAMINATION: (i) Prevalence of anaemia is more than in singleton pregnancy.

(ii) Unusual weight gain, not explained by preeclampsia or obesity, is an important feature

(iii) Evidence of preeclampsia (25%) is a common association.

ABDOMINAL EXAMINATION:

Inspection: The elongated shape of a normal pregnant uterus is changed to a more “barrel shape” and the abdomen is unduly enlarged.

Palpation:

(i) The height of the uterus is more than the period of amenorrhea. This discrepancy may only become evident from mid-pregnancy onwards.

- (ii) Fetal bulk seems disproportionately larger in relation to the size of the fetal head .
 - (iii) Palpation of too many fetal parts.
 - (iv) Finding of two fetal heads or three fetal poles make the clinical diagnosis almost certain.
- Auscultation: Simultaneous hearing of two distinct fetal heart sounds located at separate spots with a silent area in between by two observers, gives a certain clue in the diagnosis of twins, provided the difference in heart rates is at least 10 beats per minute

INTERNAL EXAMINATION:

In some cases, one head is felt deep in the pelvis, while the other one is located by abdominal examination.

On occasions, the clinical methods fail to detect twins prior to the delivery of the first baby.

INVESTIGATIONS

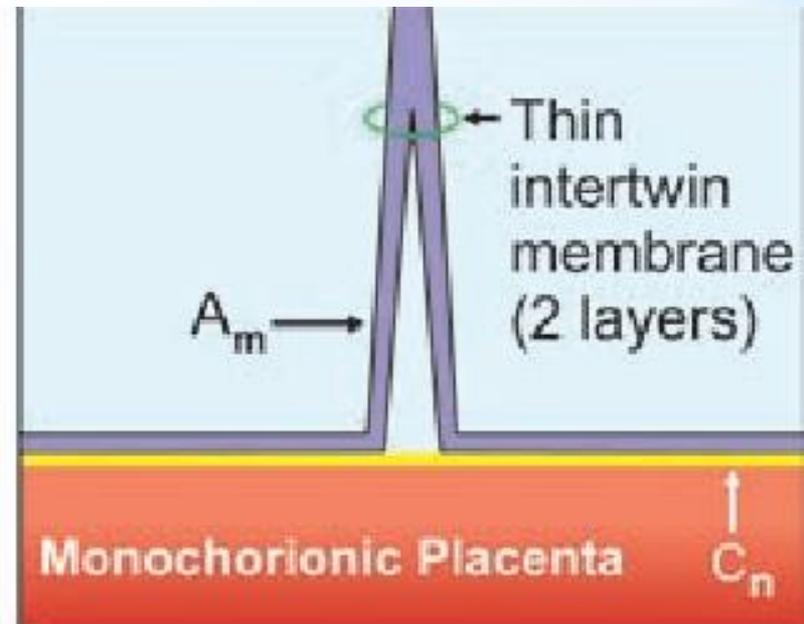
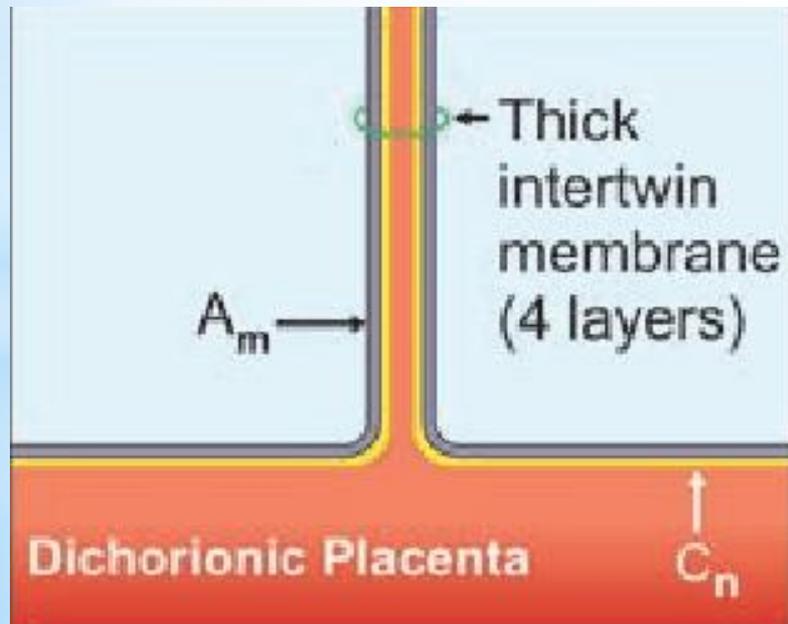
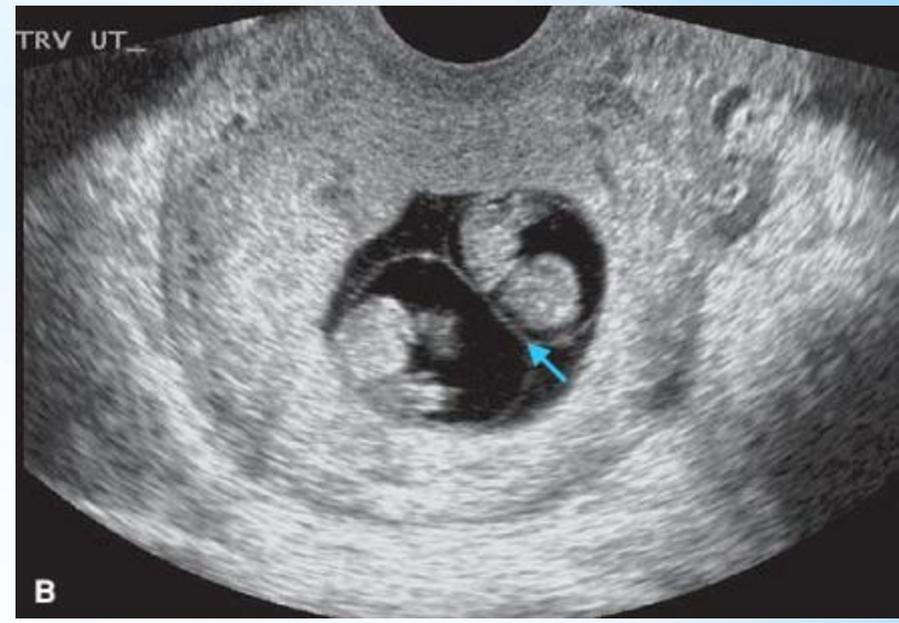
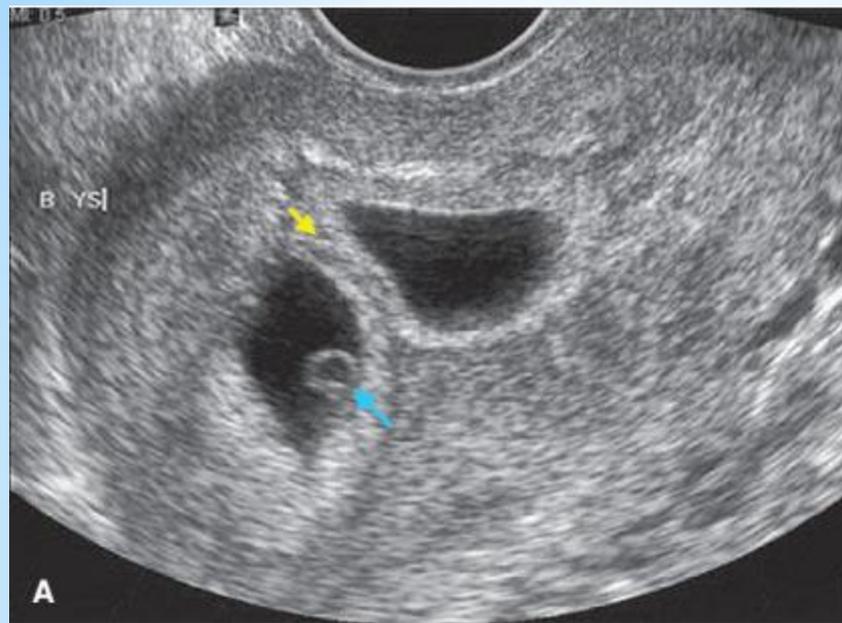
- **Sonography:** In multifetal pregnancy it is done to obtain the following information: (i) Confirmation of diagnosis as early as 10th week of pregnancy. (ii) Viability of fetuses, vanishing twin in the second trimester.
- (iii) Chorionicity (lambda or twin peak sign).
- (iv) Pregnancy dating. (v) Fetal anomalies
- (vi) Fetal growth monitoring (at every 3-4 weeks interval) for IUGR. (vii) Presentation and lie of the fetuses.
- (viii) Twin transfusion (Doppler studies). (ix) Placental localization. (x) Amniotic fluid volume.

Chorionicity of the placenta

is best diagnosed by ultrasound at 6 to 9 weeks of gestation.

In dichorionic twins there is a thick septum between the chorionic sacs. It is best identified at the base of the membrane, where a triangular projection is seen.

This is known as lambda or twin peak sign. Presence of lambda or twin peak sign indicates dichorionic placenta.



Differential diagnosis of multiple gestations :

DIFFERENTIAL DIAGNOSIS includes all cases of large for date including:

- (1) polydramnios.
- (2) Big baby (macrosomia).
- (3) Fibroid or ovarian tumor with pregnancy
- (4) Ascites with pregnancy.
- (5) Urinary retention.

Management during labour:

Complications are more common with labour in multiple pregnancy.

Judiciously managed, labour is generally considered to be safe. It may require considerable expertise and is the only situation in which internal podalic version is still practised in obstetrics.

Requirements for twin delivery

- Large delivery room
- Operating theatre and staff ready
- Anaesthetist present
- Senior obstetrician present
- At least two midwives present
- Twin resuscitaires
- Ventouse/forceps to hand
- Blood grouped and saved
- Intravenous access
- Neonatologists present
- Pre-mixed oxytocin infusion ready

Fetal well-being in labour:

Fetal heart rate monitoring should be continuous throughout labour, ideally using a specialized twin monitor. An abnormal fetal heart rate pattern in the first twin may be assessed using fetal scalp sampling, as for a singleton pregnancy. However, a non-reassuring pattern in the second twin will usually require delivery by Caesarean section.

The condition of the second twin must be carefully monitored after the delivery of the first twin, as acute complications such as cord prolapse and placental separation are well recognized.

Vaginal delivery of vertex-vertex:

Although this combination is considered low risk, an obstetrician should be present, as complications with delivery of the second twin can occur. Delivery of the first twin is undertaken in the usual manner and thereafter the majority of second twins will be delivered within 15 minutes. However, there is no urgency to deliver the second twin within a set time period, providing both mother and baby remain well.

After the delivery of the first twin, abdominal palpation should be performed to assess the lie of the second twin. It is helpful to use ultrasound for confirmation, which is also useful for checking the fetal heart rate. If the lie is longitudinal with a cephalic presentation, one should wait until the head is descending and then perform amniotomy with a contraction.

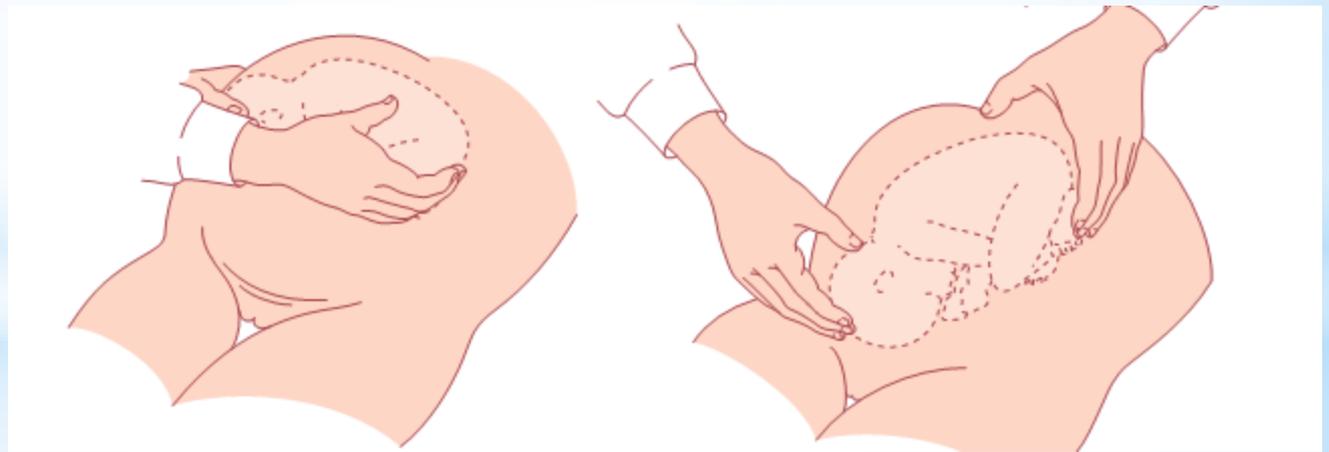
If contractions do not ensue within 5-10 minutes after delivery of the first twin, an oxytocin infusion should be started. The indications for instrumental delivery of the second twin are as for singletons.

Delivery of vertex-non-vertex

If the second twin is non-vertex, which occurs in about 40 per cent of twins, numerous studies have shown that vaginal delivery can be safely considered.

If the second twin is a breech, the membranes can be ruptured once the breech is fixed in the birth canal. A total breech extraction may be performed if fetal distress occurs or if a footling breech is encountered, but this requires considerable expertise.

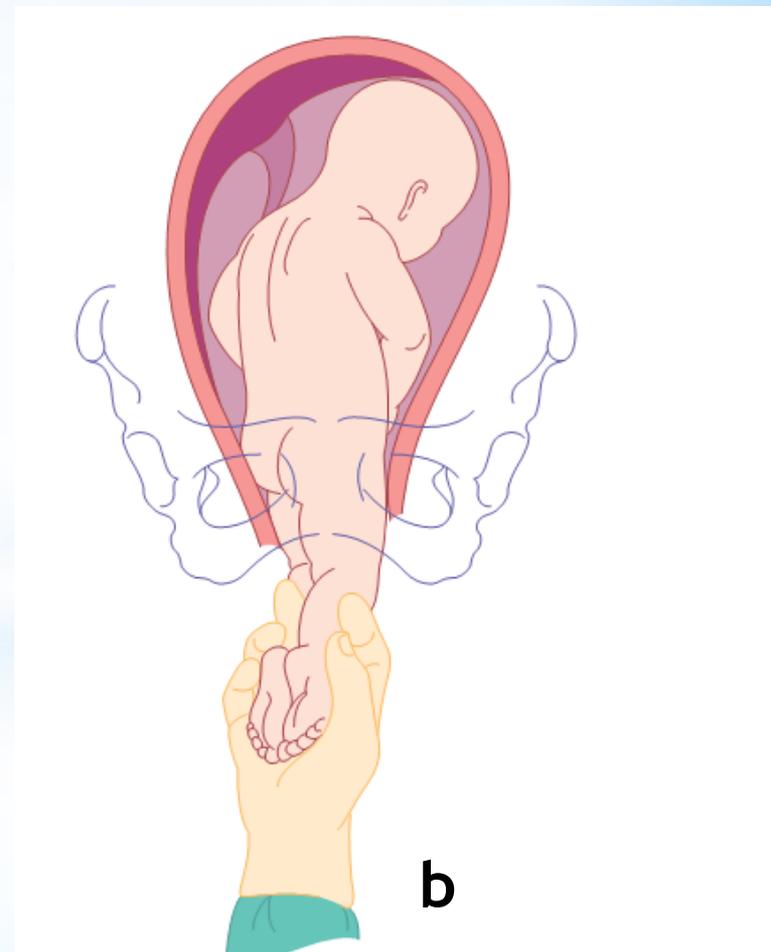
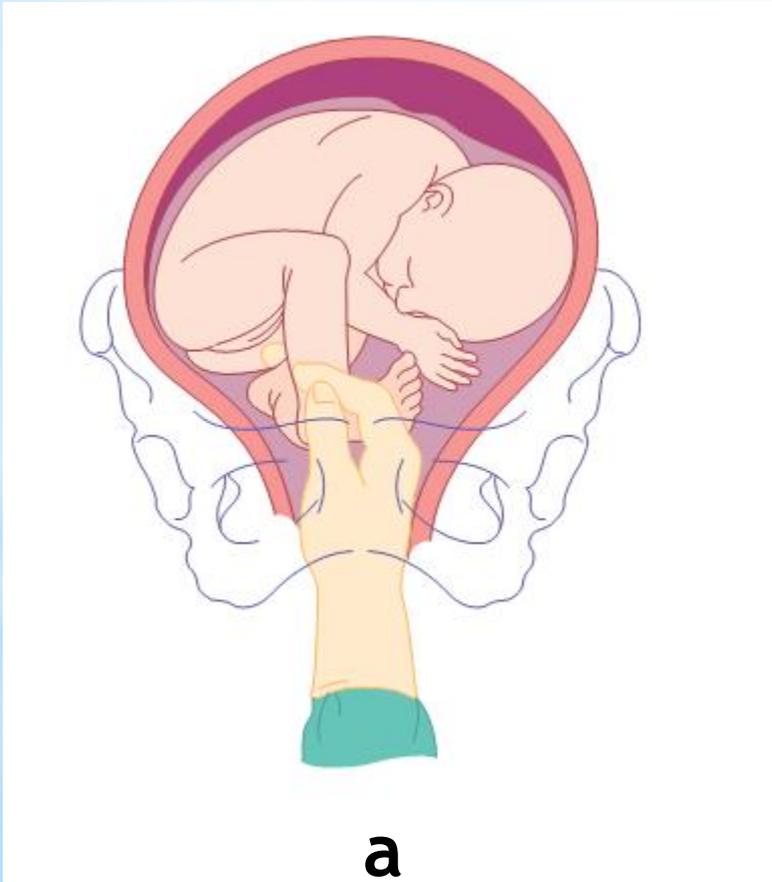
Complications are less likely if the membranes are not ruptured until the feet are held by the operator. Where the fetus is transverse, external cephalic version can be successful in more than 70 per cent of cases.



The fetal heart rate should be closely monitored, and ultrasound can be helpful to demonstrate the final position of the baby.

If external cephalic version is unsuccessful, and assuming that the operator is experienced, an internal podalic version can be undertaken.

A fetal foot is identified by recognizing a heel through intact membranes. The foot is grasped and pulled gently and continuously into the birth canal. The membranes are ruptured as late as possible.



This procedure is easiest when the transverse lie is with the back superior or posterior.

If the back is inferior or if the limbs are not immediately palpable, ultrasound may help to show the operator where they would be found.

This will minimize the unwanted experience of bringing down a fetal hand in the mistaken belief that it is a foot.

Non-vertex first twin:

When the first twin presents as a breech, clinicians usually recommend delivery by **elective Caesarean section**. This is largely because of the increased risks associated with singleton breech vaginal delivery. Other factors include decreasing in the experience of breech delivery the rarely seen phenomenon of ‘locked twins’.

In this latter case, the chin of the first (breech) baby locks against the chin of the second (cephalic) twin.

Indications of cesarean section in multiple pregnancy:

Obstetric indication: (1) Placenta previa (2) Severe preeclampsia (3) Previous cesarean section (4) Cord prolapse of the first baby (5) Abnormal uterine contractions (6) Contracted pelvis.

For twins: (i) Both the fetuses or even the first fetus with noncephalic (breech or transverse) presentation
(ii) Twins with complications: IUGR, Conjoined twins
(iii) Monoamniotic twins (iv) Monochorionic twins with TTS (v) Collision of both the heads at brim preventing engagement of either head.

Postpartum haemorrhage

The risk of postpartum haemorrhage is increased in twin pregnancies due to the larger placental site and uterine over-distension. For that reason, all multiple gestations should have an intravenous line and blood grouped and saved during labour.

Management is generally no different from that of postpartum haemorrhage complicating singleton delivery .

However, ideally, the third stage should be actively managed and a high-dose oxytocin infusion commenced following delivery as prophylaxis.

Higher multiples:

Because of the widespread introduction of assisted reproductive techniques has been an exponential increase in the incidence of higher multiple pregnancy, mostly triplets.



At least 75 per cent of triplet pregnancies are secondary to assisted conception.

They are associated with increased risk of miscarriage, perinatal death and handicap.

The median gestational age at birth is 33 weeks and long-term complications are primarily a consequence of extremely preterm delivery.



Although the demands on maternal physiology are greater still, antenatal care is essentially no different from that of a twin gestation.

Caesarean section is usually advocated for delivery due to the difficulties of intrapartum fetal monitoring.