Multiple Gestation
Any pregnancy which two or more embryos or fetuses present in the uterus at same time.

It is consider as a complication of pregnancy due to:

* The mean gestational age of delivery of twins is approximately 36w.
* The perinatal mortality & morbidity increase.
Singletons - one fetus

Twins - two fetuses.

Triplets - three fetuses.

Quadruplets - four fetuses.

Quintuplets - five fetuses.

Sextuplets - six fetuses.

Septuplets - seven fetuses.
The incidence of multiple pregnancy is approximately 3% (increase annually due to ART).

- Monozygotic twins (approx. 4 in 1000 births).
- Triplet pregnancies (approx. 1 in 8000 births).
- Conjoined twins (approx. 1 in 60,000 births).

Multiple gestation increase morbidity & mortality for both the mother & the fetuses.

The perinatal mortality in the developed countries:

Twins = 5 – 10% births

Triplets = 10 – 20% births
RISK FACTORS (only for dizygotic pregnancy)

* Ethnicity (afroamerican race > caucasian race > asian race)
* Maternal age > 35 years (due to increase gonadotrophins production)
* Increases with parity
* Heredity usually on maternal side
* Induction of ovulation, 10% with clomide and 30% with gonadotrophins
## Mean gestational age of delivery

<table>
<thead>
<tr>
<th>Number of babies</th>
<th>Weeks of Gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 weeks</td>
</tr>
<tr>
<td>2</td>
<td>36 weeks</td>
</tr>
<tr>
<td>3</td>
<td>33 weeks</td>
</tr>
<tr>
<td>4</td>
<td>29 ½ weeks</td>
</tr>
</tbody>
</table>
Classification

Dizygotic (>70%)

Dichorionic/Diamniotic

Monozygotic (<30%)

Dichorionic/Diamniotic (8%)

Monochorionic/Monoamniotic (1%)

Monochorionic/Diamniotic (20%)

N.B.: Placentation in higher-order multiples (triplets, quadruplets...) follows the same principles, except monochorionic & dichorionic may coexist.
IMPORTANT NOTES!

* Monozygotic twins having same sex & blood group
* Process of formation of chorion is earlier than formation of amnion
* Dizygotic twins must be dichorionic/diamniotic.
* There is no dichorionic/monoamniotic.
Dizygotic twins (fraternal):

* Most common represents 2/3 of cases.
* Fertilization of more than one egg by more than one sperm.
* Non identical, may be of different sex.
* Two chorion and two amnion.
* Placenta may be separate or fused.
* “each fetus is contained within a complete amniotic-chorionic membrane “
DIZYGOTIC PREGNANCY

Dizygotic
(Dichorionic, Diamniotic)
MONOZYGOTIC PREGNANCY

- Constitutes 1/3 of twins
- These twins are multiple gestations resulting from cleavage of a single, fertilized ovum.
- The timing of cleavage determines the placentation of the pregnancy.
- Constant incidence.
- Not affected by heredity.
- Not related to induction of ovulation.
<table>
<thead>
<tr>
<th>Time of cleavage</th>
<th>Nature of membranes</th>
<th>%</th>
<th>Perinatal mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 72 hr</td>
<td>diamniotic,dichorionic</td>
<td>8</td>
<td>8.9%</td>
</tr>
<tr>
<td>4 – 8 days</td>
<td>diamniotic,monochorionic</td>
<td>20</td>
<td>25%</td>
</tr>
<tr>
<td>9-12days</td>
<td>monoamniotic,monochorionic</td>
<td>1</td>
<td>50-60%</td>
</tr>
<tr>
<td>&gt;13 days</td>
<td>Conjoined twin</td>
<td>----</td>
<td>------</td>
</tr>
</tbody>
</table>
MONOZYGOTIC PREGNANCY

No intervening chorion

Amnion

Monozygotic
(Monochorionic, Diamniotic)
Monozygotic Pregnancy

Monozygotic
(Monochorionic, Monoamniotic)
Multiple gestation should be suspected when:

- Uterine size is greater than expected for gestational age.
- Multiple FHRs are heard.
- Multiple fetal parts are felt.
- hCG & serum alpha-fetoprotein levels are elevated for gestational age.
- If the pregnancy is a result of ART.

Diagnosis is confirmed by US.
HISTORY

History of ovulation inducing drugs specially gonadotrophins

Family history of twinning (maternal side).

SYMPTOMS

- Hyperemesis gravidorum
- Cardio-respiratory embarrassment - palpitation or shortness of breath
Diagnosis

General Examination

- Prevalence of anaemia is more than in singleton pregnancy
- Unusual weight gain, not explained by pre-eclampsia or obesity
- 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:

- Fundal height more than the period of amenorrhoea
- Girth more than normal
- Palpation of too many fetal parts
- Palpation of two fetal heads
- Palpation of three fetal poles

Auscultation:

Two distinct fetal heart sounds with zone of silence and 10 beat difference
THE MOST IMPORTANT DIAGNOSTIC TOOL IS FETAL ULTRASOUND IN THE FIRST TRIMESTER

Ultrasound Evaluation

* The diagnosis of multiple gestation requires a sonographic examination demonstrating two separate fetuses and heart activities (5 weeks of gestation)

* Cardiac activities (6 weeks of gestation - heartbeats are clearly visible)

* Placentation (10 – 14 weeks of gestation)
US view: Twins 10 hbd
• "Two rings sign"
• "Lambda sign"
• thick septum
The twin peak sign (also known as the lambda sign) is an ultrasound finding that is helpful in determining the chorionicity of a multifetal pregnancy. The only absolute sign of dizygosity on ultrasound is documentation of different sex fetuses.

The sign describes the triangular appearance to chorion insinuating between the layers of the inter twin membrane and strongly suggests a dichorionic twin pregnancy. It is best seen in the first trimester (between 10-14 weeks). While the presence of a twin peak sign is a useful indicator of dichorionicity, its absence however is not that useful in confidently excluding it.
ULTRASOUND SIGNS
MONOCHORIONIC PREGNANCY

US view. Twins. 5 hbd.
- „Eight sign”
- No septum between yolk sac
- Two yolk sacs in the one ring – „one ring sign”
The "T sign" is really the absence of a twin-peak sign (or lambda sign) and is used in ultrasound assessment of a multifetal pregnancy.

It refers to the lack of chorion extending between the layers of the intertwin membrane, denoting a monochorionic pregnancy. The intertwin membrane comes to an abrupt halt at the edge in a T configuration.
SONOGRAPHIC EXAMINATION

* US view of different sex fetuses and two separated placentae suggests dizygotic pregnancy

* US view of two fetuses and one yolk sac suggests monoamniotic (always monochorionic!) pregnancy
More advantages of US examination

- Fetal anomalies
- Fetal growth monitoring (at every 3-4 weeks interval) for IUGR
- Presentation and lie of the fetuses
- Twin transfusion (Doppler studies)
- Placental localization
- Amniotic fluid volume
### Complications of Multiple Gestation

<table>
<thead>
<tr>
<th>Maternal</th>
<th>Fetal</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Anemia</td>
<td>* Malpresentation</td>
</tr>
<tr>
<td>* Hydramnios</td>
<td>* Placenta previa</td>
</tr>
<tr>
<td>* Preeclampsia (40% in twins! 60% in triplets)</td>
<td>* Abruptio placentae</td>
</tr>
<tr>
<td>* Preterm labour</td>
<td>* Premature rupture of the membranes</td>
</tr>
<tr>
<td>* Postpartum hemorrhage</td>
<td>* Prematurity</td>
</tr>
<tr>
<td>* Cervical incompetence.</td>
<td>* Umbilical cord prolapse</td>
</tr>
<tr>
<td>* Hyperemesis gravidarum</td>
<td>* Intrauterine growth restriction</td>
</tr>
<tr>
<td>* Cesarean delivery</td>
<td>* Congenital anomalies</td>
</tr>
</tbody>
</table>
Causes of perinatal morbidity and mortality in twins:

- Respiratory distress syndrome
- Birth trauma
- Cerebral hemorrhage
- Birth asphyxia
- Birth anoxia
- Congenital anomalies
- Stillbirths
- Prematurity
SPECIFIC COMPLICATIONS OF THE TWINNING PROCESS

Abnormalities of the twinning process:

- Conjoined Twins.
- Interplacental Vascular Anastomosis.
- Twin-Twin Transfusion Syndrome.
- Fetal Malformations.
- Umbilical Cord Abnormalities.
- Discordant Twin Growth.
- Locked twins (delivered by CS).
- Single fetal death
- Rupture of membrane in single sac
LOCKED TWINS
There are two types of locked twins: breech/vertex and vertex/vertex. In breech/vertex presentations, which are much more common, the first twin is in the breech position, presenting feet-first, and the second is in the cephalic (vertex) position, presenting in the normal head-first manner. In these cases, the chin of the first twin locks behind the chin of the second twin while in the uterus or birth canal, preventing vaginal delivery. In vertex/vertex presentations, where both twins are positioned for head-first delivery, the two heads become locked at the pelvic brim, preventing either fetus from passing through the pelvic inlet in a vaginal delivery.
TWIN TO TWIN SYNDROME (TTTS)

TWIN TO TWIN SYNDROME (TTTS)

Twin to twin transfusion syndrome (TTTS) is a disease of the placenta that affects identical twin pregnancies. Occurs in 10% of monochorionic twins. TTTS affects identical twins (or higher multiple gestations), who share a common monochorionic placenta. The shared placenta contains abnormal blood vessels, which connect the umbilical cords and circulations of the twins.

The common placenta may also be shared unequally by the twins, and one twin may have a share too small to provide the necessary nutrients to grow normally or even survive.

The events in pregnancy that lead to TTTS: the timing of the twinning event, the number and type of connecting vessels, and the way the placenta is shared by the twins are all random events that have no primary prevention (see section on The Monochorionic Placenta), is not hereditary or genetic, nor is it caused by anything the parents did or did not do. TTTS can happen to anyone.
Depending on the number, type and direction of the connecting vessels, blood can be transfused disproportionately from one twin (the donor) to the other twin (the recipient).

The transfusion causes the donor twin to have decreased blood volume. This in turn leads to slower than normal growth than its co-twin, and poor urinary output causing little to no amniotic fluid or oligohydramnios (the source of most of the amniotic fluid is urine from the baby).

The recipient twin becomes overloaded with blood. This excess blood puts a strain on this baby’s heart to the point that it may develop heart failure, and also causes this baby to have too much amniotic fluid (polyhydramnios) from a greater than normal production of urine.

TTTS can occur at any time during pregnancy, even while a mother is in labor at term. The placental abnormalities determine when and to what degree a transfusion occurs between the twins.
 TYPES OF TTTS

Diagnosis criterias:

1) monochorionic pregnancy confirmed on US

2) oligohydramnion (MVP < 2 cm) and polyhydramnion (MVP > 8cm)

Quintero Scale – help to diagnose severity of TTTS
## Quintero Scale

<table>
<thead>
<tr>
<th>STAGE</th>
<th>AFI</th>
<th>DONOR BLADDER +/-</th>
<th>Doppler US</th>
<th>EDEMA</th>
<th>IUFD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>II</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>III</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IV</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>V</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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</tr>
</tbody>
</table>
TTTS

- Complication:
  - **Donor**: anemic HF, hypovolemia, hypotension, anemia, oligohydramnios, growth restriction. (do intrauterine blood transfusion).
  - **Recipient**: hypervolemic HF, hypervolemia, hypertension, polyhydramnios, thrombosis, hyperviscosity, cardiomegaly, polycythemia, hydrops fetalis. (do repeated amnioreduction).
  - **Both**: risk of demise & PTL.
Possible methods of treatment:

* Repeated amniocentesis from recipient.
* Indomethacin.
* Fetoscopy and laser ablation of communicating vessels.

If not treated, death occurs in 80-100% of cases.

Intrauterine transfusion of the anemic (donor) twin is of no benefit in this condition.
FETAL MALFORMATION

Incidence:

* Twice as common in twins & 4 times more common in triplets than in singleton infants.
* Monozygotic > Dizygotic.

Etiology:

* Usually result from arterial-arterial anastomosis.
* Common deformations in twins include limb defects, plagiocephaly, facial asymmetry, and torticollis.
* Acardia and twin-reversed arterial perfusion (TRAP) “rare but unique to multiple pregnancy”.

Amniocentesis:

Only if U/S shows abnormality.
Normal (pump) twin

Acardiac twin

TRAP Sequence
(Twin-Reversed Arterial Perfusion Sequence)
TRAP AND ACARDIC TWIN

* TRAP - Twin reversed arterial perfusion syndrome or Acardiac twin - absent heart in one fetus with arterio-arterial communication in placenta, donor twin also dies.

The acardiac twin is a parasitic twin that fails to develop a head, arms and a heart. The parasitic twin, little more than a torso with or without legs, receives its blood supply from the host twin by means of an umbilical cord-like structure (which often only has 2 blood vessels, instead of 3), much like a fetus in fetu, except the acardiac twin is outside the host twin's body. Although the reason is not fully understood, it is apparent that deoxygenated blood from the pump twin is perfused to the acardiac twin. The acardiac twin grows along with the pump twin, but due to inadequate perfusion it is unable to develop the structures necessary for life, and presents with dramatic deformities.
Selective Intrauterine Growth Restriction (sIUGR)

- sIUGR is a condition that occurs when monochorionic twins share unequal portions of the placenta. When twins have sIUGR one identical twin is normal size, while the other is significantly smaller. This condition occurs in 10-15% of monochorionic twins.

- When a mother is pregnant with monochorionic twins they share the same placenta. Vessels on the surface of the placenta connect the babies’ circulation. When twins have sIUGR one twin has a smaller portion of the placenta and has a harder time getting enough oxygen and nutrients.
SIUGR - DIAGNOSIS

The in utero diagnosis of SIUGR is established by ultrasound. First, clinicians work to confirm the presence of a monochorionic twin pregnancy. Usually ultrasounds performed earlier in the pregnancy help establish the number of placentas in the womb. Ultrasound findings such as a single placenta, same fetal sex and a “T-sign” in which the dividing membrane inserts perpendicular to the placenta are helpful in diagnosing a monochorionic twin gestation.

Once a monochorionic diagnosis has been established, the presence of three things:

1. **Fetal Weight**
   In order for monochorionic twins to exist, the estimated fetal weight (EFW) of one twin must measure less than the tenth percentile for the gestational age of the baby. The EFW is a second fetal biometric.

2. **Blood Flow**
   Clinicians also look for absent or reversed blood flow in the umbilical artery of the growth-restricted twin.

3. **Ruling out of Twin-Twin Transfusion Syndrome**
   Finally, the diagnosis of twin-twin transfusion syndrome (TTTS) must be ruled out. TTTS is diagnosed by assessing the difference in amniotic fluid volume on either side of the dividing fetal membranes; the maximum vertical pocket (MVP) of amniotic fluid volume must be greater than or equal to 8.0 centimeters in the recipient's sac, and less than or equal to 2.0 centimeters in the donor's sac to confirm a diagnosis of TTTS.
sIUGR – TREATMENT OPTIONS

1) Observation Through Frequent Ultrasounds
Some cases of sIUGR may not require intervention, however it is important to monitor the twins frequently to note significant changes in the twins’s status. Ultrasound has been recommended one a week.

2) Laser therapy (18 – 26 weeks of gestation)
This surgical approach uses a laser to seal off the offending blood vessels on the surface of the shared placenta. Because the blood vessels connecting the two babies are sealed, the fetuses are no longer able to share blood flow. In theory, this method of eliminating blood flow transfer is thought to prevent harm to the surviving twin should the under-developing twin die. However, the specific benefits of this treatment as studies are still preliminary and inconclusive.

As the best treatment approach for this condition remains unclear, a multinational group is working on a prospective randomized trial of expectant management versus laser therapy.

3) Umbilical Cord Occlusion
This procedure uses an operative fetoscope to interrupt the flow of blood through the umbilical cord of one of the fetuses. The under-developing fetus dies and remains inside the uterus for the duration of the pregnancy. This method is not recommended.
Conjoined Twins:

- **Etiology**: It results from cleavage of the embryo is incomplete because it happens very late (after 13 days, when the embryonic disc has completely formed).
- **Incidence**: Once in 70,000 deliveries.
- **Classification**:
  - Thoracopagus (anterior) “most common”.
  - Pygopagus (posterior)
  - Craniopagus (cephalic)
  - Ischiopagus (caudal)
- Delivery by C.S.
MANAGEMENT

**Antepartum**

- Adequate nutrition.
  - Adequacy of maternal diet is assessed due to the increased need for overall calories, iron, vitamins, and folate.
  - The Institute of Medicine (IOM) recommends women with twins gain a total of 16.0 to 20.5 kg during the pregnancy.
- More frequent prenatal visits.
- Periodic U/S assessment “every 3-4 weeks from 23 weeks“ to monitor the growth and detection of discordant growth or TTTS.
- Fetal surveillance:
  - Performance of NST is not indicated before 34 wks unless to confirm IUGR or discordant growth.
  - (avoid CST)
- Amniocentesis. (If indicated)
Monitoring:

- FHR
- Growth progress
- AFI
- CL
- Doppler US

Monochorionic pregnancy – every 2 weeks:

Dichorionic pregnancy – every 4 weeks
In case of death of one fetus is managed based on the gestational age and condition of the surviving fetus.

1- fetal surveillance
2- maternal clotting profiles surviving fetus is exhibited [ weekly measured Until evidence of fetal lung maturity in the

Delivery should be considered if:
1) Fetal lung maturity is demonstrated
2) If compromise of the remaining fetus develops
3) If evidence of disseminated intravascular coagulation in the mother is present.

In the setting of TTTS, the death of one twin should prompt consideration of delivery, particularly after 28 weeks, given the high rates of embolic complications in the surviving twin.
Intrapartum

- The route of delivery depends on:
  - Presentation of the twins.
  - Gestational age.
  - Presence of maternal or fetal complications.
  - Experience of obstetrician.
  - Availability of anesthesia & neonatal intensive care.
Delivery:

- **Vertex/Vertex (43%)**:
  - Vaginal delivery. (Successful in 70-80% of cases).
  - Surveillance of twin B with real-time U/S.

- **Vertex/Nonvertex (38%)**:
  - Vaginal delivery (better) (in absence of discordant growth).
  - Either external cephalic version or podalic version with breech extraction may be attempted.

- **Nonvertex Twin A (19%)**:
  - CS.
**postpartum**

- Active management of PPH:
  By giving oxytocin in the 3nd stage of labor just after delivery of both fetuses and placentas.
Specific indication C/S in Twins:

1. monochorionic monoamniotic twins
2. Conjoined twins
3. Non vertex presentation of first twin
4. Locked twins
5. Twin-reversed arterial perfusion (TRAP)
6. Placentation in Higher-Order Multiples
7. Other obstetric indication of C/S
THANK YOU