Multiple Pregnancy

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Multiple pregnancy

Definition
• Any pregnancy in which two or more embryos or fetuses occupy the uterus simultaneously

Two type
• Monozygous twinning
• Dizygous twinning
Epidemiology

Monozygous (MZ) twinning
• Rates are constant throughout the world
• 3-5 / 1000 births

Dizygous (DZ) twinning
• Rates vary widely
• Affected by maternal age, race, nutrition, geographical location or ART

Prevalence of all spontaneous twin pregnancies
• 0.6 % : in Asia
• 1 - 2 % : in Australia, Europe, USA
• 4 % : in Africa
Perinatal mortality & Morbidity

PNM
• 7-8 / 1000 live births for singleton
• 37 / 1000 live and stillbirths for twins
• 52 / 1000 live for triplets
• 231 / 1000 live for higher order multiples births

Morbidity
• The risk of cerebral palsy compared to singleton
  • 8 times greater in twins
  • 47 times greater in triplets
• Long-term neurological sequelae due to
  • Increased rates of preterm delivery
  • Low birth weight
Types of twins

Divided according to zygosity & chorionicity
Have important implications for pregnancy and infant outcome

Zygosity
• Refers to genetic makeup of the twins
• Monozygous or Dizygous

Chorionicity
• Refers to placentation
• Monochorionic or dichorionic

Amnionicity
• Refers to the presence or absence of amniotic membranes between the twins
• Monoamniotic or diamniotic
Twins: 3 variants

- DCDA
- MCDA (Monozygotic, Diamniotic)
- MCMA (Monozygotic, Monochorionic, Monoamniotic)
Zygosity vs Chorionicity

Dizygotic twins (DZ)
- 2/3 of all twins
- Always DCDA
- Placentae may fuse early on, giving the appearance of one placenta
- No vascular connections between two placentae

Monozygous twins (MZ)
- 1/3 of twins
- Can result in any of the 3 varieties depending on the timing of division of the zygote
MZ twins

Type depends on time of cleavage

Cleavage by day 3 (30%)  
- 2 separate blastocysts  
- 2 sites of implantation  
- DCDA

Cleavage by days 4 - 8 (69%)  
- MCDA

Cleavage by days 8-13 (<1%)  
- Too late for amnion to form separately for each twin  
- MCMA

Cleavage >13 days  
- MCMA with incomplete division of the embryos “conjoined twins”
- Very rare: (1/50,000 – 1/100,000 live births)
<table>
<thead>
<tr>
<th>Monozygotic</th>
<th>Dizygotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form from one zygote</td>
<td>Originate from two zygotes</td>
</tr>
<tr>
<td>1/3 of twins</td>
<td>2/3 of twins</td>
</tr>
<tr>
<td>Stable rate</td>
<td>Rate increases with age</td>
</tr>
<tr>
<td>No hereditary tendency</td>
<td>Hereditary tendency</td>
</tr>
<tr>
<td>Identical</td>
<td>Non-identical</td>
</tr>
<tr>
<td>Mono or dichorionic</td>
<td>Always dichorionic</td>
</tr>
<tr>
<td>Similar genetic components and same sex</td>
<td>Different genetic components; may be same or different sex</td>
</tr>
</tbody>
</table>
Determination of chorionicity

- Earliest time: 6 - 8 weeks
- Most accurate & reliable time: 10–13 weeks
- Depends on identification of the
  - Lambda sign: DC
  - T sign: MC
DCDA
Lambda sign

LAMBDA SIGN
MCDA
T - sign

"T-sign" in Monochorionic Diamniotic Pregnancy
Clinical importance of determining zygosity and chorionicity

- Planning Mx, including ANC schedule
- Early detection & Mx of complications of MC twins
- Counselling regarding
  - Risk of perinatal morbidity & mortality (MZ>DZ)
  - Risk of genetic & structural abnormality
  - Sequelae in presence IUFD of one twin
Twins: Complications

• Maternal
• Obstetrics
• Fetal / neonatal

Specific complications
  o Twin-twin transfusion syndrome (TTTS)
  o Twin-reversed arterial perfusion sequence (TRAP, acardiac twinning)
  o Death of one twin
  o Preterm delivery
Maternal Complications

- Higher frequency and severity of maternal conditions (e.g. nausea & vomiting in early pregnancy and respiratory discomfort in late pregnancy)

- Greater increase in blood volume, PR, cardiac output and weight gain
Obstetrics complications

Increased risk of

- Miscarriage
- Preterm labor
- Hypertension & pre-eclampsia
- Gestational diabetes
- Abruption
- Anemia (10 %, increased demands & dilutional)
- UTI
- Polyhydramnios
- Congenital anomalies (> in MZ twins)
- Malpresentations
- Caesarean section
- Postpartum haemorrhage
Fetal / Neonatal Complications

- Prematurity
- PROM
- Congenital anomalies increased 2-3X in twins
  - Mostly MZ
  - Most common: cleft lip & palate, CNS, CVS
  - Congained twins & fetal acardia (only in MZ twins)

- Umbilical cord problems
  - Single umb. artery, velamentous insertion, prolapse, vasa previa

- Discordance - unequal weights (difference > 15% in estimated fetal weight) (IUGR)
  - Unequal placental surface area
  - Twin to twin transfusion syndrome (TTTS)
  - Genetic syndromes
Fetal / neonatal complications

- Increased frequency of long-term adverse infant outcomes including cerebral palsy
- TTTS in MC twins (Rarely in DC)
- < 50 % of twin will continue up to or >38 weeks
- Perinatal morbidity & mortality increased for the 2^{nd} because of delivery complications
Major challenges

Perinatal mortality and morbidity is significantly higher in twin

- Preterm birth
- Intrauterine growth restriction (IUGR)
- Increased incidence of medical complications
- Twin to twin transfusion (TTTS)
- Antepartum death of one twin
Antenatal care

Early ultrasound
- Confirm GA, number of fetuses and chorionicity

Serum screening for chromosomal abnormalities
- Not applicable to twin pregnancies

Nuchal translucency
- Can be applied
- CVS or amniocentesis
  - Loss rates are greater in twin pregnancy (possibly due to double puncture)
  - Possibility of inaccurate diagnosis due to sampling same sac twice

Fetal reduction or termination
- Possible in cases of congenital anomaly in one or both twins
Subsequent care in pregnancy

Nutritional advice
• Supplementary iron, folate, Vitamin D

More frequent Antenatal visits
• **DC**: ANC Q 2 wks from 24 wks onwards
  (Fetal growth, liquor volume, umbilical artery Doppler’s)
• **MC**: ANC every 2 wk from 16 wks

Twins growing to their full potential should follow the singleton growth curve until 32 – 35 weeks
Subsequent care in pregnancy

Discordant growth
May be due to
• IUGR of one fetus
• TTTS
• Aneuploidy
• Anomaly
• Viral infection in one fetus

Twin pregnancies
• Require specialist antenatal care
• Referral to hospitals with adequate facilities
Specific Complications

- Twin-twin transfusion syndrome (TTTS)
- Twin-reversed arterial perfusion sequence (TRAP, acardiac twinning)
- Death of one twin
- Preterm delivery
Twin to twin transfusion syndrome (TTTS)

Affects: 10–15% of MC twins

Onset: usually in 2nd trimester (16 to 25 wks)

Aetiology poorly understood

• Unbalanced sharing of blood via placental vascular anastomoses
  o Superficial anastomoses: (A–A) or (V–V) allowing bidirectional blood flow between the twins?
  o Deep anastomoses are usually A-V & allow only unidirectional flow
TTTS

Donor
• Hypovolaemia activates renin–angiotensin system & ADH, leading to “vasoconstriction, oliguria & oligohydramnios & growth restriction”

Recipient
• Hypervolaemia increases secretion of atrial natriuretic factor leading to “polyuria, polyhydramnios & fetal hypertension”
  o Fetal hypertension
    ▪ Results from volume overload + transfer of angiotensin from donor
    ▪ May cause cardiac hypertrophy and failure, fetal hydrops & fetal death
TTTS

**Diagnosis** is by USS

- Oligohydramnios in one sac (maximal depth < 2)
- Polyhydramnios in the second sac (maximal depth > 8)

If TTTS is suspected, referral to maternal fetal medicine specialist

**Stuck twin**

- The sonographic appearance of extreme form of TTTS
TTTS treatment

Amnio-reduction (serial)
- Established method of treatment
- By amniocentesis
- Beneficial

Fetoscopic laser ablation of placental vascular anastomoses
- In 2\textsuperscript{nd} trimester of pregnancy
- Better outcome compared with amnio-reduction

Delivery after lung maturation. GA?
Death of one twin

- Incidence: 3.7%
- Neurological damage of the survivor results from
  - Transfer of thromboplastin from dead twin causing thrombotic arterial occlusion in second twin
  - Sudden severe hypotension
- Mother: DIC, in 25% of mothers after > 3 week of fetal death
- Chorionicity not zygosity determines risk of fetal mortality morbidity
Death of one twin

First trimester death
- Most common time
- Results in resorption of fetus and placenta
- No developmental consequence in surviving twin

Death after 17 weeks gestation:
- Increased risk of IUGR, preterm labour, PET, PNM
- ? Ischemic brain damage of 2nd twin
- May lead to maternal complication (DIC)

Causes of fetal death
- TTTS
- Placental insufficiency, IUGR, PET
- Velamentous insertion of the cord
- Congenital abnormalities
Death of one twin

In MC twin pregnancy

- Associated with a much higher risk of
  - Disability for the other twin
  - Death after 20 weeks may carry a risk of death or damage for the remaining fetus of up to 20 %

In DC twin pregnancies

- The risk of cerebral damage is far less than MC
Mx of death of one twin

Maternal Monitoring
• Weekly coagulation profile (platelet, PT, PTT, BT)
• FDP, D-dimer

Fetal Monitoring
• Daily fetal movement count
• Twice weekly NST in pregnancies > 32 weeks
• Twice weekly biophysical profile and Doppler

Delivery time:
• Steriods after 28 weeks
• Individualised (around 34 weeks)
Preterm labour

• Largest factor associated with increased mortality & morbidity

• Due to
  o Distention of the uterus & early dilatation of the cx
  o Exposure of fetal membranes to vaginal flora leading to amnionitis with or without ROM

• Prevention: ? bed rest, tocolytic, ? cx cerclage

• The wellbeing of both twins should be confirmed by CTG before tocolytics are considered

• Corticosteroids
Timing and mode of delivery

• Timing
  - The optimal timing of delivery is unclear
  - Twins: ? 38 weeks
  - Triplets: ? 35 weeks

• Mode
  - Most important factor in deciding mode of delivery is fetal presentation at time of labour
  - Fetal presentation: best determined by USS
Mode of delivery

- Frequency of fetal presentations at birth:
  - Vx-vx: 40%, vx – br: 30%, vx – tx: 7%, br-br: 9%, br-vx: 7%
  - Vaginal delivery is preferred for all twin pregnancies with the following criteria:
    - DC twins
    - Leading twin is cephalic
    - Neither twin has evidence of fetal compromise requiring CS
  - Locked twins: br-vx (may happen in twin delivery)
  - Entanglement of the cord: mono amniotic twins, CS
Elective caesarean section

- Monoamniotic twins
- Discordant twins
- 1\textsuperscript{st} twin non vx
- Other major obstetric risk factors require elective CS at 38 weeks gestation

Breech presentation of the 2\textsuperscript{nd} twin is not a contraindication to vaginal birth
Higher order multiple pregnancy
Triplets and higher

Causes
- The most frequent cause is iatrogenic (ART)
- May result from embryo splitting
- Polyovulation

Incidence
- Spontaneous triplets: 1 / 8000 births
- ART triplet: 1 / 3000 births
- Spontaneous quadruplets: 1 / 700,000 births
Higher order multiple pregnancy

The average duration of pregnancy
• 33 weeks for triplets
• 29 weeks for quadruplets

Delivery
• CS

Perinatal mortality
• Triplets & quadruplets: 52 - 231 /1000 births