Multiple gestation

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Introduction

- The incidence of multiple gestation **continues to increase,** and now accounting for more than **3%** of all live births.
- Twin pregnancies and higher-order multiple births comprise an increasing proportion of the total pregnancies in the developed world due to the expanded use of fertility treatments and older maternal age at childbirth.
- Increase neonatal morbidity and mortality rates with multiple gestations .
- Increase maternal complication with multiple gestations at least two folds.

Introduction

- The number of triplet, quadruplet, and higher-order multiple births peaked in 1998 and has dropped slightly recently, most likely because of limits in the number of embryos transferred and because of the availability and acceptance of multifetal pregnancy reduction (MFPR) procedures.

Fetal complications

- **Prematurity, monochorionicity**, and **growth restriction** pose the main risks to fetuses and neonates in multiple gestations.
- The mean duration of pregnancy is **35.3 weeks for twin gestations**, **31.9 weeks for triplets,** and **29.5 weeks for quadruplets.**
- **Stillbirth** rates increase from **6.8 /1000** for **singletons** to **16.1** for **twins** and to **21.5** for **triplets,** and **infant mortality rates increase** from 5 to 23.4 and to 51.2 /1000 births, respectively.
- **infants of multiple gestations** comprise almost **one quarter of very-low-birth-weight infants.**
- The incidence of **severe handicap** among neonatal survivors of multiple gestation is also **increased**: **34.0 and 57.5 /1000** twin and triplet survivors, respectively, compared with **19.7 /1000** singleton survivors.

Maternal complications

- maternal morbidity is significantly increased in mothers with multiple gestations and is apparently related to the number of fetuses.
- multiple gestations are associated with significantly higher risks for:
  - ✓ Hypertension
  - ✓ Placental abruption
  - ✓ Preterm labor (78%)
  - ✓ Preeclampsia (26%);
  - ✓ HELLP syndrome (9%)
  - ✓ Anemia (24%)
  - ✓ Preterm premature rupture of membranes (pPROM) (24%)
  - ✓ Gestational diabetes (14%)
  - ✓ Acute fatty liver (4%)
  - ✓ Chorioendometritis (16%)
  - ✓ Postpartum hemorrhage (9%)

Zygosity

- Twins can be **dizygotic (DZ),** resulting from the fertilization of **two separate ova** during a single ovulatory cycle.
- **Monozygotic (MZ)**, resulting from a **single fertilized ovum** that subsequently **divides** into two separate individuals.
  - ✓ **DZ twins have dichorionic-diamniotic (DCDA) placentas, although these may fuse during pregnancy.**
  - ✓ **In MZ twins, the timing of egg division determines placentation:**
    - **Diamniotic, dichorionic (DCDA) placentation occurs with division prior to the morula stage (within 3 days post fertilization).**
    - **Diamniotic, monochorionic (MCDA) placentation occurs with division between 4-8 days postfertilization.**
    - **Monoamniotic, monochorionic (MCMA) placentation occurs with division between 8-12 days postfertilization.**
    - **Division at or after day 13 results in conjoined twins.**

Incidence and epidemiology

- **Twins** account for **96%** of multiple births in the United States.
- **DZ twins** are **more common** than **MZ twins**, **69 and 31 %** of twins, respectively.
- The **incidence of MZ twins** is relatively **stable** worldwide at **3 - 5 /1000** births.
- **Factors influencing the incidence of DZ twins** are:
  - ✓ **Use of fertility stimulating drugs(**twin births increased from 1/53 infants in 1980 to 1/30 infants in 2009)
  - ✓ **Maternal age(**One-third of the increase in multiple births in recent decades has been attributed to increasing age at childbirth)
  - ✓ **Race/geographic area** (1.3/1000 Japan, 8/1000 United States and Europe, 50/1000 Nigeria)
  - ✓ **Parity**
  - ✓ **Family history**

Diagnosis of Multiple Gestation

- Excessive weight gain
- Rapid uterine growth
- Abdominal palpation of an excessive number of fetal parts
- Auscultation of two separate fetal heart rates that differ by >10 beats/min.

Diagnosis of Multiple Gestation

- All women with a twin pregnancy should be offered an ultrasound examination at **10–13 weeks** of gestation to assess **viability**, **chorionicity**, **major congenital malformation** and **nuchal translucency**.
- Visualization of **multiple gestational sacs with yolk sacs by 5 weeks**, or **multiple embryos with cardiac activity** by **6 weeks.**
- Before **8 weeks** gestation, **clearly separate gestational sacs**, each surrounded by a **thick echogenic ring**, is suggestive of **dichorionicity**.
- **Later in gestation**, if the fetuses are **discordant for sex** or **two distinct placentas** are seen, a **DC gestation** can be confirmed with confidence.

Diagnosis of Multiple Gestation

- **membrane thickness of 2 mm** helps in diagnosing **chorionicity**.
- **placentation is MC** if only **two layers** are present; the presence of **three or four layers suggests dichorionicity.**
- **DC twins** identified by **visualization of a triangular projection of placenta between the layers of the dividing membrane** (***lambda* sign**).
- **MC twins** identified by **presence of the "T" sign**, which refers to the appearance of the **thin intertwin membrane** as it takes-off from the placenta at a **90 degree angle.**

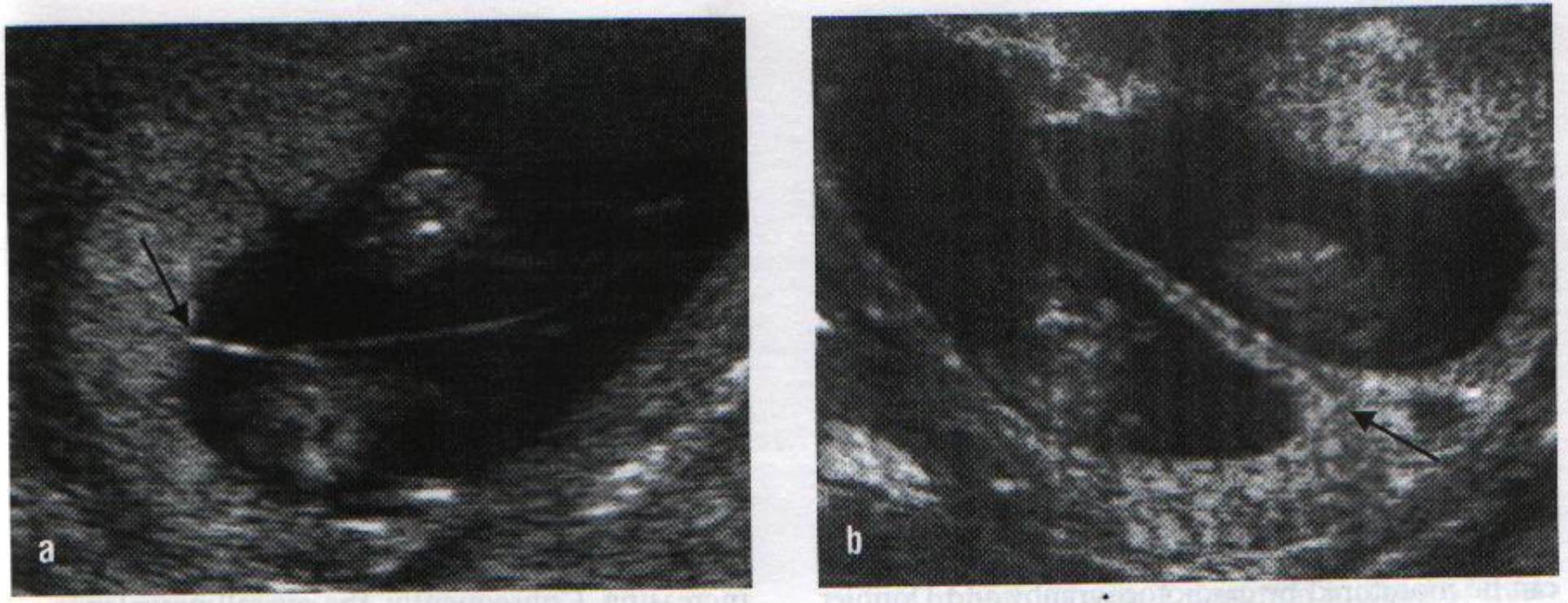
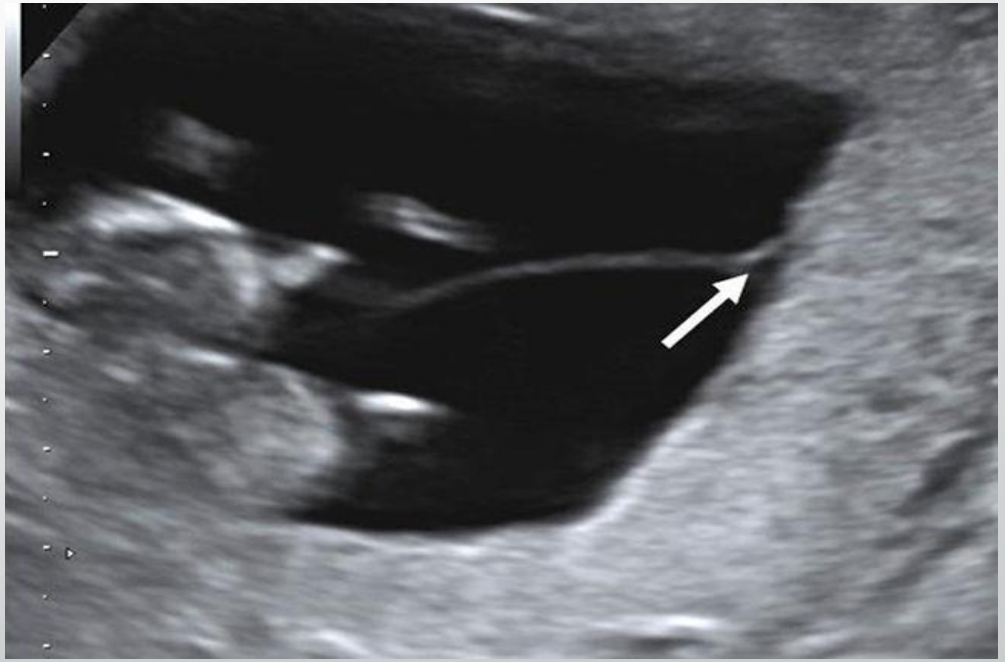


Figure 13.2 Ultrasound appearance of monochorionic (a) and dichorionic (b) twin pregnancies at 12 weeks' gestation. Note that in both types there appears to be a single placental mass but in the dichorionic type there is an extension of placental tissue into the base of the inter-twin membrane forming the lambda sign.

DC twins

MC twins



Antepartum management of multiple pregnancy

- The incidence and range of **maternal and fetal complications** in multiple gestation suggest that these pregnancies should be **managed under the supervision of an appropriately trained specialist.**
- After **confirming a diagnosis of multiple gestation** we should **determine chorionicity.**
- **Careful sonographic surveys** of **fetal anatomy** are indicated in multifetal pregnancies, because the risk for **congenital anomalies** is **increased (3-5 fold higher).**

Antepartum management of multiple pregnancy

- Assess **fetal growth** by **serial ultrasonography** (**the most accurate method in cases of multiple gestation).**
- Intrauterine growth of twins is **similar** to that of singletons until **30 - 32** weeks gestation.
- Assess for **growth discordance (discordance greater than 20% has also been shown to be an important predictor for adverse perinatal outcomes)**
- **Assess cervical length in** multiple gestation to identify those at **increased risk for preterm delivery**.(**16 -24week , A cut-off of 20 mm**)

Preterm Labor and Delivery

- **Preterm birth** occurs in more than **50% of twin** and **75% of triplet** gestations.
- A **cervical length of less than 20 mm** in a **twin pregnancy** at **20 to 24 weeks** gestation was associated with a **10-fold** positive likelihood ratio for preterm birth before **32 weeks** gestation.
- **Cervicovaginal fetal fibronectin** assay can be used to predict preterm labor.

Preterm Labor and Delivery

- **Interventions to prevent preterm labor** and **prolong pregnancy** for patients with multiple gestations :
  - ✓ prophylactic **cervical cerclage** (no benefit)
  - ✓ Supplemental **progesterone** (no evidence to support the effectiveness)
  - ✓ **Bedrest (**does not prolong pregnancy or prevent preterm labor or delivery)
  - ✓ **Tocolytic drugs** (does not prolong pregnancy)

Fetal Surveillance

- **Serial sonographic assessment of fetal growth** is recommended in multiple gestations.
  - ✓ every **3 - 4 weeks** from **18 weeks gestation** in **DC twins**, or every **2 weeks** if **growth restriction or growth discordance (>20%) is discovered.**
  - ✓ **MC twins**, as well as all **higher-order multiple gestations**, serial growth scans are performed every **2 weeks** from **16 weeks** gestation.

- When **significant growth discordance** is confirmed, fetal testing should begin intensively. This consists of **twice-weekly NST** supplemented by **biophysical profiles** and **umbilical artery Doppler velocimetry**.

Timing of delivery

- All **twin fetuses** should therefore be **delivered by 39 weeks of gestation** because of the **rising perinatal morbidity and mortality** beyond that date.
- The optimal timing of delivery for **uncomplicated DC twins is 37 -38 weeks**, and for **uncomplicated MCDA twins 36 -37 weeks.**
- For **MA twins** delivery at about **32 weeks** should be suggested because of the **increasing risk of perinatal mortality in the third trimester.**

Intrapartum management

- After admission to the delivery unit, ultrasonography should be performed to determine **fetal presentations** and size before choosing the mode of delivery.
- **Electronic fetal heart monitoring** should be available, (**fetal scalp electrode for the 1st twin and using an external monitor for the 2nd twin**).
- **Epidural anesthesia is recommended.**

Intrapartum management

MULTIPLE PREGNANCY

Twins may present in various ways:—

45%

Vertex and Vertex

37%

Vertex and Breech

10%

Breech and Breech

5%

Vertex and Transverse

2%

Breech and Transverse

0,5%

Transverse and Transverse

Intrapartum management

- For **vertex-vertex presentation** and in the **absence of obstetric indications for cesarean delivery**, **vaginal birth** should be planned regardless of gestational age.
- There is **no absolute indication** to deliver the **second twin** within a **specified time limit** (**continuous FHM**).
- For **vertex-non-vertex twins**, **Vaginal delivery allowed with breech delivery of the 2nd twin .**
- **If the 2nd twin is significantly larger than the 1st , cesarean delivery is recommended.**
- For **non-vertex 1st twin cesarean delivery is recommended**.

Intrapartum management

- **Higher-Order Multiple Gestations:**
  - ✓ **cesarean delivery** under **regional anesthesia** for all patients with three or more live fetuses that are of a viable gestational age is recommended.
- **Monoamniotic twins:**
  - ✓ **Cesarean birth is recommended** to avoid complications from **cord entanglement.**

Twin-Twin Transfusion Syndrome (TTTS)

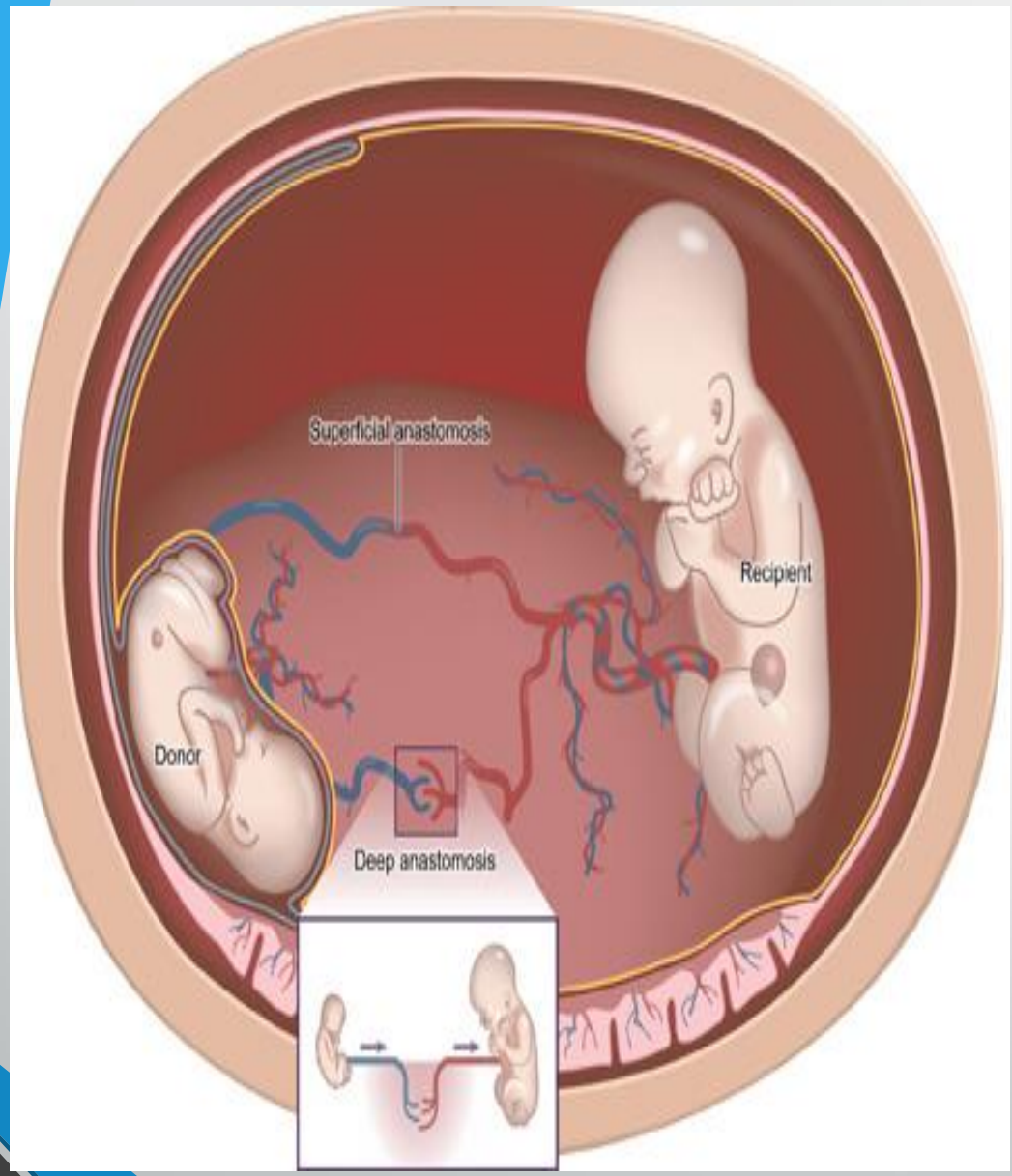
- **TTTS** occurs because of an **imbalance in blood flow** through **vascular communications in the placenta**, which leads to **overperfusion** of one twin and **underperfusion of its co-twin.**
- It occurs in **15% of MC twin** pregnancies.
- **Arterio-venous unidirectional anastomoses** result in net transfusion of blood from the donor to the recipient fetus.
- It is associated with a **high risk of fetal/neonatal mortality**, and fetuses who survive are at risk of **severe cardiac, neurologic, and developmental disorders.**

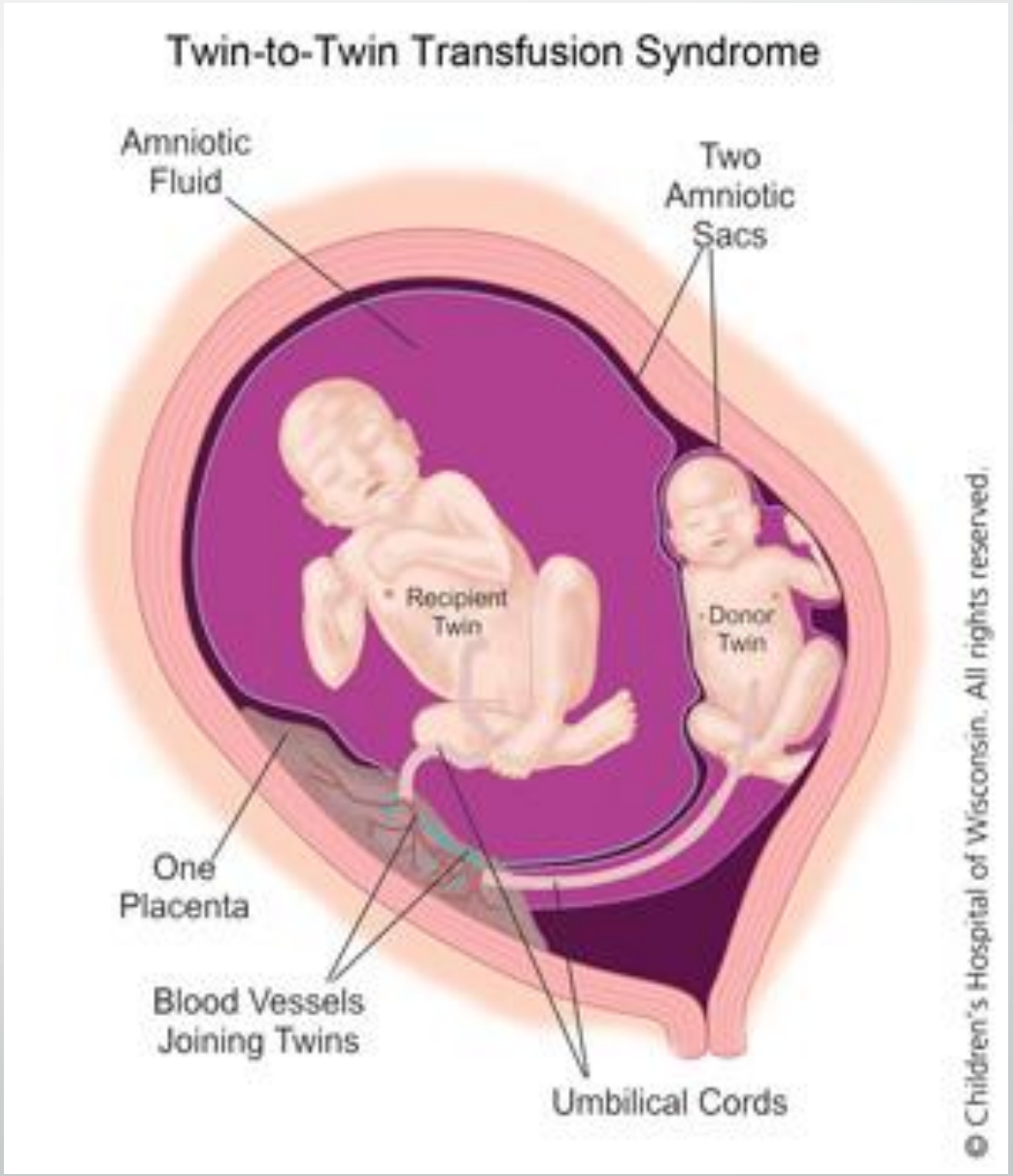
Twin-Twin Transfusion Syndrome (TTTS)

- **Ultrasonographic criteria for diagnosis of TTTS include :**
  - ✓ Presence of a single placenta
  - ✓ Sex concordance
  - ✓ Significant growth discordance (approximately 20%)
  - ✓ Discrepancy in amniotic fluid volume between the two amniotic sacs (usually oligohydramnios and polyhydramnios)
  - ✓ Presence of fetal hydrops or cardiac dysfunction
  - ✓ Abnormal umbilical artery Doppler findings, such as absent end-diastolic flow in the donor fetus

Twin-Twin Transfusion Syndrome (TTTS)

- **The donor fetus** is hypoperfused, demonstrating signs of intrauterine growth restriction, anaemic and oligohydramnios.
- **The recipient fetus** is hyperperfused, hypertensive, demonstrate biventricular hypertrophy and diastolic dysfunction, and polyhydramnios.
- management approaches for the treatment of **severe TTTS** before 24 to 26 weeks gestation:
  - ✓ **Serial reduction amniocenteses**
  - ✓ **Amniotic septostomy**
  - ✓ **Selective fetoscopic laser coagulation of placental anastomoses.**


Superficial anastomosis
Recipient
Donor
Deep anastomosis


Twin-to-Twin Transfusion Syndrome
Amniotic Fluid
Two Amniotic Sacs
Recipient Twin
Donor Twin
One Placenta
Blood Vessels Joining Twins
Umbilical Cords
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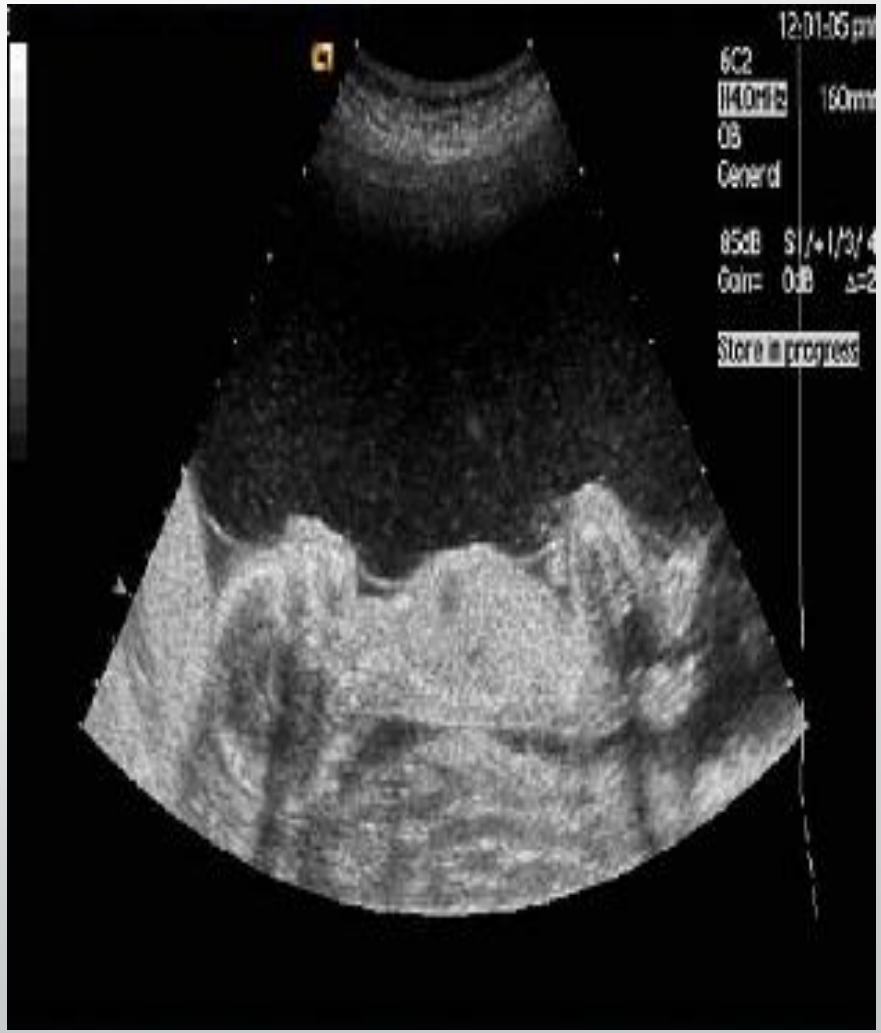
Twin-Twin Transfusion Syndrome (TTTS)



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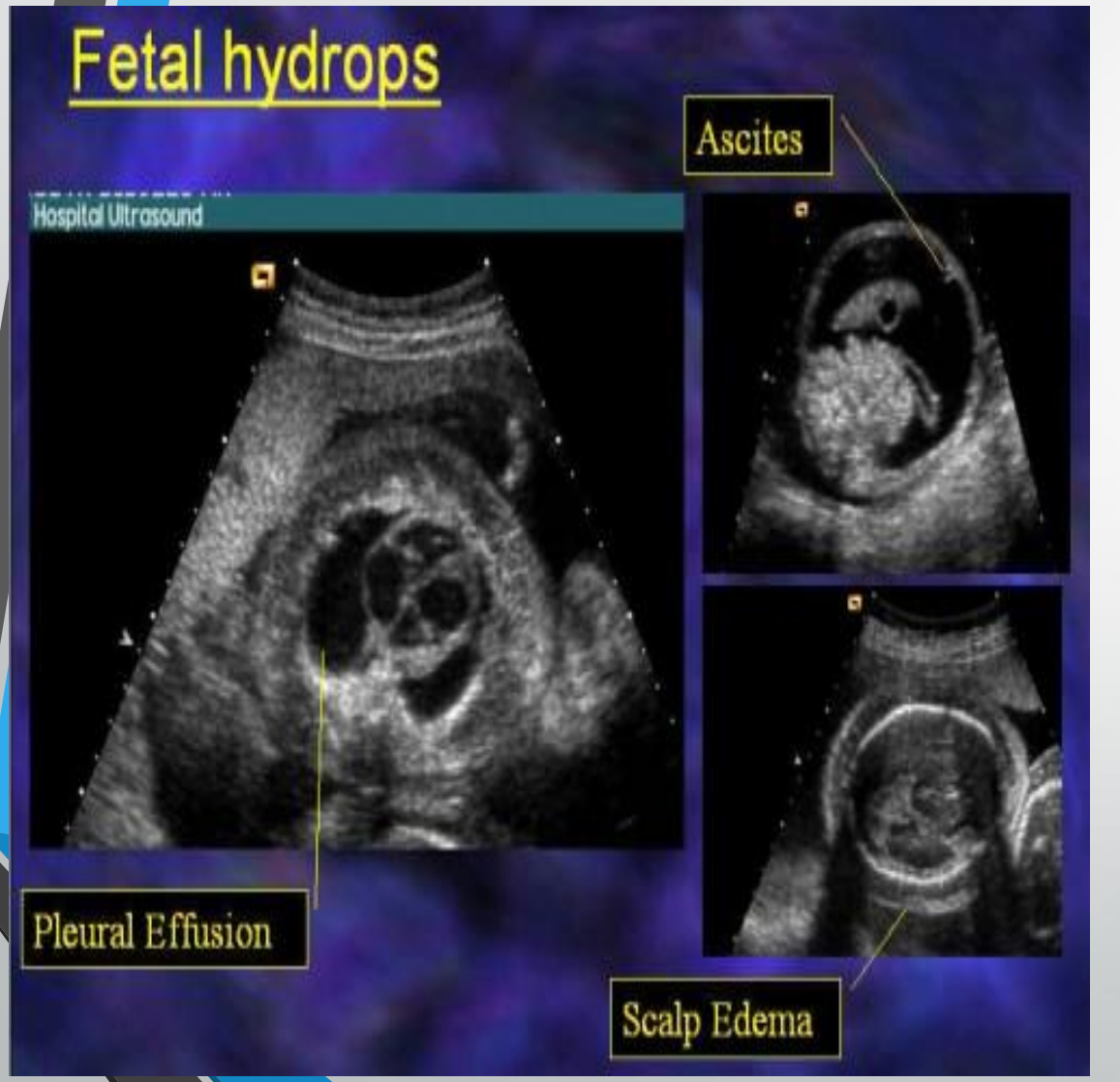
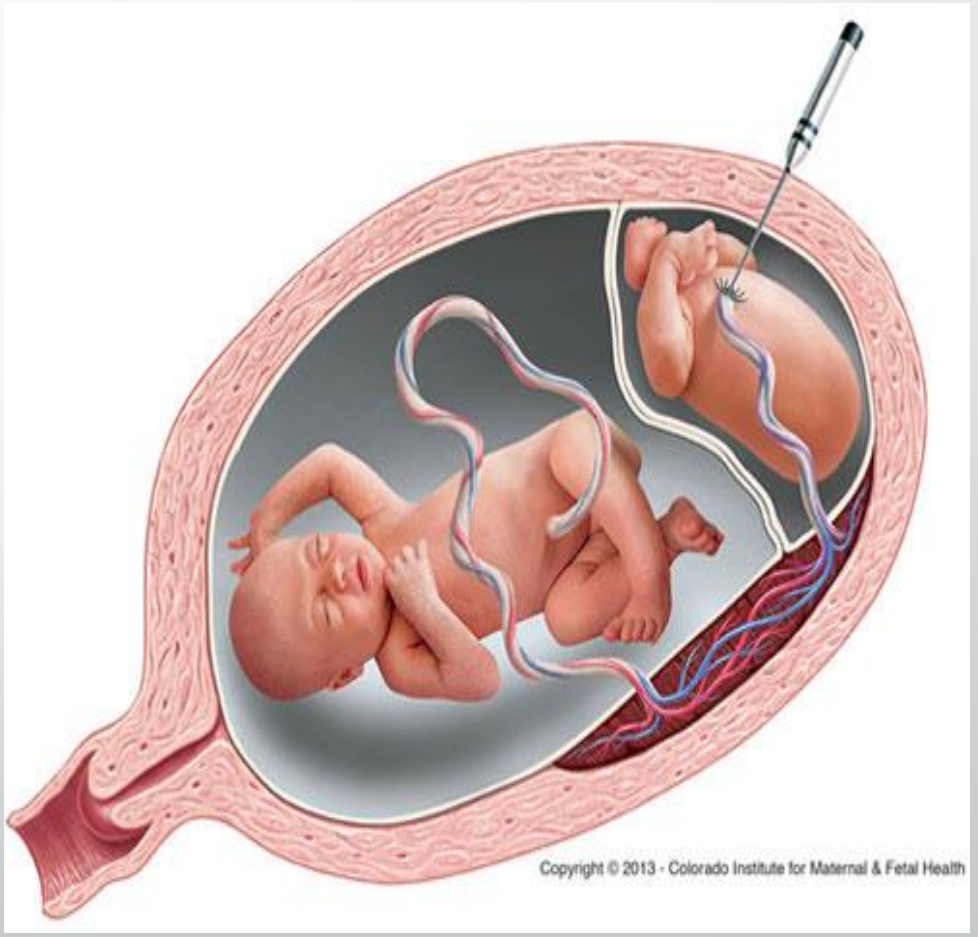


Twin Reversed Arterial Perfusion Sequence(TRAP)

- One twin has an **absent, rudimentary, or nonfunctioning heart (acardiac)**.
- Occur in **1%** of **MZ twins.**
- **The donor (pump twin)** provides circulation for itself and for the **recipient (perfused twin)** through a **direct arterio-arterial anastomosis** at the placental surface.
- The pump twin is at risk for development of **hydrops** or congestive **cardiac failure.**

Twin Reversed Arterial Perfusion Sequence(TRAP)



Conjoined Twins

- A subset of **monozygotic twin gestations** in which **incomplete embryonic division** occurs **13 to 15 days** after conception, resulting in varying degrees of fusion of the two fetuses.
- Classified according to the **anatomical site of union** (eg, chest, head).
- **Associated congenital defects** unrelated to the area of fusion are common, as is stillbirth.
- **Delivery of viable infants is always by cesarean.**

Conjoined Twins

Intrauterine Demise of One Fetus

- Common during **1st trimester.**
- **Vanishing twin** occur in **21%** of twin pregnancies, with no obvious detrimental effect on the remaining fetus.
- Intrauterine demise of one fetus in the **2nd or 3rd trimester** is **rarer (2% to 5% of twin pregnancies).**
- After the death of one twin in a **MC gestation**, approximately **15%** of **remaining fetuses also die**, compared with approximately **3%** of **remaining fetuses in a DC gestation.**
- The risk for **significant neurologic morbidity is increased after intrauterine death of one fetus in a MC, but not in a DC gestation**.
- **Small risk for maternal DIC.**

Multifetal Pregnancy Reduction(MFPR)

- The incidence of **high order multifetal gestation** (ie, triplets or more) increased dramatically, due to widespread use of assisted reproductive technology (ART).
- These pregnancies are at higher risk of **maternal, fetal, and neonatal complications than singleton pregnancies(cerebral palsy, PPH, preeclampsia**).
- Higher order multifetal gestations **should be prevented** by better control of ovulation induction and embryo transfer.

Multifetal Pregnancy Reduction(MFPR)

- **MFPR** is usually performed between **10 and 13 weeks** of gestation.
- Under **continuous ultrasound guidance**, a **needle** is placed into the thorax of the targeted fetus, **2 to 3 mL of potassium chloride** is injected, and **asystole** is observed for at least **3 minutes.**
- Potassium chloride injection must not be used for MFPR in **a single fetus of a MC pair because of the risk for co-fetal demise or neurologic injury.**

Thank you