بنام خداوند بخشنده مهربان

Management in twin pregnancy

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INCIDENCE

Multiple pregnancy affecting 2-3% of births

Incidence is rising due to:

- Increase maternal age
- Use of ART

COMPLICATIONS

Twin pregnancy is associated with a high risk of perinatal mortality and morbidity:

- **Maternal complication:**
  - **hypertension, worth preexisting cardiac disease, GDM, intrahepatic cholestasis, maternal mortality,…..**
- **Fetal risk:**
  - **Stillbirth**
  - **Preterm birth (60%)**
  - **Congenital abnormalities, FGR, TTTS,….**

Prenatal management

- For woman undergoing ART,
- Offer folate supplementation
- Single embryo transfer in IVF

At 10-14weeks

- Dating
- Chorionicity
- Gestational sac position and labeling
- Amniocity
- Screening for anuploeidy

PREGNANCY DATING

Pregnancy dating is important for

- Timing of screening and diagnostic testing
- Correct interpretation of fetal growth in multiple gestations
- Time of delivery

PREGNANCY DATING

- Twin pregnancies should ideally be dated by CRL. CRL between 45 and 84 mm (i.e. 11+0to13+6 weeks)is good time for dating
- The larger of the two CRLs should be used to estimate GA
- After the first trimester, multiple biometric measurements should be used to date the pregnancy but this approach is less precise (larger fetus biometry should be used)
- In-vitrofertilization should be dated using the oocyte retrieval date or the embryonic age from fertilization

CHORIONICITY

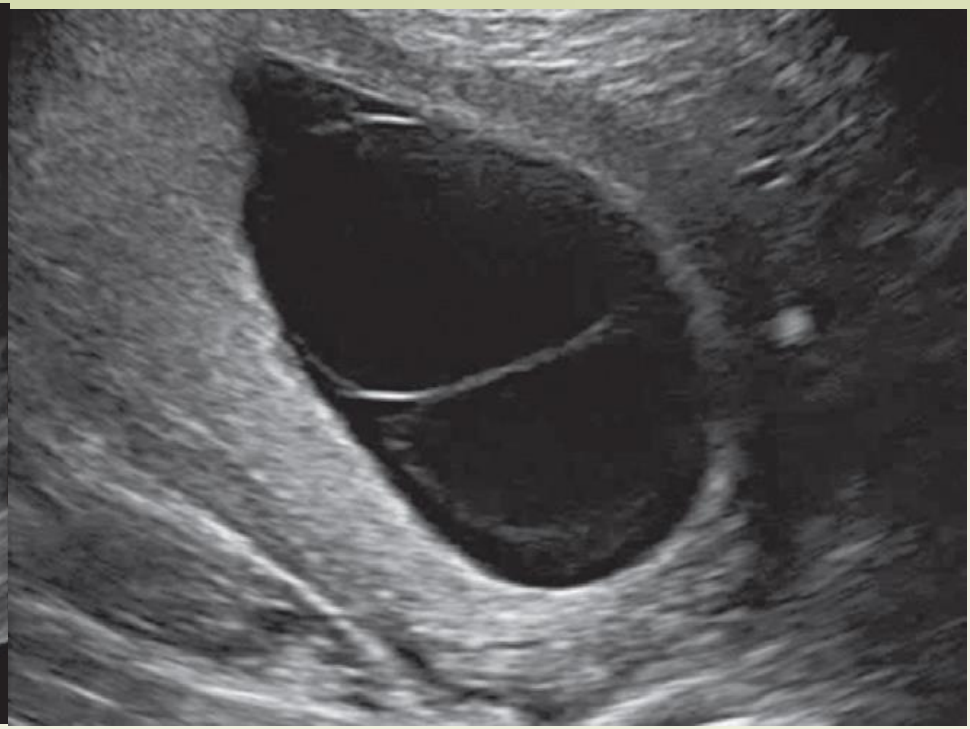
Chorionicity affects pregnancy outcomes in multiple pregnancies:

- Correct assignment of chorionicity using sonography is nearly 100% when done in the first trimester compared to an approximate 10% likelihood of error in the second trimester

- **If it is not possible to determine chorionicity by ultrasound imaging, it is safer to classify the pregnancy as monochorionic**

Diagnosis of chorionicity

- Early in the first trimester, the number of gestational sacs equals the number of chorions
- Late in the first trimester,
  - Discordant fetal sex
  - The visualization of two separate placentas
  - Using the membrane thickness at the site of insertion of the amniotic membrane
  - Identifying the T-sign or lambda sign



Determined amnionicity

- absence of the intertwin membrane
- cord entanglement

Labeling of twin fetuses

- **Labeling** should be documented clearly in the woman's notes
- Either left and right, or upper and lower or
- Mapping in the first trimester according to the insertion of their cords relative to the placental edges and membrane insertion
- Twin A is the fetus on the right side, while Twin B is the one on the left

Example

Twin A (female) is on the maternal right with a posterior placenta and marginal cord insertion

Screening for aneuploidy

- First trimester using the combined test
  - NT* free (β-hCG)*(PAPP)*maternal age
- In case of a vanished twin, if there is still a measurable fetal pole, NT alone, in combination with maternal age, should be used for risk estimation

Screening for aneuploidy

- **The risk of trisomy 21 in monochorionic twin pregnancy is calculated per pregnancy based on the average risk of both fetuses (because the twins share the same karyotype)**
- **In dichorionic twin pregnancy the risk is calculated per fetus**
- **The DR (89% for singletons, 86% for dichorionic twins and 87% for monochorionic twins, at a false-positive rate (FPR) of 5%)(ISUG) (80% High risk P)**
- **RR 1/150 or greater should be referred**
- **If first trimester screening cannot be achived , second T screening is offered(is not availible in triplet pregnancy**

Implications of discordance in NT or CRL in the first trimester

- **pregnancy with CRL discordance≥10% or NT discordance≥20% should be detailed ultrasound assessment and testing for karyotype**

- **In cases of discordance in NT or CRL, or reversed a-wave (DV), may be appears TTTS, sensitivity of 52–64% and a specificity of 78–80%,**

NIPT

- **DD of Cell-free DNA for**
  - **singleton pregnancy was 99% with a FPR of 0.1%**
  - **twin pregnancy were 94.4% and with a FPR of 0.2%**

- **In DZ twins fetal fraction is nearly twofold. If FF for affected fetus is below under 4% lead to false negative result. So currently ACOG and RCOG do not recommended cell free DND for twin pregnancy**

Invasive prenatal diagnosis in twin pregnancy

In screen positive cases to DC twins(RR≥1/150):

- CVS is contraversial,
  - (ISOUG),CVS is preferred because it can be performed earlier than can amniocentesis
  - Earlier diagnosis is important because lower risk of selective termination in the first T compared with the second trimester (7% risk of loss of the entire pregnancy and 14% risk of delivery before 32 weeks

Invasive prenatal diagnosis in twin pregnancy

- **(RCOG) because of cross-contamination of chorionic tissue and rate of fetal loss 2-4% higher than amniocentesis(1-4%) CVS should be limited to high risk cases and performed by expertise**

- **CVS in monochorionic pregnancy will sample only the single placenta**

Invasive prenatal diagnosis in twin pregnancy

- **During amniocentesis in monochorionic twins, if monochorionicity has been confirmed before 14 weeks' gestation and the fetuses appear concordant for growth and anatomy, it is acceptable to sample only one amniotic sac**

- **Otherwise, both amniotic sacs should be sampled because of the possibility of rare discordant chromosomal anomalies in monochorionic pregnancy**

Invasive prenatal diagnosis in twin pregnancy

- **Discordance for most of the common aneuploidies (trisomies 13, 18 and 21, Turner syndrom and triploidy) has been reported in monochorionic twin pairs**

- **selective reduction by umbilical cord occlusion can be offered from 16 weeks, with a survival rate of more than 80% for the healthy**

16 week- Term

Ultrasound screening for structural abnormalities in twin pregnancy

- **Routine second-trimester (anomaly) scan should be performed at around 20 (18–22) weeks' gestation**

- **Cardiac screening assessment should be performed in monochorionic twins**

- **The risk of fetal anomaly is greater in twin compared with singleton pregnancy**
  - **The rate per fetus in dizygotic twins is probably the same as that in singletons, whereas it is two-to-three times higher in monozygotic twins.**
  - **In around 1 in 25 dichorionic, 1 in 15 MCDA and 1 in 6 monoamniotic**

Managing twin pregnancy discordant for fetal anomaly

For conditions carry a high risk of intrauterine demise:

- **Conservative management is preferred in dichorionic twins**
- **Whereas in monochorionic twin intervention to protect the healthy cotwin against the adverse effects of spontaneous demise of the other**

Selective feticide in twin pregnancy

- **In dichorionic twin pregnancy:**
  - **selective feticide is performed by ultrasound-guided intracardiac or intrafunicular injection of potassium chloride or lignocaine preferably in the first trimester**
- **When the diagnosis is made in the second trimester, women might opt for late selective termination** **7% risk of loss of the entire pregnancy, and 14% risk of delivery before 32 weeks)**
- **In monochorionic twins:**
  - **Is performed by cord occlusion, intra fetal laser ablation or radiofrequency ablation**

Routine monitoring dichorionic twin

- **Women with an uncomplicated dichorionic twin pregnancy should have a first-trimester scan, a detailed second-trimester scan, and scans every 4 weeks thereafter**

- **Complicated dichorionic twins should be scanned more frequently, depending on the condition and its severity**

Routine monitoring monochorionic twin

- **Uncomplicated monochorionic twins should have a first-trimester scan and be scanned every 2 weeks after 16 weeks in order to detect TTTS and TAPS in a timely manner**

- **Complicated monochorionic twins should be scanned more frequently, depending on the condition and its severity**

Maternal surveillance and management

- **Screen for hypertension**
- **ASA 80 for women with, first pregnancy.age ≥ 40 y, pregnancy interval ≥ 10 y, BMI ≥35, amiliy history of preeclampsia**
- **Corticosteroids in additional risk of preterm delivery**
- **Cervical length, FN routinely measurement is contraversial**

Screening for risk of preterm birth in twin pregnancy

- **Cervical length measurement is the preferred method of screening for preterm birth in twins; 25mm is the cut-off most commonly used in the second trimesterat 18–24 weeks**

- **In asymptomatic women, a cervical length ≤20mm at 20–24 weeks was the most accurate predictor of preterm birth before 32- 34 weeks**

Complications in twin pregnancy

sFGR
definition

- ***Selective FGR*** **is defined as a condition in which one fetus has EFW<10th centile and the intertwin EFW discordance is>25% (weight of larger twin – weight of smaller twin)×100)/weight of larger twin)**

- **A discordance cut-off of 20% seems acceptable to distinguish pregnancies at increased risk of adverse outcome**

- **10% difference in fetal weight is normal**

causes of FGR

search about causes of FGR

- **Detailed anomaly scan**
- **Screening for viral infections (cytomegalovirus,rubella and toxoplasmosis)**
- **Amniocentesis for exclude chromosomal abnormalities**
- **sFGR in monochorionic twin pregnancy occurs mainly due to unequal sharing of the placental mass and vasculature**

Managing DC twin pregnancy complicated by sFGR

- **EFW discordance between twins is significantly associated with the risk of perinatal loss**
- **This pregnancies can be followed as in singleton pregnancy, by umbilical artery, MCA and DV Doppler, and of biophysical profile scores**
- **Fetal Doppler should be assessed approximately every 2 weeks, depending on the severity**

Managing DC twin pregnancy complicated by sFGR

- **Timing of delivery should be determined based on a risk–benefit assessment and according to the wishes of the parents, guided by obstetric and neonatal counseling**

- **Delivery is usually not recommended before 32–34 weeks**

Managing MC twin pregnancy complicated by sFGR

1. fetal growth should be assessed at least every 2 weeks, and fetal Doppler (umbilical artery and MCA) at least weekly

2. If spontaneous demise is presumed imminent selective feticide by cord occlusion recommended

3. Consider elective preterm delivery at 32 w for cases with discordance >20% and abnormal UA doppler

monochorionic twin pregnancy complicated by sFGR

The classification of sFGR:

- **Type I, the umbilical artery Doppler waveform has positive end-diastolic flow**

- **Type II, there is absent or reversed end-diastolic flow (AREDF)** **It is associated with a high risk of IUD of the growth-restricted twin and neurodevelopmental delay if the other twin survives**

- **Type III, there is a cyclical/intermittent pattern of AREDF** **It is associated with a 10–20% risk of sudden death of the growth-restricted fetus**

Managing the surviving twin after demise of its cotwin

- **Offer counseling and psycological support to patient and family**
- **Administer rhesus prophylaxis if RH –**
- **Give steroid if preterm delivery is consider**

In DC twins

- **Continue fetal surveillance in survivor**

Managing the surviving twin after demise of its cotwin

In MC:

If the pregnancy is at term, then it makes sense to deliver without delay

If it is preterm, prolonging the pregnancy for the benefit of the surviving twin because any neurological harm, has often already happened by the time the death has been diagnosed

- **Assessment of CTG, fetal Doppler, especially MCA-PSV, and looking for signs of fetal anemia should be done in surviving twin**

Managing the surviving twin after demise of its cotwin

- **The result of intrauterine transfusion of an anemic surviving cotwin is unknown**

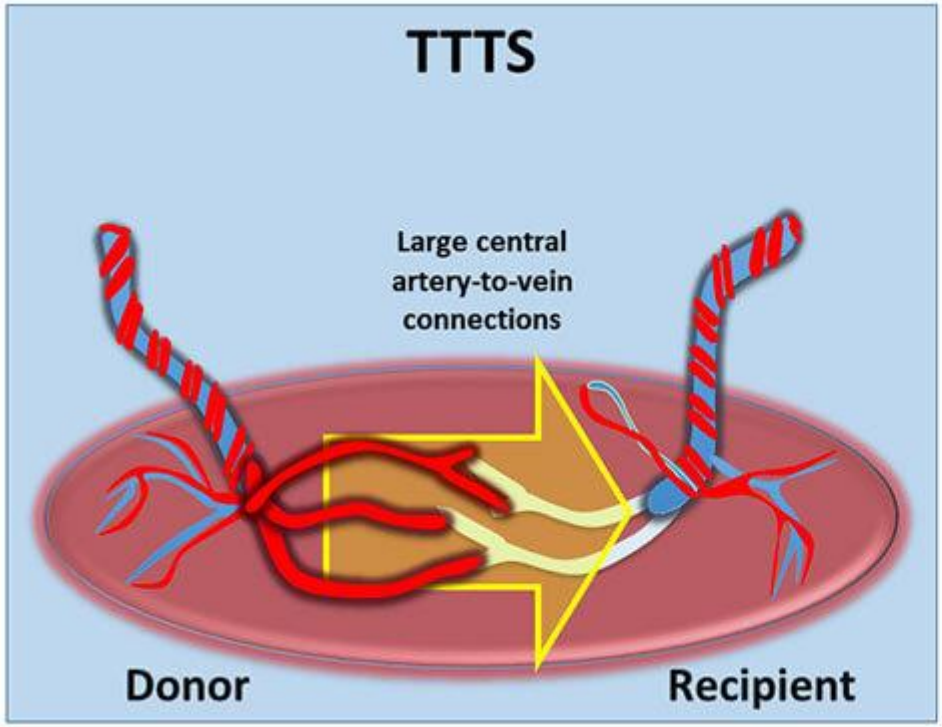
- **Assessment of umbilical and MCA Doppler should be scheduled every 2–4 weeks, and delivery should be considered at 34–36 weeks, after a course of maternal steroids**

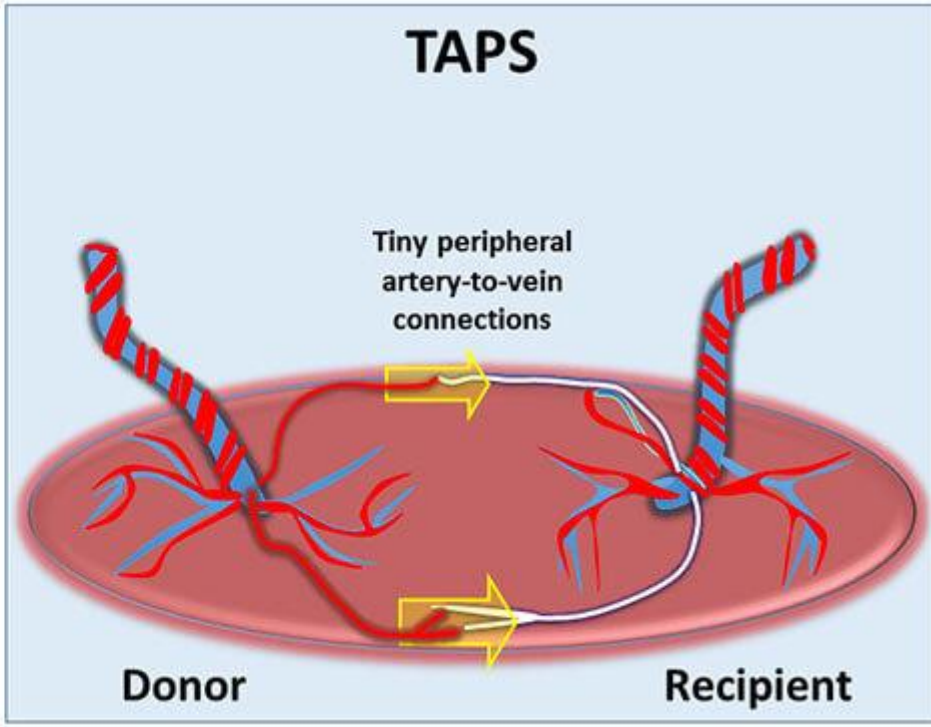
- **The fetal brain should be imaged around 3–6 weeks after the death of the cotwin to search for evidence of cerebral morbidity**

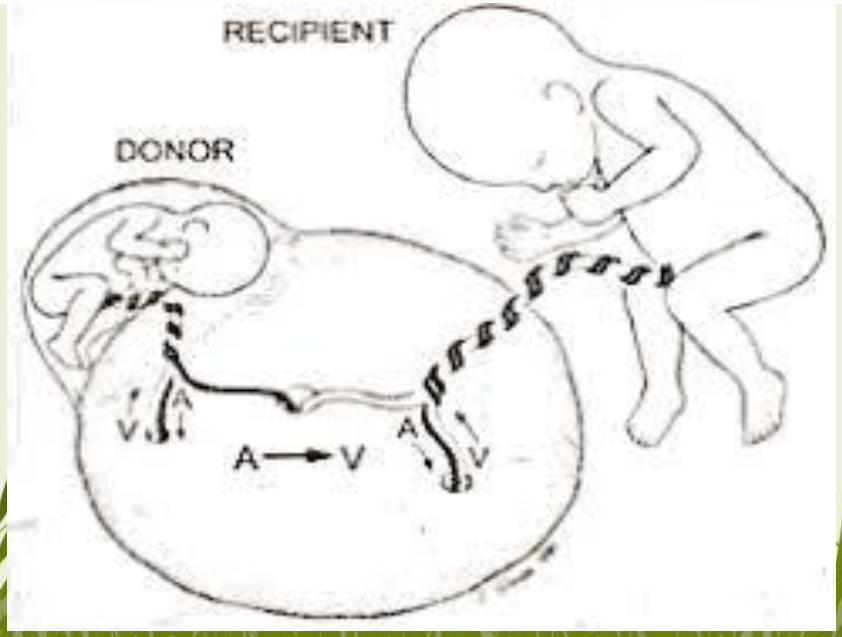
specific serious pregnancy complications in monochorionic multifetal pregnancies

Fetal complications in
Monochorionic twins

- Twin-twin transfusion syndrome (TTTS)
- Twin anemia-polycythemia sequence (TAPS)
- Twin reversed arterial perfusion sequence (TRAP)
- Selective fetal growth restriction
- Single fetal demise
- Monoamniotic pregnancy
- Conjoined twinning


TTTS
Large central artery-to-vein connections
Donor
Recipient


TAPS
Tiny peripheral artery-to-vein connections
Donor
Recipient


RECIPIENT
DONOR
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TTTS

DIAGNOSIS:

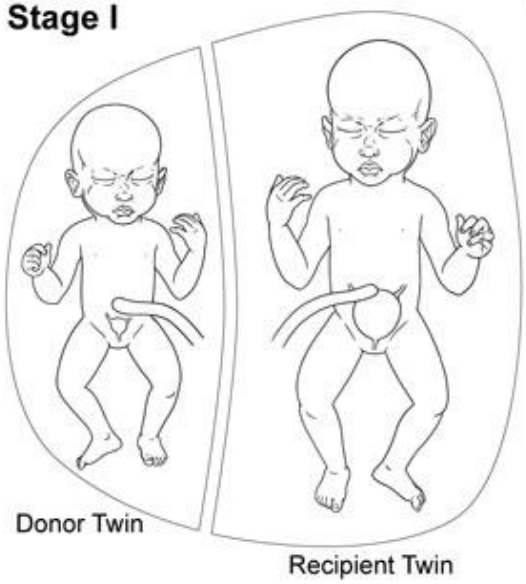
- **Presents in mid pregnancy**

- **Polyhydramnios/oligohydramnios sequence**
  - **Before 20 weeks of gestation, the maximum vertical pockets for oligohydramnios and polyhydramnios are <2 cm and >8 cm, respectively**
  - **After 20 weeks, the maximum vertical pocket for polyhydramnios is defined as >10 cm**

Quintero staging system

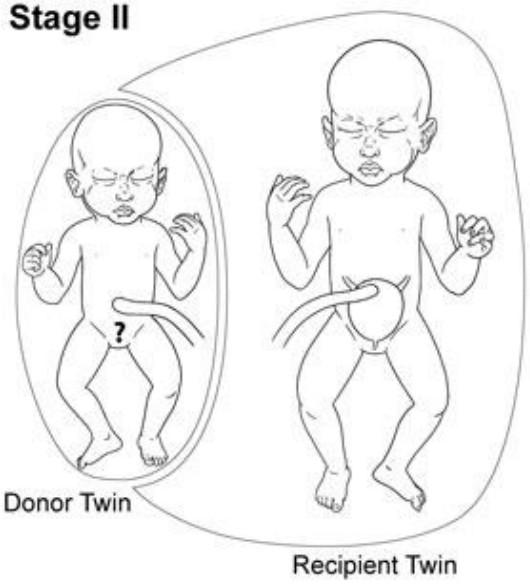
- **stageI, Polyhydramnios–oligohydramnios sequence**
- **stageII ,Bladder in donor twin not visible on ultrasound**
- **stageIII, Absent or reversed umbilical artery diastolic flow, reversed ductus venosus a-wave flow, pulsatile umbilical venous flow in either twin**
- **stageIV, Hydrops in one or both twins**
- **stageV, Death of one or both twins**

Stage I



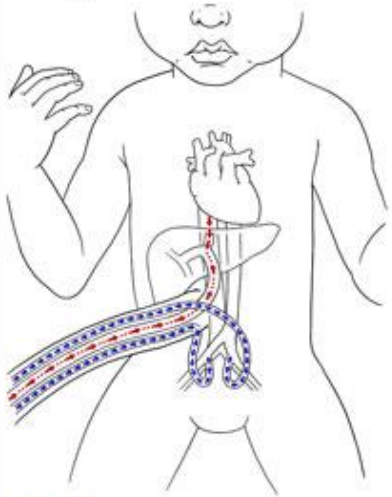
Imbalanced distribution of amniotic fluid with the donor twin sharing less than the recipient.

Stage II



Similar to stage I, but the bladder of the donor twin is not visible with doppler.

Stage III



Absent or reversed umbilical artery flow

Reversd ductus venosus flow

Pulsatile umbilical vein flow

Stage IV

One or both twins presents with fetal hydrops.

ultrasound examination every two weeks

16W

- **assess AFI**
- **Visualization of fetal bladders**

18 weeks

- **AFI**
- **visualization of the fetal bladder**
- **anatomical survey**
- **Doppler studies of umbilical artery, ductus venosus, MCA**

Every 2weeks

- **assess AFI**
- **Visualization of fetal bladders**
- **complete assessment that includes assessment of fetal growth (serially every four weeks**
- **placental findings suggestive of spontaneous TAPS (discordant placental echogenicity**

Management

- **Women with debilitating symptoms or short cervical length or Qs ≥ 2 at 16 to 26 weeks of gestation Fetoscopic laser ablation of placental anastomosis**
- **Amnioreduction**
- **Fetal reduction**

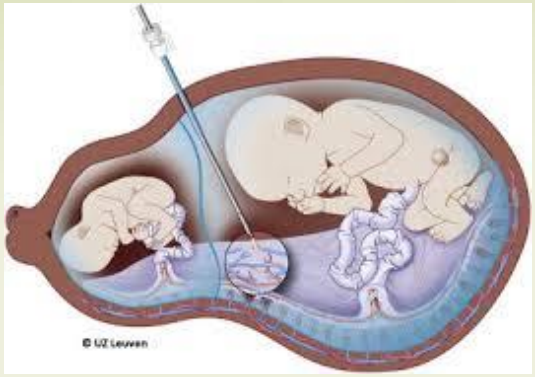
No pregnancy treated with laser ablation progressed to a more advanced Quintero stage,

whereas 30 percent of pregnancies treated with amnioreduction progressed

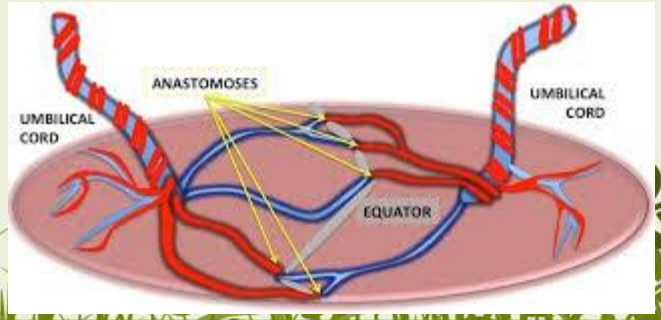
FETOSCOPIC LASER ABLATION OF ANASTOMOTIC VESSELS

- **Fetoscopic laser ablation is a procedure in which a laser is inserted through a fetoscope and used to ablate superficial blood vessels on the surface of the placenta that cross the inter-twin membrane. Although anastomoses exist deep in the placenta, their afferent and efferent branches are superficial**

- A site for entry into the recipient sac is selected at 90 degrees to the equator

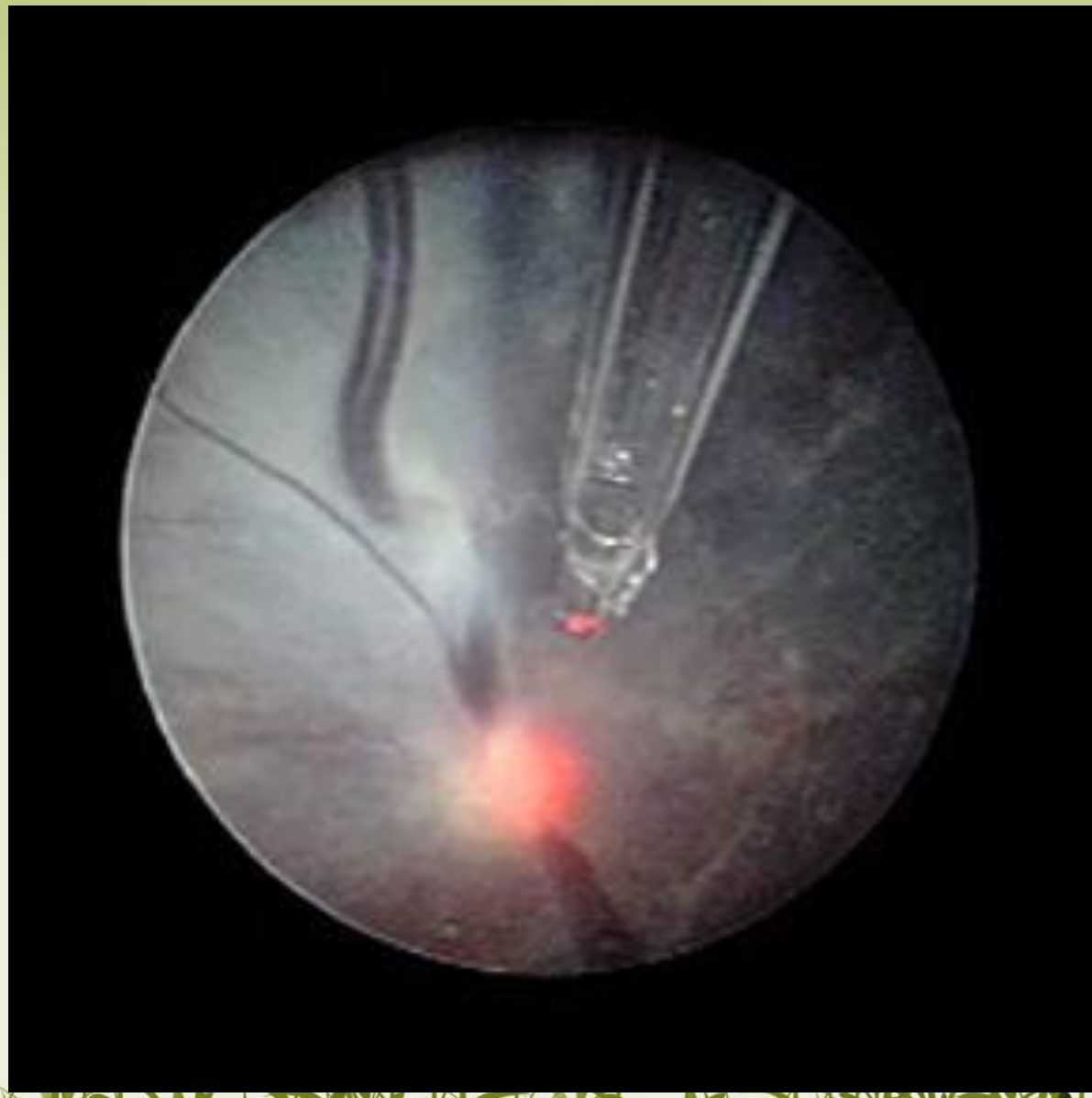


- Identify the vascular equator and map the anastomoses



Technique:

- **sequential selective laser photocoagulation(AV-VA-AA-VV)**
- **selective ablation**
- **equatorial dichorionization**



Women with debilitating symptoms or Qs ≥ 2 in >26 w

- **Amnioreduction** (no more than 3 liters):
  - Reduced uterine overdistention
  - Relieve maternal symptoms
  - Reduced preterm labor
  - Reduced PPROM
  - Decreases pressure inside the amniotic cavity and may thus improve uteroplacental perfusion
- **Selection reduction**
  - Bipolar cord coagulation (in donor twin after amnioinfusion can be useful)
  - Laser cord coagulation
  - Radiofrequency ablation [RFA] is preferred technique because the smaller device reduces maternal morbidity

- If conservative management chosen for stage I, worsening polyhydramnios,maternal discomfort and shortening of the cervical length are considered ‘rescue’ criteria signalling need to proceed with fetoscopic laser treatment
- Another option is selective termination of pregnancy using bipolar, diathermy, laser coagulation or RFA of one of the umbilical cords
- Rarely, parents may opt for termination of the entire pregnancy.
- Following laser treatment, the recurrence rate of TTTS is up to 14%

Follow-up and optimal gestational age for delivery in twin pregnancy with TTTS

- **weekly ultrasound assessment for the first 2 weeks after treatment then weekly**
- **In case of demise of one fetus (post-laser), brain imaging of the surviving cotwin should be considered 4–6 weeks later, and neurodevelopmental assessment**
- **should take place at 2 years of age treatment should result in normalization of amniotic fluid by 14 days. Cardiac dysfunction generally normalizes in the recipient within 1 month**

- **8% of all twins, both recipients and donors, will have pulmonary artery stenosis at the age of 10 years**
- **4%of survivors suffer antenatal brain damage**
- **7% of the children had major neurological abnormalities**
- **Amputation secondary to thrombi or amniotic bands**

- **delivery at 34 weeks of gestation for persisting abnormalities and up to 37 weeks where there is complete resolution**

TAPS

Twin anemia-polycythemia sequence (TAPS)

Prenatal diagnosis :

- (**MCA-PSV) is >1.5 (MoM) in one twin and <0.8 MoM in the other twin**
- **There may also be growth discordancy**
- **Placental discordance**

- The postnatal diagnosis of TAPS is made based on the finding of difference in hemoglobin concentration between the twins of more than 8 g/dL

Diagnosis

- **Placental discordance**

Classification — Severity of TAPS

- Stage 1 – MCA-PSV >1.5 MoM in D and <1.0 MoM in the R
- Stage 2 – MCA-PSV >1.7 MoM in Dand <0.8 MoM in the R
- Stage 3 – Stage 1 or 2 plus cardiac compromise: critically abnormal Doppler findings
- Stage 4 – Hydrops of donor
- Stage 5 – Demise of one or both fetuses

Treatment

- Expectant management in S1
- Treatment perform for stage 2 and more:
  - laser therapy
  - Utero fetal transfusion
  - Selective feticide
  - Early delivery

TRAP

Twin reversed arterial perfusion sequence (TRAP)

- **TRAP refers perfusion blood via arterial anastomoses from D to R**

- **The recipient twin usually has a poorly developed heart ("acardiac twin"), upper body, and head. The pump twin is at risk of heart failure and problems related to preterm birth**

- **INCIDENCE: about 1 %MC**

Diagnosis

- **Diagnosed in first trimester as early as 11 weeks when abnormal fetus which has no functional cardiac activity with movement and growth**

- **Doppler study show reversed arterial perfusion through an AA anastomosis**

- **The differential diagnosis:**
  - **Single intrauterine demise**
  - **Anomalous second twin**

OBSTETRICAL MANAGEMENT

Assessment for poor prognosis:

- **An acardiac/pump wieght ratio > 70%**
- **Polyhydramnios**
- **Sign of cardiac fauilure**

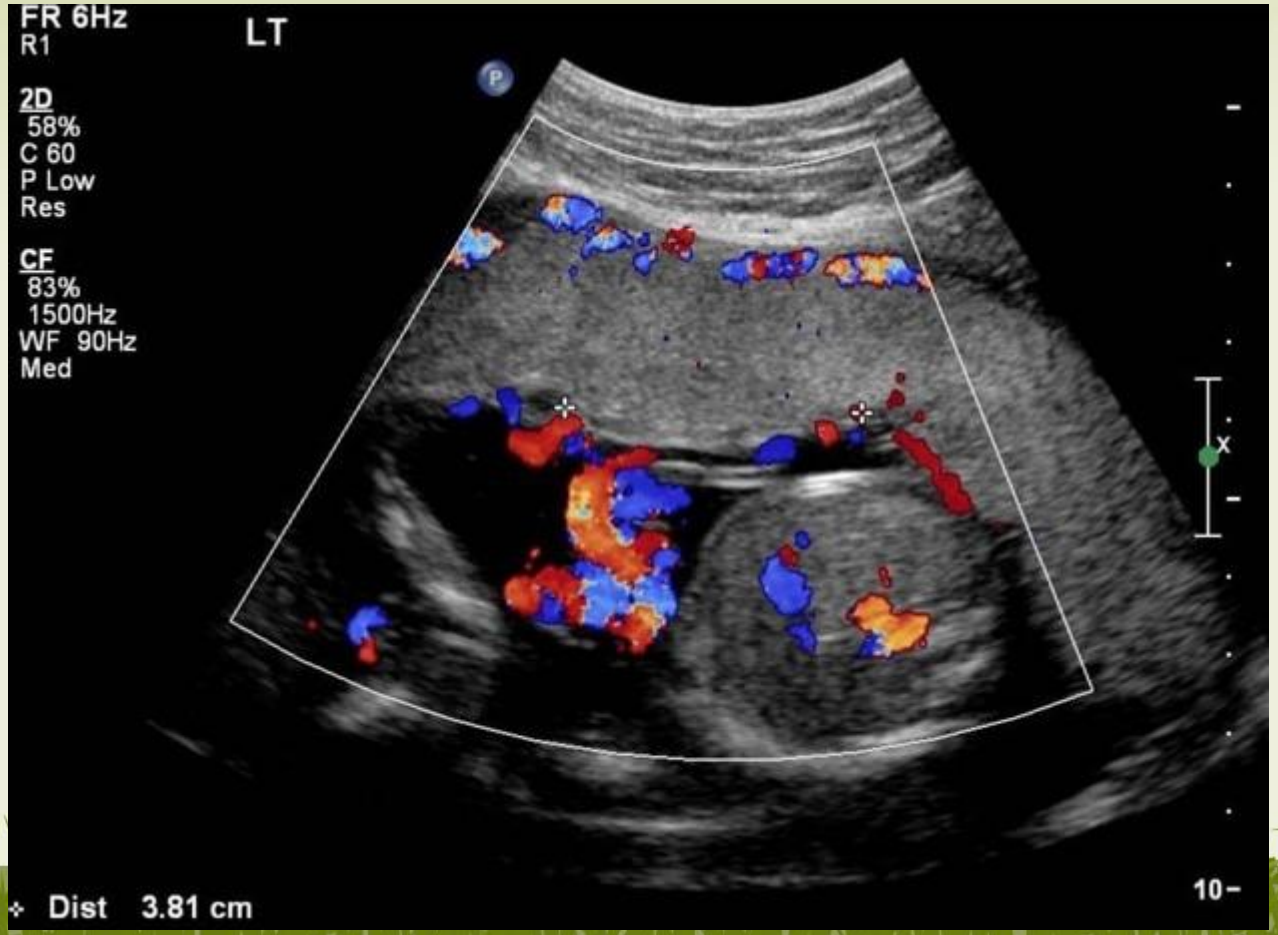
If there is no sign of these, conservative management is recommended

Presence of one or more poor prognosis feature intervention suggested

In utero therapy

- between 18 and 27 w
  - karyotype of the pump twin
  - Occlusion of the umbilical cord of the acardiac twin:
    - laser coagulation(for gestational ages less than 16 w)
    - Radiofrequency ablation (for ≥16 w because of the higher blood flow rate)
    - Bipolar cord coagulation(for fetuses of later gestational age)
- Antenatal corticosteroid between 23 and 34 w

Cord entanglement



Monoamniotic twin pregnancies **Cord entanglement**

- Diagnosis:
  - The two separate umbilical cords typically insert close to one another (within 6 cm of each other) and are located centrally in two-thirds of cases
  - Detected antenataly whene 2 distinct arterial waveform pattern with different HR are observed within the same sampling gate

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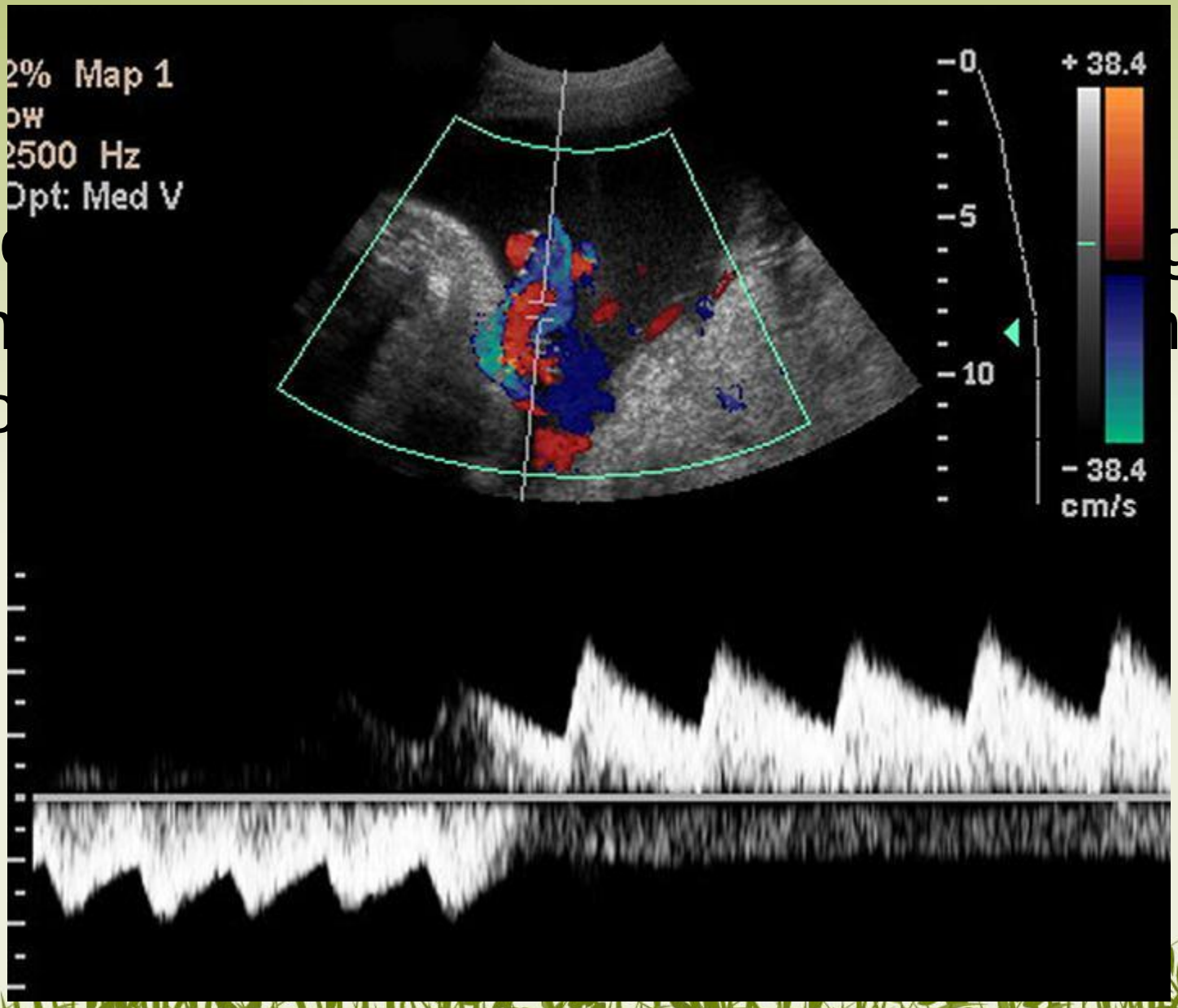

- Loose cord entanglements probably begin in the first trimester, and have the potential to tighten at any time. Intermittent occlusion of umbilical blood vessels may be associated with neurologic morbidity; significant prolonged occlusion can be lethal

conjoined twins

Monoamniotic twin pregnancies conjoined twins

- **Incidence** :1.5 per 100,000 births
- Females are affected more often than males
- Diagnosis: should be suspected in first-trimester when the embryonic/fetal poles are closely associated and do not change in position with respect to each other

Management

- **Color Doppler, fetal echocardiography, and 3D ultrasound , MRI can confirm the diagnosis and clarify anatomy, which is critical for assessing prognosis and pre- and postnatal decision-making**

- **Near-term cesarean delivery after confirming lung maturity to optimize**

- **The abdominal and uterine incisions should be large enough to deliver the twins atraumatically; this will usually require a classical uterine incision**

با تشکر