Twins: chorionicity

ECHO

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General Info

- Multiples account for 3% of all live births in the US but account for 23% of LBW infants

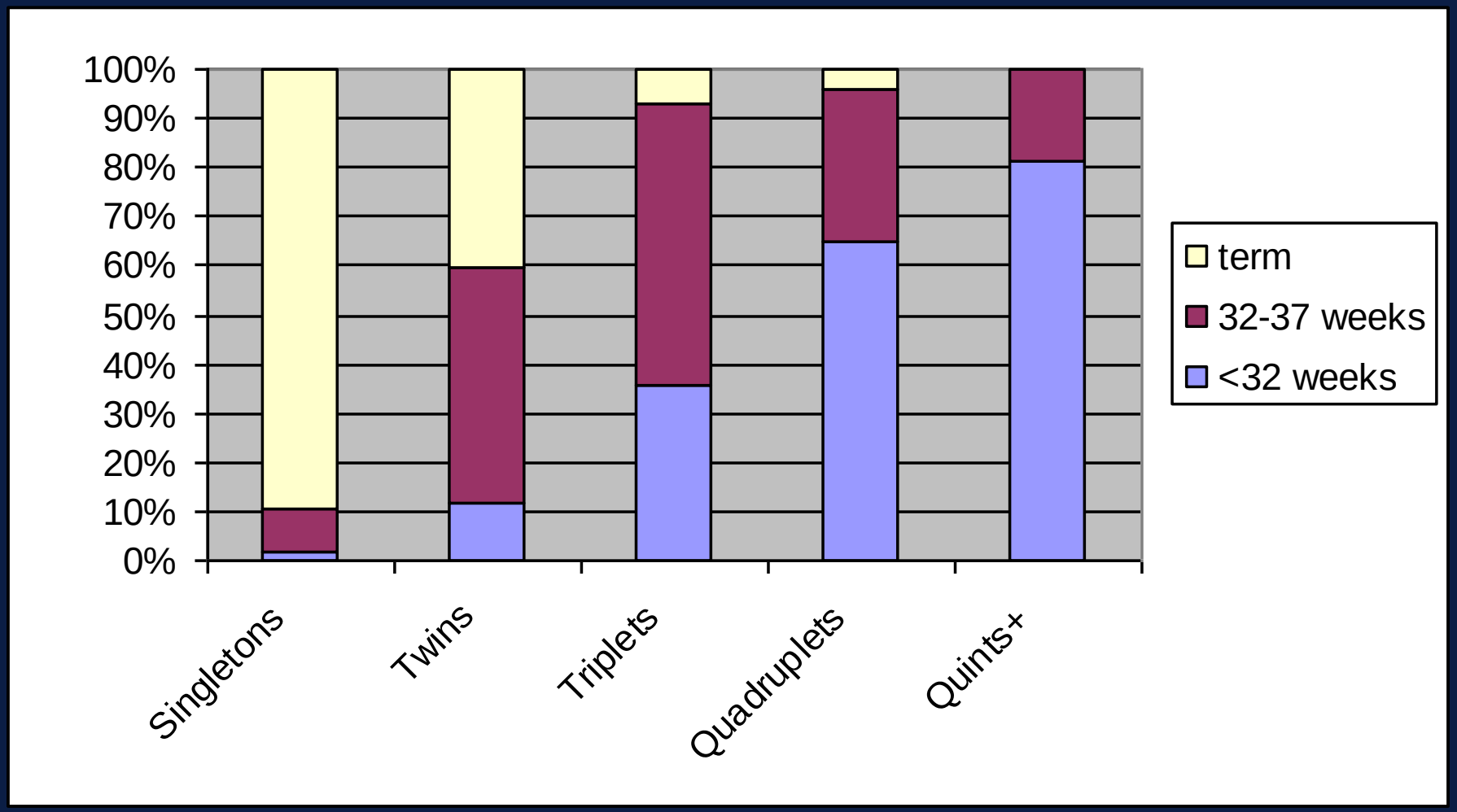
- CDC data 2004:
  - 32.3 twins/1000 births
    - Twin rate up 42% since 1990, 70% since 1980

Multiples - Biology

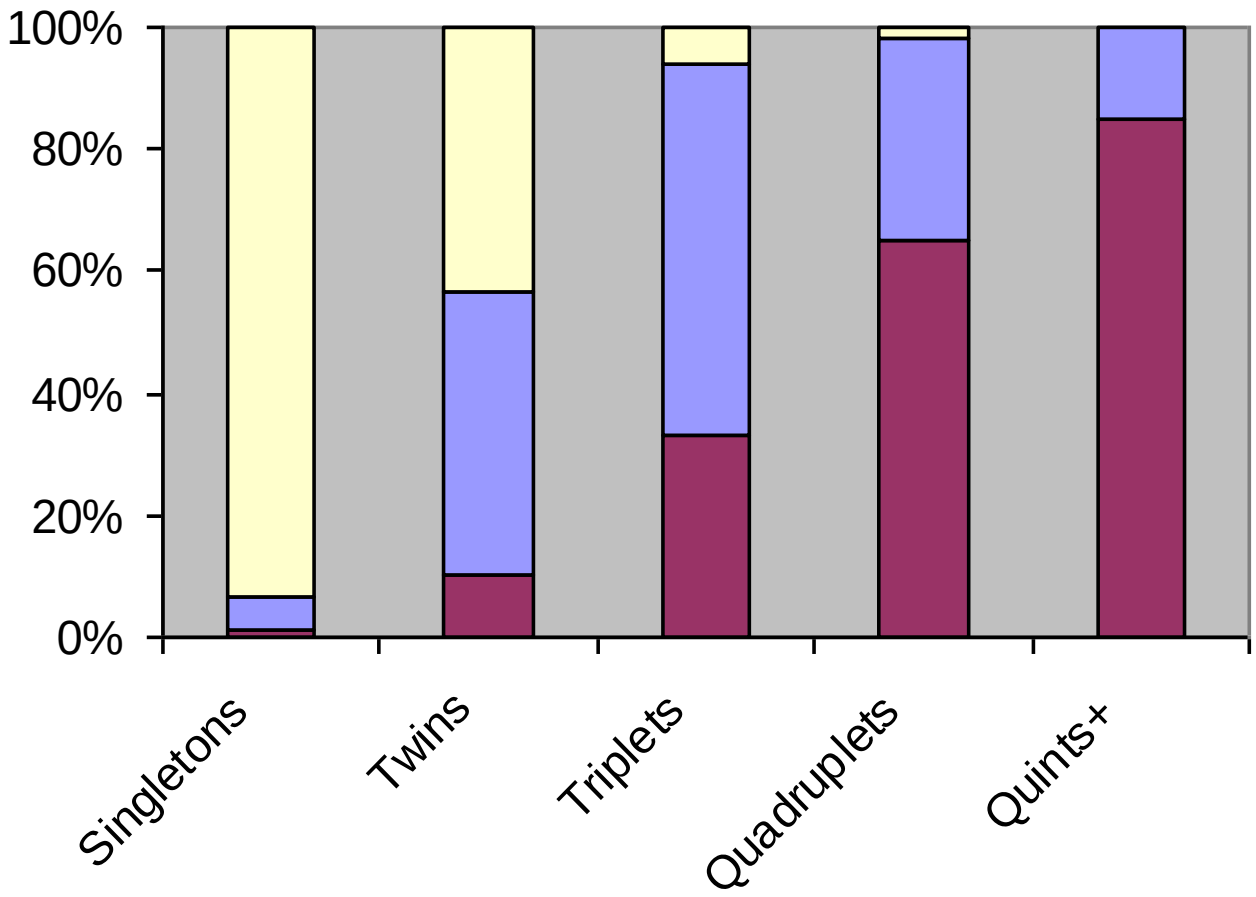
- Monozygotic twinning rate is “remarkably constant” at 3.5-4.0/1,000

- Dizygotic twinning more variable
  - Varying rates in different populations
  - Increases w/maternal age until 35 then drops
  - Familial (?) – Chromosome 3 mutation

Delivery Gestational Age – US Birth Data 2004

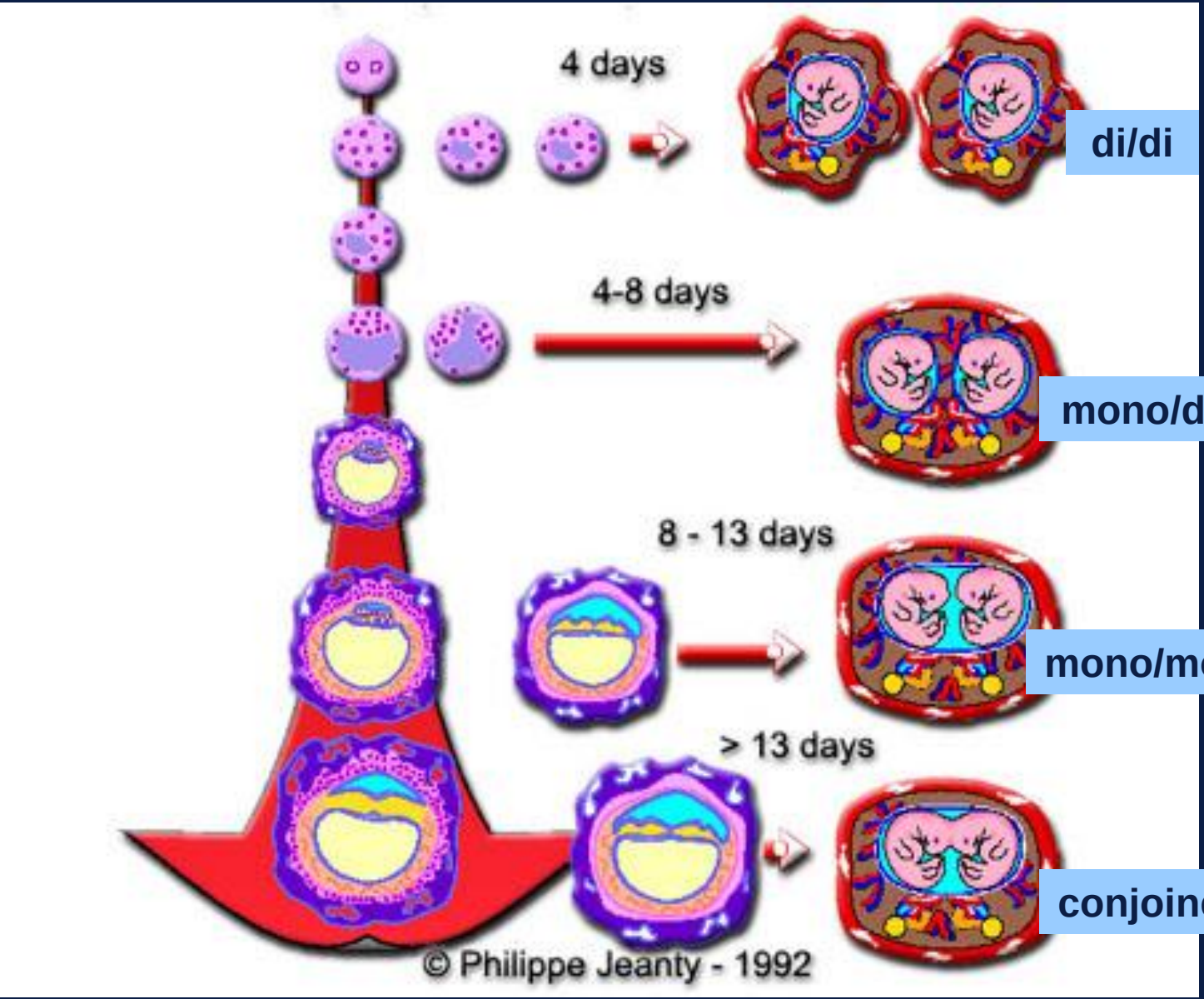


Birthweight – US Birth Data 2004



Early Ultrasound – Determine Chorionicity & Dates

Chorionicity



Twinning & Percentages

di/di

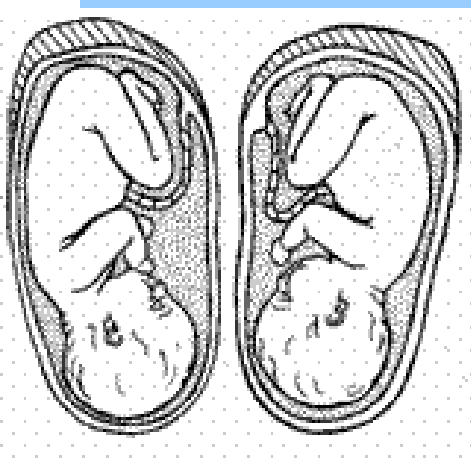


Fig. A
Separate placentas
2 chorions
2 amnions

19% of MZ twins
58% of DZ twins

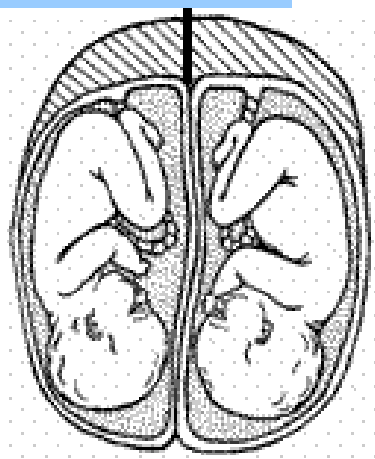


Fig. B
"Fused" placentas
2 chorions
2 amnions

13% of MZ twins
42% of DZ twins

mono/di

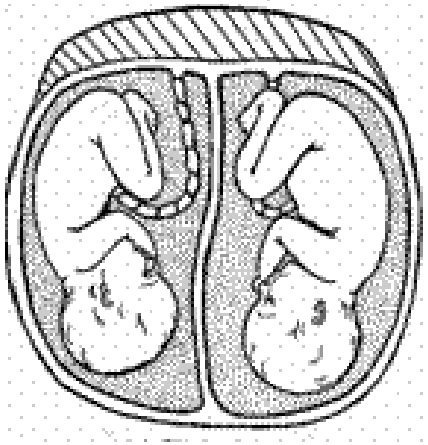


Fig. C
Single placenta
1 chorion
2 amnions

64% of MZ twins

mono/mono

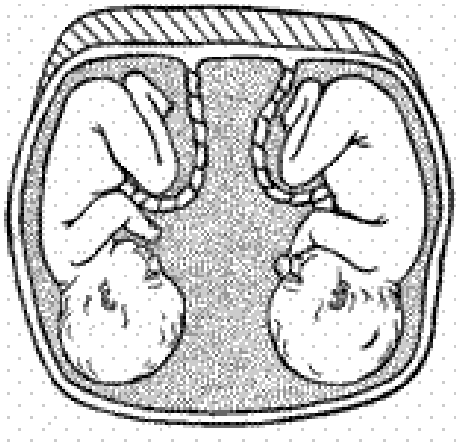


Fig. D
Single placenta
1 chorion
1 amnion

4% of MZ twins

Determining Chorionicity

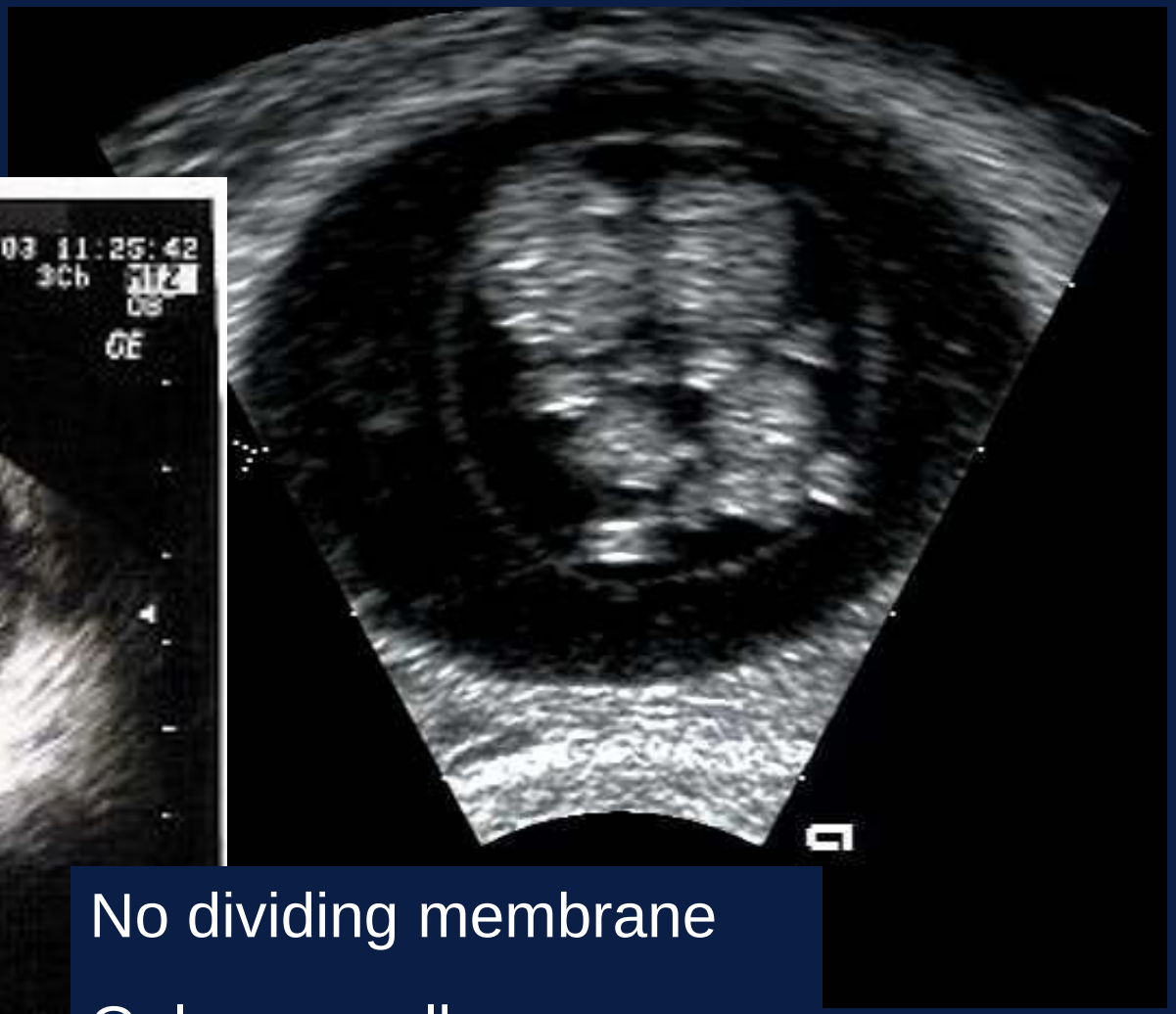
- Dichorionicity confirmed:
  - Different genders
  - Separate placentas
- Dichorionicity likely:
  - Twin peak present
  - Thick membrane (>2mm) between fetuses
- Monochorionicity likely:
  - Same gender + one placenta + thin intervening membrane + absent twin peak

Early ultrasound – di/di twins

Early ultrasound – monochorionic twins

Mono/Mono Twins -

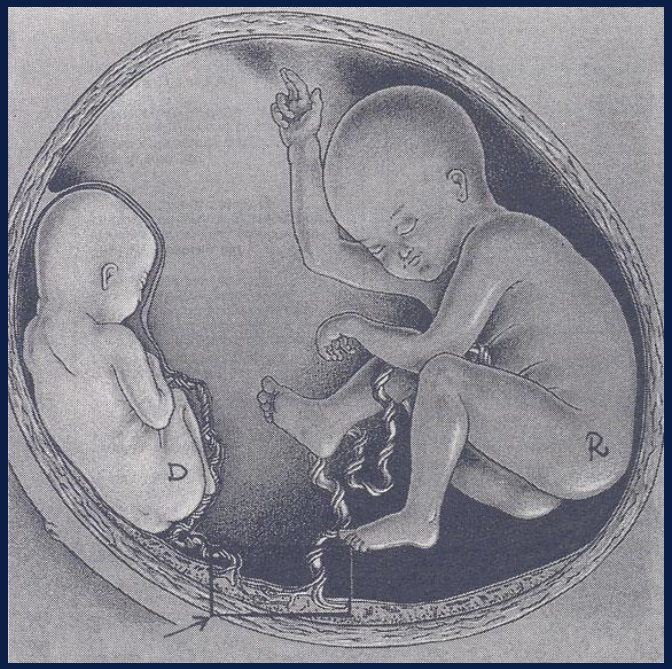
1st Trimester ultrasound



No dividing membrane

Only one yolk sac

Twin-Twin Transfusion Syndrome



Twin-Twin Transfusion Syndrome

- 15% of MC twins
- More accurate term may be “twin oligohydramnios-polyhydramnios sequence”
- AV anastomoses: net transfusion of blood from donor to recipient
  - However - these vessels are seen in up to 70% of all monochorionic twins

Twin-Twin Transfusion Syndrome

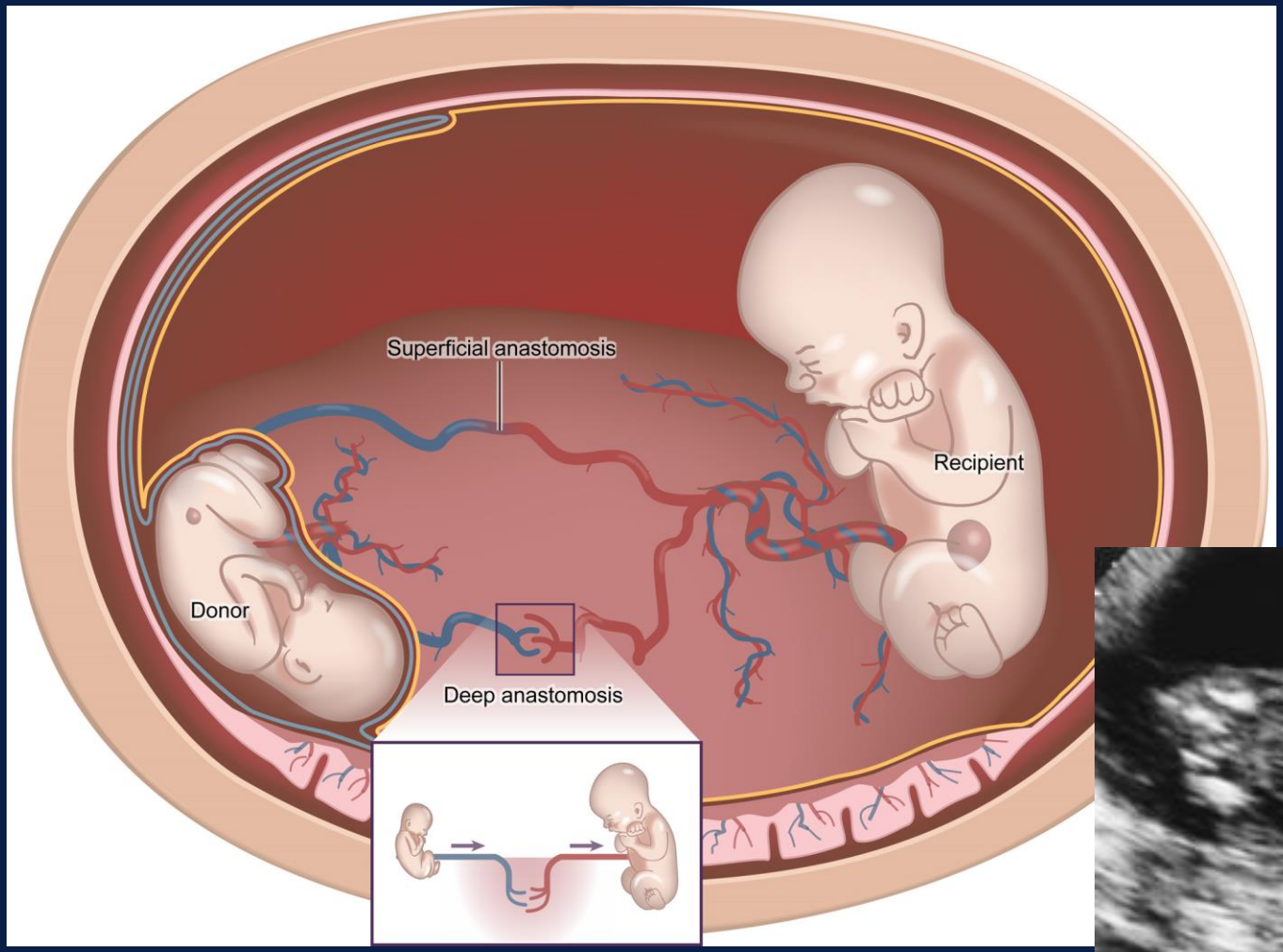
Diagnostic Criteria

1) Presence of a single placenta
2) Gender concordance
3) Growth discordance >20%
4) Amniotic fluid discrepancy between fetuses
   - usually deepest pocket of amniotic fluid is <2 in donor and >8 in recipient
5) Discrepancy in size of umbilical cords
6) Presence of hydrops or cardiac dysfunction
7) Abnormal cord dopplers ratio in donor fetus

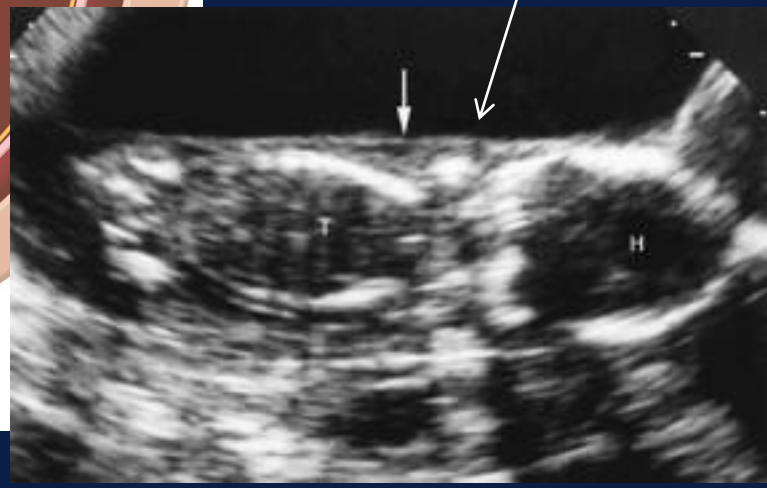
**** not all criteria need to be met****

**** none of these criteria are specific to TTTS****

Twin-Twin Transfusion Syndrome
Ultrasound Findings



Stuck twin – near anhydramnios, note membrane wrapping around baby like ‘saran wrap’



Twin-Twin Transfusion Syndrome

Donor and Recipient Effects

- ***Donor:*** hypoperfused, IUGR, oligo, "stuck" twin, anemic
- ***Recipient:*** hyperperfused, hypertensive, increased atrial and brain natriuretic peptides in attempt to handle large volume overload → polyhydramnios
  - Fetal echo: ventricular hypertrophy, tricuspid regurg, cardiac failure/hydrops
- Polyhydramnios exacerbates hypoperfusion of donor fetus by compressive effects

Twin-Twin Transfusion Syndrome

Scoring of Severity

Stage I: donor bladder visible, fetal doppler values wnl

Stage II: donor bladder no longer visible, fetal doppler values wnl

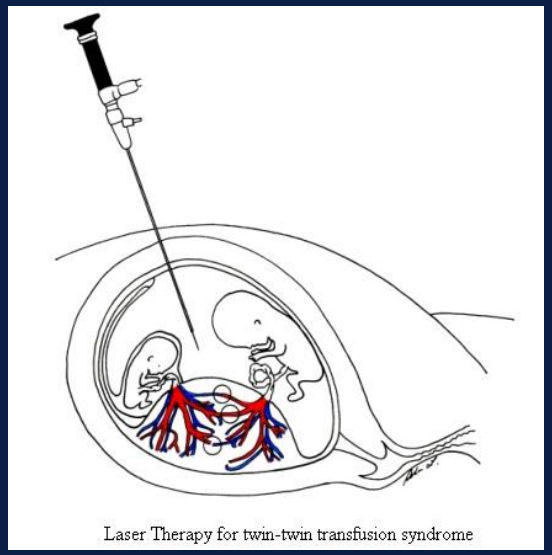
Stage III: donor bladder no longer visible, fetal doppler values critically abnomral

Stage IV: presence of hydrops

Stage V: IUFD of one or both fetuses

Twin-Twin Transfusion Syndrome

Treatment Options


Laser Therapy for twin-twin transfusion syndrome

1) Serial amniocentesis

2) Amniotic septostomy

3) Selective laser coagulation of placental anastamoses

4) others…

Monoamniotic Twins

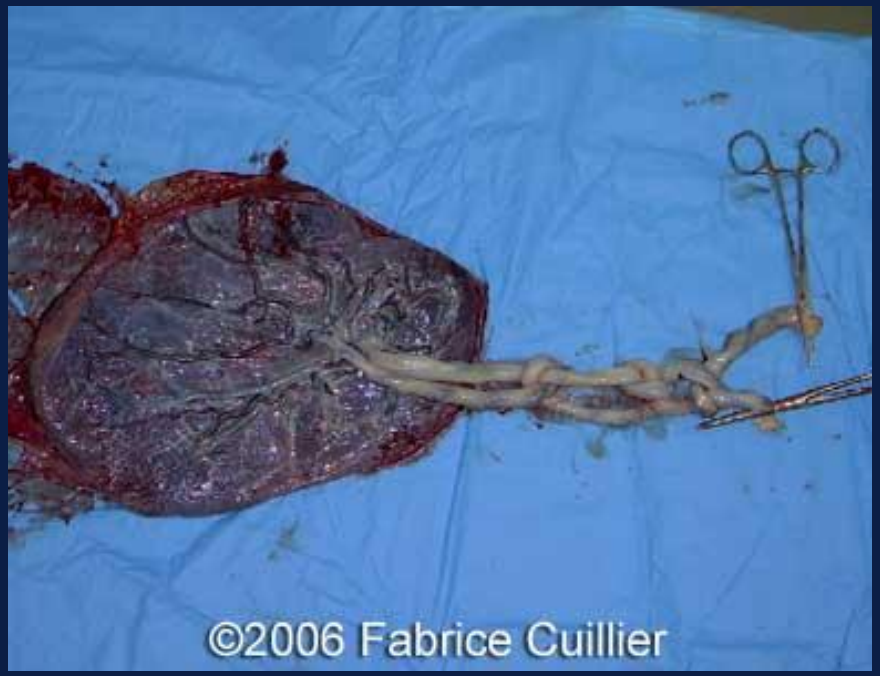
Mono/Mono Twins -
Risks & special considerations

- 54% PMR ‘90 → more recent: 10-20% mortality
  - Better/earlier ultrasounds, better understanding of importance of establishing chorionicity, thus increased detection and therefore surveillance

- Only intervention to reduce cord accidents is prostaglandin inhibitor sulindac → decreased AFI, stabilizes fetal lie
  - Considered experimental

Mono/Mono Twins -

Cord Entanglement



-70-100% of M/M twins

-Dx as early as 10 weeks

Management of Mono/Mono twins

- Daily NST from 24-26 weeks… if increased variables → consider continuous EFM
  - Some centers monitor continuously
- Most cord accidents <32 weeks
  - ? After 32 wks, less movement due to space constraints and lower chance of cord accidents
- Nonetheless, it is reasonable to deliver @ 32-34 weeks, after corticosteroids

Conjoined Twins

- 1/50,000 births
- Sonographic signs:
  - “bifid” appearance of fetal pole, >3 umbilical vessels
  - Definitive dx should not be made <10 weeks

Retained Fetal Demise - Risk of Neurologic Morbidity

- Serious morbidity to survival is 10-25%
  - 12% multicystic encephalomalacia
  - 10% CP rate
- Neurologic morbidity after co-twin demise as early as 18 wks
- Injury likely occurs due to hypotenion at the time of demise of the co-twin; is likely **instantaneous**
  - Injury is not detectable by ultrasound or EFM
- Modern literature does not support a high risk of maternal DIC

Detecting Anomalies

- DZ: each fetus has independent risk of aneuploidy
- MZ: increased risk of aneuploidy; ***may not be concordant***
  - postzygotic nondisjunction
- Risk of one baby having Tri 21:
  - age 28 with triplets = 33 with twins = 35 with singleton (~1/200)
  - Offer testing to women @ younger ages – relative "AMA"
- Amnios: each fetus should be individually karyotyped even MZ

First Trimester Screening

- First trimester screening:
  - Serum marker levels not well established
  - NT more routinely used
  - Important when considering multifetal reduction
- Increased NT at 10-14 weeks may also be associated with future development of TTTS

Twins and PTL

- High NPV – if CL long, risk of PTB is low
- NO apparent benefit to cerclage for CL <2.5cm
- Short CL in singleton not the same as in twins
- Consider cerclage only for twins who has clear PRIOR HISTORY of cervical insufficiency
- Progeserone: No benefit (MFMU RCT:
  - PTB rate <35 wks: 42% (17P), 37% (placebo)

Pre-Eclampsia in Twins

- ~20% of twins
- ART: higher than spontaneous conception
- Compared to PreE in singletons:
  - Earlier
  - More severe
  - Often atypical
    - May not have HTN, edema, proteinuria… but instead have HELLP

Placentation

- Vasa Previa
- Velamentous Cord Insertion
  - 6-9x higher rate in twins vs. singleton, rate even higher with triplets+

Retained Fetal Demise

- 1st trimester "vanishing twin" – 21% of twin pregnancies, no effect on remaining fetus
  - May see fetus papyrcus @ time of delivery
- IUFD in 2nd & 3rd trimester less common
  - 2-5% of twins
  - 14-17% of triplets
- After 2nd/3rd trimester IUFD, the risk of significant neuro morbidity increased in monochorionic but not dichorionic gestation

Twin Management

- Literature not great.
- Limited prospective studies.
- Almost no randomized trials.
- Management depends on (a) how you were trained and (b) the practice ‘standard’ where you work

Overview - Managing Twins

- Early ultrasound – establish chorionicity & dates
- Targeted “level II” anatomy scan at 18-20 weeks
- Serial ultrasounds
  - Di/di – q 3-4 wks
  - Mono/di, mono/mono – q 3-4 wks for growth, limited us q 2 wks until 32 wks for TTTS surveillance
- Antenatal testing
  - Di/di – once or twice weekly NST/AFI starting 32-34 weeks
  - Mono/di – twice weekly NST/AFI start @ 32 weeks
  - Mono/mono – NICU consult, admit at ‘viability’ 24-26 weeks, ? CEFM
- Maternal screening & recommendations:
  - Consider early glucola, if wnl repeat at 26-28 wks
  - Add iron supplementation @ 20-24 weeks

Monitoring Growth

- Twins follow singleton growth curve until 30-32 weeks, then AC begins to lag behind singletons
- Calculate twins growth discrepancy:
  - (Larger twin EFW – smaller twin EFW) divided by larger twin EFW
- Growth discordance >20-25% associated with 6.5x increased risk of IUFD vs. non-discordant twins
  - ‘cutoff’ for discrepant growth is 20% in some literature, 30% in other literature
  - Overall perinatal death rate of 9.7%

Antenatal Testing - YES

- Should definitely monitor with NST if:
  - Growth discordance
  - Significant growth restriction in either fetus
  - Oligo
  - Decreased fetal movement
  - Maternal medical complications

Delivery

- Rate of IUFD in multiples at 39 weeks > rate of IUFD in singleton at 42 weeks
- 40-45% are vertex/vertex
  - VD okay regardless of GA/EFW
- Some studies suggest delay between delivery is associated with acidotic cord pH
  - Delay 0-15 minutes: no effect
  - Delay 16-30 minutes: 6% have pH<7.0
  - Delay >30 minutes: 27% have pH<7.0

Delivery timing

- Nadir of perinatal mortality - twins: 38 weeks
- Fetal & neonatal morbidity & mortality increase >37 weeks for twins
- No prospective studies examining impact of elective deliveries @ these GA & outcomes
- ACOG: if AGA with normal AFV and reassuring antepartum testing in the absence of maternal complications (pre-eclampsia, diabetes), pregnancy may be continued.

Delivery Mode

- ~40% of twins are vtx/transv, ~40% are vtx/br
- 5%-10% risk of 2nd twin del by c/s after first vag…
  - Higher risk w/prolonged interdelivery time & if 2nd non vtx
- Liberal c/s for non-vtx 2nd twin: no improved outcome
  - ? Cutoff of minimum 1500g – not very much data

Options:

1) ECV after delivery of "A" – 70% successful
2) Breech extraction: 95% successful