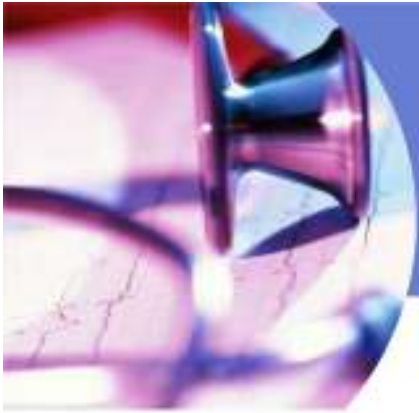


An Approach to TTTS in South Africa

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Introduction

- **TTTS occurs in 10 to 15% of monochorionic pregnancies**
- **Diagnosis based on poly/oligohydramnios and not weight discrepancy**
- **Important to understand the architecture of monochorionic placentas**

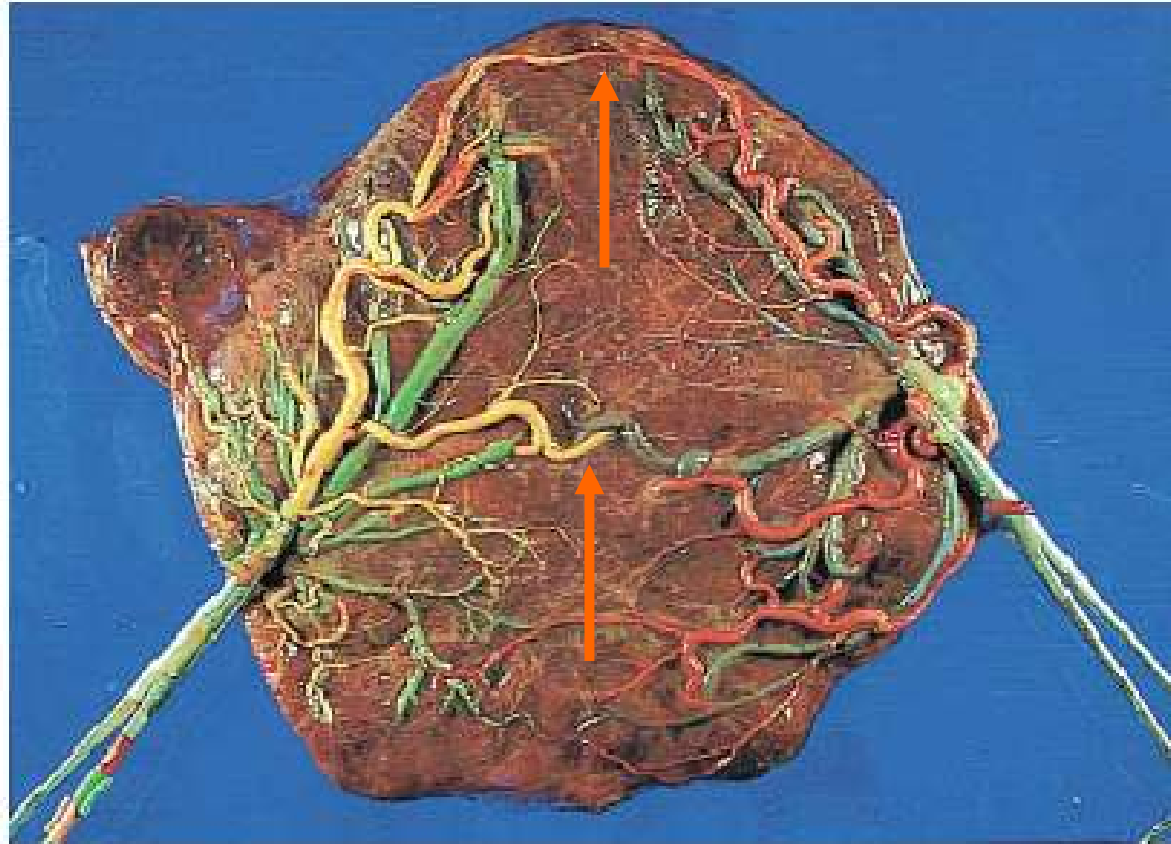


Fig 1. Postnatal injection in monochorionic twin placenta. *Blue dye* representing vein from one twin and *yellow arterial dye* from other twin meet in center to indicate arteriovenous anastomosis. A superficial arterioarterial anastomosis is also present at *top* of figure (indicated by mixing of arterial dyes [*yellow and red*] within one vessel).

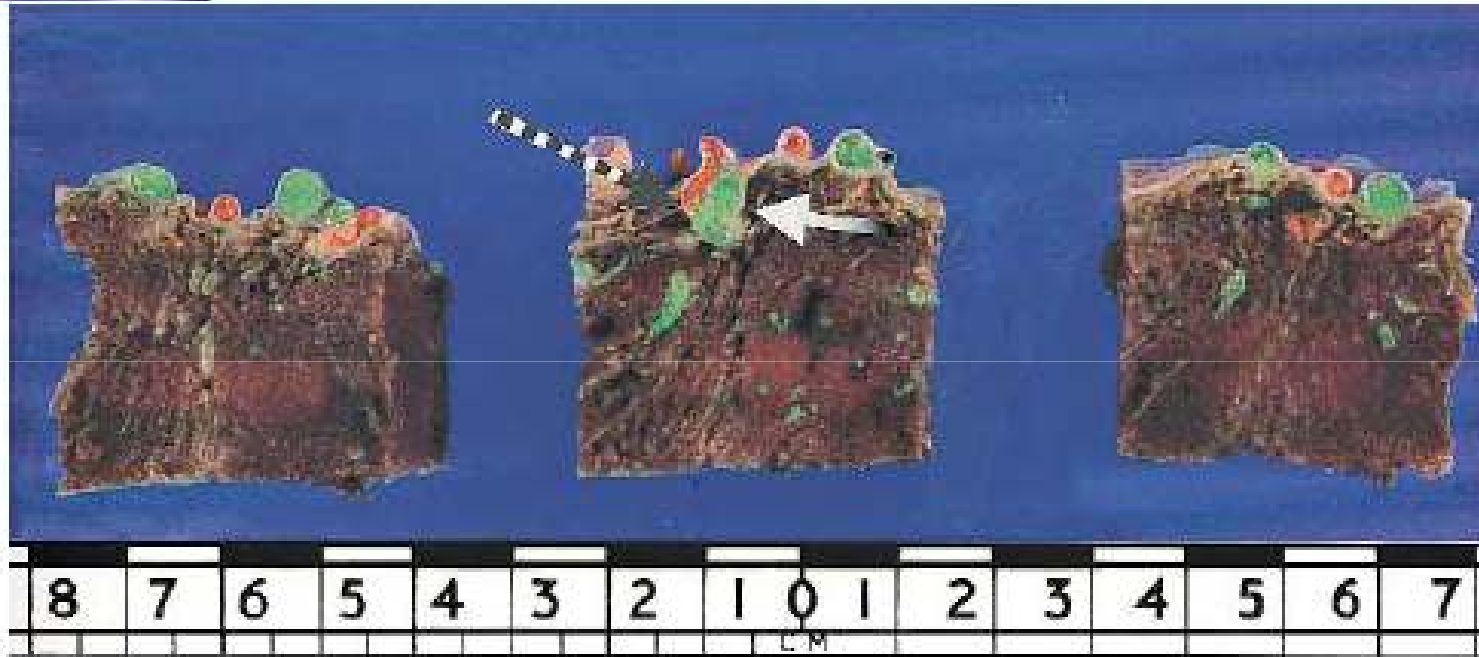
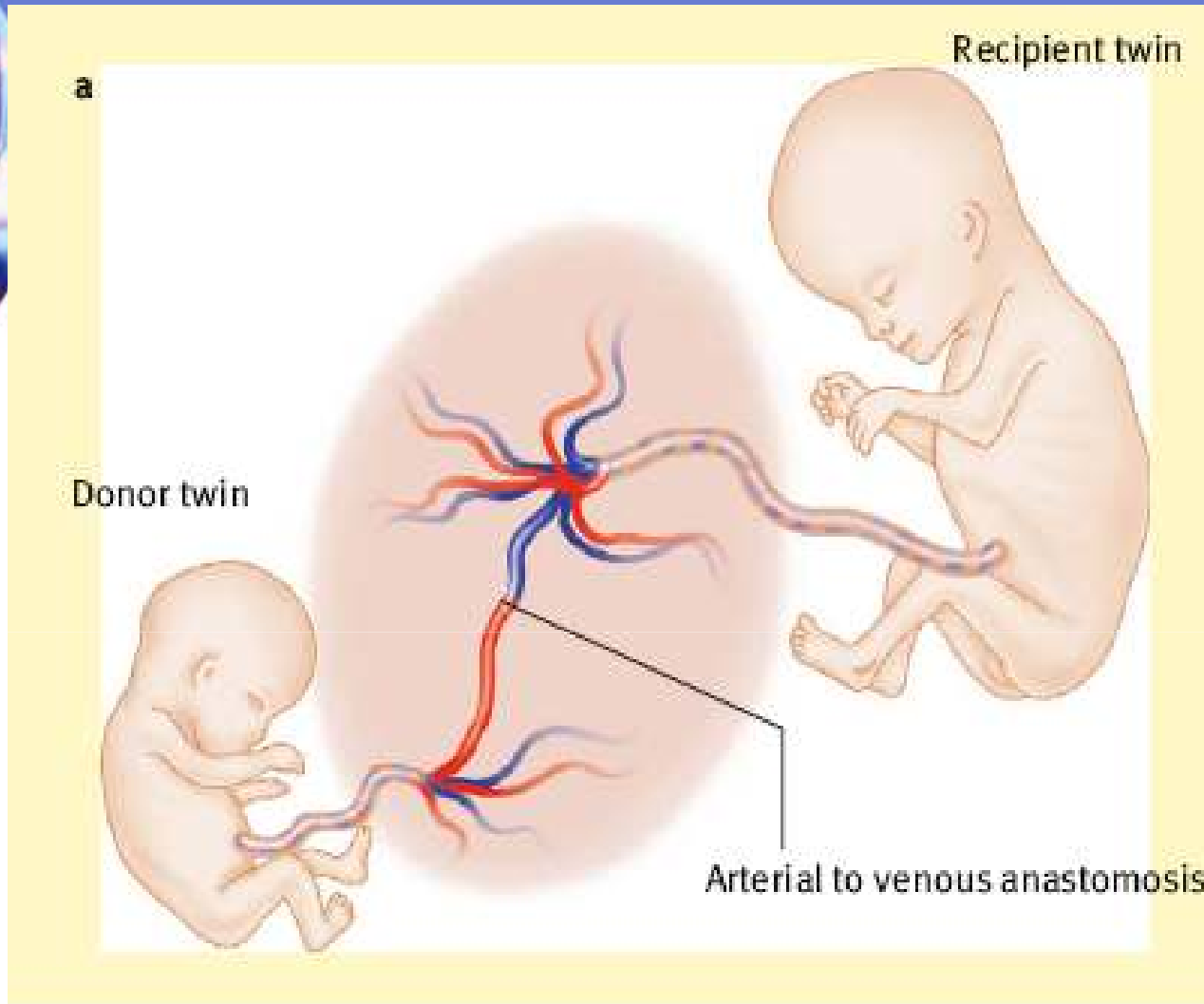
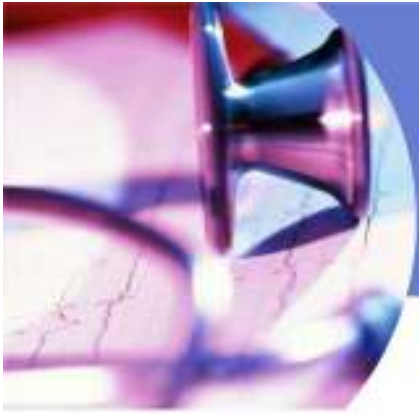


Fig 2. Slicing through 3 deep arteriovenous anastomoses indicating mixing of *red arterial dye* (*dashed arrow*) from one twin with *green venous dye* (*white arrow*) from other.

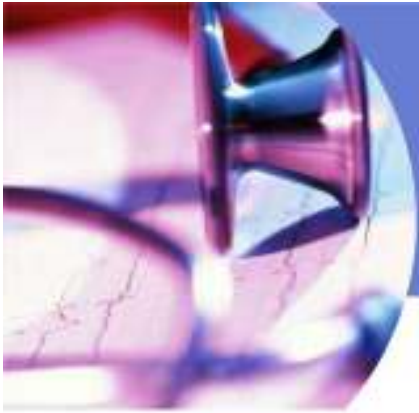


Gibson J, Cameron A Paediatrics and Child Health 2008



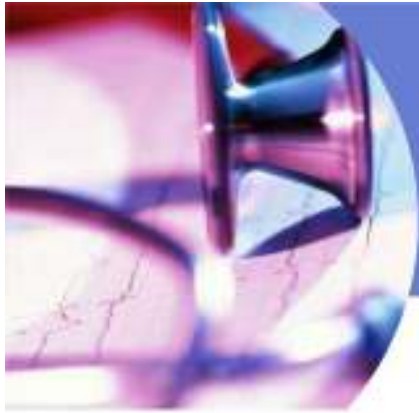
Cardiovascular response

- Donor is hypovoleamic
- Increased vasopressin in the donor which leads to oliguria
- The atria of the recipient is stretched which leads to increased secretion of ANP and BNP leading to poliuria



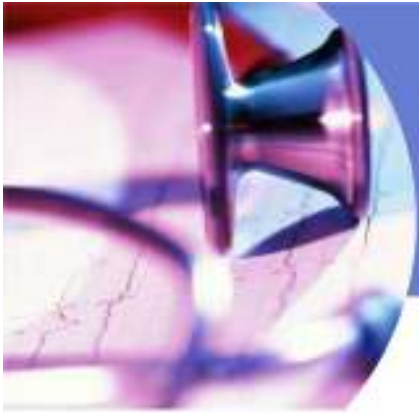
Diagnosis

- **Before 20 weeks:**
 - Donor has a deepest pool $< 2\text{cm}$
 - Recipient has a deepest pool $> 8\text{cm}$
- **After 20 weeks:**
 - Recipient has a deepest pool $> 10\text{cm}$



Quitero staging

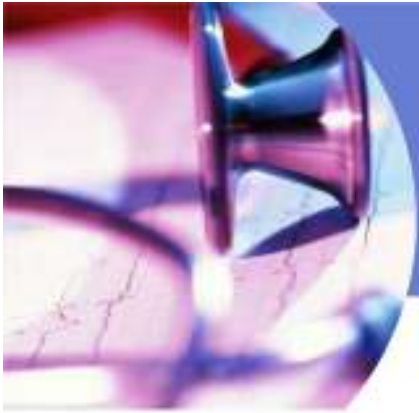
Stage	Findings
1	Oligo/Polyhydramnios, visible bladder of donor
2	Stage 1 with absent bladder and normal Dopplers
3	Stage 2 with abnormal Dopplers, Absent or reversed flow in umbilical artery, reversed a wave in the ductus venosus, pulsatile flow in the umbilical vein of any fetus
4	One fetus with hydrops
5	Death of a fetus



Follow up of patients with a monochorionic pregnancy

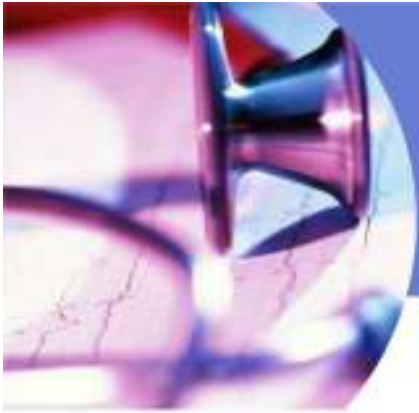
- **Patients with low risk features should be seen at**
 - **11-14 weeks**
 - **16 weeks**
 - **20 weeks**
 - **26 weeks**
 - **30 weeks**

} **In a specialised unit**
- **Scans every 2 weeks**
- **From 32 weeks**
 - **Non stress testing**
 - **Biophysical profile was done**
 - **Corticosteroids only if preterm delivery were anticipated.**



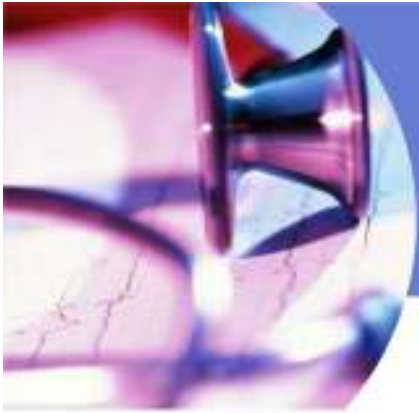
Outcome

- **If followed up as described above the outcome is:**
- **85% survival of both**
- **92.5% survival of at least 1 twin**
- **Most losses were 24 weeks or less**



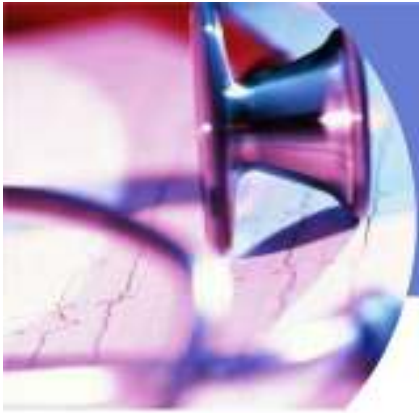
Follow up in South Africa

- **Early scan at 11 to 14 weeks for chorionicity, risk factors and anomaly screening**
- **16 Weeks to evaluate amniotic fluid and look for fetal bladders**
- **18 to 20 weeks to evaluate the fetal anatomy, growth, amniotic fluid volume and bladders**
- **2 to 4 weekly assessment of fetal growth alternated with evaluation of AFI and bladder volumes**



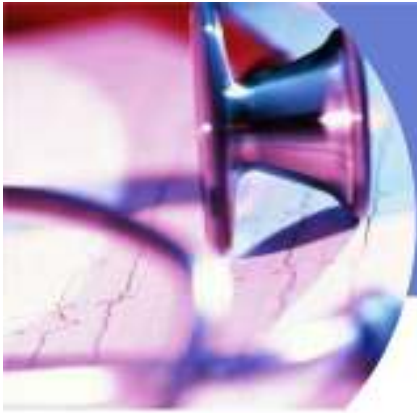
Follow up

- **First trimester**
 - Discordant amniotic fluid
 - Difference in CRL $> 12\text{mm}$
- **16 Weeks assessment**
 - Discordant amniotic fluid (AF) and discordant cord insertions or
 - Difference in AC $\geq 6\text{mm}$ if discordant AF and concordant cord insertions or
 - Difference in AC $\geq 13\text{mm}$ if concordant AF and discordant cord insertions or
 - Difference in AC $\geq 24\text{mm}$ if all others are equal
- **Patients with any of these risk factors should be referred to a specialist unit**



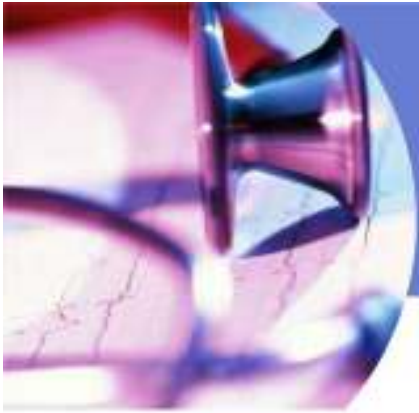
Follow up

- **Once the diagnosis of TTTS has been made at stage 1 the patient need to be referred.**



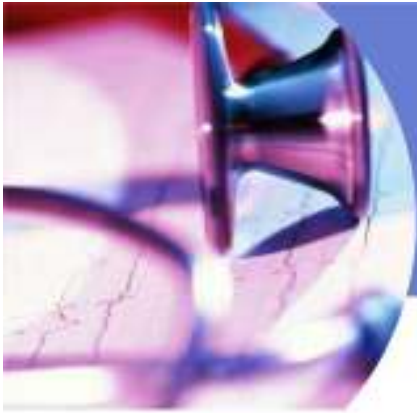
Management

- **Amnioreduction:**
 - Does not treat the underlying pathology
 - Value of mild disease after 26 weeks
- **Indication:**
 - Maternal discomfort
 - Shortening of the cervical length
- **Should be avoided early in pregnancy if laser fetoscopy is an option**



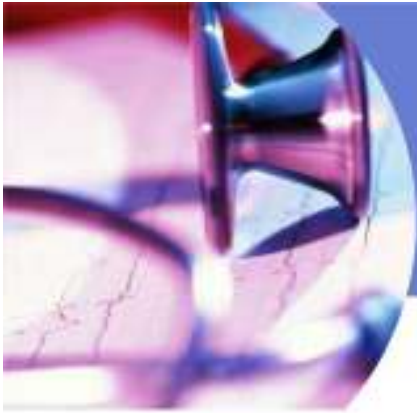
Management

- **Amnioreduction**
 - Should not drain more than 5l in an hour but it is probably safer to drain less
- **Complications:**
 - PROM
 - Preterm delivery
 - Fetal distress
 - Fetal death
 - Chorioamnionitis



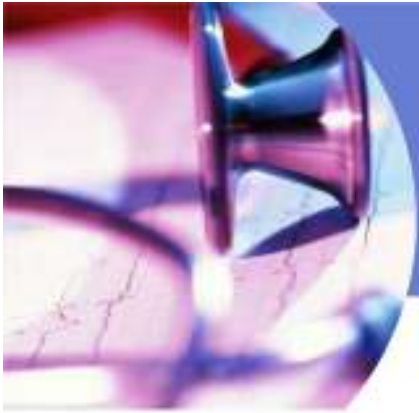
Management

- **Amnioreduction:**
- **Outcome:**
 - Both twins were live born in 55% of pregnancies,
 - One twin was liveborn in 31%
 - Both twins were stillborn in the remaining 14%
 - During the first four weeks of neonatal life, an additional 30% of live born twins died
 - 24% of recipient twins and 25% of donor twins that survived to four weeks of age had evidence of intracranial abnormalities on neonatal cranial ultrasound.



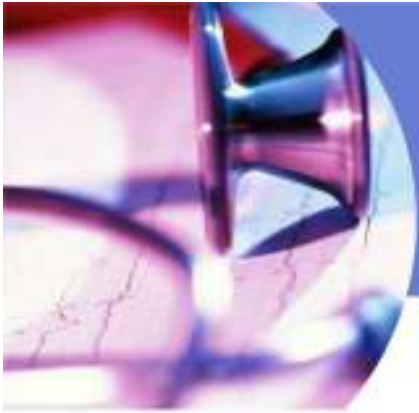
Management

- **Septostomy**
 - The outcome the same as for amnioreduction
 - Technically more difficult
 - Advantage only one procedure needed.



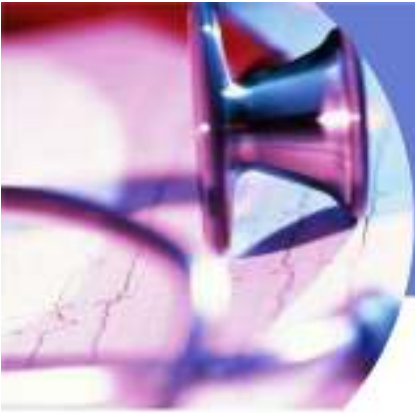
Management

- **Selective fetocide**
 - Indication
 - Failed laser
 - Recurrent TTTS after laser
 - Twin anemia-polycythemia sequence TAPS
 - Severe cardiac failure of 1 twin
- **Outcome**
 - 80 to 92% survival of the co twin
 - 20% PPRM
 - Low risk of neurological morbidity in the survivor

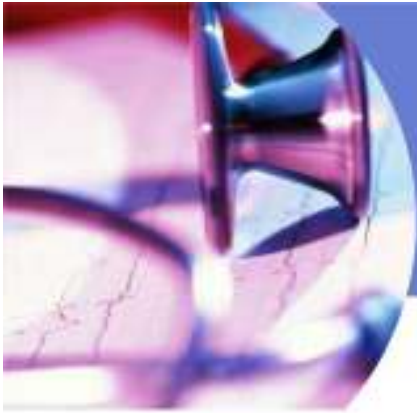


Management

- **Fetoscopic laser ablation**
 - Indicated for gestations 16 to 26 weeks
 - In the US for Stages 2 to 4

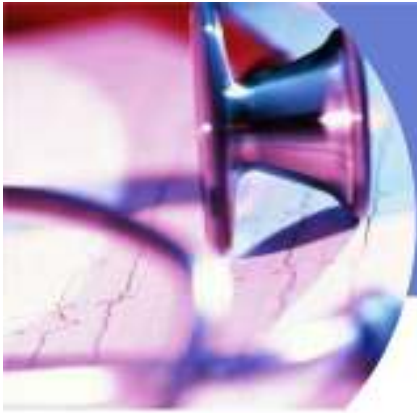


- **Outcome: Meta-analysis by Rossi found**
 - Survival twice as likely after laser
 - 80 percent reduction in neurologic morbidity
 - Overall survival OR 2.04, 95% CI 1.52-2.76;
 - Neonatal death: OR 0.24, 95% CI 0.15-0.40;
 - Neurologic morbidity OR 0.20, 95% CI 0.12-0.33)
- **The Cochrane review by Roberts found**
 - Laser coagulation of anastomotic vessels resulted in fewer double deaths (RR 0.32-0.61,
 - Fewer perinatal deaths (26 versus 44% RR 0.59; 95% CI 0.40-0.87, one trial
 - Fewer neonatal deaths (8 versus 26%, RR 0.29; 95% CI 0.14-0.61, one trial) than pregnancies treated with amnioreduction



Management

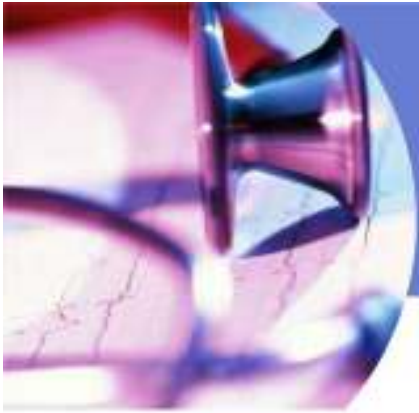
- **Perio perative Complications:**
 - PPROM with rates of 7 to 17%
 - Amniotic fluid leakage into the maternal peritoneal cavity 7%,
 - Vaginal bleeding 4%,
 - Abruptio 2%,
 - Chorioamnionitis 2%.
 - TAPS
- **Follow up after laser**
 - Weekly ultrasound to do Doppler studies for 6 weeks



Management of TTS in South Africa

- **Stage 1 :**
 - Weekly follow up
 - Amniodrainage after 26 weeks
 - Corticosteroids from 28 weeks

- **Stage 2:**
 - Follow up as above
 - Consider referral to a specialized Unit to do extensive Doppler studies



Management of TTTS

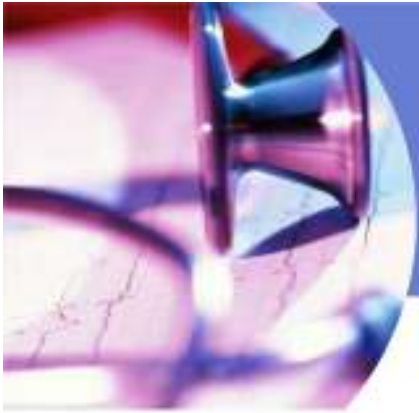
- **Stage 3 and 4**
 - Cord occlusion and selective fetocide
 - Laser therapy.



Steve Biko Academic Fetal Medicine Unit

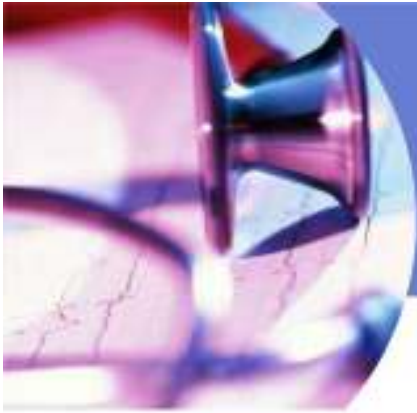


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Timing of delivery

- Barigye and co-workers proposed delivery at 32 weeks.
- They found a 4.6% risk of fetal death after 32 weeks
- Lewi and co worker suggested delivery at 37 weeks in uncomplicated cases
- They found a risk of death after 32 weeks 1.2%
- Complicated cases should be decided on an individual bases



Conclusion

- **Patients with high risk factors for complications should be identified**
- **Need careful follow up**
- **Invasive procedures did improve the outcome of the survivor**
- **After invasive therapy there is less double deaths**
- **Currently in uncomplicated cases timing of delivery can be closer to term if there is good fetal surveillance possible.**