Twin Pregnancy Protocol

Purpose: To provide guidance on the methods used to determine gestational age and chorionicity, screening for chromosomal and structural abnormalities, and screening for TTTS, TAPS, growth abnormalities and preterm birth.

Dating of twin pregnancy

<table>
<thead>
<tr>
<th>Ideal dating of a twin pregnancy</th>
<th>Crown–rump length (CRL) measurement is between 45 and 84mm. (i.e. 11+0 to 13+6 weeks of gestation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRL discordance</td>
<td>Use the larger of the two CRLs if spontaneous conception *** If CRL discordance ≥10% or of NT discordance ≥20% refer to MFM</td>
</tr>
<tr>
<td>After 14 weeks’ gestation</td>
<td>Use the larger head circumference</td>
</tr>
<tr>
<td>In-vitro fertilization</td>
<td>Use the oocyte retrieval date or the embryonic age from fertilization</td>
</tr>
</tbody>
</table>

Determining chorionicity/amnionicity in twin pregnancy

| Chorionicity                      | Determined before 13+6 weeks of gestation Identify the T sign or lambda sign, and the number of placental masses
Keep ultrasound image in the records for future reference |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Amnionicity</td>
<td>2 yolk sac: diamniotic 1 yolk sac: monoamniotic</td>
</tr>
</tbody>
</table>

1. All monochorionic diamniotic (MCDA) and monochorionic monoamniotic (MCMA) twin pregnancies should be referred to MFM to monitor the pregnancy.
2. After 14 weeks of gestation, chorionicity is best determined using the same ultrasound signs, in particular by counting the membrane layers, and noting discordant fetal sex. If the center is uncertain about the chorionicity, it is safer to classify the pregnancy as monochorionic.

Labeling of twin fetuses

Document clearly and be consistent:
*** Options include: labeling according to their site, either left and right, or upper and lower; or mapping in the first trimester according to the insertion of their cords relative to the placenta edges and it is advisable to describe each twin using as many features as possible so as to enable others to identify them accurately; e.g. ‘Twin A (female) is on the maternal right with a posterior placenta and marginal cord insertion’.
# Routine monitoring of twin pregnancy with ultrasound

<table>
<thead>
<tr>
<th></th>
<th>DCDA</th>
<th>MCDA</th>
<th>MCMA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First-trimester ultrasound</strong></td>
<td>Dating Chorionicity NT Label fetuses</td>
<td>Dating Chorionicity NT Label fetuses</td>
<td>Dating Chorionicity NT Label fetuses</td>
</tr>
<tr>
<td><strong>Non-invasive prenatal screening (NIPT)</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Invasive testing</strong></td>
<td>Yes, both placentas/sacs</td>
<td>Yes, acceptable to sample one placenta/sac</td>
<td>Yes, acceptable to sample one placenta/sac</td>
</tr>
<tr>
<td>Chorionic villous sampling (CVS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amniocentesis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Detailed second trimester scan (76811) at 18-20 weeks</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Transvaginal cervical length (TVCL)</strong></td>
<td>At 18-20 with fetal survey, unless history of preterm delivery (PTD)</td>
<td>At 18-20 with fetal survey, unless history of PTD</td>
<td>At 18-20 with fetal survey, unless history of PTD</td>
</tr>
<tr>
<td><em>short cervix &lt;25 mm</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fetal echocardiogram</strong></td>
<td>Not routinely</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Serial growth ultrasounds</strong></td>
<td>Q 4 weeks</td>
<td>Q 4 weeks</td>
<td>Q 4 weeks</td>
</tr>
<tr>
<td><strong>Serial ultrasound to screen for TTTS: Maximum vertical pocket (MVP) +/- Bladder</strong></td>
<td>No</td>
<td>Q 2 weeks starting at 16 weeks</td>
<td>Q 2 weeks starting at 16 weeks</td>
</tr>
<tr>
<td>If abnormal MVP</td>
<td></td>
<td>Weekly UA and MCA Doppler</td>
<td>Weekly UA and MCA Doppler</td>
</tr>
<tr>
<td><strong>Screening for TAPS</strong></td>
<td>No</td>
<td>Controversial At 32 weeks or If abnormal MVP</td>
<td>Controversial At 32 weeks or If abnormal MVP</td>
</tr>
<tr>
<td><strong>Antenatal testing</strong></td>
<td>Not indicated if growth is concordant</td>
<td>At 32 weeks 2x week</td>
<td>At 23-24 weeks Inpatient 3x day</td>
</tr>
<tr>
<td><strong>Hospital admission</strong></td>
<td>Only if complicated</td>
<td>Only if complicated</td>
<td>Yes, at 23-24 weeks or when willing to intervene</td>
</tr>
<tr>
<td><strong>Timing of delivery if uncomplicated</strong></td>
<td>38 weeks</td>
<td>36 weeks</td>
<td>32 weeks</td>
</tr>
</tbody>
</table>

*Dichorionic/Diamniotic (DCDA); Monochorionic/ Diamniotic (MCDA); Monochorionic/Monoamniotic (MCMA).*
Complicated dichorionic and monochorionic twins should be scanned more frequently, depending on the condition and its severity.

Risk of pregnancy loss after genetic amniocentesis

The loss rate loss rate at < 24 weeks of gestation is 0.9% (95% CI, 0.6–1.3) or 1 per 111 procedures (95% CI, 76–111).

Preeclampsia prevention in twin pregnancies

The American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine support the USPSTF guideline criteria for prevention of preeclampsia. Low-dose aspirin (81 mg/day) prophylaxis is recommended in women at high risk of preeclampsia and should be initiated between 12 weeks and 28 weeks of gestation (optimally before 16 weeks) and continued daily until delivery.

A multicenter, randomized, placebo-controlled of patients at high risk for preterm preeclampsia, using a dose of 150 mg of Aspirin per day from 11 to 14 weeks of gestation until 36 weeks of gestation was associated with a significantly lower incidence of preterm preeclampsia than was placebo. Given the findings of this trial we recommend Aspirin 162 mg daily to prevent preeclampsia in twin pregnancies.

Recommendation for weight gain and nutrition

The 2009 IOM guidelines for weight gain in twin pregnancy now recommend BMI (pregravid) specific weight gains for:
Normal weight women: gain 17–25 kg (37–54 lb)
Overweight women: gain 14–23 kg (31–50 lb)
Obese women: gain 11–19 kg (25–42 lbs.)

<table>
<thead>
<tr>
<th>Micronutrient</th>
<th>First trimester</th>
<th>Second trimester</th>
<th>Third trimester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multivitamin with iron (30 mg elemental tabs)</td>
<td>1 tab</td>
<td>2 tab</td>
<td>2 tab</td>
</tr>
<tr>
<td>Calcium</td>
<td>1,500 mg</td>
<td>2,500 mg</td>
<td>2,500 mg</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>1,000 IU</td>
<td>1,000 IU</td>
<td>1,000 IU</td>
</tr>
<tr>
<td>Magnesium</td>
<td>400 mg</td>
<td>800 mg</td>
<td>800 mg</td>
</tr>
<tr>
<td>Zinc</td>
<td>15 mg</td>
<td>30 mg</td>
<td>30 mg</td>
</tr>
<tr>
<td>DHA/EPA</td>
<td>300-500 mg</td>
<td>300-500 mg</td>
<td>300-500 mg</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>1 mg</td>
<td>1 mg</td>
<td>1 mg</td>
</tr>
<tr>
<td>Vitamin C/E</td>
<td>500-1,000mg/400 IU</td>
<td>500-1,000mg/400 IU</td>
<td>500-1,000mg/400 IU</td>
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</tbody>
</table>
Screening, diagnosis and management of fetal growth restriction (FGR)

<table>
<thead>
<tr>
<th>Discordant growth</th>
<th>A discordance cut-off of 20% in estimated fetal weight (EFW) is associated with increased risk of adverse pregnancy outcome. Discordance in should be calculated and documented at each scan from 20 weeks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selective Fetal growth Restriction (sFGR)</td>
<td>sFGR: one fetus has an EFW &lt; 10th centile and the intertwin EFW discordance is &gt; 25%. Evaluate interval growth per FGR protocol.</td>
</tr>
</tbody>
</table>

Managing the surviving twin after demise of its cotwin

Following single IUFD, the following complications are found in monochorionic and dichorionic pregnancies, respectively are:

<table>
<thead>
<tr>
<th>Complication</th>
<th>DC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death of the co-twin</td>
<td>3%</td>
<td>15%</td>
</tr>
<tr>
<td>Preterm delivery</td>
<td>54%</td>
<td>68%</td>
</tr>
<tr>
<td>Abnormal postnatal cranial imaging of the surviving co-twin</td>
<td>16%</td>
<td>34%</td>
</tr>
<tr>
<td>Neurodevelopmental impairment of the surviving co-twin</td>
<td>2%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Assess fetal Doppler, especially MCA-PSV; look for signs of fetal anemia in the surviving twin.

Conservative management is the most appropriate course of action. Evaluate the surviving twin for evidence of ongoing fetal compromise:

- NST and/or MCA Doppler to assess for fetal anemia.
- Fetal biometry and assessment of umbilical and MCA Doppler every 2 – 4 weeks.
- Delivery at 34 – 36 weeks, after a course of maternal steroids.
- Consider fetal brain MRI around 4 – 6 weeks after the death of the cotwin to search for evidence of cerebral morbidity.

COMPLICATIONS UNIQUE TO MONOCHORIONIC TWIN PREGNANCY

<table>
<thead>
<tr>
<th>TTTS</th>
<th>TAPS</th>
<th>TRAP sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence</td>
<td>10-15%</td>
<td>1-5% spontaneous</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Donor-recipient. Discrepancy in DVP, bladder, Doppler of UA</td>
<td>Discordant MCA Doppler abnormalities: MCA-PSV &gt; 1.5 MoM in the donor, suggesting fetal anemia, and MCA-PSV &lt; 1.0 MoM in the recipient, suggesting polycythemia. Also differences in placental echogenicity and thickness. Bright, thick in the donor and echolucent, thin in the recipient.</td>
</tr>
</tbody>
</table>
Treatment | Conservative for Quintero I | Fetoscopic laser for II and above (if < 26 weeks) | Is individualized. Options: conservative, early delivery, laser ablation or IUT for the anemic twin, combined IUT for the anemic twin and partial exchange transfusion for the polycythemic twin | Cord coagulation, cord ligation and photocoagulation of the anastomoses. Intrafetal methods: RFA and intra-fetal laser therapy, are performed as a means of preventing the demise of the pump twin

Screening, diagnosis and management of Twin to twin transfusion syndrome (TTTS):.

Staging of TTTS

<table>
<thead>
<tr>
<th>Stage</th>
<th>Classification</th>
</tr>
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</table>
| I     | Polyhydramnios-Oligohydramnios sequence  
DVP > 8 cm in recipient and DVP < 2 cm in donor |
| II    | Bladder in donor not visible |
| III   | Absent or reverse EDF in Umbilical artery, reversed ductus venosus a-wave flow, pulsatile umbilical venous flow in either twin |
| IV    | Hydrops in one or both twins |
| V     | Death of one or both twins |

DVP, deepest vertical pocket

Although Quintero staging does not always predict accurately outcome or chronological evolution of TTTS, it remains the classification system of choice.

Treatment of TTTS

<table>
<thead>
<tr>
<th>Conservative</th>
<th>Quintero stage I.</th>
</tr>
</thead>
</table>
| Fetoscopic laser ablation | Quintero stage I with worsening polyhydramnios, maternal discomfort and shortening of the cervical length are considered 'rescue' criteria.  
**Quintero stages II and above** and before 26 weeks. |

If untreated, it leads to fetal demise in up to 90% of cases, with morbidity rates in survivors of over 50%. When laser treatment is not available, serial amnioreduction is an acceptable alternative after 26 weeks’ gestation.

Following laser treatment, the recurrence rate of TTTS is up to 14%, which is likely to be due to
anastomoses missed at the time of the initial laser treatment.

**Optimal timing for monochorionic twins treated for TTTS.** There is limited evidence but consensus is 34 weeks of gestation, after a course of steroids.

**Screening, diagnosis and management of twin anemia–polycythemia sequence (TAPS)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Classification</th>
<th>Postnatal staging: intertwine Hb diff (g/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Donor MCA-PSV &gt; 1.5 MoM and recipient MCA-PSV &lt; 1.0 MoM, without other signs of fetal compromise</td>
<td>&gt;8.0</td>
</tr>
<tr>
<td>2</td>
<td>Donor MCA-PSV &gt; 1.7 MoM and recipient MCA-PSV &lt; 0.8 MoM, without other signs of fetal compromise</td>
<td>&gt;11.0</td>
</tr>
<tr>
<td>3</td>
<td>Stage 1 or 2 and cardiac compromise in donor (UA-AREDF, UV pulsatile flow, or DV increased or reversed flow)</td>
<td>&gt;14.0</td>
</tr>
<tr>
<td>4</td>
<td>Hydrops of donor twin</td>
<td>&gt;17.0</td>
</tr>
<tr>
<td>5</td>
<td>Death of one or both twins, preceded by TAPS</td>
<td>&gt;20.0</td>
</tr>
</tbody>
</table>

AREDR, absent or reversed end-diastolic flow; DV, ductus venosus; Hb, hemoglobin; MCA, middle cerebral artery; PSV, peak systolic velocity; UA, umbilical artery; UV, umbilical vein

It is controversial to routinely monitor for TAPS as it presents in 1% of MC twin pregnancies. However, we propose to evaluate MCA Doppler at 32 weeks for uncomplicated MC twins pregnancies. If the pregnancy was complicated by TTTS and the patient is status post laser ablation, monitoring for TAPS should be part of the post-laser ablation follow up since the incidence in these pregnancies is increased and reported to be as high as 13%.

**Postnatal diagnosis:** difference in hemoglobin concentration between the twins of more than 8 g/dL and at least one of either reticulocyte count ratio greater than 1.7 or small vascular anastomoses (<1mm in diameter) in the placenta.

**Screening, diagnosis and management of Twin reversed arterial perfusion (TRAP) sequence**

Risk of demise of the pump fetus in TRAP sequence managed conservatively is up to 30% by 18 weeks’ gestation. The survival rate of the pump twin using these treatment modalities is approximately 80%. When treatment is necessary, it appears to be preferable before 16 weeks’ gestation.
**Monochorionic monoamniotic (MCMA) twins**

MCMA twin pregnancies constitute approximately 5% of monochorionic twin pregnancies.

Umbilical cord entanglement is almost always present in MCMA twins and does not appear to contribute to their morbidity and mortality.

Recent evidence suggests that MCMA twin pregnancies are at increased risk of IUD compared with other types of twin pregnancy and should be delivered by Cesarean section between 32 and 34 weeks.

**Conjoined twins**

Conjoined twins are very rare, occurring in approximately 1 in 100 000 pregnancies (1%) of monochorionic twin pregnancies.

Survival to discharge was only around 25%, and the majority of these had significant morbidity. The classification of conjoined twins depends on the site of the union. The most common form is thoracopagus, in which the twins face each other and have junctions between chest and abdomen, often with conjoined livers, hearts and intestinal structures.

Delivery by elective Cesarean section is now the rule.

References:


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