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

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

Determining chorionicity/amnionicity in twin pregnancy

Chorionicity	Determined before 13+6weeks of gestation Identify the T sign or lambda sign, and the number of placental masses **Keep ultrasound image in the records for future reference**
Amnionicity	2 yolk sac: diamniotic 1 yolk sac: monoamniotic

1. **All monochorionic diamniotic (MCDA) and monochorionic monoamniotic (MCMA) twin pregnancies should be referred to MFM** to monitor the pregnancy.
2. After14 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

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

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.)

Micronutrient Supplementation (daily total Intake)

Micronutrient	First trimester	Second trimester	Third trimester
Multivitamin with iron (30 mg elemental tabs)	1 tab	2 tab	2 tab
Calcium	1,500 mg	2,500 mg	2,500 mg
Vitamin D	1,000 IU	1,000 IU	1,000 IU
Magnesium	400 mg	800 mg	800 mg
Zinc	15 mg	30 mg	30 mg
DHA/EPA	300-500 mg	300-500 mg	300-500 mg
Folic Acid	1 mg	1 mg	1 mg
Vitamin C/E	500-1,000mg/400 IU	500-1,000mg/400 IU	500-1,000mg/400 IU

Screening, diagnosis and management of fetal growth restriction (FGR)

Discordant growth	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
Selective Fetal growth Restriction (sFGR	sFGR: one fetus has an EFW < 10th centile and the intertwin EFW discordance is > 25% Evaluate interval growth per FGR protocol

Managing the surviving twin after demise of its cotwin

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

Complication	**DC**	**MC**
Death of the co-twin	3%	15%
Preterm delivery	54%	68%
Abnormal postnatal cranial imaging of the surviving co-twin	16%	34%
Neurodevelopmental impairment of the surviving co-twin	2%	26%

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

	TTTS	**TAPS**	**TRAP sequence**
Incidence	10-15%	1-5% spontaneous 13% after laser for TTTS	1% or 1 in 35,000
Diagnosis	Donor-recipient. Discrepancy in DVP, bladder, Doppler of UA See staging below	Discordant MCA Doppler abnormalities: MCA-PSV > 1.5 MoM in the donor, suggesting fetal anemia, and MCA-PSV < 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	A TRAP or acardiac mass perfused by an apparently normal (pump) twin. This characteristic vascular arrangement predisposes to a hyperdy

			namic circulation and progressive high-output cardiac failure in the pump twin
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

Stage	Classification
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

Conservative	Quintero stage I.
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)

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

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

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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