

Antepartum Management of Twin Pregnancies

Introduction

Twin gestations attract a lot of attention in the media, from patients and the medical community. Twins account for 3-4% of all pregnancies and have increased in the last 25 years, due to artificial reproductive technologies and women delaying child-bearing to their late 30s and early 40s.^{1,2} While higher order multiple pregnancies have also increased, this article will be limited to discussion of twin pregnancies.

Diagnosis

Patients and their families will describe twin gestations as "identical" or "fraternal." These descriptions are not clinically relevant or accurate. Twin gestations should be described by their chorionicity (number of placentas) and amnionicity (number of amniotic sacs).³ Zygosity can also be a determinant but cannot be diagnosed antenatally by noninvasive means. Dichorionic twins account for the majority of twin gestations (approximately 75%). Dichorionic twins can be monozygous if the zygote splits before the third day after conception, prior to differentiation of the placenta. The majority of dichorionic twins are dizygous.

Monochorionic twins result from a single fertilized egg and occur at a constant rate of about 1 of 250 gestations. If the inner cell mass splits between days 3 and 8 after conception, the twins will be diamniotic. If the inner cell mass splits after day 8, mono-chorionic/monoamniotic twins will be present, representing approximately 1% of all twins. If an incomplete division of the inner cell mass occurs after day 13 this may result in conjoined twins, which occur in 1 of 50,000 births. However, an alternate theory states that conjoined twins develop due to fusion of two previously separate embryonic plates. If the inner cell mass does not divide before day 16, a singleton gestation results.

Determining chorionicity is important as it predicts pregnancy outcome and is best performed in the first trimester.^{3,4} The number of amniotic sacs does not always equal the number of placentas and an ultrasound report of twins is incomplete if there is no mention of chorionicity. Chorionicity can occasionally be deciphered in a second trimester ultrasound and is usually impossible to determine in the third trimester unless there are two separate placental masses. Chorionicity can be determined on ultrasound by several methods: number of placenta masses, thickness of the intertwin membrane, fetal gender, and presence or absence of the "twin peak" sign. The "twin peak" or lambda sign is produced by the presence of chorionic villi between the two amniotic layers and produces a visibly thicker intertwin

membrane. This finding may not be present in a third trimester ultrasound in dichorionic twins. Two separate placenta masses or discordant fetal gender (male and female) indicate a dichorionic, dizygous twin gestation. The intertwin membrane thickness should be measured in the presence of a single placenta mass to aid in the diagnosis of chorionicity. However, this should not be the only parameter used to determine chorionicity as there is no consensus on the appropriate "cut off" value to use. 1.5 to 2.0 mm has been reported by various authors.⁵⁻⁷

Maternal and Fetal Complications

Potential maternal complications related to twin gestations include preeclampsia, gestational diabetes, preterm labor, anemia, placenta abruption, and urinary tract infection.⁸⁻¹² The list of possible fetal complications in all twin gestations includes preterm delivery, increased risk for cerebral palsy, intrauterine fetal demise of one or both fetuses, and discordant growth. Twin pregnancies have a higher rate of fetal anomalies as compared to singletons.^{10,12-14}

The rate of fetal complications in twin pregnancies is associated with chorionicity. Monochorionic twins are at higher risk for fetal growth restriction, growth discordance, premature delivery and perinatal mortality, which are most likely due to the shared placenta and intertwin vascular anastomoses.^{15,16} Other complications unique to monochorionic twins include monoamniotic/mono-chorionic twins, acardiac twins, and twin-twin transfusion syndrome. As mentioned above, mono/mono twins occur in 1% of twin gestations. The perinatal mortality rate is higher in this type of monochorionic twins due to entanglement of both umbilical cords. There are two schools of thought regarding management of these pregnancies in the third trimester: inpatient vs. outpatient management. Small retrospective studies have shown improved outcomes with no fetal deaths when patients are hospitalized at 24-28 weeks for frequent monitoring and delivery by 34 weeks.¹⁷⁻¹⁹ There is no consensus on the frequency of monitoring or if continuous monitoring is beneficial. At UIHC, we recommend admission at 28 weeks with fetal non-stress tests three times daily and delivery between 32 and 34 weeks unless concern for fetal well-being arises sooner.

An acardiac twin pregnancy is a monochorionic twin gestation with one normal-appearing twin and an anomalous second twin.²⁰ Acardiac twin pregnancies are also referred to as a Twin Reversed Arterial Perfusion (TRAP) sequence. The second twin typically has incomplete body formation, usually a torso and

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lower extremities. There is no heart or head but a short umbilical cord is present. Because this anomalous twin has no heart, the normal twin is at risk for high output cardiac failure as little blood returns from the acardiac twin. Acardiac twins occur in 1 of 35,000 to 1 of 150,000 births. Due to the risk to the normal twin, these pregnancies are followed closely with ultrasound. One option for patients to consider is interruption of the acardiac twin's umbilical cord with electrocautery or laser ablation to prevent or treat high output cardiac failure in the normal twin.

Twin-twin transfusion syndrome (TTTS) occurs in approximately 10-15% of monochorionic/diamniotic twin gestations and is unique to these gestations due to the shared single placenta.^{21,22} TTTS can present at any gestational age but most commonly occurs between 18 and 24 weeks. Vascular anastomoses in the placenta allow even exchange of blood between the twins. If the blood flow becomes unbalanced, usually due to the absence of an artery-artery anastomosis, the donor twin becomes anemic and the recipient twin becomes polycythemic. The donor twin develops oligohydramnios and the recipient twin develops polyhydramnios. These pregnancies can have varying degrees of growth discordance as well. Untreated TTTS has a poor outcome with a high risk of hydrops in one or both twins, premature delivery and perinatal mortality of one or both twins. Possible therapies for TTTS include digoxin, septostomy, indomethacin, serial reduction amniocentesis and laser ablation of intertwin anastomoses. Only amnioreduction and laser ablation have been shown to improve perinatal outcome to a moderate degree.²³ Amnioreduction is available at UIHC and for women where laser ablation is indicated are referred to one of the regional fetal treatment centers. Research indicates laser ablation of intertwin anastomoses has a slightly better outcome than amnioreduction.²³

Antenatal Management

These are general recommendations which can be adjusted for individual patient care. There is not sufficient evidence in the literature for many of these recommendations and therefore some suggestions are based on expert opinion.

First Trimester If a twin gestation is suspected or the patient has risk factors for twinning, early ultrasound for chorionicity should be considered. The patient should be seen every four weeks for prenatal visits. The provider should consider a Maternal-Fetal Medicine consultation if a monochorionic twin gestation is present. Additional calcium, iron and folate in the mother's diet can be considered as well.²

Counseling women about their risk of aneuploidy in twin pregnancies differs from singleton pregnancies as there are unique considerations in twin gestations regarding the risks of aneuploidy and serum screening options. Chorionicity and zygosity play a major role in these risk calculations. Zygosity can be presumed antenatally as it cannot be determined until after birth. Mothers of monochorionic twins have the same

age-related risk of aneuploidy as mothers of singletons because monochorionic twins are monozygous. Since the majority of dichorionic twins are dizygous, the risk of aneuploidy in these pregnancies is double that of the mother's age-related risk.²⁴ For example, a 32-year-old woman with dichorionic twins has the same risk for aneuploidy as a woman who is 35 years old and carrying a singleton fetus.²⁴ Therefore, women who are 32 years or older should be referred to a Maternal-Fetal Medicine specialist for a consultation and ultrasound.

Nuchal lucency screening alone can be performed at 10-14 weeks and has similar sensitivity and specificity to singletons for aneuploidy and congenital malformations.²⁵ Serum screening is less sensitive and less specific in twin gestations.^{26,27} First trimester and integrated screening are not available for twin gestations through the Iowa statewide program. Chorionicity plays a role in the levels of the individual serum markers and reference ranges for monochorionic and dichorionic twins have not been validated.²⁶ Second trimester serum screening can be offered but is less sensitive for Down syndrome and neural tube defects than in singletons.²⁷ Risk of trisomy 18 cannot be calculated for twins with current second trimester serum screening protocols. We recommend a detailed or level II ultrasound for all twin gestations at 18-20 weeks.

Amniocentesis can be performed in twin gestations after 15 weeks. Chorionic villus sampling (CVS) can be performed in twin gestations at 10-12 weeks gestation but is not a commonly performed procedure. This is because it is often difficult in dichorionic twins and nearly impossible in monochorionic twins to assure separate samples from each fetus.

Second Trimester Prenatal visits can continue to be scheduled every four weeks. If the patient desires serum screening and has been counseled by her provider on the limitations, this can be done between 16 and 20 weeks. A detailed ultrasound should be performed at 20 weeks for fetal anatomy and growth. We typically recommend ultrasounds every two weeks in our facility beginning at 16 weeks for women with monochorionic twins to evaluate for TTTS. These biweekly scans continue for the remainder of the pregnancy. We do not routinely perform cervical lengths in these patients and do not recommend progesterone supplementation as the evidence does not indicate a decreased risk of preterm birth with progesterone.²⁸

Third Trimester Prenatal visits should be more frequent at every two weeks due to the increased risk of preterm labor and preeclampsia. Symptoms of preterm labor and preeclampsia should be discussed at each visit. Maternal blood pressure should be recorded and fetal movement should be assessed.

We recommend ultrasounds for fetal growth every 4 weeks for dichorionic and monochorionic twins. Biweekly assessments for TTTS in monochorionic twins should continue into the third trimester. We recommend initiating weekly fetal nonstress tests (NSTs) at 32 weeks in dichorionic twins. NSTs should be started sooner if there is evidence of growth discordance or other complications. These recommendations are based on expert opinion because there is not adequate evidence in the medical literature.

Delivery Planning A general conversation regarding timing and mode of delivery should be initiated early in the pregnancy. Women with twin gestations should be made aware of their

high risk of preterm labor and delivery.¹² For those women who do not deliver before the latter third trimester, delivery timing will become an issue. In dichorionic twins, we recommend delivery by 38 weeks if there is no evidence of other complications. See below for recommendations on when to delivery monochorionic/diamniotic twins.

While a detailed discussion on mode of delivery is beyond the scope of this article, mode of delivery for diamniotic twin gestations (both dichorionic and monochorionic) is determined by the patient's history and preferences, fetal presentation, and provider training and experience. Monoamniotic twins should be delivered by cesarean section due to potential cord entanglement.

Special Considerations for Monochorionic Diamniotic Twins After a rigorous review of the literature, our institution implemented a management protocol for monochorionic diamniotic twin gestations. We routinely perform ultrasounds every 2 weeks for evaluation of TTTS (hydropic features and assessment of amniotic fluid indices) and every 4 weeks for detection of IUGR or growth discordance. Antenatal surveillance via twice weekly non-stress tests is performed beginning at 32 weeks gestation in the uncomplicated monochorionic diamniotic twin pregnancy.

An important decision that many obstetricians face is when to deliver uncomplicated monochorionic diamniotic twin gestations. A study out of the United Kingdom published in 2005 suggested delivery as early as 32 weeks gestation.¹⁴ Understandably, this received much censure from the obstetrical community, who argued that the risk of prematurity is not negligible. Subsequent academic articles proposed elective preterm delivery anywhere from 34 weeks to the completion of 36 weeks.^{22,29-33} Thus, balancing the risk of iatrogenic prematurity with the risk of single fetal demise with concomitant neurological injury or double fetal demise is challenging. At our institution, delivery for all uncomplicated monochorionic diamniotic twin pregnancies is scheduled no later than 36 weeks and 0 days. If there is any evidence of TTTS which subsequently resolved with or without therapy or growth discordance greater than 20%, the twins are delivered by 34 weeks and 0 days. Monochorionic diamniotic twin gestations with unique clinical features are managed on an individual basis by a consensus of perinatologists in our department.

Conclusion

The incidence of twin gestations is increasing and obstetric providers will continue to see more of these patients in their practice. It is important to be familiar with the risks and complications unique to these pregnancies, particularly monochorionic twins. We recommend a consultation early in pregnancy with a Maternal-Fetal Medicine specialist for all monochorionic twins.

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