Twin pregnancy

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Abstract

Twins account for 2–3% of all births. They carry significant risks to both mothers and babies. These risks include preterm delivery, intrauterine growth restriction, and pre-eclampsia. In addition, monochorionic gestations confer an even higher rate of perinatal morbidity and mortality arising from a shared placenta due to placental anastomoses, which may lead to twin-to-twin transfusion syndrome (TTTS) or twin anaemia-polycythaemia sequence (TAPS). It is essential that chorionicity is established in the first trimester in order to initiate the appropriate antenatal management and surveillance. In view of the high risk of both maternal and fetal complications, twin pregnancies are ideally managed in a dedicated clinic according to agreed protocols with both obstetric and midwifery input.

Keywords chorionicity; dichorionic; monochorionic; twins

Introduction

Twin pregnancies account for approximately 3% of all live births, but account for 6.3% of stillbirths and 12.7% of neonatal deaths. Twins are more at risk of pregnancy complications (Table 1). Monozygotic twin frequency rates remain relatively stable worldwide at 3.5/1000 maternities, but dizygotic twins have a variable rate depending on a number of factors including geographical location, assisted reproductive techniques and increasing maternal age. Rates vary from 1.3 to 49/1000 maternities. Monochorionic twin gestations are associated with even higher perinatal risk. Multiple pregnancies have been described as a modern epidemic and carry considerable resource implications for health providers. In order to reduce the numbers of twin pregnancies conceived as a result of assisted conception techniques, a number of strategies have been proposed such as elective single embryo transfer, selective fetal reduction and single blastocyst transfer.

Zygosity and chorionicity

Twin pregnancy usually results from the fertilization of more than one oocyte, producing dizygotic or non-identical fetuses.

Frequency of fetal complications in twins

	Singleton	Dichorionic	Monochorionic
Miscarriage 11–23 weeks	1%	2%	10%
Perinatal death	0.5%	1.5%	3%
IUGR	5%	20%	30%
Preterm delivery <32 weeks	1%	5%	10%
Major defects	1%	1%	4%

Table 1

Splitting of a single fertilized oocyte produces a monozygotic twin pregnancy with two genetically-identical co-twins. Non-identical twins develop their own placentae: monozygotic twins may share a placenta according to the time of separation (Figure 1). Dichorionicity occurs in 80% of twins, and genotyping is required to confirm zygosity in these cases ie dichorionic twins can be monozygous.

Monochorionicity confers major increases in perinatal morbidity and mortality when compared to dichorionic gestations. Chorionicity may be accurately determined by ultrasound from between 10 and 14 weeks' gestation. A number of methods are widely used, including the presence of the lambda or 'twin peak sign' for dichorionicity and the 'T sign' for monochorionicity. In addition, the thickness of the intertwin membrane may be determined – a membrane thickness of less than 2 mm is suggestive of monochorionicity. Other indicators in the second trimester may be the presence of two separate placental masses or discordant fetal sex. All twin pregnancies should be offered an ultrasound scan between 11 and 13 + 6 weeks to assess viability, determine chorionicity and to screen for Down's syndrome. In monochorionic twins it is important to exclude acardiac twinning.

If a woman with a twin pregnancy presents after 14 weeks, it is important to determine chorionicity at the earliest opportunity by ultrasound using the number of placental masses, the lambda or T sign, the membrane thickness and discordant fetal sex. If chorionicity remains uncertain, even after senior review, the pregnancy should be managed as monochorionic.

Screening for abnormality in twins

Aneuploidy screening

The risk of Down's syndrome (Trisomy 21) is 1 in 700 pregnancies. The risk for monozygotic twins is the same as for singletons, but for dizygotic twins this risk is doubled as each twin has its own individual risk. The screening test of choice for twins is combined first trimester screening at between 11 and 13 + 6 weeks' gestation with a calculated risk for the pregnancy in monochorionic twins and an individual risk per baby in dichorionic twins. Combined screening uses the measurement of the nuchal translucency combined with first trimester measurements of pregnancy associated plasma protein A (PAPP-A) and human chorionic gonadotrophin (HCG). The detection rate varies according to the chorionicity of the pregnancy: in monochorionic twins the detection rate should be the same as for singletons (80% with a 3% false positive rate), however, in dichorionic twins where one baby is affected with aneuploidy, the detection

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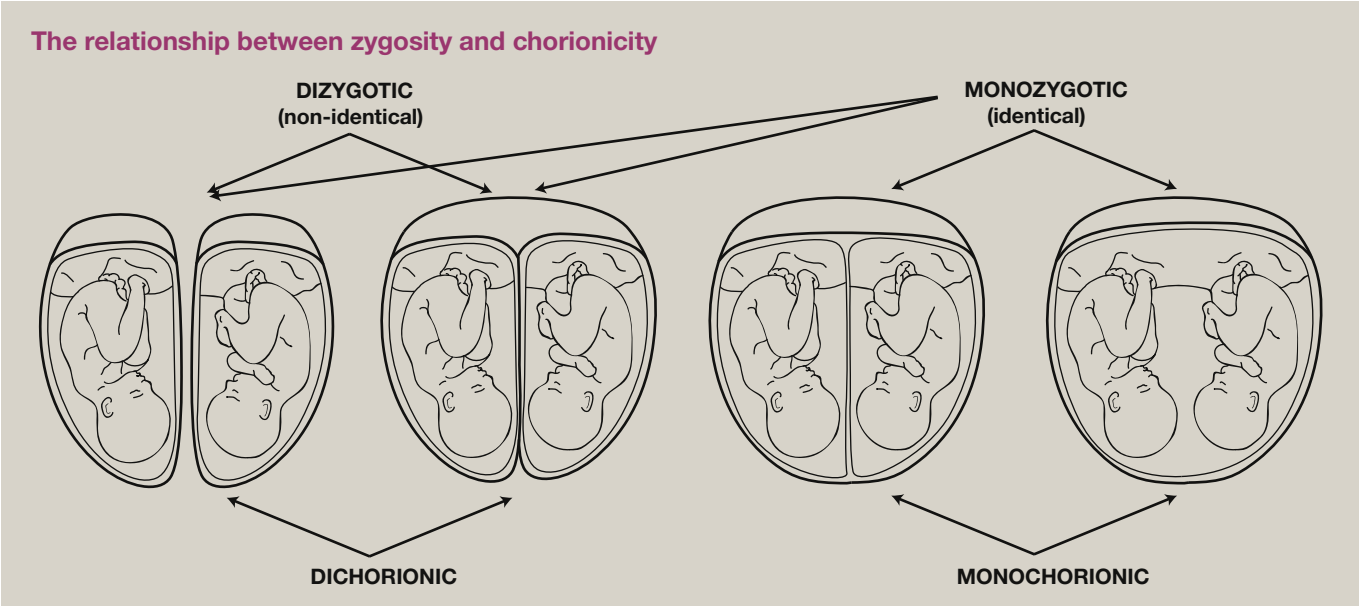

Figure 1

rate may fall to between 40 and 50% with a 3% false positive rate. Detection rates can be improved further using additional ultrasound markers such as the presence of the nasal bone and ductus venosus and tricuspid Doppler waveform analyses. Additional biochemical markers, alpha-fetoprotein (AFP) and oestriol, can increase the detection rate further (up to 87%). For women who present beyond 14 weeks the quadruple test may be offered up to 20 weeks gestation.

Finally, the advent of Non-Invasive Prenatal Testing (NIPT) offers a further choice in screening for women with twin pregnancies. Detection rates are between 98 and 99% in singletons with false positive rates of <0.2%, however data for NIPT in twins is still being collected. There seems little doubt it will perform in twins much more highly that the combined or quadruple tests.

Following a high-risk screening result, or the detection of a fetal abnormality including an increased nuchal translucency, the option of invasive testing should be discussed. Both amniocentesis and CVS are possible in twin pregnancy, but these procedures should be performed in a specialist fetal medicine unit to ensure that the pregnancy is mapped correctly and the samples taken are correctly attributed to each of the fetuses. The risks of miscarriage and other procedure-related complications are quoted as around 1 in 50 in twin pregnancies. Both amniocentesis and chorionic villus sampling are valid options, but there is some evidence to suggest that a double amniocentesis has a lower risk of mistakenly sampling the same fetus twice.

Anomaly screening

The frequency of fetal abnormality in dizygotic twins is comparable to that of singleton pregnancies (2–3%). This contrasts with the increased frequency of anomalies seen in monozygotic pregnancies where rates of up to 10% have been reported, or 2 to 3 times those which occur in dizygotic twinning. Several different types of anomaly are thought to be more commonly seen in twin pregnancies, including neural tube defects and congenital heart disease. In monozygotic twinning, abnormal vascular connections predispose to limb reduction defects and bowel atresias.

Disorders of laterality occur when embryonic migration has begun prior to zygotic splitting and may explain the increased incidence of cardiac anomalies in monozygotic twin pregnancies. A fetal echocardiogram is ideally offered at 20–22 weeks gestation.

While the majority of monozygotic twins appear to be almost identical, there are monozygotic offspring who are genetically and phenotypically dissimilar. Mechanisms may include unequal allocation of blastomeres between the two embryos, disrupted embryonic migration, somatic mosaicism or chimerism, and variations in penetrance of single gene disorders producing phenotypic discrepancy.

The type of discordance varies from genetic and chromosomal abnormalities through to isolated structural anomalies. Discordant single gene disorders, imprinting defects and aneuploidy have all been reported in monozygotic twins. Case reports detail a range of discordant structural anomalies found in monozygotic twin pairs, from neural tube defects and holoprosencephaly to lateral and ventral body wall defects, and anomalies related to the VATER association.

Management of twins discordant for fetal anomaly

The diagnosis of discordant anomaly in twins creates significant dilemmas for parents, and careful counselling is required in centres with expertise in this area. Accurate diagnosis and determination of chorionicity is critical for subsequent management. Depending on the anomaly detected, parents may be faced with a choice of continuing the pregnancy and delivering both a normal and an affected baby, or of terminating the affected fetus and risking the viability of the healthy co-twin. Invasive testing

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