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Diagnosis and Management of Obstetrical Complications Unique to Multiple Gestations

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Obstetrical complications unique to multiple gestations pose a number of unique challenges. The presence of more than one fetus complicates the diagnosis and management of a pregnancy when one fetus has a structural or chromosomal abnormality, intrauterine demise, preterm premature rupture of the membranes, or delivers prematurely. Similarly, the diagnosis and management of monoamniotic twins and conjoined twins is challenging. These obstetrical complications that are unique to multiple gestations require thorough counseling of the expectant parents, as well as care by physicians with expertise in the management of multiple gestations.

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Common obstetric complications, such as preeclampsia, gestational diabetes, preterm labor, and intrauterine fetal growth restriction, occur more frequently in multiple gestations, yet the diagnosis and management of these conditions are similar as for singleton pregnancies. In contrast, unique challenges arise when one fetus in a multiple gestation has a structural or chromosomal abnormality, intrauterine demise, preterm premature rupture of the membranes, or delivers prematurely. The presence of more than one fetus in utero confounds the diagnosis and management of these serious obstetric complications. Furthermore, multifetal gestations are at increased risk for complications that are unique to monochorionic gestations, such as twin–twin transfusion syndrome, monoamnionicity, twin reversed arterial perfusion syndrome, and conjoined twins. This chapter addresses the management of some of these complications that are unique to multiple gestations.

Discordant Fetal Abnormalities

Diagnosis of an Abnormal Fetus

A single fetus in multiple gestation may be affected by both chromosomal and structural abnormalities. In a dizygotic pregnancy, each fetus has its own independent risk for a chromosomal or structural abnormality, so the overall risk of an abnormality increases as the number of fetuses increases. The risk of a chromosomal abnormality in a monozygotic multiple gestation is similar to the risk in a singleton. However, monozygotic gestations are at an increased risk of complications that are unique to monochorionic gestations, such as twin–twin transfusion syndrome, twin reversed arterial perfusion syndrome, and conjoined twins.

The goals of prenatal diagnosis in a multiple gestation are the same as a singleton: to identify fetal abnormalities that could lead to a couple's decision to terminate a pregnancy or alter the management of the pregnancy and delivery, and to identify fetuses that might benefit from fetal or early neonatal therapy. However, prenatal diagnosis in multiple gestations poses a number of unique challenges. Maternal serum screening is not as reliable in twins and may not be interpretable in higher-order multiples. Invasive diagnostic procedures, such as chorionic villus sampling and amniocentesis, are technically more challenging in multifetal gestations. Finally, the presence of multiple fetuses makes the assessment of fetal anatomy at the time of prenatal ultrasound more difficult. For a more thorough review of prenatal diagnosis in multiple gestations, the reader is referred to the chapter by Drs. Cleary-Goldman, D'Alton, and Berkowitz.

Management of Discordant Fetal Abnormalities

When fetal abnormalities are detected in one fetus of a previable multiple gestation, couples can choose between termi-

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nation of the entire pregnancy, expectant management, or selective termination of the abnormal fetus. When the abnormality is diagnosed after viability, the options are limited depending on the jurisdiction and the extent of the abnormality. For example, as in a singleton pregnancy, the third trimester termination of an anencephalic fetus in a multiple gestation may be considered.[1,2] Termination of the entire pregnancy in a multifetal gestation, as in a singleton gestation, can be performed surgically or by prostaglandin induction.

Expectant management should be pursued only after a thorough discussion and documentation of the risks of continuing the pregnancy. It is important that the patient be informed of how the anomalous fetus might affect the prognosis for the entire pregnancy. In a monochorionic pregnancy, counseling should include the risks to the normal cotwin in the event of a demise of the abnormal fetus. Regardless of chorionicity, an abnormal fetus may increase the risk of miscarriage or preterm delivery through complications such as polyhydramnios. The management of labor, in particular intervention for nonreassuring fetal status or malpresentation of the anomalous fetus, should be defined before delivery.

Selective termination should be offered when a fetal anomaly is detected before viability in a multifetal gestation. The benefits of selective termination need to be weighed against the procedure-related risk of miscarriage or premature delivery. Selective termination in multichorionic pregnancies is most commonly performed by fetal intracardiac injection of potassium chloride. In a multicenter study of 402 selective reductions by intracardiac or intrafunic injection of postassium chloride, the overall rate of pregnancy loss before 24 weeks was 7.5%.[3] The pregnancy loss rates based on the gestational age at the time of the procedure were 5.4% when the procedure was performed between 9 and 12 weeks, 8.7% between 13 and 18 weeks, 6.8% between 19 and 24 weeks, and 9.1% when the procedure was performed beyond 25 weeks. These differences were not statistically significant, suggesting that the risk of pregnancy loss following selective termination is similar in all trimesters. Further support for the safety of second trimester selective reduction comes from a study that reported similar loss rates following multifetal reduction in the first trimester and selective termination in the second trimester.[4] In monochorionic pregnancies, selective reduction using an intracardiac injection of postassium chloride can result in demise of the cotwin either by transplacental passage of potassium chloride or acute hemodynamic changes in the untreated fetus.[3] For this reason, a number of methods involving cord ligation and coagulation have been developed for performing selective termination in monochorionic pregnancies.[5] For a more thorough review of the methods of selective reduction in monochorionic multifetal gestations, the reader is referred to the chapter by Drs. Spadola and Simpson.

The diagnosis of an abnormal fetus in a multiple gestation creates a complex set of circumstances for a family that must decide between termination of the entire pregnancy, expectant management, or selective reduction of the abnormal fetus. Furthermore, these cases are challenging for physicians involved in the counseling and management of such patients. There are ethical challenges that require an appreciation for beneficence and respect for autonomy of both the mother and the fetuses.[6] Before viability, a fetus can only be considered a patient if the mother confers that status on the previable fetus, including the fetus with an anomaly. As such, respect for the autonomy of the mother is the guiding principle. When a woman chooses selective termination, she is withholding the status of becoming a patient from the fetus with the abnormality, but not the other normal fetuses. Because the risk of selective termination to the remaining fetuses is minimal, the procedure does not violate the beneficence-based obligation to the remaining fetuses. After viability, the ethical standard of care is to optimize perinatal outcome through aggressive antepartum and intrapartum management. However, other options that could be considered include selective termination and nonaggressive management of the pregnancy. Selective termination of a viable abnormal fetus is only ethical when there is certainty of the diagnosis, and certainty of death or absence of cognitive development as an outcome of the anomaly.[1,7] When the diagnosis and/or prognosis are less certain, both the physician and the mother have a beneficence-based obligation to the viable fetus. Nonaggressive management should be reserved for cases in which there is a high probability of death or absence of cognitive function, but not certainty of the diagnosis and prognosis.[7,8] However, nonaggressive management may not be appropriate when an abnormal fetus shares a placenta with a normal fetus. In such a case, nonaggressive management might place the normal fetus at risk and, for this reason, challenges the beneficence-based obligation to the normal fetus.

Intrauterine Demise of One Fetus in a Multiple Gestation

The increasing use of ultrasonography in early pregnancy has revealed that the incidence of a spontaneous multiple gestation is greater than previously believed. In fact, twin gestations may occur in as many as 12% of all spontaneous conceptions.[9] However, it is estimated that only 50% of twin pregnancies identified in the first trimester will result in two live born infants.[10] In some cases the entire pregnancy will be lost, and in other cases only one embryo will be lost and the pregnancy will continue as a singleton gestation. When one embryo in a multiple gestation is lost, this is known as a "vanishing twin."[9]

Risks to the Surviving Fetus(es) Following the Demise of One Fetus

Although the loss of one embryo in a multiple gestation is common in the first trimester, most patients are asymptomatic or have only slight vaginal spotting following the loss.[11] Fortunately, when the demise occurs early in pregnancy, it appears that the prognosis for the surviving fetus(es) is excellent.[9,10,12]