

Ultrasound to Identify Cord Knotting in Monoamniotic Monochorionic Twins

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This case report demonstrates the use of ultrasound and doppler flow in the management of mono-amniotic monochorionic (M/M) twins. M/M twinning is a rare but significant event. It is associated with high rates of fetal mortality, most commonly cited at anywhere from between 30% and 70%. A common cause of death is cord entanglement. The case presented is that of a 19-year-old gravida 1 at 30 weeks with M/M twins in which multiple cord knots were found by ultrasound color doppler flow after variable fetal heart rate decelerations occurred. This prompted a decision for immediate cesarean delivery with normal fetal outcomes. Improvements in perinatal imaging systems are therefore beneficial in the management of M/M twins.

Monoamniotic monochorionic (M/M) twins occur in 1% to 2% of twin pregnancies (Aisenbrey et al., 1995; Shveiky et al., 2004; Tessen & Zlatnik, 1991). About 40% of twins develop from a single zygote, and division of the zygote can take place at different times after fertilization. If division takes place 8 to 13 days after fertilization, the outcome will be two fetuses with a single amnion and chorion (Shveiky et al., 2004). M/M twins have a unique problem of both being in the same amniotic sac which can lead to umbilical cord entanglement, knotting, and constriction.

Diagnosing M/M twins has become more accurate in the past few decades with the help of advances in imaging technology, and may reach 100% (Benirshke & Kaufman, 1990). The definitive diagnosis cannot be made until the cord-placenta unit is examined after delivery (by pathology). However, criteria for making an accurate antenatal diagnosis include, but are not limited to, no dividing membrane observed on at least two consecutive ultrasound exams, same-sex twins, unrestricted fetal movement, a single placenta, and cord entanglement (sometimes visualized by ultrasonography).

Over the last 40 years, the risk of fetal death in M/M twins has been reported to be from 30% to 70% (Beasley et al., 1999; Shveiky et al., 2004). Causes include twin-twin transfusion syndrome, congenital anomalies, and cord entanglement due to fetal move-

ment around each other. Unfortunately, due to the paucity of M/M twinning, management criteria are controversial. A wide range of management options have been proposed to help decrease morbidity and mortality, and depending on the individual case may include aggressive fetal monitoring, frequent ultrasonography, selective feticide, medical and/or surgical amnioreduction, and prophylactic steroids for fetal lung maturity in anticipation of delivery at approximately 32 weeks (Rodis et al., 1997; Sutter et al., 1986). Here a case of M/M twins is presented in which several cord knots were diagnosed with ultrasound color doppler flow — immediate cesarean delivery resulted in healthy infants.

Case

The patient was a 19-year-old gravida 1 para 0 with M/M twins diagnosed at 20 weeks. Ultrasound examination demonstrated no dividing membrane, same-sex fetuses, and a single placenta. Weekly fetal monitoring was initiated at 28 weeks, which consisted of nonstress testing (NST) and ultrasound. The patient was also diagnosed with diabetes mellitus at 29 weeks and started on insulin treatment and a diabetic diet.

At a routine clinic appointment at 30 weeks the patient was noted to have mild variable decelerations of both twins on NST. She was admitted to labor and delivery for continuous fetal monitoring in an attempt to detect any impending cord accident.

Several days after admission, the patient once again demonstrated several mild variable decelerations. An ultrasound examination was performed to visualize the umbilical cords. The results (shown in Figure 1) demonstrated significant cord entanglement with probable knotting by doppler flow. A decision was made to proceed with cesarean delivery to prevent hypoxia from cord entanglement.

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Figure 1
Ultrasound of cord entanglement.

Both babies were delivered without incident. Baby A weighed 1558 g and had an apgar score of 8 and 9; Baby B weighed 1640 g and had an apgar score of 8 and 9. A single placenta was delivered. The cords were found to be extensively entangled with multiple true knots (see Figure 2).

Both infants were admitted to the neonatal intensive care unit and required intubation and surfactant therapy for respiratory distress syndrome. They were gradually weaned from ventilator support. Both

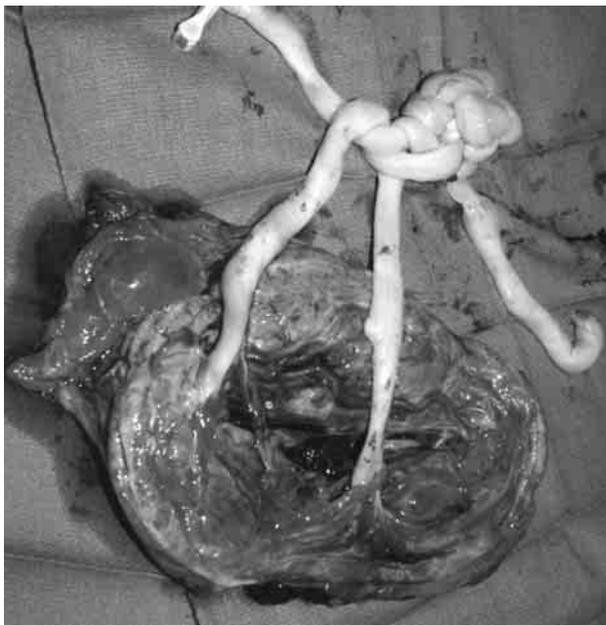


Figure 2
Umbilical cords at time of delivery.

babies were treated with phototherapy for mild jaundice and had problems with apneic episodes during feeding. Baby A was diagnosed with a patent foramen ovale. This is being followed on an outpatient basis. Baby A was discharged after 4 weeks of care in the NICU, and Baby B was discharged after 5 weeks. Both are currently doing well.

Discussion

A case of M/M twins is presented in which the management decision was aided by fetal heart rate monitoring and ultrasonography with doppler flow. The pathology of intertwined umbilical cords was correctly identified. While there is no definitive management scheme in M/M twins, the findings in this case suggest that recent improvements in perinatal monitoring can be very beneficial in deciding when to perform delivery. While intertwined umbilical cords do not mean that there will necessarily be a cord accident, a hypoxic event is possible. Two studies have suggested that cord accident mortality occurs before 30 to 32 weeks of gestation, and thus early monitoring beginning at 25 weeks is very important (Carr et al., 1990; Tessen & Zlatnik, 1991). When coupled with variable decelerations on NST delivery should be expedited.

The liberal use of NST and ultrasound with doppler in monitoring M/M twins should improve perinatal outcomes (Ezra et al., 2005; Heyborne et al., 2005).

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