



Twin pregnancies with two separate placental masses can still be monochorionic and have vascular anastomoses

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Objective: This study was undertaken to report the occurrence of bipartite monochorionic twin placentas.

Study design: Examination of 109 monochorionic placentas delivered at our institution between June 2002 and June 2005 was performed. Placental characteristics on prenatal ultrasound were studied, including single or double appearance and type of intertwin membrane-placental junction ("T" sign or lambda sign). Monochorionicity was confirmed by postnatal histologic confirmation (diamniotic intertwin membrane without chorionic tissue within the dividing septum). Bipartition was diagnosed when 2 separate placental masses attached by membranes were identified.

Results: Of the 109 monochorionic placentas, 3 were composed of 2 separate placental masses. Prenatal ultrasound examination showed 2 separate placental masses in each case. Monochorionicity was suspected on prenatal ultrasound because of the presence of "T" sign in 2 cases and twin-to-twin transfusion syndrome (TTTS) in another case. Microscopic examination of the dividing septum was consistent with monochorionicity in each case. Vascular anastomoses were present in 2 of the 3 placentas, and led in both cases to the development of TTTS.

Conclusion: Two separate placental masses in twin pregnancies are not per se dichorionic and may occur in almost 3% of monochorionic placentas.

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Twin pregnancies are either dichorionic (DC) or monochorionic (MC). Exact determination of chorionicity is of major clinical importance because of the high risk of perinatal mortality and morbidity in MC twins.¹ Perinatal mortality is almost 3-fold higher in MC twins compared with DC twins,² whereas neurologic morbidity is 7-fold higher in MC infants than in DC infants.³ Chorionicity can be determined on early prenatal

ultrasound examination. Examination of the type of insertion of the intertwin dividing membrane, fetal sex, and number of placentas allows a fairly accurate determination of chorionicity when performed during the first trimester of pregnancy.⁴⁻⁶ Microscopic examination of the intertwin membrane after delivery is accepted as the gold standard for chorionicity.⁷

Number of placental masses on prenatal ultrasound or at postnatal gross examination is often used in most contemporaneous studies to discriminate between MC and DC placentas.^{4-6,8} Traditional medical doctrine

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states that MC twin pregnancies are composed of 1 single placental mass. However, the number of placental masses is not a reliable criterion for assessing chorionicity.¹ To date, 2 cases of bipartite MC placentas have been reported.^{9,10} The incidence of bipartite MC placentas is not known and is thought to be extremely low.¹⁰

We report 3 cases of twins with separate placental masses on prenatal ultrasound and postnatal gross examination. On histologic examination, the intertwin membrane was found to be diamniotic in all 3 cases, confirming monochorionicity.

Material and methods

All placentas of MC twin pregnancies delivered at the Leiden University Medical Center between June 2002 and June 2005 were studied by gross and microscopic examination. The angioarchitecture was studied by injecting the umbilical vessels of both infants with 4 different colored dyes (blue or green for arteries and orange or yellow for veins). From an ultrasound database, we extracted the type of intertwin membrane-placental junction and number of placental masses on prenatal ultrasound examination. Postnatal histologic presence of a diamniotic intertwin membrane without chorionic tissue within the dividing septum was required to diagnose monochorionicity. Placentas were divided into those with a single mass and those with more than 1 placental mass. Bipartition was defined as 2 separate placental masses attached by membranes. Diagnosis of twin-to-twin transfusion syndrome (TTTS) was based on standard antenatal ultrasound criteria.¹¹ To illustrate the importance of correctly diagnosing placental morphology prenatally, the cases with a bipartite MC placenta are described in detail.

Results

A total of 120 consecutive MC twin pregnancies were delivered at our institution during the study period. TTTS was found in 52.5% (63/120) of MC twin pregnancies, whereas 48.5% (57/120) of MC pregnancies were not affected by TTTS. Our center is the national reference center for fetoscopy and invasive fetal therapy, which explains the high rate of TTTS in our series. In 11 cases, the data required for this study could not be recorded completely. A total of 109 MC placentas were suitable for histologic examination and injection study with colored dye and had data available concerning the type of intertwin membrane and number of placental masses on prenatal ultrasound examination. Of the 109 MC placentas, 3 (2.8%) were composed of 2 separate placental masses on gross examination after delivery. Prenatal ultrasound examination showed 2 separate placental masses. Monochorionicity was suspected on prenatal

ultrasound because of the "T" sign in 2 cases and TTTS in another case. Monochorionicity was confirmed on microscopic examination of the intertwin septal membrane in all cases. Placental injection studies showed vascular anastomoses in 2 of the 3 bipartite MC placentas.

Case reports

Case 1

A 30-year-old woman, gravida 2, para 1, was referred to our institution at 16 weeks' gestation with signs of TTTS. Prenatal ultrasound examination performed at 9 weeks' gestation showed initially a single placental mass and a thin dividing membrane and 'T'-sign suggestive of MC diamniotic twin pregnancy. Ultrasound examination at our center showed polyhydramnios (deepest vertical pocket 8 cm) in the amniotic sac of the first fetus (recipient) and an enlarged bladder. The second fetus (donor) had oligohydramnios (deepest vertical pocket 2 cm) and showed a collapsed bladder. TTTS Quintero stage II was diagnosed. Two separate placental masses without connecting tissue were then observed; cord insertions of the recipient and donor were located on the anterior and posterior placental mass, respectively. Fetoscopic laser coagulation of vascular anastomoses was successfully performed. Two velamentous arteriovenous anastomoses from donor to recipient were coagulated. Two healthy girls were born at 36 weeks of gestation. The ex-donor twin was born first and weighed 2275 g. The second-born ex-recipient twin weighed 2885 g. Birth weight discordance was 21%. The Apgar score of the first- and second-born twin was respectively 1/7/9 and 9/10/10 at respectively 1, 5, and 10 minutes. Both infants had the same blood group, A Rh-negative and negative Coombs' tests. Stay at our neonatal intensive care unit was uneventful.

The placenta was composed of 2 distinct placental masses that were minimally 1 cm separate from one another and linked together by a bridge of membranes. The umbilical cord insertion of the donor twin was velamentous, whereas the umbilical cord insertion of the recipient was central. Injection with colored dye showed no residual vascular anastomoses (Figure 1). Laser coagulation spots are shown in Figure 2. Microscopic examination of the dividing membrane showed diamniotic fetal membranes without chorionic membranes. DNA zygosity studies involving 10 polymorphic markers performed on DNA extracted from the umbilical cord of each twin showed sharing of all 10 markers, indicating a 99.9% probability of monozygosity.

Case 2

A 33-year-old woman, gravida 3, para 2, was referred to our center for suspected TTTS at 27 weeks' gestation.

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