Monochorionic quadruplet pregnancy without severe complications: sonographic work-up and placental findings

Monozygotic, monochorionic quadruplet pregnancy is extremely rare and is estimated to occur at a rate of 1 in 10−15 million pregnancies. Only one documented case of monochorionic quadruplets has been published with sonographic work-up of the placenta and a successful perinatal outcome. In this report, we describe, to the best of our knowledge, the first such case in Germany.

A 31-year-old woman, gravida 2 para 1, at 11+6 weeks' gestation was referred for first-trimester screening and suspected to have a spontaneous quadruplet pregnancy. On ultrasound imaging (GE Medical Systems, Zipf, Austria) we found a monochorionic, quadramniotic quadruplet pregnancy (Figure 1) with a placental insertion of the umbilical cord central in the first fetus, velamentous in the second, lateral in the third and marginal in the fourth. The membranes approached the placental surface in a T-shape. Detailed ultrasound revealed normal growth, nuchal translucency (crown–rump length, 53.3–57.6 mm), heart anatomy and Doppler spectrum in the umbilical artery and ductus venosus for all fetuses. After comprehensive counseling regarding the medical, social and economic challenges of quadruplets, the parents decided to continue the pregnancy.

We continued to monitor the patient for the remainder of her pregnancy, performing 12 sonographic evaluations in total. At each evaluation, we measured the biometry, Doppler parameters of the umbilical and middle cerebral arteries, the deepest pool of amniotic fluid and the sonographic length of the cervix. There was no evidence of any complications up to 27+6 weeks' gestation.

However, the following day the patient reported sudden abdominal pain. Clinical and sonographic evaluation revealed polyhydramnios in the fourth fetus without other complications. This evaluation suggested the onset of twin–twin transfusion syndrome (TTTS). Therefore, we performed an elective Cesarean section to prevent progression of the condition.

Four live female infants were admitted to the neonatal intensive care unit (Table 1). Following an uneventful neonatal period of 63 days, four healthy infants were discharged from the hospital without any complications. Inspection of the placenta revealed four separate amniotic sacs surrounded by one chorionic membrane, thereby confirming the diagnosis of a monochorionic quadramniotic pregnancy and placental insertions of the umbilical cords (Figure 2). Detailed evaluation of the placenta showed 11 vascular anastomoses between all four supplying areas. Of these, only three were intertwin arteriovenous anastomoses between the third and fourth fetuses. All supplying areas were approximately the same size.

The risks of complications of quadruplet pregnancies are high and depend on the chorionicity. In twins

Table 1 Perinatal outcomes in the quadruplets

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Quadruplet 1</th>
<th>Quadruplet 2</th>
<th>Quadruplet 3</th>
<th>Quadruplet 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (g)</td>
<td>1050</td>
<td>986</td>
<td>1050</td>
<td>1100</td>
</tr>
<tr>
<td>Umbilical artery pH</td>
<td>7.33</td>
<td>7.28</td>
<td>7.37</td>
<td>7.07</td>
</tr>
<tr>
<td>Base excess (mEq/L)</td>
<td>−2.4</td>
<td>−2.7</td>
<td>−2.3</td>
<td>−5.2</td>
</tr>
</tbody>
</table>

*Recorded at 1, 5 and 10 min.
and triplets, monochorionicity is also linked to higher morbidity and mortality rates. Thus, we expected that our monochorionic quadruplet pregnancy would have an extremely high probability for complications before 28 weeks. We assumed that a large number of communicating placental blood vessels between the four placental supply areas accounted for TTTS. Poor outcomes associated with TTTS in quadruplets are well documented in the literature. In our case, the small number of arteriovenous anastomoses (Figure 2) could explain the late onset of TTTS.

In summary, in cases of monochorionic quadruplet pregnancy in which maternal, placental and fetal conditions are comprehensively known and appear normal, the first cautious prognosis can be made after first-trimester screening. The architecture of the placenta and the competence of the cervix are important features in predicting the final outcome.

S. Faber*,†, S. Riße†, H. Steinke‡, U. Thome§ and H. Stepan¶
†Center of Prenatal Medicine Leipzig, Johannisplatz 1, 04103 Leipzig, Germany,
‡Institute of Anatomy, University of Leipzig, Leipzig, Germany,
§Department of Neonatology, University of Leipzig, Leipzig, Germany;
¶Department of Obstetrics, University of Leipzig, Leipzig, Germany
*Correspondence.
(e-mail: faber@praenatalmedizin-leipzig.de)

References