Amniorupture Leading to Cord Entanglement in Twin Gestation Complicated by Twin to Twin Transfusion

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By OBGYN.net Staff [1]

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Introduction

Twin to twin transfusion syndrome (TTTS) is a common complication of monochorionic twin gestations. If untreated, this condition carries a very high mortality rate for both twins. The therapeutic options available today are still rather limited. Therapeutic amniocentesis (amnioreduction) of the recipient twin's amniotic fluid has been shown to be effective in equalising pressures between the two amniotic cavities, decreasing the incidence of hydrops in the recipient, and subsequently improving perinatal outcome. It is worth noting that during amnioreduction, a small percentage of monochorionic diamniotic pregnancies may be iatrogenically converted to monoamniotic pregnancies (also described as pseudomonoamniotic) carrying with it the high risk of cord entanglement as well as subsequent risk of morbidity and mortality which is observed in true monoamniotic pregnancies. This presentation describes the occurrence of amniorupture in a twin pregnancy affected by TTTS and highlights the potential complications.

Case Description

A 32yo G3P2 presented for a routine anatomy scan at 20 weeks gestation by LMP. The ultrasound demonstrated a live twin gestation with a single anterior placenta and a thin inter-twin membrane characteristic of monochorionic diamniotic pregnancy. The twins were symmetrical in size and the amniotic fluid volumes also appeared equal.

<table>
<thead>
<tr>
<th>20w GA</th>
<th>Position</th>
<th>BPD</th>
<th>HC</th>
<th>FL</th>
<th>AC</th>
<th>AUA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin A</td>
<td>Left</td>
<td>4.6</td>
<td>16.8</td>
<td>3.1</td>
<td>14.6</td>
<td>19w4d</td>
</tr>
<tr>
<td>Twin B</td>
<td>Right</td>
<td>4.6</td>
<td>16.4</td>
<td>3.1</td>
<td>14.4</td>
<td>19w3d</td>
</tr>
<tr>
<td>Twin A</td>
<td>BPD</td>
<td></td>
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<td></td>
<td>AC</td>
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</table>
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Comparison

No appreciable difference in the size and appearance of fetal heads and abdomens. Amniotic fluid volumes were equal.

The image quality of this scan was limited, and though no fetal anatomic abnormalities were identified, the patient was referred for a re-scan in 14 days at 22 weeks GA. This ultrasound demonstrated evidence of twin to twin transfusion syndrome characterized by vast discrepancy amniotic fluid volumes (A-polyhydramnios, B-anhydramnios sequence) and an appreciable discrepancy in fetal sizes. The anatomy survey was completed at this time, and no fetal anatomic abnormalities were identified on either twin. The patient was appropriately counseled and admitted for immediate therapeutic amniocentesis.

<table>
<thead>
<tr>
<th>22w GA</th>
<th>Position</th>
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<th>HC</th>
<th>FL</th>
<th>AC</th>
<th>AUA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin A</td>
<td>Left</td>
<td>5.1</td>
<td>17.9</td>
<td>3.7</td>
<td>15.4</td>
<td>20w6d</td>
</tr>
<tr>
<td>Twin B</td>
<td>Right</td>
<td>4.7</td>
<td>17.1</td>
<td>3.4</td>
<td>14.5</td>
<td>19w3d</td>
</tr>
</tbody>
</table>
Comparison Twin B appears stuck on maternal right, while twin A has acquired polyhydramnios (maternal left).

Follow-up ultrasound at 24.5 weeks GA showed reaccumulation of amniotic fluid in the sac of twin A. Additionally, twin A had acquired abdominal ascites and scalp edema. The amniotic fluid volume for twin B appeared satisfactory. Serial amnioreductions were performed between 22 and 30 weeks. Follow-up ultrasound examinations were arranged.

<table>
<thead>
<tr>
<th>Twin A</th>
<th>25.5wks</th>
<th>27wks</th>
<th>30wks</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Ultrasound Image" /></td>
<td><img src="image2.png" alt="Ultrasound Image" /></td>
<td><img src="image3.png" alt="Ultrasound Image" /></td>
<td></td>
</tr>
</tbody>
</table>

Comment Ascites Comparison of abdomens A and B Scalp Edema

Ultrasound at 25.5 weeks demonstrated an unusual appearance of a folded, relaxed intertwin membrane. At 27 weeks GA, the inter-twin membrane was not identified. Additionally, the twins appeared to have swapped in position. Twin A (originally on the left) was now in vertex presentation on maternal right, while twin B (originally on the right) was now in breech presentation on maternal left. We hypothesized that amniorupture, either iatrogenic or spontaneous, could account for these findings.

Overall fetal growth for both twins remained appropriate, however the AC of twin A increased markedly with accumulating ascites.
25.5w GA
Inter-Twin Membrane
Fetal distress at 32 weeks GA prompted an emergency Cesarean delivery. Twin A was delivered cephalic followed by twin B in breech presentation. Two amnions were identified at the placental surface, however there was evidence of extensive amniotic disruption. Pronounced cord entanglement was also noted. These findings were consistent with a pseudomonochorionic twin pregnancy. Twin A weighed 3028g and B 1084g. Apgar scores were 2,2,6 for twin A, and 8,10,10 for twin B (at 1, 5, 10 minutes respectively). Histopathology report confirmed a monochorionic diamniotic placenta with cord entanglement.

The twins were transferred to the New Born Intensive Care Unit immediately following delivery. The recipient twin (A) required bilateral chest drains and an abdominal drain along with ventilatory support. During the next 6 weeks, twin A lost approximately 1000grams subsequent to decrease in hypervolemia, while twin B gained approximately 600grams.
Twin B=1654g

Twins are progressing well, and their current weights are A=2086g, and B=1828g. They expect to go home in approximately 2 weeks time.

Discussion

The etiology of intrauterine amniorupture in our case is not known. The possibilities include spontaneous amniorupture which is known to occur, or iatrogenically induced amniotic membrane defect produced during a therapeutic amniocentesis.

The reduction of diamniotic gestations to monoamniotic has been referred to as a pseudomonoamniotic twin gestation. The incidence of iatrogenically induced pseudomonoamniotic twin gestations may be more common than is believed. This may be due to increasing frequency of 1) treatment of TTTS, or 2) any invasive procedure during pregnancy, such as amniocentesis on twins. Regrettably, pseudomonoamniotic gestations carry the high risk of cord entanglement as well as subsequent risk of morbidity and mortality which is observed in true monoamniotic pregnancies. Intentional penetration of the intertwin membrane by laser has been described by Gilbert and colleagues in which case this permitted access anomalous placental vessels for laser ablation. In 1990 Jeanty et al explored the possibility of performing genetic amniocenteses on twins with a single pass technique where the intertwin membrane would be penetrated. Although this approach is technically possible, it has been discouraged by other authors in fear of promoting amniotic tears and raising the incidence of pseudomonoamniotic pregnancies.

Although our case highlights the complications of pseudoamniotic twin gestation following amniorupture, several researchers have explored septostomy (iatrogenic amniotic membrane puncture) as a treatment for twin-to-twin transfusion. The rationale is to allow equalization of amniotic fluid pressures between the twins for the benefit of the anhydramnitic donor twin. The perinatal morbidity and mortality of this approach, however does not appear to be greater than that of serial aggressive amnioreduction.

Ultrasonography plays a major role not only in detecting pregnancies affected by TTTS, but also in assessing appropriate time for intervention, and providing guidance during therapeutic amniocentesis. Unfortunately, it can sometimes be difficult to visualize an intertwin membrane in pregnancies with oligohydramnios-polyhydramnios sequence. Features of a "stuck twin" may be helpful at confirming intact amnion when a membrane is not visualized. These include: immobile, "teathered", growth retarded fetus, in sharp contrast with the hyperactive (possibly hydropic) co-twin which seems to be “bouncing about” its amniotic cavity. Even if an intertwin membrane is confidently identified, subsequent rupture may occur. It is therefore not recommended to rely on the positive identification of a membrane from prior scans in determining diamnionicity; instead an effort should be made to visualize an intertwin membrane on every examination. Amniotic tears may be
extremely difficult to visualize directly, owing to the difficulty in visualizing even normal amnions in their entirety. Although we hypothesized that amniorupture had occurred in our case, the confirmatory findings were achieved only after birth. The clues that lead us to believe this pregnancy had become pseudomononamniotic were: complete swap in fetal positions, and sudden seemingly normal amniotic fluid volume around the donor twin B without apparent reduction in polyhydramnios of twin A.

**References:**


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