Original Article

Crown-rump length discordance in twins in the first trimester and its correlation with perinatal complications*

Zahra Shahshahan1, Maryam Hashemi2

Abstract

BACKGROUND: A difference more than 15-40% in birth weight of twins can predict perinatal complications. As significant difference in twins growth has a very important effect on pregnancy and perinatal complications, this study aimed to evaluate crown-rump length discordance (ΔCRL) in the first trimester of pregnancy and its correlation with perinatal complications.

METHODS: A total number of 118 women in the first trimester of twin pregnancy underwent ultrasound examination to measure ΔCRL. Then, at the time of delivery, perinatal complications in twins were recorded and the correlation between ΔCRL and perinatal complications were evaluated.

RESULTS: Among 118 studied mothers with twin pregnancy, ΔCRL was normal (< 11%) in 96 cases (81.4%) and high (≥ 11%) in 22 cases (18.6%). Birth weight discordance was normal (< 20%) in 103 cases (87.3%) and above normal (≥ 20%) in 15 cases (12.7%). The results revealed a significant correlation between higher frequency of small for gestational age (SGA) and high ΔCRL (more than 11%) (p = 0.01).

CONCLUSIONS: Our study concluded that SGA has a significant relationship with high ΔCRL (> 11%).

KEYWORDS: Crown-Rump Length, Discordance, Ultrasound Examination, Twins, Perinatal Complications.

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Assessment of fetal growth is very important in twin pregnancies because growth restriction and prematurity are the main causes of morbidity and mortality in twins.1

Although growth discordance in twins in the third trimester correlates with perinatal morbidities, the effect of growth discordance in the first trimester has not yet been fully understood.2, 3

Ultrasound examination in the first trimester is a useful method for an accurate estimation of fetal growth via measuring crown-rump length (CRL).1, 7

A difference of 15-40% in birth weight of twins can predict perinatal complications.8 About 15% of twins have a birth weight discordance of more than 20% which increases perinatal complications.9

Results of previous studies showed that the rates of small for gestational age (SGA) and cerebro-pulmonary complications in twins with a CRL discordance (ΔCRL) of more than 11% are significantly higher.1, 8

This study aimed to evaluate ΔCRL in the first trimester and its correlation with perinatal complications.

Methods

This study was a descriptive-analytical study including women in the first trimester of twin pregnancy. Monochorionic twins and women

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who underwent first- or second-trimester pregnancy termination were excluded. Totally 120 subjects with inclusion criteria were selected among pregnant women who referred to Alzahra and Shahid Beheshti hospitals in Isfahan. The study was approved by the Ethics Committee of Isfahan University of Medical Sciences and informed written consents were obtained from all of the participants.

Participants underwent ultrasound examination between 7th-14th week of pregnancy. The value of CRL, defined as the distance between the middle of fetal head and the lowest point of the bottom,10-12 was measured and recorded separately for each twin. Then, the CRL difference between the twins was calculated and the percent of ΔCRL was determined.

The value of ΔCRL was calculated as the difference between CRL in twins in the first trimester divided by the larger CRL. The differences more than 11% were considered as abnormal ΔCRL discordance.1, 12

Weight difference was calculated as the difference in birth weight between the twins divided by the birth weight of the larger twin. A difference more than 20% was considered as abnormal birth weight discordance.1, 12

Participants were followed until the end of the pregnancy and at the time of delivery a specific checklist including birth weight of each twin, birth weight difference between twins, percent of birth weight discordance, Apgar score (5 minutes after birth), perinatal complications like neonatal death, SGA, Apgar score < 7, admission in neonate intensive care unit (NICU), respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH) and necrotizing enterocolitis (NEC) was completed for the participants. Finally, the data were analyzed using SPSS 15.

Results
From 120 participants who enrolled in this study two were excluded because of pregnancy termination at the second trimester. Mean age of the participants at the time of pregnancy was 28.38 ± 4.62 years. Eighty-nine participants (75.4%) had twin pregnancy following treatment for infertility. Mean gestational age at the time of delivery was 33.86 ± 2.36 weeks (range: 28-38 weeks).

Among 118 mothers with twin pregnancy, ΔCRL was normal (< 11%) in 96 cases (81.4%) and high (≥ 11%) in 22 cases (18.6%). Birth weight discordance was normal (<20%) in 103 cases (87.3%) and above normal (≥ 20%) in 15 cases (12.7%).

Mean ΔCRL was 6.54% ± 5.81 and mean birth weight difference between the twins was 7.51 ± 7.72. A significant relationship was seen between ΔCRL and twins birth weight difference (p < 0.01; r = 0.42).

Our results showed that the most and least frequent perinatal complications among the studied twins were cerebro-pulmonary complications (72.9%) and acidosis (6.8%), respectively. In addition, a significant correlation was observed between higher frequency of SGA and high ΔCRL (> 11%) (p = 0.01). Moreover, significant correlations were seen between weight discordance > 20% and frequency of SGA (p < 0.01), NICU admission (p < 0.01) and cerebro-pulmonary complications (p = 0.01).

According to Table 1, ΔCRL > 11% was significantly related with gestational age at delivery, SGA and weight discordance > 20%. However, ΔCRL > 11% in twins did not have a significant correlation with mother’s age, perinatal death, Apgar score after 5 minutes < 7, pH of arterial blood < 7, NICU admission or other perinatal morbidities.

Discussion
Based on the results of the current study, although ΔCRL > 11% had a significant correlation with higher frequency of SGA in twins, it was not significantly related with other perinatal complications. Significant correlations between weight discordance > 20% and higher frequency of SGA, NICU admission and cerebro-pulmonary complications were also reported in this study.

Tai et al. found a significant relationship between ΔCRL > 11% and SGA and cerebro-pulmonary complications in twin pregnancies.1
Table 1: Comparison between normal and high crown-rump length discordance (ΔCRL) with twin pregnancy outcomes

<table>
<thead>
<tr>
<th></th>
<th>ΔCRL &lt; 11% (n = 96)</th>
<th>ΔCRL &gt; 11% (n = 22)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers' age (yr)</td>
<td>28.54 ± 4.67</td>
<td>27.68 ± 4.43</td>
<td>0.43</td>
</tr>
<tr>
<td>Gestational age at delivery (wk)</td>
<td>33.57 ± 2.39</td>
<td>35.10 ± 1.75</td>
<td>0.00</td>
</tr>
<tr>
<td>Weight discordance &gt; 20%</td>
<td>6 (6.25%)</td>
<td>9 (40.90%)</td>
<td>0.00</td>
</tr>
<tr>
<td>Small for gestational age</td>
<td>26 (27.08%)</td>
<td>12 (54.54%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Perinatal death</td>
<td>7 (7.29%)</td>
<td>3 (13.63%)</td>
<td>0.33</td>
</tr>
<tr>
<td>Apgar score after 5 minutes &lt; 7</td>
<td>10 (10.41%)</td>
<td>5 (22.72%)</td>
<td>0.11</td>
</tr>
<tr>
<td>pH of arterial blood &lt; 7</td>
<td>7 (7.29%)</td>
<td>1 (4.54%)</td>
<td>0.64</td>
</tr>
<tr>
<td>Admission in NICU*</td>
<td>38 (39.58%)</td>
<td>11 (50%)</td>
<td>0.37</td>
</tr>
<tr>
<td>Perinatal morbidity</td>
<td>24 (25%)</td>
<td>8 (36.36%)</td>
<td>0.53</td>
</tr>
<tr>
<td>Previous history of infertility</td>
<td>70 (72.91%)</td>
<td>19 (86.36%)</td>
<td>0.18</td>
</tr>
</tbody>
</table>

* NICU: Neonate Intensive Care Unit

P < 0.05 is considered as significant.
The results are expressed as mean ± SD or n (%) where applicable.

Although our results were similar to Tai et al. regarding the correlation between SGA and ΔCRL, we did not observe a significant correlation between cerebro-pulmonary complications and ΔCRL > 11% which may be due to the difference in sample size, race and gestational age at the time of delivery.

Unlike our study, Ananth et al. reported significant relationships between birth weight discordance ≥ 15% and stillbirth, neonatal death and preterm birth in twins.8

Erkkola et al. reported more increase in prenatal death in twins with weight discordance ≥ 25% compared with twins with weight discordance < 25%.13 However, our results did not suggest a significant correlation between weight discordance > 20% and prenatal death which may be due to the larger sample size (460) in Erkkola et al. study.

Although Yiono et al. showed that birth weight discordance > 15% in preterm twins (23-24 weeks) increases the risk of NEC, IVH and RDS,12 we found no correlation between birth weight discordance > 20% and these complications since we didn’t study on preterm twins.

We also found that twins with ΔCRL > 11% had higher gestational age compared to those with ΔCRL < 11%.

In conclusion, based on our results, among all perinatal complications, only SGA has a significant relationship with ΔCRL > 11%.

Conflict of Interests
Authors have no conflict of interests.

Authors' Contributions
Z SH presented the main idea, designed the study, supervised data collection, data analysis and helped in writing the article. M H designed the study, collected data and helped in writing the article. All authors have read and approved the content of the manuscript.

References