

*Original Article***Crown-rump length discordance in twins in the first trimester and its correlation with perinatal complications\****Zahra Shahshahan<sup>1</sup>, Maryam Hashemi<sup>2</sup>***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 ( $\Delta$ CRL) 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  $\Delta$ CRL. Then, at the time of delivery, perinatal complications in twins were recorded and the correlation between  $\Delta$ CRL and perinatal complications were evaluated.

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

**CONCLUSIONS:** Our study concluded that SGA has a significant relationship with high  $\Delta$ CRL ( $> 11\%$ ).

**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.<sup>1</sup>

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.<sup>2,3</sup>

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

A difference of 15-40% in birth weight of twins can predict perinatal complications.<sup>8</sup> About 15 % of twins have a birth weight dis-

cordance of more than 20% which increases perinatal complications.<sup>9</sup>

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

This study aimed to evaluate  $\square$ CRL 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 who underwent first- or second-trimester pregnancy termination were excluded. Totally

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1- Associate Professor of Obstetrics and Gynecology, Department of Obstetrics and Gynecology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

2- Assistant of Obstetrics and Gynecology, Department of Obstetrics and Gynecology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

Corresponding Author: Maryam Hashemi  
E-mail: hashemi@yahoo.com

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 7<sup>th</sup>-14<sup>th</sup> week of pregnancy. The value of CRL, defined as the distance between the middle of fetal head and the lowest point of the bottom,<sup>10-12</sup> was measured and recorded separately for each twin. Then, the CRL difference between the twins was calculated and the percent of  $\Delta$ CRL was determined.

The value of  $\Delta$ CRL 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  $\Delta$ CRL discordance.<sup>1, 12</sup>

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.<sup>1, 12</sup>

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  $28.38 \pm 4.62$  years. Eighty-nine participants (75.4%) had twin pregnancy following treatment for infertility. Mean gesta-

tional age at the time of delivery was  $33.86 \pm 2.36$  weeks (range: 28-38 weeks).

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

Mean  $\Delta$ CRL was  $6.54\% \pm 5.81$  and mean birth weight difference between the twins was  $7.51 \pm 7.72$ . A significant relationship was seen between  $\Delta$ CRL 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  $\Delta$ CRL ( $> 11\%$ ) ( $p = 0.01$ ). 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,  $\Delta$ CRL  $> 11\%$  was significantly related with gestational age at delivery, SGA and weight discordance  $> 20\%$ . However,  $\Delta$ CRL  $> 11\%$  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  $\Delta$ CRL  $> 11\%$  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  $\Delta$ CRL  $> 11\%$  and SGA and cerebro-pulmonary complications in twin pregnancies.<sup>1</sup>

**Table 1:** Comparison between normal and high crown-rump length discordance ( $\Delta$ CRL) with twin pregnancy outcomes

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

\* NICU: Neonate Intensive Care Unit

P < 0.05 is considered as significant.

The results are expressed as mean  $\pm$  SD or n (%) where applicable.

Although our results were similar to Tai et al. regarding the correlation between SGA and  $\Delta$ CRL, we did not observe a significant correlation between cerebro-pulmonary complications and  $\Delta$ CRL > 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  $\geq$  15% and stillbirth, neonatal death and preterm birth in twins.<sup>8</sup>

Erkkola et al. reported more increase in prenatal death in twins with weight discordance  $\geq$  25% compared with twins with weight discordance < 25%.<sup>13</sup> 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,<sup>12</sup> we found no correlation between birth weight discordance > 20% and these complications since we didn't study on pre-term twins.

We also found that twins with  $\Delta$ CRL > 11% had higher gestational age compared to those with  $\Delta$ CRL < 11%.

In conclusion, based on our results, among all perinatal complications, only SGA has a significant relationship with  $\Delta$ CRL > 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

1. Tai J, Grobman WA. The association of crown-rump length discordance in twin gestations with adverse perinatal outcomes. *Am J Obstet Gynecol* 2007; 197(4): 369-4.
2. Souter VL, Parisi MA, Nyholt DR, Kapur RP, Henders AK, Opheim KE, et al. A case of true hermaphroditism reveals an unusual mechanism of twinning. *Hum Genet* 2007; 121(2): 179-85.

3. Golubovsky MD. Postzygotic diploidization of triploids as a source of unusual cases of mosaicism, chimerism and twinning. *Hum Reprod* 2003; 18(2): 236-42.
4. Ewigman BG, Crane JP, Frigoletto FD, LeFevre ML, Bain RP, McNellis D. Effect of prenatal ultrasound screening on perinatal outcome. RADIUS Study Group. *N Engl J Med* 1993; 329(12): 821-7.
5. Saari-Kemppainen A, Karjalainen O, Ylostalo P, Heinonen OP. Ultrasound screening and perinatal mortality: controlled trial of systematic one-stage screening in pregnancy. The Helsinki Ultrasound Trial. *Lancet* 1990; 336(8712): 387-91.
6. Waldenstrom U, Axelsson O, Nilsson S, Eklund G, Fall O, Lindeberg S, et al. Effects of routine one-stage ultrasound screening in pregnancy: a randomised controlled trial. *Lancet* 1988; 2(8611): 585-8.
7. Kalish RB, Chasen ST, Gupta M, Sharma G, Perni SC, Chervenak FA. First trimester prediction of growth discordance in twin gestations. *Am J Obstet Gynecol* 2003; 189(3): 706-9.
8. Ananth CV, Demissie K, Hanley ML. Birth weight discordancy and adverse perinatal outcomes among twin gestations in the United States: the effect of placental abruption. *Am J Obstet Gynecol* 2003; 188(4): 954-60.
9. Demissie K, Ananth CV, Martin J, Hanley ML, MacDorman MF, Rhoads GG. Fetal and neonatal mortality among twin gestations in the United States: the role of intrapair birth weight discordance. *Obstet Gynecol* 2002; 100(3): 474-80.
10. Hartley RS, Hitti J, Emanuel I. Size-discordant twin pairs have higher perinatal mortality rates than nondiscordant pairs. *Am J Obstet Gynecol* 2002; 187(5): 1173-8.
11. Kingdom JC, Nevo O, Murphy KE. Discordant growth in twins. *Prenat Diagn* 2005; 25(9): 759-65.
12. Yinon Y, Mazkereth R, Rosentzweig N, Jarus-Hakak A, Schiff E, Simchen MJ. Growth restriction as a determinant of outcome in preterm discordant twins. *Obstet Gynecol* 2005; 105(1): 80-4.
13. Erkkola R, Ala-Mello S, Piironen O, Kero P, Sillanpaa M. Growth discordancy in twin pregnancies: a risk factor not detected by measurements of biparietal diameter. *Obstet Gynecol* 1985; 66(2): 203-6.