

To find umbilical coiling index of neonates with intrauterine growth restriction

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Abstract

Background: The umbilical cord is the life line of fetus as it supplies water, nutrients and oxygen. Its three blood vessels pass along the length of the cord in a coiled fashion.

Methods: This study was conducted at the Department of Obstetrics and Gynecology, SMS Medical College and Hospital, Jaipur, Rajasthan from the period of July 2018 to October 2019.

Results: In our study we found that in hypercoiling group 6 subjects subjects had IUGR, Innormocoiling group 7 subjects had IUGR (14.60%) out of 48 subjects and In hypocoiling group IUGR not found. P value is <0.001. There is significant relationship found between umbilical coiling index and intrauterine growth restriction as hypercoiling was highly associated with intra uterine growth restriction.

Conclusion: We infer that umbilical coiling index is an indicator of perinatal complications. Overcoiling is associated with intrauterine growth restriction.

Keywords: APGAR, IUGR, Morbidity.

Introduction

The umbilical cord is the life line of fetus as it supplies water, nutrients and oxygen. Its three blood vessels pass along the length of the cord in a coiled fashion. This coiling property of cord vessels was described as early as in 1521 by Berengarius. In 1954, umbilical coiling was first quantified by Edmonds¹ who divided the total number of coils by the umbilical cord length in centimeters and called it “The Index of Twist”. He assigned positive and negative scores to clockwise and anticlockwise coiling, respectively. Later, Strong et al² simplified by eliminating these directional scores and named it “The Umbilical Coiling Index”. An abnormal umbilical coiling index (UCI) has been reported to be related to adverse fetal outcomes³⁻⁶.

Enough data on UCI and its relationship with perinatal outcome are not available in India. This study was undertaken to find out the UCI in Indian babies and its relationship with antepartum and intrapartum outcomes

Materials and Methods

This study was conducted at the Department of Obstetrics and Gynecology, SMS Medical College and Hospital, Jaipur, Rajasthan from the period of July

2018 to October 2019. The protocol of the study was submitted to the institutional research board of our college. The research board concluded that the present study was exempt.

Patients in active labor irrespective of their parities, who had singleton pregnancies with live babies who were either delivered by vaginal or LSCS included in study and observed in second and third stage of labour.

Inclusion Criteria

1. Women in active labour admitted to LR
2. Pregnant mothers of any age and parity
3. Gestational age more than 28 weeks
4. Singleton live fetus

Exclusion Criteria

5. Anomalous foetus
6. foetus with single umbilical artery
7. mothers with drug abuse and smoking
8. multifetal gestation

Written and informed consent taken from all the subjects. A form was completed for each subject detailing her demographic, obstetric and medical history. Proper history was taken, general physical examination of the subjects were done. Then obstetrical examination was done. Subjects divided in two groups controls and cases.

- Group A (study group) : women with IUGR
- Group B (control group) : women without IUGR

IUGR defined as fetuses with a birth weight less than the 10th percentile of those born at the same gestational age or two standard deviation below the population mean.

Close intrapartum monitoring of the subjects were done for uterine contractions, dilation of the cervix, descent of the head and fetal heart sound. Duration of labour and mode of delivery was noted.

After delivery the umbilical cord was clamped, cut and the baby was handed over to the Pediatrician. The cord was tied and cut as close to baby as possible. The umbilical cord was measured in its entirety, including the length of placental end of the cord and the umbilical stump on the baby. The following parameters were noted-

1. Gestational age at delivery
2. Live or still born
3. Apgar score
4. Sex of the baby
5. Meconium staining of the liquor
6. Any congenital malformations
7. Birth weight of the baby
8. Evidence of intrauterine growth retardation

All the data thus obtained were charted, tabulated and statistical analysis was done using chi-square test, Fisher's exact test wherever applicable, statistical significance was defined as P value less than 0.05 for all analyses.

Observations and Results

Table 1: Age Distribution of subjects in case and control

	Case	Control
Mean ± SD	25.03±3.09	25.63±3.76
P value	0.422	

In our study there were 30 cases and 30 controls out of which in cases 21 were between 20-25 years age group and 9 were between 26-32 years of age group. In control 17 were between 20-25 years of age group and 13 were 26-32 years of age group.

Table 2: Meconium staining of liquor in relation to umbilical coiling index

	UCI Group			
	Hypocoiling	Normocoiling	Hypercoiling	Total
Present	4	8	1	13
Absent	2	40	5	47
Total	6	48	6	60
P value	0.001			

In our study Meconium staining of liquor was present in 1 subject in hypercoiling group and absent in 5 subjects. In normocoiling group 8 subjects had Meconium staining of liquor and absent in 40 subjects. In hypocoiling group 4 subjects had Meconium staining of liquor and absent in 2. P value is 0.001. There is significant relationship found between umbilical coiling index and meconium staining of liquor as in hypocoiling group 4 subjects out of 6 had meconium staining of liquor.

Table 3: Apgar Score of babies in relation to umbilical coiling index

	UCI Group			
	Hypocoiling	Normocoiling	Hypercoiling	Total
<5	0	3	1	3
>5	6	45	5	57
Total	6	48	6	60
P value	0.959			

In our study we found that 6 subjects in hypocoiling group had >5 APGAR score, In normocoiling group 3 subjects had <5 APGAR score (6.25%) and 45 had >5 APGAR score (93.75%). In hypercoiling group 1 had <5 APGAR score (16.67%) and 5 had >5 APGAR score (83.33%). P value is 0.959. There is no significant relationship found between umbilical coiling index and apgar score.

Table 4: IUGR babies in relation to umbilical coiling index

	UCI Group			
	Hypocoiling	Normocoiling	Hypercoiling	Total
Present	0	7	6	13
Absent	6	41	0	47
Total	6	48	6	60
P value	<0.001			

In our study we found that in hypercoiling group 6 subjects subjects had IUGR, Innormocoiling group 7 subjects had IUGR (14.60%) out of 48 subjects and In hypocoiling group IUGR not found. P value is <0.001. There is significant relationship found between umbilical coiling index and intrauterine growth restriction as hypercoiling was highly associated with intra uterine growth restriction.

Discussion

The umbilical cord is one of the most vital organ in a fetus. It is required for the development, well being and survival of a fetus. The vessels in umbilical cord is vulnerable to torsion, compression and is thus protected by Wharton jelly, the amniotic fluid, the helical pattern or the coiling of the umbilical cord.

Several studies have addressed the correlation between abnormal cord coiling and adverse pregnancy outcomes and most of them show an increase in adverse pregnancy outcome when there is an abnormal cord coiling.

In our study we included 60 subjects in which 30 were cases and 30 were controls. The cases include women with IUGR and controls include women without IUGR. In our study 1 subject in hypercoiling group had meconium staining of liquor(16.67%), In normocoiling group 8 subjects had meconium staining of liquor (16.67%) and In hypocoiling group 4 subjects had meconium staining of liquor(66.67%). P value is 0.001 there is significant relationship found between umbilical coiling index and meconium staining of

liquor as in hypocoiling group 66.67% of subjects had meconium staining of liquor which was similar to Patil NS et al (P value <0.001), Devaru D et al (P value 0.001).

In our study we found that 6 cases in hypocoiling group had >5 APGAR score, In Normocoiling group 3 subjects had <5 APGAR score (6.25%) and 45 subjects had >5 APGAR score (93.75%). In hypercoiling group 1 subject had <5 APGAR score (16.67%) and 5 subjects had >5 APGAR score (83.33%). P value is 0.959 so there is no significant relationship found between umbilical coiling index and apgar score which were similar to the study of Rubiee M et al (P value >0.05).

Conclusion

We infer that umbilical coiling index is an indicator of perinatal complications. Overcoiling is associated with intrauterine growth restriction.

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