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UMBILICAL CORD COILING INDEX AS A PARAMETER TO ASSESS PERINATAL OUTCOME

Gynecology

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ABSTRACT

To correlate the perinatal outcome by assessing the following parameters weight of the baby, meconium staining of liquor, APGAR score at 1 min, APGAR score at 5 minutes, Ponderal index, IUGR with the umbilical coiling index.Aim and Objectives

The present study is being done to evaluate the perinatal outcomes with the umbilical coiling index.

1. Hypocoiled cords and perinatal outcomes.
2. Hypercoiled cords and perinatal outcomes.

Materials and Methods: Pregnant women with term gestation, admitted as in-patients in Katuri Medical College and Hospital. The umbilical cord coiling index of 200 antenatals was measured in third trimester through ultrasound, in the duration of NOVEMBER 2016 to OCTOBER 2018. The study to correlate the relationship between the perinatal parameters like birth weight, meconium staining, pondral index, IUGR, APGAR score at 1 minute and APGAR score at 5 minutes and UCI was carried out which was statistically compared.

Results: There was significant correlation (P value < 0.05) between the parity and the hypo coiling of the umbilical cord coiling in primi gravid.Meconium staining was significant (P value < 0.02) with the hypocoiled cords in the present study.

Conclusion: The hypocoiled cords is associated with the primi gravida and meconium staining.

KEYWORDS

Hypocoiling umbilical cord; Hypercoiling umbilical cord, sonography, umbilical coiling index.

INTRODUCTION

The average number of helicles is 11 between the fetus and placental insertion.[1,2] The average length of cord ranges from 30-100 cms.[3]

The value of normal umbilical coiling ranges from (0.07 – 0.30) under Hyper coiling/ hypo coiling was defined as 0.07 coils / cm and over coiling as more than 0.30 coils / cm. (By Monique W.M. et al.,)[11]

Hypocoiling was defined when UCI was less than 10th percentile.[2,4,5,7,8]
Hypercoiling was defined when UCI was more than 90th percentile.[2,4,6,7,8]

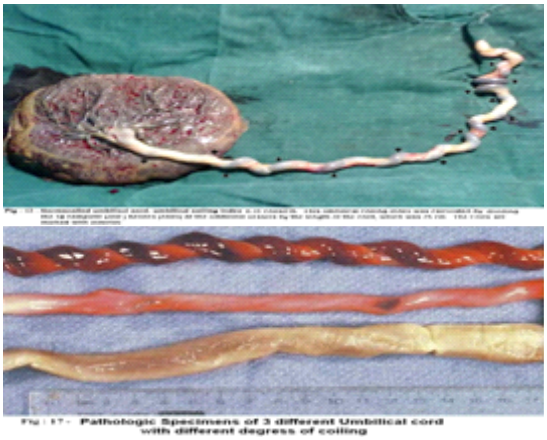

Fig : 17- Pathologic Specimens of 3 different Umbilical cord with different degress of coiling

Hypocoiled was associated with lower apgar score and meconium staining, according to study by Shalu Gupta et al., and no statistical significance was seen between hypercoiled and normocoiled cords.[6] Study by Monique W.M. Show hypocoiled coiling was associated with fetal death.[4] Low apgar at 5 minutes[4] velamentous cord insertion and dextral coiling, while

hypercoiling was associated with asphyxia, small for gestational age infants, single umbilical artery and sinistral coiling.[4]

$$\text{The umbilical coiling index} = \frac{\text{No. of coils in a cord}}{\text{Total length of cord in cms}}$$

Procedure of the study:

The study was conducted on patients who met the inclusion and exclusion criteria after taking written and informed consent. Maternal obstetrical history, medical history, and clinical examination findings was recorded in the proforma.

A trans-abdominal ultrasound was performed using a standard ultrasound scanner.

Coiling index was calculated as, It is a reciprocal value of mean of 3 measurements of pitch of one complete coil or as the reciprocal value of the largest length of umbilical cord without one complete coil.

These measurements were measured in a free-floating loop of umbilical cord.

Patients were followed till delivery; presence of meconium stained liquor, neonatal birth weight, apgar score and NICU admission were recorded. The newborns were considered low birth weight when the birth weight was below 2.5 kgs. Birth weight above 4 kgs was defined as macrosomia. Apgar below 7 was considered low. After this, perinatal factors like meconium staining, fetal weight, apgar score, ponderal index was correlated with it. Thus the effect of umbilical vascular coiling on perinatal outcome was carried out. All patients and baby were followed till discharge.

Results

Table 1: Umbilical Coiling Index

Umbilical coiling index, Hypocoiling <0.17 were 11(5.5%), Normocoiling 0.17-0.41 were 183 (91.5%), Hypercoiling >0.41 were 6(3%).

Umbilical coiling index	No.of babies	%
(Hypocoiling)<0.17	11	5.5
(Normocoiling)0.17-0.41	183	91.5
(Hypercoiling)>0.41	6	3
Total	200	100

Table 2: Correlation of Parity with UCI

There was statistical significance of Umbilical coiling index between primi gravid and multi gravid, in which Primi shows more of hypocoiling comparative multigravida.

Maternal variables	Umbilical coiling index				Pvalue
Parity	Normal	Hypo coiling	Hyper coiling	Total	0.05
Primi	82(89.13%)	7(7.61%)	3(3.26%)	92	
Multi	104(96.29%)	1(0.93%)	3(2.77%)	108	
Total	186(93%)	8(4%)	6(3%)	200	

Table 3: Correlation mode of delivery with UCI

More of Hypocoiling was seen in emergency LSCD comparative to elective and normal vaginal deliveries and there was no statistical difference between mode of delivery and umbilical coiling.

Maternal variables	UCI			P value
Mode of delivery	Normal	Hypo coiling	Hyper coiling	
• FTVD	100(93.46%)	4(3.74%)	3(2.80%)	0.35
• EM LSCD	34(91.90%)	3(8.10%)	0(0%)	
• EL LSCD	52(92.86%)	1(1.78%)	3(5.36%)	

Table 4: Correlation of birth weight of baby with UCI

Hypocoiling was more in neonates between 2-2.5kgs and there is no statistical significance between the groups.

Baby details	UCI			P value
Birth weight	Normal	Hypo coiling	Hyper coiling	
• 2-2.5	17(85%)	2 (10%)	1 (5.0%)	0.45
• 2.6-3	106(92.17%)	6(5.22%)	3 (2.61%)	
• 3.1-3.5	55(96.49%)	0 (0%)	2 (3.51%)	
• 3.6-4	8(100%)	0(0%)	0(0%)	

Table 5: Correlation of Apgar score at 1 minute of baby with UCI

As there is no neonate with APGAR<4.0, Hence no statistical significance between the 1st minute APGAR score and umbilical coiling can be ruled ou

Baby details	Umbilical coiling index		
Apgar score at 1minute	Normal	Hypo coiling	Hyper coiling
• <4.0	0(0%)	0(0%)	0 (0%)
• >4.0	186 (93%)	8(4%)	6(3%)

Table6: Correlation of Apgar score at 5 minutes of baby with UCI

APGAR at 5thmin < 7 is seen in only one neonate who has normocoiling and so correlation with APGAR at 5th min with umbilical coiling has no significant in this study.

Baby details	Umbilical coiling index			P value
APGAR score at 5 minute	Normal	Hypo coiling	Hyper coiling	
• <7.0	1(0.5%)	0(0.0%)	0(0%)	0.9
• >7.0	185(99.5%)	8(100%)	6(100%)	

Table 7: Correlation of Meconium Staining with UCI

More of hypocoiling is seen with meconium statining liquor, here the P value, which was statistically significant with P value being < 0.02 is significant.

Baby details	UCI			P value
Meconium staining	Normal	Hypo coiling	Hyper coiling	
• Yes	8(80%)	2(20%)	0 (0%)	<0.02
• No	178(93.68%)	6(3.16%)	6(3.16%)	

Table 8: Correlation of Ponderal Index with UCI

More of Hypocoiling is seen in ponderal index of >2.5 The umbilical coiling index in relation to ponderal index has not statistical significance.

Baby details	Umbilical coiling index			P value
Ponderal index	Normal	Hypo coiling	Hyper coiling	
• <2.5	1(100%)	0(0%)	0(0%)	0.9
• >2.5	185(92.96%)	8(4.02%)	6(3.02%)	

DISCUSSION

This is a prospective clinical study conducted in Department of Obstetrics and Gynaecology from Katuri medical college and hospital, Guntur in duration of November 2016 to October 2018.

200 women who fulfilled the selection criteria were taken for the study. UCI was measured in centimeter using ultrasound and the perinatal factors like meconium staining, birth weight, apgar score at 1 min and 5 min and ponderal index was correlated with UCI. The ponderal index was calculated by the formula.

Present study was aimed to assess whether umbilical cord thickness and umbilical coiling index could be a predictor for meconium staining and other adverse perinatal outcomes after 34 weeks period of gestation.

Mean cord thickness in the present study and Tahmasebhi et al[9] were 1.62 and 1.54 respectively which were comparable. Mean coiling index in present study, Tahmasebi et al[9], and Mustafa et al[34] were 0.42, 0.24 and 0.4 respectively which were also comparable.

Lean cord was found to be associated with more number of antepartum complications in the present study (p value =0.04), whereas Tahmasebi et al, had included only low risk cases in their study.

Lean cord was associated with Low birth weight babies (p value= <0.01) and MSAF (p value = <0.001) in Tahmasebi et al[9] compared to the present study were there was no such association.

Thick cord (p value =0.01) was found to be associated with macrosomia in present study as compared to Tahmasebi et al[9] were there was no such association.Cromi.et.al, 2007 found that the proportion of cases with the large umbilical cord was significantly higher in the group of macrosomic compared with non macrosomic infants (54.7% vs 8.7%) [10].

UCI below 0.09 was hypocoiling and above 0.26 was hypercoiling. In this study we found that PIH, IUGR, intrapartum FHR abnormalities, MSAF, increased instrumental deliveries, low APGAR scores, NICU admission, low birth weight and ponderal index were significantly associated with hypocoiling (P<0.005), IUGR and NICU admission were significantly associated with hypercoiling too (P<0.005).

CONCLUSION

This is a prospective study with 200 cases carried out to correlate the relationship between the abnormal umbilical coiling index (hyper or hypo) and adverse perinatal outcome.

Baseline characters were similar in the 3 groups. There was significant difference between the hypercoiled and hypocoiled group with respect to the perinatal parameters like IUGR, meconium staining, low apgar score at 1 min and 5 min.

The UCI more than 90th percentile (hypercoiling) was associated with IUGR babies and ponderal index < 2.5. The UCI less than 10th percentile (hypocoiling) was associated with meconium staining, apgar at 1 min <4 and apgar score at 5 min < 7, NICU admission of the babies.

Thus, both hypo and hyper coiling of cords had significant correlation with adverse fetal outcome.

REFERENCES

1. Edmonds HW. The spiral twist of normal umbilical cords in twins and singlestone.Am. J. Obstet Gynecol 1954 ; 67 : 102-20.
2. Strong TH, Jarles DL, Vega JS Feldman DB. The umbilical coiling index. Am. J. Obst. Gynecol Part I 1994 ; 170 (1) : 29-32.
3. Cunnigham FG, Gant NF, Leveno KJ, Gilstra III LC, Hauth JC, Westrom KD. The placenta and fetal membranes. In : Textbook of Williams Obstetrics. 21st edn. New York : McGraw Hill ; 2001. P. 105-106.
4. Monique WM, de Laat, Frank A, Dots ML, Verses GHA, Nikkels GJN. Obstet Gynecol 2006 ; 107 (5) : 1049-1055.
5. Rana J, Ebert GA, Kappy KA. Adverse perinatal outcome in patients with an abnormal umbilical coiling index. Obst. Gynaecol 1995 ; 85 (4) ; 573-77.
6. Gupta S., Faridi MMA, Krishnan J., Umbilical Coiling Index. J. Obstet Gynecol India, 2006 ; 56 (4) : 315-319.
7. Machin GA, Ackerman J, Gilbert BE. Abnormal umbilical cord coiling is associated with adverse perinatal outcome. Pediatr Dev. Pathol 2000 ; 3 : 462-71.
8. Ezimokhai m, Rizk DE, Thomas L. Maternal risk factors for abnormal vascular coiling of the umbilical cord. Am J Perinatol 2000 ; 17 : 441-5.
9. Tahmasebi M, Alighanbari R. Evaluation of Umbilical Cord Thickness, cross- sectional area and coiling index as predictors of Pregnancy Outcome. Genitourinary and Obstetric Radiology 2011;21(3):195-198.
10. Cromi A, Ghezzi F, Di Naro E, Siesto G, Bergamini V, Raio L. Large cross sectional area of the umbilical cord as a predictor of fetal macrosomia. Ultrasound Obstet Gynecol. 2007;30:861-66.