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Original research article

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STUDY OF LENGTH OF UMBILICAL CORD AND FETAL OUTCOME

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ABSTRACT:
Background & Objective: Umbilical cord length and number of loops around fetal neck leads to intrapartum complication which can predict by antenatal screening.
This study was carried out to find the effect of length of umbilical cord on intrapartum complication, mode of delivery, perinatal outcome.
Methods: This is a prospective study conducted at NHL MMC from August 2020 to July 2021. Total 300 cases were taken. Antenatal ultrasound carried out to screen nucle cord and after delivery number of loops were noticed and APGAR score noted.
Results: Out of 300 cases 5 case were <35 cm and 2 cases >102 cm ,97 cases were 66-75cm. 86% had medium cord length, 8.67% had long, 5.3% short cord length. 11.5% case with long case had IUFD. 85.7% with 3 loops delivered by cesarean section.
Conclusion: Increase umbilical cord length and loop associated with complication like fetal heart rate variation, fetal asphyxia, increase cesarean rate. Intrapartum fetal monitoring avoids perinatal morbidity and mortality.

Key words: Umbilical Cord, IUFD, Fetal asphyxia

Introduction:

The umbilical cord is lifeline of the fetus: “The baby’s life hangs by a cord”, as said by Ian Donald[1] aptly tells the importance of the umbilical cord. The umbilical cord play a vital role during intrauterine life of fetus. Umbilical cord is a pathway between mother, placenta and fetus during pregnancy and delivery. Intermittent or complete cord occlusion leads to intrauterine brain damage, fetal demise. Compression of cord leads to fetal distress due to vasospasm. Intrapartum fetal distress may be due to long and short cord complication. Short umbilical cord may be associated with adverse perinatal outcomes such as fetal growth restriction, congenital malformation, intrapartum distress and two-fold risk of fetal death[2].Abruption or hematoma at the attachment of placenta may occur due to short cord. Long umbilical cord is associated with cord prolapse, torsion, true knot entanglement around fetus[1].Nuchal cord that form early can resolve at any time or persist until term and coil may form shortly before delivery. Nuchal cord or cord around the neck of an infant at birth is a common finding that has implications for labour, management at birth, and subsequent neonatal status. Since the lengthening of cord occurs from the fetal end, perhaps coiling of cord represent a long-term record of fetal well-being[3].Nuchal

umbilical cord can be diagnosed antenatally with ultrasonography but the complications are unpredictable and unpreventable. This is a prospective study of fetomaternal outcome in 300 cases.

Material and method:

This is a prospective study conducted in the department of OBGY of SCL hospital, NHL MEDICAL COLLEGE from August 2020 to July 2021.

The present study included 300 cases. The patients admitted to labor room with period of gestation >37 weeks were included in study. After admission, history and examination of the women was carried out with consent of the patients.

Exclusion criteria:

- Malpresentation
- Multiple gestation

Mode of delivery vaginal or caesarean was noted.

Examination of umbilical cord done at the time of delivery and after delivery for the following:

- The presence of any loop round neck, trunk, shoulder etc.
- Number of loops of cord and position
- Knot of cord (true or false)

After the delivery of fetus, cord was clamped at two places and cut in between. From the cut end up to Fetal umbilicus and placental attachment umbilical cord length was measured and added. It was measured with flexible tape in cm.

Methodology: At the time of admission in labor room investigations and ultrasonography were carried out for fetal maturity and cord around neck. Position of the fetus and pelvis adequacy was checked for vaginal delivery. Details of each delivery of baby during the study period were recorded. NST/CST was done of each patient. Number of loops around the fetal neck, tight coils, or loose coils and APGAR score at 1 and 5 minutes were noted. Sex of baby was noted. Birth weight of all babies was noted. Length of cords was measured. A data check sheet was maintained for each case until completion of delivery.

Results:

Table1:- Cord length and case distribution

Length of cord (cm)	**<35**	**36-45**	**46-55**	**56-65**	**66-75**	**76-85**	**86-95**	**96-105**	**>106**	**total**
Number of cases	5	11	22	72	97	56	18	17	02	300
Percentage	1.66	3.66	7.33	24	32.33	18.66	06	5.66	0.66	100

Table2: Indication of LSCS

Indication of LSCS	**Short**	**Medium**	**Long**	**Total**
MSL/ Fetal distress	3	22	1	26
Abruption	3	2	1	6
Pre-Eclampsia	2	11	1	14

Previous CS	1	46	4	51
CPD	0	6	1	7
NPOL	0	6	2	8
Induction failure	0	5	0	5
Obstruction	0	4	1	5
Cord Prolapse	0	1	0	1
Other	1	16	02	19
Total	10	119	13	142

In our study 97 out of 300 cases had cord length of 66-75cm. Only 2 cases had cord length more than 106cm. out of 2 one had 2 tight loops and one had 3 tight loops. (Table 1) Mean Chord length was 70.6 cm. In our study 86% of cases had medium cord length. Cord length <45 cm was considered as a short cord (5.33%), cord length 46-90cm was consider as medium (86%) and length of >90 cm was considered as a long cord (8.67%). Table 2 shows that 142 out of 300 cases were undergo for LSCS. Out of 16 cases of short cord 10 (62.5%) were delivered by LSCS. From 258 cases of normal cord 119 (46.12%) were delivered by LSCS. We had 26 cases of long cord from that 13 (50%) were delivered by LSCS.30% of LSCS in short cord were due to abruption and another 30% due to fetal distress. We included breech, placenta previa, PROM, malpresentation, contracted pelvis in other indication. Due to tertiary care centre ratio of LSCS in our study was 47.3%. Main indication of LSCS was previous Cs. 15 out of 300 cases (5%) had Intra Uterine Fetal Death. Out of 16 cases of short cord 5 cases with short cord (31%) were associated with intrauterine fetal death. It suggests that short cords were more associated with IUFD. Only 2.7% of case with normal cord length had IUFD. So least association with IUFD. Only 11.5% case with long cord had IUFD. We did not include still born in our study. All the 3 cases of IUFD with long cord (20%) had loops around neck. Out of which one had 2 loops around neck and the other two had 3 loops of cord around neck.

Table3: Relation between cord loops and mode of delivery

No of loops	**Normal delivery**		**Caesarean**		**Total**
	Case	**Percentage**	**Case**	**Percentage**	**Case**
1 loop	14	46.67	16	53.33	30
2 loops	07	25.9	20	74.07	27
3 loops	01	14.28	06	85.7	07
True knot	08	57.14	06	42.86	14
Loop + knot	02	66.67	01	33.33	03
Total	32	39.6	49	60.4	81

Table 4: Apgar score

Apgar score	Short	%	Normal	%	Long	%	Total
<7	8	9.7%	63	76.8%	11	13.4 %	82
>7	3	1.4%	188	92.6%	12	5.9%	203
0	5	33.33 %	7	46.67 %	3	20%	15
Total	16		258		26		300

Table 3 shows that as the number of loops increases rate of caesarean section was high. Out of 300 cases 67 cases had cord around neck (22.33%). Here 44.77% case had one loop, 44.2% had 2 loops and 10.4% had 3 loops. In our study cases with 3 loops 85.7% delivered with caesarean section.In our study we had 16 cases of short cord. Out of 16 cases 5 were IUFD. 3 (27%) out of 11 cases had abnormal fetal heart rate variation In our study we had 26 cases of long cord. Out of 26 cases 3 was IUFD. 9 (39.1%) out of 23 cases had abnormal fetal heart rate variations. In our study we had 258 cases of normal cord. Out of 258 cases 7 cases were IUFD. Out of 251 cases 54 (21.5 %) had abnormal fetal heart rate variations.In our study we had 30 cases with 1 loop around neck out of which 5 case with 1 loop were IUFD. So from 25 cases 12 (48%) case had abnormal fetal heart. In our study we had 27 cases with 2 loops around neck out of which 2 case with two loops were IUFD. So from 25 cases 13 (52%) case had abnormal fetal heart. In our study we had 7 cases with 3 loops around neck out of which 2 case with three loops were IUFD. So from 5 cases 3 (60%) case had abnormal fetal heart. In our study we had 14 cases with true knot. From 14 cases 3 (21%) case had abnormal fetal heart.

- This table shows that APGAR score <7/10 in neonate was 9.7%, 76.8%, 13.4% in short medium and long cord respectively.
- Babies with APGAR <7 in this study were admitted in NICU for resuscitation care and severely affected babies were admitted for birth asphyxia and Meconium aspiration syndrome which prolonged NICU admission.

Discussion:

Total numbers of cases were 300. Out of which 42% cases were emergency case and 58 % were booked case. As our hospital is tertiary care center ratio of emergency cases were high. The majority of the cases were from the age group of 15-25 years, as expected as this age group consists of most fertile women. In our study 68% were multigravida and 32% were primigravida. Cord length <45 cm was considered as a short cord (5.33%), cord length 46-90cm was consider as medium (86%) and length of >90 cm was considered as a long cord (8.67%). In BALKAWADA et al study short cord was 5.9%, normal cord length in 88.8%, long cord in 5.3%.[4] In SHIVAKUMAR H C et al study short cord was 7.2 %, normal length in 86.4% and long cord in 6.4 %.[5]In our study mean cord length was 70.6 cm and 61-70 cm. in[5] and 50-60 cm. Eccentric insertion of cord is the commonest finding. In Balk wade's it was 62% and in Sivakumar hc et al it was 72.2%. Out of 16 cases of short cord 10 (62.5%) were delivered by LSCS. From 258 cases of normal cord 119 (46.12%) were delivered by LSCS. We had 26 cases of long cord from that 13 (50%) were delivered by LSCS. 30% of LSCS in short cord were due to abruption and another 30% due to fetal distress. In SHIVAKUMAR H C et al rate of LSCS in short cord (42.7%), medium cord (22%), long cord (26%) was noted. As the number of loops

increases rate of caesarean section was high. Out of 300 cases 67 cases had cord around neck (22.33%). Here 44.77% case had one loop, 44.2% had 2 loops and 10.4% had 3 loops. In SHIVAKUMAR H.C et al study they had 22% case with cord around neck. In our study cases with 3 loops 85.7% delivered with caesarean section. The one baby with 3 loops which was delivered by vaginal route was IUFD. In our study we had 16 cases of short cord out of 5 were IUFD and 3 (27%) out of 11 cases had abnormal fetal heart rate variation. Moreover, In our study we had 26 cases of long cord out of which 3 were IUFD. 9 (39.1%) out of 23 cases had abnormal fetal heart rate variations. However, we had 258 cases of normal cord in our study out of which 7 cases were IUFD. Out of 251 cases 54 (21.5 %) had abnormal fetal heart rate variations. Fetal bradycardia seen in 32% of short cord, 40% of long cord.[5] whereas it is seen 32.7% of short cord and 41.5% in long cord.[6] It has shown statistically significant ($p < 0.001$) association of cord complication with long cords. In present study, 67 cases had nuchal cord i.e. (22.3%). The incidence is almost same as Sivakumar hc et al (21%) and Balk wade et al (20.7%). Shrestha studied Nuchal cord and perinatal outcome. Neonatal outcome was analyzed by Apgar score at 1 and 5 min and the need for neonatal unit admission. Apgar score <7 at 1 min was present in 24.78 % (n = 29) of newborns in study group and 14.68 % (n = 58) of newborns in control group, which was statistically significant ($p = 0.01$).[6] Spellacy et al.[7] showed that all cord complications showed significantly low Apgar scores at 1 min. Atalla et al.[8] found no relation between umbilical cord indices and intrapartum FHR decelerations, meconium staining of the amniotic fluid, or mode of delivery. It showed that cord length did not vary according to the weight, length and sex of the baby.[5 6] In study of Seema Sharma et al, the cord length varied from 16 to 144 cm. The mean cord length was 64.2 cm (±17.26 cm). Maximum cases seen were in the group of cord length between 50 and 59 cm (27.8%). A positive correlation existed between the cord length and birth weight and placental weight and body length of the newborn. There was no significant difference between sex of the fetuses and the cord length. Abnormal cord length cases (long and short group) have higher incidences of cord complications, and hence there was increased incidence of operative interference in such cases. The cases of long cord group had maximum number of lower segment cesarean section (46.43%) in this study. The incidence of birth asphyxia (21%) was significantly more in long and short cords as compared with normal length cords[9]. In study of Birla Nandini et al cord length varied from 24 to 124 cm. The mean cord length was 61.7cm. Short cord group was associated with significant higher ($p < 0.05$) incidence of LSCS cases. Cord length did not vary according to the weight, length and sex of the baby. The incidence of all types of cord complications increases as the cord length increases ($p < 0.001$). Nuchal cords had higher mean cord length than in cases without nuchal cords ($p < 0.001$). As the number of loops in a nuchal cord increases to more than two loops, the operative interference increase. Nuchal cords were seen to be associated with more cases of fetal heart abnormalities ($p < 0.001$). There is higher incidence of variability in fetal heart rate with extremes of cord length ($p < 0.001$). Cases which had short and long cords constituted abnormal umbilical cord length. These cases had higher incidence of cord complications, increased incidence of operative interference, intrapartum complications, increased fetal heart rate abnormalities, and more chances of birth asphyxia. But umbilical cord length did not vary according to the weight, length and sex of the baby.[10]

CONCLUSION:

Increase umbilical cord length and loop associated with complication like fetal heart rate variation, fetal asphyxia, increase cesarean rate. Intrapartum fetal monitoring avoids perinatal morbidity and mortality.

REFERENCES:

1. Ian Donald. Practical Obstetric Problems. 1994;417
2. Krakowiak P, Smith EN, de Bruyn G, Lydon Rochelle MT. risk factor and outcomes associated with a short umbilical cord. Obstet Gynecol.2004; 103:119-27
3. T.H. Strong Jr., J.P. Elliot, and T.G. Radin, "Non coiled umbilical blood vessels: a new marker for the fetus at risk," Obstetrics and Gynaecology. 1993; 81(3): 409-411.
4. Nilesh Umesh Bal Kawada and Mangala Ashok Shinde study of length of umbilical cord and fetal outcome: a study of thousand deliveries. Journal of Obstetrics and Gynaecology of India, 03 Oct 2012, 62(5):520-525.
5. Shiva Kumar HC, Tharihalli CT, Chandrashekhar K, Gaddi SF. Study of length of umbilical cord and fetal outcome: a study of 1000 deliveries. Int J Reproud Contracept Obstet Gynecol 2017; 6:3770-5.
6. Shrestha NS, Singh N. Nuchal cord and perinatal outcome. Kathmandu Univ Med J. 2007; 19:360–363.
7. Spellacy WN, Gravem H, Fisch RO. The umbilical cord complications of true knots, nuchal coils and cords around the body. Am J Obstet Gynaecology. 1966;94(8):1136–1142.
8. Atalla RK, Abrams K, Bell SC, et al. New-born acid-base status and umbilical cord morphology. Obstet Gynecol. 1953;92(55):865–886.
9. Sharma S, Soliriya V. Study of Length of Umbilical Cord at Term and Its Correlation with Fetal Outcome: A Study of 500 Deliveries. J South Asian Feder Obst Gynae 2016;8(3):207-211.
10. Dr. Birla Nandini. Study of Relationship Between Umbilical Cord Length and Maternal and Fetal Outcome: study of 500 case. Indian journal of research. 2015; 4(7): 35-38

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