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Original research article

Correlation between umbilical cord length and pregnancy outcome in a tertiary care hospital

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Abstract

Aim and Objective: To correlate umbilical cord length in women delivering at term with maternal and fetal outcome. The mother's adequate blood flow through the umbilical cord is essential for the development and health of the foetus. Unfavorable prenatal outcomes result from anomalies in the umbilical cord, which prevent the fetus's proper blood flow, gas exchange, and provision of nutrients from the mother.

Methods: A Cross sectional study carried out at Department of OBG, Malla Reddy Institute of Medical Sciences from November 2021 to October 2022 to 100 term pregnancies study population were chosen. Umblical cord length was measured post-delivery and feto-maternal outcomes were analysed.

Results: The most delicate component of the foetal anatomy is the umbilical cord and its critical blood arteries. It is thought that early in the gestation, a cord's total number of coils is determined. Table 1 and Figure 1 display the length of the chord in proportion to the number of instances and their percentage. Ten cases had short cords, 81 cases had typical coeds, and nine cases had long cords. Table 2 and Figure 2 show the cord insertion via eccentric, central, marginal, and velamentous at 66%, 32%, and 1%, respectively, based on their percentages. In reference to NVD, Table 3 shows that the modes of delivery for long chord, normal coed, and short cord are 7, 57, and 4 correspondingly.

Conclusion: The current investigation demonstrated that the umbilical cords length is varying. Short or long chord cases were more likely to experience difficulties such more surgical births, foetal heart rate anomalies, and neonatal hypoxia.

Keywords: Correlation, umbilical cord, pregnancy outcome, tertiary care

Introduction

The baby's life hangs by a cord, as Ian Donald [1] aptly put it, and the umbilical cord is the lifeline of the developing fetus. The term "viviparity" refers to the development of the embryo inside the mother's body. Mammals that give birth are the best example. The umbilical cord is one of the fetoplacental unit's most crucial components. Complete cord occlusion frequently results in the death of the fetus, whereas intermittent obstruction has been linked to intrauterine brain damage. Fetal distress is frequently caused by vasospasm and compression in utero. Significant lesions that may be related to these processes are frequently found during a careful umbilical cord examination.

A fetus's health and growth are highly dependent on the mother's normal blood flow through the umbilical cord. Umbilical cord abnormalities disrupt the fetus's normal blood flow, gas exchange, and nutrition supply from the mother, which has a negative impact on the fetus's perinatal outcome. Fetal growth restriction (FGR), intrauterine foetal hypoxia, foetal distress, and intrauterine brain damage are all frequently caused by intermittent obstruction or vasospasm of the cord during the antenatal period. The majority of the time, the cause of complications in labor-which can include birth asphyxia, foetal distress, and failure to progress in the second stage of labor is not immediately apparent [2].

A known risk factor for a poor perinatal outcome is abnormal cord length, either too long or too short. Long cords have been linked to cord prolapse, entanglement, torsion, and thrombosis, whereas short cords have been linked to cord rupture, the failure of the fetus to descend during labor, as well as some congenital anomalies and malpresentation [3].

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Methodology

A cross-sectional study with 100 term pregnancies as the study population was carried out at Department of OBG, Malla Reddy Institute of Medical Sciences from November 2021 to October 2022. The length of the umbilical cord was measured following delivery, and feto-maternal outcomes were examined.

Inclusion criteria

Women having typical, straightforward pregnancies. Singleton deliveries that occur back-to-back, cesarean sections, and moms in the 20- to 35-year-old age range

Exclusion criteria

Women who experience problematic or unusual pregnancies inherited abnormalities diabetes mellitus, hypertension, anemia, and many pregnancies are examples of maternal disorders.

Results

Table 1: Length of umblical cord

Length of the cord	No. of cases	%
Long cord	9	9%
Normal cord	81	81%
Short cord	10	10%
Total	100	100

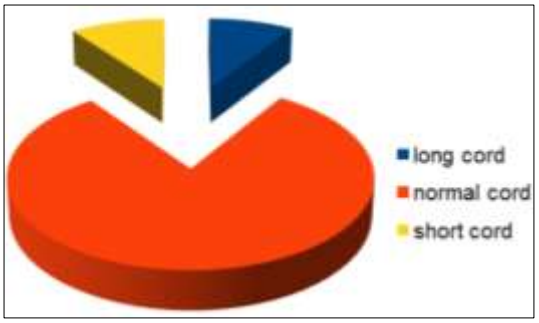

Fig 1: Graph of length of umblical cord

The length of the cord is shown in table 1 and figure 1 in relation to the number of cases and their percentage. Nine cases involved lengthy cords, 81 cases involved regular coeds, and ten cases involved short cords.

Table 2: Cord insertion

Eccentric	66%
Central	32%
Marginal	1%
Velamentous	1%

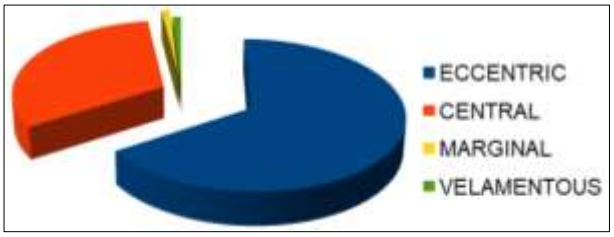

Fig 2: Graph of Cord Insertion

According to their percentages, the cord insertion via eccentric, central, marginal, and velamentous is displayed in table 2 and figure 2 at 66%, 32%, and 1%, respectively.

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Table 3: Mode of Delivery

Cord length	NVD	
Long cord	7	77.70%
Normal cord	57	70.30%
Short cord	4	40%
Total	68	

In relation to NVD, the mode of delivery is depicted in Table 3 as 7, 57, and 4 for long chord, normal coed, and short cord, respectively.

Cord Length	LSCS	
Long cord	2	22%
Normal cord	24	29.6%
Short cord	6	60%
Total	32	

In relation to LSCS, the mode of delivery is depicted in above Table as 2, 24, and 6 for long chord, normal coed, and short cord, respectively.

Table 4: Nuchal Cord

Cord length	Nuchal cord	%
Long cord	7	38.8%
Normal cord	10	55.5%
Short cord	1	5.5%
Total	18	

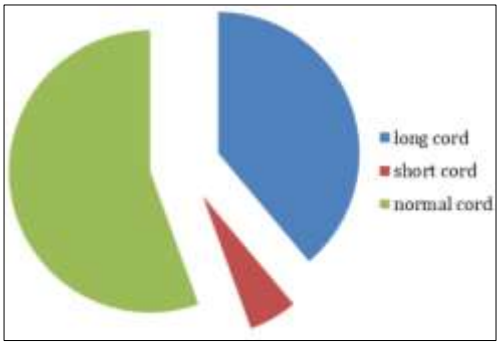

Fig 3: Graph of Nuchal Cord

In relation to Nuchal Cord, the cord length is depicted in above Table 4 as 7, 10, and 1 for long chord, normal coed, and short cord, respectively.

Table 5: Fetal Bradycardia

Cord length	Fetal bradycardia	%
Long cord	7	46.60%
Normal cord	3	20.00%
Short cord	5	33.3%
Total	15	

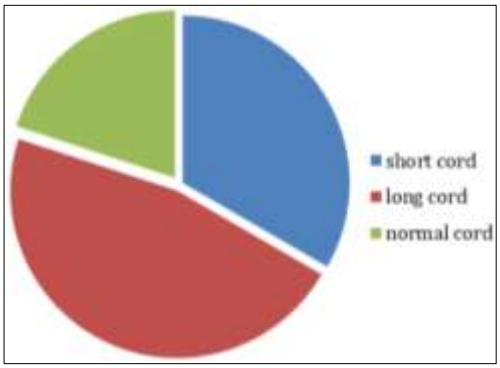

Fig 4: Graph of fetal Bradycardia

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In relation to fetal bradycardia, the mode of delivery is depicted in above Table 5 and figure 4 as 7, 3, and 7 for long chord, normal coed, and short cord, respectively.

Discussion

The part of the fetal anatomy that is most susceptible is the umbilical cord and its vital blood vessels. It is thought that early in the gestation, the total number of coils for any given cord is established. Uncertainty surrounds the function of umbilical cord coiling, but it is assumed that it serves to protect the cord from outside forces like tension, pressure, stretching, and entanglement. The aim of our study was to know the relationship between umbilical cord and pregnancy outcomes in the tertiary care hospital. The length of the cord is shown in table 1 and figure 1 in relation to the number of cases and their percentage. Nine cases involved lengthy cords, 81 cases involved regular coeds, and ten cases involved short cords. According to their percentages, the cord insertion via eccentric, central, marginal, and velamentous is displayed in table 2 and figure 2 at 66%, 32%, and 1%, respectively.

In relation to NVD, the mode of delivery is depicted in Table 3 as 7, 57, and 4 for long chord, normal coed, and short cord, respectively.

In relation to LSCS, the mode of delivery is depicted in above Table as 2, 24, and 6 for long chord, normal coed, and short cord, respectively. In relation to Nuchal Cord, the cord length is depicted in above Table 4 as 7, 10, and 1 for long chord, normal coed, and short cord, respectively. In relation to fetal bradycardia, the mode of delivery is depicted in above Table 5 and figure 4 as 7, 3, and 7 for long chord, normal coed, and short cord, respectively.

Low birth weight was found to be significantly associated with the hypocoiled group in our study, but many other studies have shown that hypercoiled are associated with LBW babies, as demonstrated by Rana *et al*., Raio *et al*., and de Laat *et al*. The same, though, was not explained in detail. Similar to studies by Ezimokhai *et al*. and Gupta *et al*. [4–8], it was discovered that hypertensive disorders of pregnancy were significantly more associated with hypocoiled than hypercoiled.

Due to the coiled umbilical cord's elastic characteristics, it can withstand outside forces that might impair the umbilical vascular flow. Since it is more resilient to snarling torsion, stretch, and compression than the non-coiled umbilical cord, the coiled umbilical cord resembles a semi-erectile organ. The link between hypocoiling and preeclampsia may be explained in this way. When compared to the hypercoiled group in our study, diabetes mellitus was found to be significantly associated with hypocoiled. The Chitra *et al*. study revealed that the hypercoiled group had a stronger association with GDM. However, GDM was significantly linked to both hypocoiled and hypercoiled cellular structures, according to Ezimokhai *et al*. Our study's limitations included the fact that the UCL was not assessed before conception and that the sample size for the hypercoiled and hypocoiled groups was insufficient to draw conclusions about the results based on them [9–12]. As a result, abnormal umbilical coiling index is linked to a number of unfavorable antenatal and neonatal characteristics. The association between the various studies conducted thus far reveals substantial differences. For a more accurate diagnosis at a younger gestational age, antenatal research on UCI should be pursued further.

Conclusion

The current study demonstrated that there are variations in umbilical cord length. Instances of complications like more frequent operative deliveries, abnormal fetal heart rates, and perinatal asphyxia were more common in cases with abnormal cord length (short or long cord). We are only scratching the surface of this field's potential, so there is a vast amount of research to be done. To improve the outcome for the fetus, the challenge should be accepted and analysis of the antenatal cord coiling index should be routinely performed at an earlier gestational age.

Funding source

None

Conflict of interest

None

References

1. Ian Donald. Practical Obstetric Problems, 1994, 417.
2. Elsayed W, Sinha A. Umbilical Cord Abnormalities and Pregnancy Outcome. J Fetal Med. 2019;6:183-9.
3. Naeye RL. Umbilical cord length clinical significance. J Pediatr 1985; 107:278-81. Yadav BB, Darade RV, Mahadar NA. Correlation of umbilical cord length with foetal and maternal outcome. JEMDS. 2013;2(4):412-8.
4. Suzuki S, Fuse Y. Length of the umbilical cord and perinatal outcome in Japanese singleton pregnancies delivered at greater than or equal to 34 weeks gestation. J Clin Gynecol Obstet. 2012;1(4-5):57-62.

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5. LaMonica GE, Wilson ML, Fullilove AM, Rayburn WE. Minimum cord length that allows spontaneous vaginal delivery. J Reprod Med. 2008;53(3):217-9.
6. Shrestha NS, Singh N. Nuchal cord and perinatal Outcome. Kathmandu Univ Med J. 2007;19:360-3.
7. Machin GA, Ackermann J, Gilbert Barness E. Abnormal umbilical cord coiling is associated with adverse perinatal outcomes. Pediatr Dev Pathol. 2000;3(5):462-71.
8. Garber A, Hernandez L, Mullin C, Simon M. Pressure Flow Through a Coiled Tube, Group M5, BE 310 Spring 2004; http://www.seas.upenn.edu/courses/belab/ LabProjects/2004/ be310s04m5.doc [Accessed 23 August 2007].
9. Ezimo Khai M, Rizk DEE, Thomas L. Maternal Risk Factors for Abnormal Vascular Coiling of the Umbilical Cord. Am J. Perinat. 2000;17(8):441-5.
10. Rana J, Ebert GA, Kappy KA. Adverse Perinatal Outcome in Patients with an abnormal Umbilical Coiling Index Am J. Obstet Gynaecol. 1995;85(4):573-7.
11. Raio L, Ghezzi F, Di Naro E, Franchi M, Maymon E, Mueller MD, *et al*. Prenatal Diagnosis of a lean Umbilical Cord: A Simple Marker of the Fetuses at Risk. Ultrasound Obstet Gynecol. 1999;13(3):157-60.
12. de Laat MW, van Alderen ED, Franx A, Visser GH, Bots ML, Nikkels PG. The Umbilical Coiling Index in Complicated Pregnancy. Eur J. Obstet Reprod Biol. 2007;130(1):66-72.