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CORD AROUND THE NECK AND ITS EFFECT ON MODE OF DELIVERY AND FETAL OUTCOME AT TERTIARY CARE HOSPITAL

Obstetrics & Gynaecology

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ABSTRACT

Background: The umbilical cord, a crucial fetal membrane, originates from the yolk sac and forms a tubular structure, typically measuring around 50 cm in length. When the umbilical cord encircles the fetal neck, it is referred to as a nuchal cord. The aim of this study is to determine the incidence of the umbilical cord around the neck at the time of delivery and its associated fetal outcomes. **Methods:** This retrospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital over a 6-month period (Aug 2024-Jan 2025). Out of 545 patients, 380 were enrolled based on inclusion and exclusion criteria. Of these, 98 patients had deliveries with an umbilical cord around the neck, while the remaining 282 patients comprised the control group. **Results:** The study found a 25.8% incidence of umbilical cord around the neck at the time of delivery. The incidence was higher among primigravida women, with statistical significance. There was no significant relationship between intrapartum and postpartum risks and the presence of the umbilical cord around the neck. Additionally, the mean length of the umbilical cord in patients with the cord around the neck was significantly greater compared to the control group. **Conclusions:** The study concludes that the presence of an umbilical cord around the neck alone is not an indication for caesarean section. However, the presence of three loops of umbilical cord around the neck was associated with an increased rate of operative delivery and lower Apgar scores. Proper intrapartum monitoring and intervention are crucial for ensuring good fetal outcomes.

KEYWORDS

Incidence of umbilical cord, Mode of delivery, Fetal outcome

INTRODUCTION

The incidence of umbilical cord around the neck (nuchal cord) ranges from 5% to 37%. The presence of the umbilical cord around the neck is one of the most common findings observed at the time of delivery. When the umbilical cord wraps around the neck up to 360 degrees, it is referred to as a nuchal cord. The average length of the umbilical cord is typically between 50 and 55 cm, with a diameter of about 2 cm. In many cases, the umbilical cord resolves during the course of delivery. The prevalence of the umbilical cord around the neck tends to be higher as gestational age increases, particularly between 40 and 42 weeks of gestation.

The umbilical cord develops from and contains remnants of the yolk sac and allantois. It begins to form by the fifth week of embryonic development, replacing the yolk sac, and becomes the primary source of nutrients for the developing fetus. The umbilical cord is not directly connected to the mother's circulatory system; instead, it attaches to the placenta, which facilitates the exchange of materials between the maternal and fetal bloodstreams without direct mixing.

The umbilical cord contains Wharton's jelly, a gelatinous substance primarily made up of mucopolysaccharides, which serves to protect the blood vessels within the cord. Wharton's jelly is derived from mesenchyme and embryonal stem cells.

Several factors contribute to the umbilical cord wrapping around the neck, including excessive fetal movements, insufficient Wharton's jelly, excessive amniotic fluid in the sac, the length of the cord, and multifetal gestations.

Methods

This study was conducted at GCS Medical College , Hospital and Research center over a 6-month period (Aug 2024-Jan 2025). A total of 545 deliveries occurred during this period, and patients were enrolled in the study based on the inclusion and exclusion criteria. This is a retrospective observational study.

Inclusion Criteria

- Singleton gestation
- Cephalic presentation
- Previous normal vaginal delivery (NVD) with 1 or more cord around neck

Exclusion Criteria

- Multiple gestations
- Previous lower segment caesarean section (LSCS)
- Patients undergoing elective LSCS
- Intrauterine fetal death (IUFD)

After applying the inclusion and exclusion criteria, patients were divided into two groups:

***Study Group*:** Deliveries with umbilical cord around the neck.

***Control Group*:** Deliveries without umbilical cord around the neck.

Selection Of The Patient

Total deliveries during the study period:545
Total number of cases enrolled: 380
Number of patients with umbilical cord around the neck: 98

Outcomes Studied

The following outcomes were studied and compared between the two groups:

- Mode of delivery
- Number of LSCS
- Apgar score of less than 7 at 1 minute and 5 minutes
- NICU admission
- Length of the umbilical cord
- Meconium staining of liquor
- Fetal distress

RESULTS

Out of 380 cases, 98 patients (25.8%) were found to have cord around neck. In these 98 cases, 65 cases (66.3%) had normal vaginal delivery, 27 cases (27.6%) had caesarean section and around 6 cases(6.1%) had instrumental delivery . The indication of caesarean section was fetal distress and meconium stained liquor.

Out of 98 patients with cord around neck, around 72% were primigravida and 28% were multigravida.

Mean length of the cord in patients with cord around the neck is higher than the patient without cord around the neck and it is statistically significant (p=0.01).

Out of 380 cases, 98 cases had cord around the neck, in which the incidence of single loop was high and statistically significant (63%). whereas double loop was 31% and triple loop was 7%.

Table 1: Distribution Of Patients According To Mode Of Delivery.

MOD	With cord	Without cord	Total	Chi sp.	P
Normal	65	190	255	1.71	0.43

Instrumental	6	9	15		
LSCS	27	81	108		
Total	98	282	380		

Table 2: Age Distribution.

Age (years)	With cord	Without cord	Total	Chi sq.	P
<20	9	23	32	5.26	0.26
21-25	52	144	196		
26-30	23	75	98		
31-35	6	30	36		
36-40	8	10	18		
Total	98	282	380		

Table 3: Distribution Of Patients According To Parity And Cord Around The Neck.

Parity	With cord	Without cord	Total	Chi sq.	P
Primi	71	152	223	10.33	0.0013
Multi	27	130	157		
Total	98	282	380		

Table 4: Comparison Of Length Of Cord In Both Groups.

Length	With cord	Without cord	P
Mean length of cord	45.39	44.64	0.01

Table 5: Distribution Of Both The Groups According To Apgar Score And NICU stay.

APGAR	With cord (n=98)	Without cord(n=282)	Z	P
<7 in 1 min	7	10	1.48	0.14
<7 in 5 min	3	5	0.77	0.44
NICU	25	50	1.67	0.096
MSL	21	46	1.15	0.25

Table 6: Incidence Of Cord Around The Neck.

Studies	Incidence (%)
Sheiner et al	14.70
Pregrine et al	18
Mastro Battista et al	17
Present study	25.8

DISCUSSION

Crawford in 1962 first defined nuchal cord as the condition in which umbilical cord was coiled at least once around the neck of the fetus. Baden in 1955 wrote: "Intrauterine life, which is sustained only by two small arteries and a tortuous vein course through a long flexible cord, hangs by very delicate thread." Umbilical cord is the structures which provide the adequate nutrition and provide the gaseous exchange in the fetus. Pathophysiology of the umbilical cord around the neck causes the foetal arterial resistance and increases the blood pressure leading on to fetal bradycardia and decrease in cardiac output.

Excessive fetal movement and length of the cord increase the incidence of umbilical cord around the neck. Many studies show, around 20-50% of umbilical cords mostly resolve before the delivery. Incidence is high in postdated pregnancies. Dhar et al has found that the incidence of LSCS was 27.2% with tight cord and 15.7% with loose loop of umbilical cord. The present study showed no perinatal mortality associated with umbilical cord which is similar to studies done by Larson and Miser et al. Incidence of umbilical cord in our study is 38.4%. Most of them are in the age group between 21-25 years. In the current study number of loops in the cord varies from 1 to 3. Prevalence of 2 or more loops is reported at about 2.5 to 8.3 %. And 0.1% shows more than 3 loops and highest reported being 9 loops.

Kitagawa et al, in 1989 used analysis of umbilical cord gases and found positive relation of variable deceleration and low Apgar score and significant respiratory acidosis in cases with nuchal cord. In this study, its association with Apgar score and Meconium-stained liquor were seen. Such patients are to be closely monitored by CTG as the cord around the neck is associated with deceleration during labour.

Other studies like Walker et al, found male babies had longer cord than female babies and it was assumed due to higher level of intrauterine activities of male fetus. Present study also observed that the proportion of males were significantly more than female among the neonates born with umbilical cord around the neck, but was not significant.

Limitations

The factors such as true knot, cord around the trunk and limbs found to interrupt the results of the study.

CONCLUSION

According to our study, the incidence of umbilical cord around the neck is 25.8%. Identification of umbilical cord at the time of delivery is not an indication for caesarean section. Such patients are to be closely monitored by CTG. Multi centric approach during the labour aids in better perinatal outcomes and decreases caesarean section and instrumental delivery. This study clearly shows that there is no change in the mode of delivery when there is umbilical cord around the neck.

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