ORIGINAL ARTICLE

# Maternal and Fetal Outcome of Pregnancies with Umbilical Cord Problems

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## ABSTRACT

**Objective:** To seek relationship between cord problems (like long cords, short cords, nuchal cord and cord knots) and its effects on fetus as well as mode of delivery.
**Study Design:** Descriptive (case series)
**Place and Duration of Study:** Obs/Gynae wards Railway hospital, Rawalpindi from September 2006 to August 2007.
**Materials and Methods:** It was a descriptive case series study. Hundred patients with umbilical cord problems, detected at delivery were included.Effects of these cord problems on mode of delivery and fetal outcome were observed.
**Results:** Twenty two percent patients had long cord, 14% had short cords.41% had single nuchal cord, 22% had double loop of cord around the neck, and 4% patients had triple loops of Nuchal cord. It was observed that 4% patients were having true kanots in umbilical cord and and only 26% patients had false knots in umbilical cord. In the patients with cord problems, rate of SVD was more than 70% and LSCS < 20%. These problems did not show significant effects on birth weight and Apgar scores when present alone.But multiple cord problems in a single pregnancy were associated with fetal complications.
**Conclusion**: Long and short umbilical cords, umbilical cord knots and Nuchal cords had no significant effects on mode of delivery and Apgar score in 5 minutes. But multiple umbilical cord problems in same case may pose problems to the fetus and early diagnosis can prevent fetal harm.


**Key words**: *Long cords, short cords, true knots, false knots, Nuchal cord, Apgar score.*

## Introduction

At birth, the normal mature cord is about 50-60 cm in length and 12 mm in diameter. A long cord is defined as more than 70 cm and a short cord as less than 30 cm. There may be as many as 40 spiral twists in the cord, as well as false knots and true knots. When umbilical blood flow is interrupted at birth, the intra-abdominal sections of the umbilical arteries and vein gradually become fibrous.[1]

It appears from indirect evidence in the human fetus that the length of the umbilical cord at term is determined by the amount of amniotic fluid present during the first and second trimesters and by the mobility of the fetus.

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If oligohydramnios, amniotic bands, or limitations of fetal motion occur for any reason, the umbilical cord will not develop to an average length. Amniocentesis performed to produce oligohydramnios in pregnant rats at 14-16 days result in significant reduction of umbilical cord length.1 Twisting of the cord about the fetus may be the reason for excessive cord length. One loop of cord is present around the neck in 21% of fetuses, 2 loops in 2.5%, and 3 loops in 0.2%. When 3 loops are present, the cord is usually longer than 70 cm.

True knots occur in the cord in 1% of fetuses, leading to a perinatal loss of 6.1% in such cases. False knots are developmental variations with no clinical importance.[2,3]

Nuchal Cord (NC) is defined as the umbilical cord being wrapped 360 degrees around the fetal neck. It is one of the most

common complications of the umbilical cord and any pregnancy might be complicated with a nuchal cord.[4,5,6] If a nuchal cord occurs in a pregnant woman with decreased fetal movements, it should be considered to be at high risk, particularly for foetuses with multiple nuchal cords.[7,8]

An entangled cord around the fetal neck does not seem to increase the risk of induction failure.[9] Our study is planned to see the maternal and fetal outcome in patients with short and long umbilical cord, umbilical cord knots, and nuchal umbilical cord. The purpose of present study was to determine the frequency of the umbilical cord problems and determine the effect of umbilical cord problem on the mother and the neonate.

## Materials & Methods

Descriptive (case series) study was carried out in the department of Obs/Gynea, Pakistan Railway Hospital, Rawalpindi, from Sep 2006 to Aug 2007. Hundred delivering women were included in the study by non-probability convenient sampling.

**Inclusion criteria:**

Full term delivered ladies and babies with

- Short umbilical cord
- Long umbilical cord
- Nuchal cord
- Umbilical cord knots.

**Exclusion Criteria:**

- Preterm deliveries
- Deliveries with associated medical problems.
- Congenitally anomalous babies.

Data was collected using a Proforma. Hundred patients who delivered in Railway Hospital with cord problems were included in this study. The information obtained from patients was taken on a Proforma after the informed consent of patients and their relatives. Patients were evaluated through comprehensive history, general physical, systemic examination and investigations.

In the hospital, mode of delivery of the patient, maternal and fetal outcome and well being were recorded. The variables were short umbilical cord, long umbilical cord, knots in the umbilical cord, Nuchal umbilical cord, identified at delivery, and maternal outcome i.e. spontaneous vertex delivery, caesarean section, and fetal outcome i.e. intrauterine growth restriction, intrauterine fetal death, poor Apgar sore, and early neonatal death.

Fetal growth restriction was assessed by abdominal ultrasonography performed during antenatal time with biparietal diameter and femur length. After birth by measuring weight, length and head circumference of baby and comparing it with the standard centile chart. Apgar score at one minute and five minutes to assess the activity of the baby after birth.

Long umbilical cord, knots in the umbilical cord, Nuchal umbilical cord, identified at delivery,and maternal outcome i.e. spontaneous vertex delivery, caesarean section, and fetal outcome i.e. intrauterine growth restriction, intrauterine fetal death, poor Apgar sore, and early neonatal death and fetal growth restriction was assessed by abdominal ultrasonography with biparietal diameter and femur length, after birth by measuring weight, length and head circumference of baby and comparing it with the standard centile chart. Apgar score at one minute and five minutes to assess the activity of the baby after birth.

## Results

Cases collected with long cord of > 70 cm length, were 22.6%. Rate of spontaneous delivery was 66.6%, operative vaginal delivery was 11.1% and lower segment caesarean section 22.2%. Apgar score in 5 min was 10/10 in 96.2% babies and NICU admissions were required 14.8% babies.Breakup of various cord problems are shown in Table I, maternal and fetal outcome are shown in Table II and Table III respectively.

Patients were identified having short cords < 30 cm were 11.7% Out of these patients 85.7% had spontaneous vaginal delivery ,7.1% had operative vaginal delivery and7.1% had LSCS.Apgar score in 5 min was 10/10 in 100% babies.

In this study 40.3% patients were having single Nuchal cord, either double loop of cord around the neck, or tripple loops of nuchal cord.Fifty percent of them had spontaneous vaginal delivery,25% patients had operative vaginal delivery and 25% had LSCS. Ninety three point seven percent babies were born with good apgar score.Only 2% needed admission in NICU.

Regarding true knots in umbilical cord 4% patients had these knots and 50% of them had SVD, 25% had operative vaginal delivery and 25% had LSCS due to fetal distress. Babies born with Apgar 10/10 in 5 min were 75% and 0/10 Apgar was in only one baby.Fifty percent babies needed NICU admission in this group.

Twenty one point eight percent. patients had false knots in umbilical cord 73% had vaginal delivery, 11.5% had operative delivery due to prolonged 2nd stage of labor and only 15.3% patients underwent LSCS due to different indications. 100% babies born with Apgar score of 10/10 after 5 min. and only 3 babies out of 26 needed NICU admissions mainly for observation

**Table-I: Umbilical Cord Problems in the Study Population (n=100)**

| Sr.No | Cord Problems | Frequency |
|---|---|---|
| 1 | Short Umbilical Cord | 14 (11.7%) |
| 2 | Long Umbilical Cord | 27 (22.6%) |
| 3 | True Knots | 4 (3.36) |
| 4 | False Knots | 26 (21.8%) |
| 5 | Nuchal Cords | 48 (40.3%) |

**Table-II: Umbilical Cord Problems and Maternal Outcome**

| Sr.No | Short Cord | Long Cord | True Knots | False Knots | Nuchal Cord |
|---|---|---|---|---|---|
| OVD | 1 (7.1%) | 3 (11.1%) | 1 (25%) | 3(11.5%) | 12 (25%) |
| SVD | 12(85.7%) | 18(66.6%) | 2 (50%) | 19 (73%) | 24 (50%) |
| LSCS | 1 (7.1%) | 6 (22.2%) | 1 (25%) | 4(15.3%) | 12 (25%) |

**Table-III: Umbilical Cord Problems and Foetal Outcome**

| | Short Cord | Long Cord | True Knots | False Knots | Nuchal Cord |
|---|---|---|---|---|---|
| Good Apgar Score(1mintutes) | 14 | 23 | 2 | 26 | 43 |
| Bad Apgar Score (1 minutes) | 0 | 4 | 2 | 0 | 5 |
| Good Apgar Score(5 minutes) | 14 (100%) | 26 (96.2%) | 3 (75%) | 26 (100%) | 45 (93.75%) |
| Bad Apgar Score(5 minutes) | 0 | 1 | 1 | 0 | 3 (6.2%) |
| Admission in NICU | 1 (7.1%) | 4 (14.8%) | 2 (50%) | 3 (11.5%) | 1 (2%) |

## Discussion

Every fetus should have the opportunity to begin life with all its God-given talents and abilities. Realistically, this may not be possible, but some physically normal newborns could benefit from a reduction in the risks of a cord mishap. It is estimated that learning disabilities are due to some type of cord complications. The issue of cerebral palsy is important, but currently no solution and few insights exist as to its origin. Preventing the stillbirth of a normal infant would be an important step in identifying cord-related harm. What is the size of the problem, and what best describes each part of the problem of umbilical cord mishap?

Causes of differences in cord length are

unknown; however the length of the cord is thought to reflect movement of the fetus in utero. Short cords are associated with fetal movement disorders and intrauterine constraints, as well as placental abruption and cord rupture. Excessively long cords are associated with fetal entanglement, the knots and thrombi.[10]

Even knots in the cord do not automatically cause distress, since blood flow is not impeded unless the knot is tight.Risk factors for having a true knot in the umbilical cord include advanced maternal age, multiparity, previous miscarriages, obesity, prolonged gravidity, male fetus, long cord, maternal anemia, maternal chronic hypertension and hydramnios.[11,12]

A study was conducted by Carey JC.[13] in Oklahama city USA to determine if the presence of a single or multiple nuchal cord encirclement has a negative effect on fetal growth. The mean birth weight was no different in the presence of a single or multiple nuchal cord encirclement than with no encirclement and conclusion was that birth weight in unaffected by a single or multiple nuchal cord encirclement. One study concluded that gross cord abnormalities like true knots, long cords, nuchal cords predispose the fetus to stasis induced vascular ectasia and thrombosis, thus leading to vascular obstruction and adverse neonatal outcome including IUGR and still birth.[14]

In another study, by Shrestha, at Kathmandu Medical College, carried out to find the incidence of nuchal cord at delivery, intrapartum complication and perinatal outcomes in the cases with nuchal cord.[15] Incidence of single nuchal cord was highest intrapartum complications like fetal heart rate irregularities and meconium staining of liquor was increased in nuchal cord group but it was not statistically significant. Instrumental delivery was high in nuchal cord group but not significantly. However caesarean section rate was high in this group with out nuchal cord. Apgar score <7 at 1 minute was significantly low in nuchal cord group. But Apgar score at 5 minutes and admission to neonatal unit was not more common. They concluded that nuchal cord is not associated with adverse perinatal outcome. In one study conducted in China, Nuchal cord was one of the nine factors which showed significant association with Autism.[16]

Our study also shows that nuchal cord is not associated with adverse prenatal outcome.

A study by Baergen, and colleagues showed that infants with excessively long umbilical cords are found to be at a significantly increased risk of brain imaging abnormalities and/or abnormal neurological follow-up.[17] Another study by Itakura it was concluded that abnormally long cords are associated with repeated coiling of cord around fetal neck and consequently can result in fetal growth restriction, distress and even demise.[18] Fortunately the outcome was good in our study inspite of multiple abnormalities of umbilical cord that could have resulted in fetal compromise or demise.

Study by Sornes concluded that knots in umbilical cord are associated with increased incidence of fetal distress; meconium stained liquor and tenfold increased risk of intrauterine fetal death.[19] but in this study above complications was not significant and did not adversely affect the fetal and maternal outcome.

## Conclusion

Our study showed statistically significant no adverse effect on maternal and fetal outcome.There was only one still birth in our study having single loop of cord around neck, true knots, and long cord.These findings are not statistically significant. This is due to small sample size of our study. And this warrants

further evaluation in future prospective studies with larger number of patients

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