

# Nuchal Cord Entanglement and its Fetomaternal Outcome

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**Abstract:** *Intrauterine life, sustained only by two small arteries and a tortuous vein coursing through a long flexible cord, hangs by a very delicate thread. Much like a hangman's noose, the nuchal cord is often blamed for problems that are encountered during delivery and is often cited as a major cause of fetal distress and perinatal mortality. However, the actual significance that a nuchal cord has on the outcome of an infant is controversial.*

**Keywords:** Nuchal cord, hypoxia

## 1. Introduction

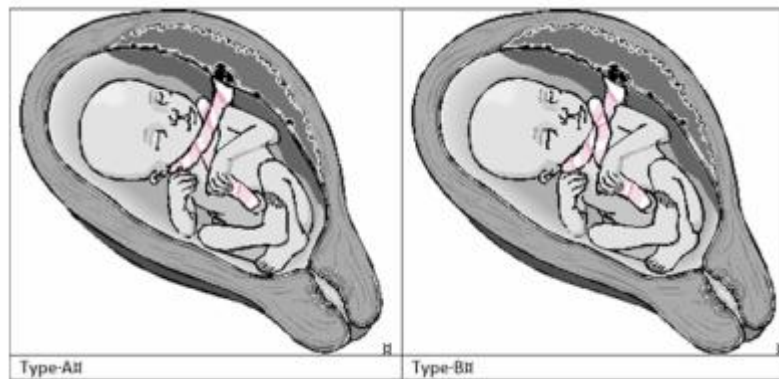
Intrauterine life, sustained only by two small arteries and a tortuous vein coursing through a long flexible cord, hangs by a very delicate thread. Much like a hangman's noose, the nuchal cord is often blamed for problems that are encountered during delivery and is often cited as a major cause of fetal distress and perinatal mortality. However, the actual significance that a nuchal cord has on the outcome of an infant is controversial<sup>1</sup>.

### Types of Nuchal Cord Entanglement-

Giacomello classified the nuchal cord entanglement in two ways<sup>2</sup>

**Type A-** A nuchal loop 360 degrees around the fetal neck where the placental end crosses over the umbilical end, entangling neck in an unlocked pattern that can undo itself.

**Type B-** A nuchal loop 360 degrees around the fetal neck where the placental end crosses under the umbilical end, entangling the neck in a locked pattern that cannot undo itself and ends up as a true knot



### Cord around the Neck Syndrome

A nuchal cord or cord around neck (CAN) occurs when the umbilical cord becomes wrapped around the fetal neck 360 degrees. Larson et al. reported that the prevalence of nuchal cord increases with the duration of pregnancy from 5-8% at 20 weeks of gestation upto 29 % at 42 weeks.<sup>3,4</sup> The presence of multiple nuchal cord i.e. 2 or more loops is estimated to affect about 2.5 to 8.3% of all deliveries. In some fetuses and newborns CAN may cause problems especially when the cord is tightly wrapped around the neck. The cluster of cardio respiratory and neurological signs and symptoms associated with unique physical features that occurs secondary to tight cord around the neck is referred as tight cord around the neck ( tCAN) syndrome.<sup>5</sup> The pathophysiology of strangulation (lethal and non lethal) involves venous followed by arterial, obstruction in neck and vagal collapse (increase parasympathetic tone). This can lead to cerebral stagnation, hypoxia, and unconsciousness which in turn produces loss of muscle tone.<sup>6</sup>

If the umbilical cord becomes overly stretched or compressed during labour, it usually causes the baby's heart rate to slow down temporarily. This is the baby's reflex response to the decreased blood flowing back to its heart. These brief variable heart rate decelerations are not harmful. Cord entanglement results from active fetal movements and is facilitated by abundant amniotic fluid (esp. if there is polyhydramnios) and a long umbilical cord. As a consequence there is shortening of free segment of cord, the extent of which can be estimated by calculating that segment around the neck; that in nuchal cord measures about 32 cm.<sup>7</sup>

## 2. Aims and Objectives

- 1) To know the incidence of babies born with nuchal cord.
- 2) To determine the fetal outcome in babies born with nuchal cord.
- 3) To determine the incidence of vaginal, instrumental deliveries and caesarean sections in babies born with nuchal cord.

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- 4) To know the APGAR score at birth and 5 min after birth.
- 5) To determine the number of loops present in babies born with nuchal cord.
- 6) To determine the incidence of babies requiring NICU admissions born with nuchal cord.

**3. Materials and Methods**

The present study was conducted in the Department of Obstetrics and Gynaecology, UMAID HOSPITAL, Dr S.N. Medical college, Jodhpur, over a period of 6 months.

**Inclusion Criteria**

All term and post term singleton pregnancies delivering in our institute.

**Exclusion Criteria**

- 1) Multiple gestations
- 2) Preterm deliveries

**4. Results**

**Table 1:** Incidence of nuchal cords

Total No. of deliveries	Without nuchal cord	With nuchal cord
5408(100%)	4645(85.9%)	763 (14.1%)

**Table 5:** Relation between mode of delivery, no of loops of nuchal cord in induced labour

Induction of labour with nuchal cord- 96										Assof MSL and fetal distress (6.25%)	
LSCS 24 (25%)						Vaginal delivery 72 (75%)					
Single		two		three	four	single		two			
Loose	tight	loose	tight					loose	tight	loose	tight
17	01	04	02			03	01	05	01		
18		06		-	-	64		06		02	-

**Table 6:** Birth weight of neonate and nuchal cord

Birth weight ( grams)	Neonate with nuchal cord
<2000	10 (1.31%)
2000-2500	215 ( 28.17%)
2500-3000	359 ( 47%)
3000-3500	126 (16.51%)
>3500	53 (6.94%)

**Table 7:** Nuchal cord and APGAR score at 1 and 5 minutes

Neonates with nuchal cord	763	Apgar score >7 at one min	Apgar score >7 at 5 min
Neonates not requiring NICU admissions	739 (95.55%)	573 (75%)	739 (100%)
Neonates requiring NICU admissions	16 (2.09%)	-	09 (56%)

**Table 8:** Nuchal cord and Neonatal mortality (IUFD, stillbirths)

Total no. of IUFD	Without nuchal cord	With nuchal cord
143	8 (5.55%)	135 (94.45%)

**Table 9:** Nuchal cord and indication for LSCS

Indication of LSCS	Number	% of Total LSCS
Prev LSCS	79	31.72%
Fetal distress	56	22.81%
NPOL	31	12.44%
Breech	17	6.82%
CPD	10	4.41%
SLOC as a sole indication	12	4.81%
2 loops of cord	11	4.41%

**Table 2:** Incidence of No. of loops in nuchal cord

Total no. of loops	single		two		Three	Four
	loose	tight	loose	tight		
763	606	21	87	21	23	5

**Table 3:** Relation between mode of delivery, parity and nuchal cord

Gravida	Vaginal Delivery	LSCS
G1 (393)	26 (67.43%)	128 ( 32.56%)
G2 (200)	129(64.5%)	71(35.5%)
G3 ( 104)	75(72.11%)	29(27.88%)
G4 (45)	31(68.8%)	14(31.11%)
G5 (21)	14(66.6%)	07(33.3%)

**Table 4:** Nuchal cord and meconium staining of liquor and irregular

Total no. of nuchal cord	Meconium staining of labour	Meconium staining + FHS irregular
763	87 (11%)	45 (5.89%)

APH	05	2%
Others	27	10.8%

**5. Discussion**

The present study was undertaken to find out the relation between nuchal cord entanglement and fetomaternal outcome. About 5408 deliveries took place , out of which 763 deliveries with nuchal cords were studied . The incidence of nuchal cord was 14.1% . The incidence is similar to the incidence by Sheiner et al<sup>9</sup> , Pregrine et al<sup>8</sup> and Mastro battista et al<sup>10</sup> which were 14.7% , 18% and 17% respectively . But the incidence was lower in comparison to the studies done by Shreshta NS <sup>11</sup>and William F Mischer when the reported incidence was around 22.85% AND 23.7%. The incidence of single loop of nuchal cod was 82.3% while the multiple loops constituted 17.7%. The maximum number of nuchal cords noted were 4 . The incidence of multiple loops in our study was significantly more than the one studied by Jennet d Larson et al where it was 3.9% and in study by Schaffer et al the incidence was 5.8% . The incidence of multiple loops in studies of Begm AA<sup>13</sup> et al and Shreshtha<sup>11</sup> was 12.5% and 17.01% respectively which was consistent with our results.The incidence of nuchal cord was highest amongst primigravidas (51.50%) in comparison to the multigravidas (48.50%) .This was in contrast to the study by Begam et al<sup>13</sup> where it was around 61.2% in multipara and 38.8% in primipara. Adnima et al denied any such correlation . 67.5% had

vaginal delivery as compared to caesarean section (32.5%) . The incidence is similar to Sheiner et al <sup>12</sup> and Mastrobattista et al <sup>10</sup> .The incidence of meconium staining of liquor was 11.4% and fetal heart rate irregularities was 5.89% . It does not correlate with the findings of studies done by Larson et al and Jauniaux et al. Induction of labour in women with nuchal cord had favourable outcome .75% delivered vaginally . It does not correlate with the studies done by Oguchi et al and Sheiner et al .<sup>12</sup> Birth weights of neonates born with nuchal cord was not affected by the presence of nuchal cord. 47% of neonates born with nuchal cord weighed between 2500 to 3000 gms . It correlated with the study done by Mastrobattista et al<sup>10</sup> and Carey JC et al . Neonates requiring NICU admission constituted only 2.09% of all neonates delivered with nuchal cord . All neonates requiring NICU admission had low 1 min APGAR score while in 56% of these neonates the 5 min APGAR score was >7 . In contrary to this , Pregrine et al <sup>8</sup> reported the presence of nuchal cord did not significantly increase the rate of low APGAR score <7 at 1 and 5 minutes . Shui & Eastan found higher fetal death rates in those not involving nuchal cord and concluded that coiling of umbilical cord around fetal neck was a rare cause of fetal death.. During caesarean section solely for nuchal cord when perinatal outcome is not affected , will only add to maternal morbidity and increase the rate of caesarean section.

## 6. Conclusion

Nuchal cord entanglement and its associated morbidities have been a controversial topic since years . All the observations made in our study prove that maternal and fetal outcomes are not adversely affected by mere presence of nuchal cord .

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