

Research Article

Cord Around the Foetal Neck: Course of Labour and Foetal Outcome

Tasneem Hayat¹

¹Associate Professor of Obstetrics & Gynaecology, Sahara Medical College, Narowal

Abstract

Background: Cord around the neck is a common occurrence, frequently found in the labour room and in the operation theatre at the time of delivery. It causes panic and alarm for the obstetrician and is a source of worry for the parents if detected during the antenatal period. Mostly the parents choose to have a caesarean delivery to avoid any risk to the baby.

Objective: To observe the labour, delivery and foetal outcome of undiagnosed cases of cord around foetal neck received in emergency with labour so as to have a supportive evidence to reduce the fear of general population against vaginal delivery in such cases.

Design: A Descriptive study.

Setting: This study was conducted in a teaching hospital affiliated with King Edward Medical University, Government Kot Khawaja Saeed Hospital Lahore in a period from Jan 2015 to Feb 2016.

Methods: Booked or un-booked, 90 cases received with labour in the labour room, having singleton, term pregnancy and alive, healthy foetus were included in the study. All these cases were found to have cord around the neck after delivery (vaginal or operative). Routine careful management of labour and maintenance of all record on the labour charts was done. A prepared Proforma was filled at the end and specific points required like number of loops and tightness of the cord was specially mentioned in the cases qualified for inclusion criteria.

Main Outcome measures: Foetal heart rate monitoring, meconium staining of liquor, mode of delivery and APGAR score of the newborn.

Results: 35(38.6%) patients had decelerations and changes in heart rate on CTG. 10 patients (11.1%) had meconium staining of liquor and 25 (27.7%) had caesarean sections due to foetal distress and failed descent of foetal head. Vacuum extraction was done in 10 (11.1%) of the cases. Outlet Forceps were applied in 3 (3.3%). Spontaneous vaginal delivery was possible in 52 (57.7%) so total 65 patients (72.2%) had vaginal deliveries. Regarding APGAR Score of the neonates, lower A/S was found in those with tight loops of cord. In 14 (15.5%) of the neonates had 1 to 4 A/S at 1 minute. 5 to 6 A/S was found in 8(8.8%). And more than 7 A/S at birth was found in 01(1.1%) of the neonates with tight cords. Thirteen babies were admitted in the Neonatal unit and 6 were kept in the Hospital for more than 24 hours.

Conclusion: Cases with cord around the neck can be delivered if they develop spontaneous labour but with strict intrapartum foetal monitoring and maintenance of partogram. There should be no delay in operative delivery if indicated. An antenatal diagnosis of cord around the neck does not justify an elective caesarean section.

Corresponding Author | Dr. Tasneem Hayat, Associate Professor of Obstetrics & Gynaecology, Sahara Medical College, Narowal. **Email:** tasneemhayyat@hotmail.com

Keywords | Cord Around the Neck (CAN), Nuchal Cords, t CAN (Tight Cord Around the Neck Syndrome).

Introduction:

Cord around the neck (CAN) is a condition in which the Umbilical cord is wrapped by 360 degrees around the Foetal neck.¹ In the recent literature, it is called Nuchal cord. It's incidence increases with increasing gestational age so that it is reported to be 6% at 20 weeks and is found to be in almost 37% of the cases who come for delivery.² Another recent study reported that their incidence was 6.57% in preterm, 49.13% at term, 39.79% at post date and 4.5% at post term.³ This can affect the labour and the foetal outcome depending upon the number of loops around the neck and how tightly they are wrapped.⁴ Flexion of the foetal head is interfered with when one or more loops of the cord are occupying the space in front of the neck so as to prevent or delay the engagement of the fetal head so the woman presents with high head at term.⁵ This delays the onset of labour and descent of the foetal head and slows down the progress.⁶ Cord around the neck does not strangulate the Baby in a typical way, it is the compression, the squeezeing of the cord caused by the slight movement of the Baby downwards with each push which involves venous/arterial obstruction in the neck and Vagal collapse. Increased Parasympathetic tone leading on to cerebral hypoxia, decreased muscle tone, passage of meconium and outward signs of foetal distress due to asphyxia and even Foetal death.⁷

A healthy umbilical cord is protected from Blood vessel compression by a soft gelatinous filling called Wharton's jelly. This jelly is designed to keep the cord free from knots, kinks or loops and protect it's vessels against constriction caused by Foetal grasping and labour contractions.⁸ The vasoconstricting effects on the umbilical cord vessels caused by the Uterine contractions depends on the length of the umbilical cord which varies normally from 35-70 cm. The cords which are longer than 70 cm are more likely to undergo entanglement in the neck of the foetus and it is the tight entangled loops which result in a significantly higher proportion of foetal distress and low APGAR Score whereas loose nuchal cords do not have any significant difference in mode of delivery and foetal outcome.⁹ The patients with nuchal cord are likely to have unevenful labour and delivery as cord compression is tran-

sient and most fetuses are able to compensate for decreased cord blood flow.¹⁰

The common signs of cord around the neck during labour is a finding of foetal bradycardia and variable decelerations in the CTG associated with Uterine contractions in the 1st and 2nd stage of labour as recorded in 14.4% of the cases admitted with cord around the neck in a study conducted in Bangladesh¹¹ A similar result is shown by another study where out of 289 neonates born with cord around the neck, 14.88% had evidence of foetal distress whereas 85.12% had vaginal delivery without their APGAR Score being affected.¹²

The effects on the foetus and dystocia caused by this condition are detectable by careful monitoring during labour and even before labour by Doppler USG.¹³ But the sensitivity of the ultrasound for it's diagnosis before labour induction is not reliable.¹⁴ Moreover, suspicion of cord around the neck prior to delivery increases the rate of elective c-sections on patient's demand as in a study at Mahatama Gandhi Institute of Medical sciences where caesarean rate is double in cases with cord around the neck as compared to control and other studies.¹⁵

It is quite common that babies are delivered vaginally with cord, one, two and sometimes even more loops around the neck. It creates a few moments of panic in the labour room but then if the loops are loose, they are slipped over the head and if tight, they are cut before delivery of the trunk. Foetal outcome is usually satisfactory and the moments of panic pass away. This study was conducted to find out the effects of the cord around the neck without prior diagnosis, on labour, mode of delivery and Foetal outcome so that an unduly increased rate of elective C - sections specially when it is diagnosed by Doppler USG before the onset of labour, can be reduced.

Methods:

This study was carried out in labour ward of Government Kot Khawaja Saeed Hospital, a teaching Hospital affiliated with King Edward Medical University Lahore and a private Hospital also a teaching Hospital affiliated with a private Medical College. The period of study was from Jan 2015 to February 2016. A total 90 patients were included in

the study. The sample size was calculated using WHO software taking incidence of Nuchal cord is equal to 37%, confidence level equal to 95% and margin of error equal to 10%.²

This was a descriptive observational study on pregnant women getting admission in the labour ward with labour pains. Their inclusion in the study was complete when their diagnosis of cord around the neck was confirmed after delivery or caesarean section.

All patients having a singleton pregnancy of 36-40 weeks with cephalic presentation and with spontaneous onset of labour and intact membranes were included in the study. Profiles of all the patients were recorded on a proforma after delivery (vaginal or operative). Their antenatal observations, details of labour and delivery, operative findings and foetal outcome was recorded.

Foetal monitoring was performed as per routine i.e foetal heart auscultation by a foetoscope or by a sonicaid after every 15 minutes to half an hour during the 1st stage and at the end of each contraction during the 2nd stage. Intermittent cardiotocography was performed as required.

Artificial rupture of membranes was performed at 4-5 cm dilatation of the cervix in active labour as per routine and the colour of liquor was noted. Duration of 1st and 2nd stage of labour, mode of delivery, instrumental or operative were recorded. But here for descriptive purposes, delivery either instrumental or spontaneous will be considered as vaginal delivery.

Operative findings like colour and amount of liquor, number of loops of cord around the neck, tight or loose and any other findings related to the cord like true knots were noted. Tight coils were those which had to be cut before delivery of the body of the foetus and loose coils were those which could be slipped over the foetal head.

APGAR Score of the baby at 1 min and 5 min after delivery was assessed. A score of 1-4 at 1 and 5 min was taken as poor and a score of 7-10 at 1 and 5 min

was taken as good. Babies who needed resuscitation were shifted to Neonatal intensive care unit under supervision of a paediatrician and were kept in the Hospital as required.

The data analysis was done by using SPSS 23. Frequency and percentage were given for loops of cord around the neck, foetal heart rate changes, mode of delivery, and APGAR score. Chi square was used to determine the Association of mode of delivery and APGAR score with Cord around the Neck. A p-value ≤ 0.05 was taken as significant.

Results:

A total 90 patients were found to be in the study group fulfilling the inclusion criteria and with a diagnosis of cord around the neck. Besides cord around the neck, we also found cord wrapped around the trunk, shoulder and stretched over the foot and arm but for the description, all are discussed in the total cases of Cord around the neck.

Their age ranged from 21 -32 years and parity from primigravida to 5th gravid. Duration of pregnancy was 36 to 40 weeks. At the time of admission, they were in labour, having regular uterine contractions. On abdominal examination, head was high in 57 (63.3%) and it was fixed in 33 (36.7%) patients. On pelvic examination, cervical dilatation ranged from 2 cm to 5 cm and pelvis was adequate in all the cases. 13 Babies were admitted in the Neonatal unit and 6 were kept in the Hospital for more than 24 hours. In this study, 74.4% loose cords and 25.6 % tight cords were observed. 35(38.6%) patients had decelerations and changes in heart rate on CTG. 10 patients (11.1%) had meconium staining of liquor. (Table 2)

Table 1: Distribution of Loops of Cord Around the Neck

Cord Around the Neck	Loose	Tight	Total
Single Loops	40 (75.5%)	13 (24.5%)	53 (58.9%)
Two Loops	24 (75.0%)	8 (25.0%)	32 (35.6%)
>Two Loops	3 (60.0%)	2 (40.0%)	5 (5.5%)
Total:	67 (74.4%)	23 (25.6%)	90 (100.0%)

Table 2: Foetal Heart Rate Changes During Labour:

Foetal Heart Rate Changes	Frequency	Percentage
Tachycardia	3	3.3%
Bradycardia	8	8.8%
Early decelerations	8	8.8%
Late decelerations	3	3.3%
Variable decelerations	13	14.4%
No change	55	61.1%
Meconium staining (operative finding)	10	11.1%

Apgar score > 7 was significantly higher in loose loops as compared to tight loops.

Table 3: Association of Mode of Delivery and Cord Around the Neck

Mode of delivery	Loose loops	Tight loops	Total	p-value
Vaginal delivery (N=65)	57 (87.7%)	8 (12.3%)	65 (72.2%)	< 0.001
Caesarean section (N=25)	7 (28.0%)	18 (72.0%)	25 (27.8%)	
Total:	64 (71.1%)	26 (28.8%)	90 (100.0%)	

Caesarean section was significantly higher in tight loops as compared to loose loops.

TABLE 4: Apgar Score of the Neonates Born with Cord Around the Neck

Apgar score	At 1Min		p-value	At 5Min		p-value
	Tight	Loose		Tight	Loose	
1-4	14 (15.5%)	3 (3.3%)	< 0.001	03(3.3%)	0 (0.0%)	< 0.001
5-6	08 (8.8%)	38 (31.1%)		11 (12.2%)	02 (2.2%)	
7-10	01 (1.1%)	26(85.1%)		09 (10%)	65 (97.0%)	
Total	23 (100%)	67 (100%)		23 (100%)	67(100%)	

Apgar score > 7 was significantly higher in loose loops as compared to tight loops.

Discussion:

In our study,²¹ 1% of the cases were noted to have high head at term. This occurrence seems to be a bit higher as compared to a study showing the same in 11% of the cases.¹⁶ This seems to be coincidental.

We recorded, 74.4% loose cords and 25.6 % tight cords in our study in comparison with another study, which had 63% loose and 37% tight cords. They also recorded that out of their total vaginally delivered cases, 85% had loose cords and 15% had tight loops while out of their caesarean cases ,63% had tight cords and 37% had loose.¹⁷ If we consider our mode of delivery in relation to loose or tight loops, we had almost similar distribution as shown in the Table 3. Out of our total vaginal deliveries 12.3% had tight loops and 87.7% had loose and out of the total caesareans sections, 72% had tight loops and 28% had loose ones.

A peculiar finding noticed retrospectively was that the patients who developed serious decelerations immediately after the onset of labour, had constant bradycardia on their antenatal visits but even then, their Foetal outcome after a safe operative delivery in the form of APGAR Score was satisfactory. A similar results are shown in another study where the cases which had an APGAR Score < 7 at 1 minute, APGAR Score at 5 minutes was good and admission to neonatal unit was not more common.¹⁸

Inspite of loops (Tight or loose, single or multiple) around the neck, 72% of the cases had an uneventful vaginal delivery (including the instrumental deliveries) and good APGAR Score. This is comparable to another study which had no cases of intra uterine or neonatal death associated with cord around the neck but it is suggested that such patients should have close foetal monitoring preferably continuous electronic foetal heart monitoring as

tightened multiple loops are associated with persistent variable or late decelerations.¹⁹

25 (27.8%) of our patients had C-sections. This is comparable to a study conducted at Kuwait teaching Hospital where they had 26.6% caesarean rate and they concluded that cord around the neck does not influence the clinical management.²⁰ Caesarean rate in normal pregnancies without nuchal cord is reported to be 24% in UK.²¹

It was found that single or multiple, the loop's tightness is the factor that determines the course of labour and foetal outcome. Similar conclusion has been drawn by another study in China.²²

By looking at the Table 1 and Table 4, it can be seen that about 38.6% of the cases had changes in the CTG. but APGAR Score at 1 Min is 18.8%. This is supported by another study where foetal distress on CTG was found in 18.6% but overall perinatal outcome was satisfactory.²³

Perinatal morbidity in the form of admission in the Neonatal unit is not bad as we had only 6 Babies who remained in the hospital for more than 24 hours.

So it is concluded that in spite of unexpected finding of cord around the neck at the time of delivery, with careful and proper management of labour and neonates after birth, perinatal outcome can be satisfactory. There is a possibility of missing foetal distress plus once the diagnosis is made there is only a very short time to make a safe delivery possible, to have a good foetal outcome. One of the study suggested that for emergency caesarean section for foetal distress due to cord around the neck, the ideal time for decision to incision is less than 20 Minutes.⁵

Conclusion:

The cases of CAN require strict intra-partum monitoring preferably by continuous electronic Foetal heart record as well as maintenance of partogram. But detection of cord around the neck before labour, does not make an indication for elective caesarean section

In such cases, proper counselling of the patient and the family is required preferably by a senior practitioner to alleviate their fear for vaginal delivery and at the same time, the concerned staff of the labour room should be kept vigilant and prepared for emergency caesarean section.

Ethical Approval: Given

Conflict of Interest: The authors declare no conflict of interest

Funding Source: None

References:

1. Foetus or Newborn problems: Labour and delivery complications [Cited 20 July 2020]. Merck Manual Home Edition. Available from <https://www.ncbi.nlm.nih.gov/pubmed/15543520>.
2. Joshi K, Saxena R, Bhat M, Lomrod Y, Verma K. Incidence of cord around the neck and its effects on labour and neonatal outcome. *Advances in Human Biology*. 2017;7(1):15-18.
3. Tamrakar SR. Incidence of nuchal cord, mode of delivery and perinatal outcome: a notable experience in Dhulikhel Hospital-Kathmandu University Hospital. *Nepal Med Coll J*. 2013;15(1):40-45.
4. Peesay M. Nuchal cord and its implications. *Maternal Health Neonatal Perinatol*. 2017;3(1):28.
5. Rabia Sajjad, Mamoona Mushtaq, Neelofar Mustafa. Cord around Neck in singleton term pregnancies and its outcome. *Pak Armed Forces Med J*. 2014;64(1):51-55.
6. Ansari A. Causes and management of high fetal head in primigravida at term. *PAFMJ*. 2008;58(1):16-20.
7. Morarji Peesay. Nuchal cord and its implications. *Maternal Health Neonatal Perinatol*. 2017;3(1):28.
8. Ferguson VL, Dodson RB. *Eur J Obstet Gynecol Reprod Biol*. 2009;144(1):108-113.
9. G Singh, K Sidhu. Nuchal cord: A Retrospective Analysis. *Med J Armed Forces India*. 2008; 64(3):237-240.
10. Yum Narang, Neelam Bala Vaid, Sandhya Jain, Ameeta Suneja, Kiran Guleria, MMA Faridi, et al. Is nuchal cord justified as a cause of Obstetrician anxiety? *Archives of Gynecology and Obstetrics*. 2014;289(4):795-801.
11. Begum A A, Sultana H, Hassan R, Ahmed M. A clinical study of fetal outcome in cases of nuchal cord. *JAFMC Bangladesh*. 2011;7(1):25-27.

12. Gupta A, Kakkar T, Pathania H, Singh V. Impact of nuchal cord on intrapartum complications, mode of delivery and perinatal outcome. *Journal of evolution of Medical and Dental Sciences*. 2018;7(9): 1114-1117.
13. Shazia Taizon. Perinatal outcome in cases with or without Nuchal cord. *Annals*. 2014;20(2):159-164.
14. Paregrine E, O' Brien P, Jauniaux E. Ultrasound detection of nuchal cord prior to labour induction and the risk of caesarean section. *Ultrasound Obstet Gynecol*. 2005;25(2):160-164.
15. Surekha Tayade, Jaya Kore, Atul Tayade, Neha Gangane, Ketki Thool, Jyoti Borkar. Is Nuchal Cord a cause of concern? *Madridge J Women's Health Emancipation*. 2018;2(1):46-50.
16. Gupta Y, Gupta A, Ganjoo S, Kaul V, Raina S K. Is Nuchal cord a perfect scapegoat: A retrospective analysis from Northwest India? *Journal of Basic and Clinical Reproductive Sciences*. 2013;2(2): 119:122.
17. Mane V S, Kulkarni PR, Mane S. Reliability of Antenatal Sonography for detection of nuchal cord and it's impact on mode of delivery. *Global j of Research analysis international*. 2019;8(6):39-41.
18. Shrestha NS, Singh N. Nuchal cord and perinatal outcome. *Kathmandu University medical journal (KUMJ)*. 2007;5(3):360-363.
19. K Shereen, K Patel, MK Swami. Nuchal cord and perinatal outcome. *J of south Asian Fed Obstet Gynecol*. 2015;7(1):15-17.
20. Rehana A H, Noor ul H, Bushra K, Iqbal A. Mode of delivery in loop of cord around the foetal neck. *KJMS*. 2014; 7(2):271-273.
21. Megan Thielking. Sky-high C-section rates in the US don't translate to better birth outcomes. *STAT*. 2015.
22. Choi Wah Kong, Lai Wai Chan, William Wing Kee. Neonatal outcome and mode of delivery in the presence of nuchal cord loops: Implications on patient counselling and the mode of delivery. *Arch of Gynecol and Obstet*. 2015;292(2):283-289.
23. Kong CW. Neonatal outcome and mode of delivery in the presence of nuchal cord loops: Implications on patient counselling arch *Gynecol Obstet*. 2015;292(2):283-289.