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To Evaluate the Association of Cord around Neck at the Time of Delivery with Maternal and Peri-natal Outcomes

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Abstract

Nuchal cords have been invariably seen in pregnancies, sometimes discovered antenatally while more often as an incidental finding during birth. It sometimes can present as a complication to active labour, leading to unpredictable maternal and peri-natal morbidity and mortality. However, as often as nuchal cords are witnessed in clinical scenarios, only little is known in peer reviewed literature about their significance. There is an existing practical deficiency of guidelines and algorithmic measures to ensure maternal and neonatal wellbeing in a case of cord around neck. Diagnosis of nuchal cord is still a challenge during antenatal evaluation and not often taken in concern by obstetricians. In our study we study the incidence of nuchal cords with its overall aftermath with respect to maternal and neonatal parameters and attempt to probe the likely importance for its screening and developing guidelines.

Key words: Nuchal cords, Shoulder dystocia, Cord around neck (CAN).

INTRODUCTION

The nuchal cord is defined as an occurrence of umbilical cord coiled in a 360º angle around fetal neck.[1] It has always been a subject of enigma to both obstetricians and pediatricians in modern medicine. Historically, first described by Hippocrates as; "[Nuchal cords] will cause suffering to the mother and either perish or born difficulties to the fetus". It is often seen as a risk of late pregnancy.[1] Much of its understanding has been widely revamped with the advent of newer sonographic modalities and multiple studies that have evidently shown that it does not lead to any complications either perinatally or later in life.[2-4] However, simultaneously there have been some major studies indicating an association of nuchal cords with adverse perinatal and maternal outcomes.[1,5,6] Empirically speaking, nuchal cord and its implications still stand controversial to our understanding and in our study, we aim to fill the lapses of knowledge and understanding of this subject at large.

What leads to the genesis of the nuchal cord is still little understood. There are many theories conceptually explaining the antenatal development of CAN, however the one by Ferguson *et al.*[7] Stands out. He described the "Bioengineering" aspect of the umbilical cord as their development and anatomical constituents may lead to its coiling around fetus over time. Other factors such as intrinsic properties of vascular development and differential blood flow within arteries and veins, fetal movements and lastly the "re-entry of physiological herniation" during embryogenesis during 6-8 weeks are some highly regarded postulates for possible mechanisms of CAN.[1] In one study by Gupta *et al.*[8] Found the association of CAN with fetal distress, oligohydraminos, pre-term delivery, IUGR (intra-utrine growth retardation), MSAF (meconium stained amniotic fluid), FHR (fetal heart rate) and low cord pH, some which we have also used as indices to be investigated in our study.

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Incidence

In the most recent study conducted in 2015; Hanoch *et al*.[9] Demonstrated nuchal cord incidence of 20% in normal deliveries conducted. It has been demonstrated jointly by Larson JD *et al*.[10] and Clapp *et al*.[10] In two separate studies that the incidence of CAN (Cord Around Neck) rises with advanced gestational age.

Methodology

Ours is a retrospective study conducted in the Department of Obstetrics and gynecology, SMS and R, Sharda University. The data of 100 eligible subjects admitted during Jan 2018-2019 was collected from MRD (Medical Records Department). Their records were analyzed against various indices and variables such as demographics, gestational age at delivery, Number of nuchal cords, ANC factors, sonographic records and pre-natal events. The result was then prepared using the percentage method.

Inclusion criteria

1. Singleton pregnancy between Jan 2018-Jan 2019.
2. Nuchal cord found ante-natally or at birth.
3. Delivered either LSCS or NVD.

Exclusion criteria

1. Multiple pregnancy.
2. Obstructed labor.
3. Low lying placenta.

RESULTS

We reviewed 100 cases of singleton pregnancy in whom nuchal cord was detected either through ultrasound (USG) during ANC screening or as an incidental finding during delivery. Most of the patients were in 20-26 years age group (62%) all predominantly had a parity of ≥1 (≥G2; 64%) (Table 1.1-1.2). The nuchal cord was seen in most patients with 39 weeks period of gestation (27%) followed by 37 weeks period of gestation (24%) at delivery. (Table 1.3)

Table 1.1: Incidence of CAN w.r.t gravidity.

Gravida	Number (%)
Primi	36%
P1	39%
P2	13%
P3	6%
P4	1%
P0	5%
Total	*n*=100

Table 1.2: Incidence of CAN w.r.t maternal age.

Age group (in years)	Numbers (%)
16-19 years	2%
20-26 years	62%
>26 years	36%
Total	*n*=100

Table 1.3: Incidence of CAN w.r.t POG.

POG at delivery	Number (%)
≤21 wks	1%
31 wks	7%
33 wks	3%
36wks	7%
37- 38 wks	36%
39 wks	27%
40-42 wks	19%
Total	*n*=100

Table 1.4: Ante-natal medical issues.

Maternal medical Issues	Number (%)
Present	57%
Absent	57%
Total	*n*=100

Table 1.5: Ante-natal medical issues in CAN.

Medical issues**	Number (%) of *n*=57
Hyporthyroidism	24.6% (14)
Anemia	19.3% (11)
Oligohydraminos	8.7% (5)
GDM	7% (4)
Rh Incompatibility	7% (4)
HbSAg+ve	7% (4)
Deranged LFT	5.2% (3)
PIH	5.2% (3)
Bronchial asthma	3.5% (2)
Pre-eclampsia	3.5% (2)
Polyhydraminos	3.5% (2)
Hyperthyroidism	1.75% (1)
Other illness	3.5% (2)
Total	*n*=57

About 56% of cases had a concomitant medical or surgical condition, predominantly hypothyroidism (24.6%) and anemia (19.3%) with other minor conditions ranging from oligohydramnios (8.7%), polyhydraminos (3.5%), pre-eclampsia (3.5%), GDM (7%), Rh incompatibility (7%), HBsAg positive (7%), bronchial asthma (3.5%), all of which which seems statistically and clinically insignificant (Table 1.4-1.5). Only 7% of cases had an obstetrical complication mainly, breech (3%), PROM (2%) and Cord Prolapse (2%).

As high as 30% of cases were priorly induced for delivery of which about 10% had a failed induction and were taken for LSCS. 72% had a normal vaginal delivery and 28% went for LSCS for various indications such as previous LSCS (43.33%), fetal distress (26.6%), breech (10%) and only 3.33 % for nuchal cord as an indication. (Table 1.6-1.7)

About 17% of patients had intrapartum events like prolonged 2nd stage of labor (7%), shoulder dystocia (4%), 3º perineal tear (6%). (Table 1.8)

Table 1.6: Mode of delivery in CAN.	
Mode of Delivery	**Number (%)**
NVD	72%
LSCS	28%
Total	*n*=100

Table 1.7: LSCS indications.	
LSCS Indications**	**Number (%) of *n*=28**
Previous LSCS	43.33% (13)
Fetal distress	26.6% (6)
Failed Induction	10% (3)
Breech	10% (3)
Decreased FHR	7% (2)
High risk pregnancy	7% (2)
Cord Around Neck (CAN)	3.33 %
Total	*n*=28

** Some patients have co-existing conditions/Indications.

Table 1.8: Peri/Intra-partal complications.	
Perinatal/Intrapartum factors	**Number (%) of *n*= 100**
Prolonged IInd Stage	7%
3º Perineal tear	6%
Shoulder dystocia	4%
Total	*n*=17 of 100

Table 1.9: Congenital abnormalities in CAN babies.	
Congenital abnormalities	**Number (%) (*n*=10)**
IUGR	30% (3)
IUD	50% (5)
Cleft Lip	10% (1)
GIT-Gonadal defects	10% (1)
Total	*n*=10 of 100

Post-partal events such as PPH was documented in 18% all of which was due to atonic uterus and was managed medically without further complications. MSAF was seen in 28%. Table 1.9

As with congruency with previous studies more male babies (58%) were delivered than female (42%), out of which 8% had some degree of fetal abnormalities like IUGR, cleft lip and GIT-Gonadal developmental defect and IUD; interestingly all were in male offsprings. (Table 1.9)

Lastly, to assess the sonographic relevance for early detection of nuchal cord, only 14% of cases had USG suggestive for nuchal cords, with 57% of them having one CAN. (Table 1.10-1.11)

Table 1.10: USG for CAN screening.	
Ultrasonograpgy	**Number (%) (*n*=100)**
Not Suggestive of CAN	56%
Suggestive of CAN	14%
Not available for review	30%
Total	*n*=100

Table 1.11: Number of rounds of cord at birth.	
CAN	**Number (%) (*n*=18)**
1 CAN	56%
2 CAN	29%
3 CAN	10%
4 CAN	4%
5 CAN	1%
Total	*n*=100

DISCUSSION

Our data extrapolates inferences which resonate with multiple studies when it comes to incidence with maternal age, late-term pregnancy, fetal distress, intra-partal and post-partal events.

Even though most of the cases were seen in 20-26 years of age. 36% of overall cases being a *primi*. However, a strong association with advanced maternal age cannot be commented because of various socio-cultural factors, even though in a study by Vasa R *et al*.[11] strong pre-disposition was seen in age 20-34 years, however author denied any relevance with maternal age due to longitudinal socio-cultural factors. Since in our study all patients were racially homogenous, we cannot comment on its association with CAN, but in multiple studies no racial relevance was identified.[11]

As far as maternal morbidity is concerned no major life-threatening events were noted as an effect of nuchal cords ante-natally except co-existing medical conditions which seemingly has no role in CAN causation, neither its evidenced by other authors. About 7% patients had some obstetrical issue, mainly breech presentation, PROM and cord-prolapse, for which no relevant evidence can be found in contemporary studies and should be further investigated. However, some interesting events were duly noted during parturition. About 17% of patients had some intra-partal events, like prolonged 2nd stage, shoulder dystocia, 3º perineal tear (Table 1.8) which should be looked out for after sonographic evidence, since they can cause significant maternal and peri-natal complications. Similar intra-natal results were observed in a study by Ogeuh *et al*.[12] Mainly a significant increase shoulder dystocia likely due to restraining effect of cords in fetal decent. Its relatively contrasting to deliveries in diabetic mother where babies are large and invariably have shoulder dystocia, however in CAN babies are usually below 4000 gms and often have intra-utrine growth retardation.[12]

Ogeuh *et al*.[12] also demonstrated increased induction of labor in CAN vs non-CAN, which we also observed to have significant association with CAN, as about 30% of patients were induced. This association can be reasonably argued considering restrained decent of fetus due to CAN that gives an uterine inertia.[12]

CAN association with meconium stained amniotic fluid was statistically relevant in our study, invariably with both LSCS and NVD, because of increased incidence of fetal stress which has been shown by multiple studies,[11,12] but no evidential consensus was found in literature. Same applies to post-partal hemorrhage, all due to atonic uterus, which was seen in 18% of cases of CAN in our study, but it hasn't been rigorously evaluated in other studies and should be further investigated.

Most cases patients delivered normally and only a very small percentage of population had LSCS with CAN as an exclusive indication, which is similar to Ogeuh *et al.* observation, as no signifiant increase in LSCS or other assisted methods because of CAN.

Most of newborns had no peri-natal morbidity or mortality whatsoever and did not need any resuscitation. Even though in several studies no major short-term outcomes have been seen, CAN has been associated with many implication in newborns, like fetal hypoxia, non-reassuring fetal heart rate (bradycardia/tachycardia), widened veno-arterial blood pH[12] which is similar to "tCAN syndrome" defined by Peesay *et al.*[6] as a constellation of neurological (fetal hypotonia, depressed neonatal reflexes) and cardiopulmonary (facial duskiness, hypovolemia, respiratory distress) symptoms. Lastly, resonating with Miser *et al.*[13] We observed increased incidence in male babies.

Even though we were able to detect CAN in 14% of patients, its relevance as an ante-natal factor in tailoring a different approach for managing obstetrical cases remains questionable because in our study only 3.3% of patients with CAN delivered through LSCS. More advanced modalities like Doppler can provide evidence of abnormal waveforms suggesting of non-linear blood-flow in nuchal cords[14] and are better than gray-scale imagining. And it can be further helpful justifying CAN as an indication for LSCS, but presently authors do not recommend it as an indication.

CONCLUSION

Our data has evidently demonstrated that; Firstly, nuchal cords have increased incidence with advanced period of gestation and without any association with race or maternal age. Secondly, occurrence of CAN is random, since it has no significant association with ANC factors.

Thirdly, CAN is associated with increased incidence of induced labor. Fourthly, increased incidence of shoulder dystocia. Fifthly, no maternal morbidity was observed, other than PPH, which was medically manageable. Sixthly, a very small number of patients with CAN as an exclusive indication delivered through LSCS. Seventhly, more male babies were born and a relatively smaller number of newborns had any morbidity. Lastly, a prenatal screening of CAN becomes important as sonographic evidence of CAN in the third trimester should prompt the obstetrician for the possibility for induction of labor, prolonged stage II and shoulder dystocia, PPH and neonatal implications.

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CONFLICT OF INTEREST

All authors declare no conflict of interests.

ABBREVIATIONS

ANC: Ante-natal care; **CAN:** Cord around neck; ***et al.*:** And others; **FHR:** Fetal heart rate; **GDM:** Gestational diabetes mellitus; **GIT:** Gastrointestinal tract; **IUD:** Intrauterine death; **IUGR:** Intrauterine growth retardation; **LSCS:** Lower segment cesarean section; **MRD:** Medical records department; **MSAF:** Meconium stained amniotic fluid; **NVD:** Normal vaginal delivery; **PPH:** Post-partum hemorrhage; **PROM:** Premature rupture of membranes; **USG:** Ultrasonography; **w.r.t:** With respect to.

REFERENCES

1. Peesay M. Nuchal cord and its implications. Maternal Health, Neonatology and Perinatology. 2017;3(1):28. doi:10.1186/s40748-017-0068-7 [PUBMED]
2. Henry E, Andres RL, Christensen RD. Neonatal outcomes following a tight nuchal cord. J Perinatol. 2013;33(3):231e4. [PUBMED].
3. Zahoor F, Minhas Z, Zaki A. Perinatal outcome of nuchal cord. J Postgrad Med Inst. 2013;27(2):174-8. [Scopus]
4. Shrestha NS, Singh N. Nuchal cord and perinatal outcome. Kathmandu Univ Med J. 2007;5(3):360-3. [Scopus]
5. Clapp JF, Stepanchak W, Hashimoto K, Ehrenberg H, Lopez B. The natural history of antenatal nuchal cords. Am J Obstet Gynecol. 2003;189(2):488-93. doi: 10.1067/S0002-9378(03)00371-5. [PUBMED]
6. Peesay M, Nitin M. Cord around the neck syndrome. Neonatology Today. 2011;6(2):11-2. [PUBMED]
7. Ferguson VL, *et al*. Bioengineering aspects of the umbilical cord. European Journal of Obstetrics and Gynecology and Reproductive Biology. 2009;144:S108-13. [PUBMED]
8. Gupta S, Faridi MMA, Krishnan J. Umbilical coiling Indes. J Obstet Gynecol India. 2006;56(4):315-9. [Google Scholar]
9. Schreiber H, *et al*. Multiple nuchal cord loops and neonatal outcomes. American Journal of Obstetrics and Gynecology. 2018;218(1):S91. [Google Scholar]
10. Larson JD, Rayburn WF, Crosby S, Thurnau GR. Multiple nuchal cord entanglements and intrapartum complications. Am J Obstet Gynecol. 1995;173(4):1228-31. doi: 10.1016/0002-9378(95)91359-9. [PUBMED]
11. Vasa R, *et al*. Nuchal cord at delivery and perinatal outcomes: Single-center retrospective study, with emphasis on fetal acid-base balance. Pediatrics and Neonatology. 2018;59(5):439-47. https://doi.org/10.1016/j.pedneo.2018.03.002. [Science Direct]
12. Ogueh O, Al-Tarkait A, Vallerand D, Rouah F, Morin L, Benjamin A, *et al*. Obstetrical factors related to nuchal cord. Acta Obstet Gynecol Scand. 2006;85(7):810-4. [Wiley Online Library]
13. Miser W. Outcome of infants born with nuchal cords. J Fam Pract. 1992;34(4):441-5. [PUBMED]
14. Pilu G, *et al.* Sonographic demonstration of nuchal cord and abnormal umbilical artery waveform heralding fetal distress. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 1998;12(2):125-7.[Wiley Online Library]

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