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Original Research Paper

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RELIABILITY OF ANTENATAL SONOGRAPHY FOR DETECTION OF NUCHAL CORD AND IT'S IMPACT ON MODE OF DELIVERY

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ABSTRACT

AIMS: To know reliability of antenatal sonography for detection of nuchal cord and it's impact on mode of delivery.

INTRODUCTION : Diagnosis of a cord around the neck on sonography was first described in 1982 [1]. Nuchal cord influence mode of delivery and neonatal outcome.

MATERIALS AND METHODOLOGY: This study was a prospective, observational study done during 19 months . Antenatal songraphy of 900 pregnant women was done after 30 weeks of gestation for detection of nuchal cord conducted in the rural maternity hospital in Western Maharashtra. All cases were observed till delivery to ascertain position, number of loops of cord and mode of delivery.

RESULTS: Age and parity has no role in the occurance of nuchal cord. The proper period to detect nuchal cord by sonography is just before labour.

CONCLUSIONS: Antenatal sonography for detection of nuchal cord is a reliable examination.

KEYWORDS : Nuchal cord, Caesarean section , Antenatal sonography

INTRODUCTION :

Nuchal cord is defined as an umbilical cord that passes 360 around the neck. Nuchal cord is responsible for fetal asphyxia and death. Nuchal cord is detected commonly during routine obstetric sonographic examination with prevalence rates of 6% to 37% . [2]

Nuchal cords can be classified as Single or multiple, Loose or tight (causing compression of the fetal neck identified by indentation on sub-cutaneous tissue of neck). Nuchal cord is also classified as Type A or B. A nuchal cord means – The placental end crosses over the umbilical end, entangling the neck in an unlocked pattern is classified as type A. In type B of nuchal cord,the placental end crosses under the umbilical end, entangling the neck in a locked pattern [3]

The impact of nuchal cord on mode of delivery and neonatal outcome is debated. Tight nuchal cord may cause intra-uterine death due to asphyxia or perinatal complications but its detection is not possible on sonography. Prevalence rate of nuchal cord is 6 % to 37 % at any gestation of pregnancy but uncoiling of cord later in gestation, reduces it incidence to 50 % at time of delivery (1) . This study was done to find sensitivity and specificity of antenatal sonography to detect nuchal cord and its impact on mode of delivery.

Identification of the presence of nuchal cord in late trimester,sonography is very important examination to plan the method of delivery and to predict the possible complications.

MATERIAL AND METHODOLOGY:

This study was a prospective, observational study of 900 pregnant women done during 19 months conducted in private rural maternity hospital in Western Maharashtra. All patients referred for routine obstetric sonography were selected for antenatal songraphy with color Doppler on GE Logic V5 unit after 30 weeks of gestation for detection of nuchal cord.

With gray scale and colour box, umbilical cord around the fetal neck, number of loops in the cord and indentation on sub-cutaneous tissue of neck was identified. Out of 900 cases 97 % (873) cases were followed upto delivery , 3 % (27) cases lost follow up. The details (position, number of loops) of nuchal cord and mode of delivery was noted. The period between detection of nuchal cord on antenatal sonography and delivery was noted to correlate with position of cord at the time of delivery.

Singleton pregnancies with all types of presentations (cephalic , breech and transverse lie) were included in the study. Patients with multiple gestations , antenatal complications like pre-eclampsia, medical disorders like diabetes, heart diseases were excluded from the study.

It is difficult to distinguish between a loose or tight nuchal cord on ultrasound [4].Indentation on sub-cutaneous tussue of neck was considered as tight nuchal cord.Looseness or tightness of cord was checked at the time of delivery.

RESULTS :

Total 873 of 900 total patients were followed till delivery , out of which 3%(27) cases were lost follow up. Amongst them 95 %(837) cases was having vertex presentation . Nuchal cord was detected by antenatal ultrasonography in 37 %(315) cases with vertex presentation (Table 1). Breech presentation was detected in 3% (30) cases. Amongst them,43 % (13) were with nuchal cord.. It was observed in this study that 62 %(544) cases underwent normal vaginal delivery .Total 31.9 % (174) cases with nuchal cord underwent normal vaginal delivery amongst them, 85 % (149) cases had loose nuchal cord and 15%(25) had tight nuchal cord. Total 329 cases underwent caesarean sections, out of which 48% (159) cases were with nuchal cord . Total 63 % (99) cases with loose cord and 37 % (60) cases with tight cord underwent caesarean sections (Table 2). Nuchal cord was seen in 35%(312) cases at the time of deliveries showing false positivity 2.4 % (21) and false negativity (2.4%). The positive predictive value (PPV) was 85.29 % and negative predictive value (NPV) was 94.79%.Specificity of antenatal ultrasonography to detect nuchal cord was 91.22 % and sensitivity was 91.03 % .

Correlation between detection of cord on sonography and detection of nuchal cord on delivery was not seen in 47 % (37)

cases of less than 35 weeks of gestation and 53 % (42) cases of more than 35 weeks of gestation.

Overall incidence of nuchal cord in this study was 38% (333) in which most common type of cord was single loop (94.24 %) followed by 2 loops (4.8%) and 3 loops (0.6 %) . In this study nuchal cord with more than 3 loops was not seen. Detection of nuchal cord does not differ with gestational age as same number of cases of nuchal cord are found in 2 groups of less than 36 weeks and more than 36 weeks. Nuchal cord with multiple loops persist till delivery without uncoiling (100 % correlation) . In this study, there is no any statistically significant difference in percentage of normal delivery and caesarean sections in cases with nuchal cord group and without nuchal cord group. But tight nuchal cord affects mode of delivery.

OBSERVATIONS AND RESULTS :

Table 1 – No of cases with presentation

	Total	with Nuchal cord	without Nuchal cord
Vertex	837	315	522
Breech	30	13	17
Transverse	6	5	1

The presence of nuchal cord was not having any statistical significance on presentation of fetus (P value: 0.06) .

Table 2 – Tight or loose cord & Mode of Delivery

	Total	Loose	Tight	Total
Normal Vaginal Delivery	544	149(85%)	25(15%)	174(31.9%)
Delivery With Caesarean Section	329	99(63%)	60(37%)	159(48%)

In this study,condition of cord (tight or loose) was having highly significant effect on mode of delivery (P-value: 0.0000).

Diagram 1- Diagramatic presentation of cases of Nuchal cord in Age groups

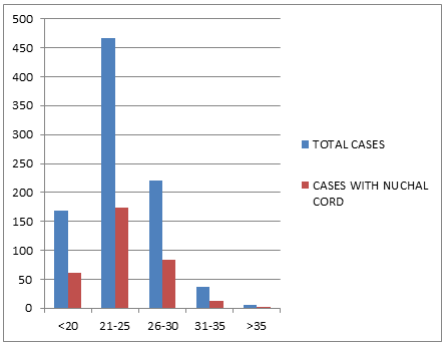

Table 3-Cases of Nuchal cord with relation to Parity

	Primigravida	Multigravida	Total
Nuchal cord on sonography	162(48%)	171(52%)	333
Nuchal cord at delivery	157(51%)	155(49%)	312

There is no statistical significant difference between Cases of Nuchal cord with relation to Parity (P-value:0.671).

In this study 13 cases of breech presentation are having nuchal cord on sonography,out of it 12 cases are having nuchal cord at delivery .

Table 4-Correlation of False positive cases with period between detection of nuchal cord on sonography and detection of cord at delivery

Period in days between detection of nuchal cord on sonography and at delivery	Number of cases with nuchal cord on sonography	Number of cases with nuchal cord at delivery	False positive cases
0-5	25	24	1(4%)
6-10	24	22	2(8%)
11-20	105	103	2(1.9%)
21-30	97	95	29(2%)
31-40	61	52	9(14%)
41-50	15	13	2(13%)
More than 50	6	3	3(50%)

There is statistical significant difference between period in days between detection of nuchal cord on sonography & presense of nuchal cord are delivery and False positive cases (P-value :0.0003)

Diagram 2-Cases of nuchal cord with number of loops on Sonography

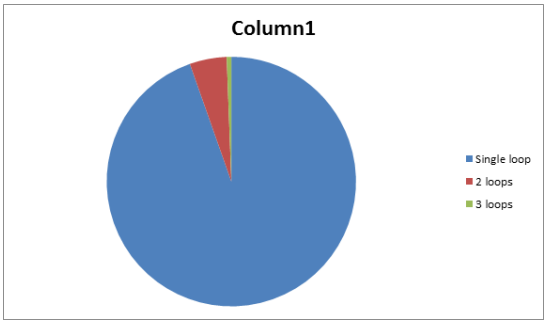

Table 6-Number of loops in Nuchal cord on Sonography and at delivery

	On sonography	at delivery	% of correlation
Single loop	315(94.6%)	294(94.24%)	93
Two loops	16(4.8%)	16(5.12%)	100
Three loops	2(0.6%)	2(0.64%)	100
Total	333	312	

There is no statistical significant difference between Number of loops in Nuchal cord on Sonography and number of loops in nuchal cord at delivery (P-value :0.98)

Total number of cases studied are 900 out of which 333 number of cases were having nuchal cord on sonography .At delivery total cases with nuchal cord are 312.Total false positive cases are 21 and false negative cases are 28. Sonography has high sensitivity and specificity in detection of nuchal cord.Accuracy of sonography in detection of nuchal cord is 91.15 %.Hence sonography is reliable investigation for detection of nuchal cord. There is statistically high degree significant association between detection of nuchal cord on sonography and presence of nuchal cord at delivery (P-value :0)

DISCUSSION :

Detection of nuchal cord on routine sonography alerts the treating obstetrician as compression of cord has adverse effect on neonatal outcome. It helps in obstetrical management and neonatal support. This study revealed that gray scale and color imaging improves the prenatal detection of nuchal cord during third trimester of pregnancy.

Total 873 patients were followed till delivery , out of which 333 cases had nuchal cord making it an incidence of 38% with most common type is single loop (94.24 %). Spellacy et al reported incidence of 15.8 & 30 % [4] and Singh et al reported 18.57 % incidence of nuchal cord [5].The most common type of nuchal cord is single loop (94.24 %) followed by 2 loops (4.8%) and 3 loops (0.6 %).In one study The incidence of single loop was 5.32% ,double loop was 1.14% and three loops was 0.17%. [6] In this study nuchal cord with more than 3 loops was not seen. Dr .Srinivas Prasad found incidence of 25 % and states rare incidence of 4 loop cord [7]. In literature more than 3 loops in nuchal cord are mentioned. Mastrobattista JM, detected [8] 9 loops of cord and Devendran detected 6 loops of cord [9].

Statisically there is no significant differences between the

occurances of nuchal cord in differetnt age groups. This observation agrees with study by G.Sing et al [5]. So we believe maternal age play no role in incidence of nuchal cord. Almost same number of cases are detected in the group less than 36 weeks and in a group more than 36 wks of gestation. Rohitkumar found more number of cases of nuchal cord in a group of more than 36 wks gestation [10]

Nuchal cord was seen in 35 % of deliveries (n-312) in one study in Nepal [11].

Nuchal cord with 3 loops persist till delivery (100 % correlation). Leonhard Schaffer stated type B nuchal cords are more likely to persist than type A [12]. Multiple loops of cord never get disentangled, uncoiled or slip.

There is no statistically significant difference in percentage of normal delivery and delivery by caesarean section in cases with nuchal cord group and group without nuchal cord in this study. Miser also observed similar findings [13]. Condition of cord (tight or loose) was having highly significant effect on mode of delivery. It suggests importance of detection of tight nuchal cord on songraphy before delivery. Amita Gupta et all [14] also of same opinion about tight nuchal cord which affect mode of delivery. In future, research need to be done for detection of tight nuchal cord. According to study by Larsen et al [15] cord with multiple loops do not affect mode of delivery. Mere presence of nuchal cord will not increase caesarean section[16] but it is tight nuchal cord which definitely affect obstetrical management [17]

In this study, rate of caesarean delivery was more common in test as compared to control group although difference was not statistically significant. Similar finding was observed by Miser that there was no significant difference in number of operative deliveries between nuchal cord and non-nuchal cord group. Larson et al. also reported that caesarean delivery was not more common in multiple entanglement that the control group.

Nuchal cord does not increase the chances of cesarean delivery . However, such patients require close monitoring during labour, preferably by continuous fetal electronic heart rate monitoring as tightand multiple nuchal loops were associated with persistent variable or late deceleration [18].

CONCLUSIONS:

Sonography has high sensitivity and specificity in detection of nuchal cord.Sonography is reliable investigation for detection of nuchal cord. . Its detection just before delivery is more reliable.. For detection of nuchal cord reliably ,sonography has to be done just before delivery. Multiple loops of cords persist till delivery. Age of patient and parity has no role in incidence of nuchal cord.Tight nuchal cord will affect mode of delivery.Detection of tight nuchal cord in late third trimester of pregnancy by sonography will help to plan the method of delivery and to predict the possible complications.

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REFERENCES :

1 Jouppila P, Kirkinen P. Ultrasonic diagnosis of nuchal encirclement by the umbilical cord: A case and methodological report. J Clin Ultrasound. 1982; 10(2): 59-62. doi: 10.1002/jcu.1870100205
2. J. D. Larson, W. F. Rayburn, V. L. Harlan : Nuchal cord entanglement and gestational age : Amer J Perinatol.1997; 14:555–557.
3. Collins JH.: Nuchal cord type A and type B: Am J ObstetGynecol 1997; 177:94
4. Spellacy WN, Gravem H, Fisch RO. :The umbilical cord complications of true knots, nuchal coils, and cords around the body :Am J Obstet Gynecol. 1966 Apr 15;94(8):1136-42
5. G Singh and K Sidhu : Nuchal Cord : A Retrospective Analysis:Med J Armed Forces India. 2008 Jul; 64(3): 237–240.
6. Vijayata Sangwan ,Mukesh Sangwan, Sunita Siwach, Rajiv Mahendroo, Richa Kansal, Pinki Lakra :Ultrasonographic detection of nuchal cord: required or not :International Journal of Reproduction, Contraception, Obstetrics and Gynecology. Int J Reprod ContraceptObstet Gynecol. 2014 Sep;3(3):507-511
7. Dr. Srinivas Prasad R.H :Incidence of Nuchal Cord in Late Trimester Pregnancy Sonography: International Journal of Science and Research (IJSR) 6.391Volume 6 Issue 6, June 2017
8. Mastrobattista JM, Hollier L M ,Yeomons ER, et al : Effects of nuchal cord on birth weight and immediate neonatal outcome :Am J Perinatol2005 Feb;22(2):83-5.
9. Devendran1, Rabindran2, Dhwaraga J. :A rare case of six loops of nuchal cord ObsGyne Review: Journal of Obstetric and Gynecology
10. RohitkumarVasa ,Roger Dimitrov Shivani Patel ::Nuchal cord at delivery and perinatal outcomes Single-center retrospective study, with emphasis on fetal acid-base balance:pediatrics and Neonatology October 2018 Volume 59, Issue 5, Pages 439–447
11. Tamrakar SR :Incidence of nuchal cord, mode of delivery and perinatal outcome: a notable experience in Dhulikhel Hospital : Nepal Med Coll J. 2013 Mar;15(1):40
12. Leonhard Schaffer, MD, Roland Zimmermann, MDUpToDate nuchal cord
13.W.F.Miser :Outcome of infants born with nuchal cords:Journal of Family Practice,vol 34.no 4,441-445,1992
14. Amita Gupta1, Tania Kakkar2, Hema Pathania3, VirenderSingh :Impact of nuchal cord on intrapartum complications,mode of delivery and perinatal outcome.Journal of Evolution of Medical and Dental Sciences
15. Larson JD, Rayburn WF, Crosby S, Thurnau GR. :Multiple nuchal cord entanglements and intrapartum complications : Am J ObstetGynecol 1995;173:1228-31.
16. E. PeregrineP. O'BrienE. Jauniaux:Ultrasound detection of nuchal cord prior to labor induction and the risk of Cesarean Section :Ultrasound Obstet Gynecol2005;25: 160 – 164
17. MorarjiPeesay: Nuchal cord and its implications:Matern Health NeonatolPerinatol. 2017; 3: 28.
18. AA Begum : A clinical of fetal outcome in cases of nuchal cord :JAFMC Bangladesh. Vol 7, No 1 (June) 2011; 25-27