

A CLINICAL STUDY OF FETAL OUTCOME IN CASES OF NUCHAL CORD

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Abstract

Introduction: The umbilical cord around the neck of the fetus at the time of birth is nuchal cord.

Objectives : To study the perinatal events and fetal outcome in cases with nuchal cord and formulate a plan for safe delivery.

Methods: This cross sectional prospective study of 152 cases of nuchal cord (out of 1646 deliveries) was carried out in department of Obstetrics and Gynaecology of a Combined Military Hospital of Bangladesh during the period of two years. The nuchal cords were classified as tight coils or loose coils. Apgar score at 1 and 5 minutes after birth were recorded. Birth weight and sex of all babies were noted. Cord length was measured and considered as long (>70 cm) and short (<35 cm).

Results: Out of 152 cases 128 (84.21%) had normal vaginal delivery, 3 (1.97%) cases had instrumental delivery, 21 (13.82%) cases underwent caesarean section and fetal distress was the main indication (16 out of 21). Only 22 (14.47%) of fetuses manifested fetal heart rate variation mostly variable deceleration (10 out of 22). Neonates born with tight nuchal cord had low Apgar score in one minute in comparison to loose ($p<0.05$), whereas significantly low Apgar score after 5 minutes was observed in babies born with multiple nuchal cord.

Conclusion: The presence of a nuchal cord per se is not found to be an indication of operative delivery. However, such patients require close monitoring during labour, preferably by continuous electronic fetal heart rate monitoring as well as strict maintenance of partogram.

Key words: Nuchal cord, normal delivery, caesarean section, fetal outcome

Introduction

The umbilical cord, the lifeline of the fetus is subject to a wide variety of lesions and untoward gestational events whose origin may be structural, mechanical, hamartomatous, infectious or otherwise¹. Some cord lesions lead to indisputable cord failure due to compromise of umbilical blood flow to a degree

sufficient to prejudice the life or the well being of the fetus. The umbilical cord around the neck of the fetus at the time of birth is called nuchal cord. The loops of the cord may be single or multiple, tight or loose². An umbilical cord entanglement around the fetal neck affects 23% to 33% of all pregnancies and generally considered benign². However, the occurrence of nuchal cord entanglement is associated with an increased rate of variable fetal heart rate decelerations during the 1st and 2nd stage of labour³. Although the new borns with cord encirclement required resuscitations, fetal or neonatal death could rarely be attributed to the nuchal cord³. The study was carried out to find out the incidence of nuchal cord within a group of population and its impact on perinatal outcome, intrapartum complications and mode of deliveries.

Materials and Methods

This cross sectional prospective study was carried out in Combined Military Hospital (CMH) of Chittagong Cantonment over a period of 24 months from July 2008 to Jun 2010. The study group included both primigravida and multigravida with singleton pregnancies only. Pregnancies complicated by intrauterine fetal death, malpresentations, multiple gestations, congenital malformations of fetus and active herpes infection were excluded. All patients in the study group were booked cases with an average of 4 antenatal visits. The maternal and fetal monitoring in labour were done as per partograph. Fetal heart rate was monitored by intermittent auscultation with stethoscope and fetal doppler. Continuous electronic fetal heart rate monitoring was done in cases of abnormalities found during admission test and high risk cases like: pregnancy induced hypertension (PIH), intrauterine growth restriction (IUGR), oligohydramnios and diabetes mellitus.

Details of each delivery of baby during the study period were recorded. Number of loops around the fetal neck, tight coils or as loose coils & Apgar score at 1 and 5 minutes after birth were noted. The tight coils were those which had to be cut before the body of the fetus was

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delivered. Birth weight and sex of all babies were noted. Lengths of cords were measured and labeled as long (>70cm), short (<35cm) or normal. A data check sheet was maintained for each case till completion of delivery.

Result

Out of 1646 deliveries (normal or caesarean) performed within this period total 152 (9.23%) neonates had nuchal cord. The male and female baby ratio of the newborn with nuchal cord was 1.41:1 and that of babies without nuchal cord was 1.07:1. The majority of the patients (71 cases) were from the age group of 21-25 years (46.71%) and number of multipara (93 cases) was more (Table I). Only 14.47% of fetuses with nuchal cord manifested fetal heart rate variations (Table II). The most common fetal heart rate variation was variable deceleration specially in fetuses with multiple tight cords.

Table-I: Distribution of gravida status of cases as per age group

Age group (in years)	Primigravida (n=59) Number (%)	Multigravida (n=93) Number (%)	Total (n=152) Number (%)
15-20	36(61.02)	03(03.22)	39(25.65)
21-25	18(30.51)	53(56.99)	71(46.71)
26-30	05(08.47)	35(37.63)	40(26.31)
31-35	00	01(01.08)	01(00.65)
>35	00	01(01.08)	01(00.65)

Table-II: Fetal heart rate variations in cases with nuchal cord (n=152)

Type of Dysrhythmias	Number
Bradycardia	03
Tachycardia	03
Early deceleration	02
Late deceleration	04
Variable deceleration	10
Total	22 (14.47%)

Incidence of caesarean deliveries was not increased in cases with nuchal cord. On the contrary the incidence of such deliveries was lower than that in cases without nuchal cord (Table III).

Table-III: Mode of delivery in relation with nuchal cord

Mode of delivery	With nuchal cord Number (%)	Without nuchal cord Number (%)	Total Number (%)
Normal	128 (84.21%)	1025 (68.61%)	1153 (70.04%)
Vacuum extraction	03 (01.97%)	10 (00.67%)	13 (00.79%)
Caesarean Section	21 (13.82%)	459 (30.72%)	480 (29.16%)
Total	152 (9.23%)	1494 (90.77%)	1646 (100%)

Rate of vacuum deliveries was 1.97% which is more than deliveries without nuchal cord. Majority of patients

with nuchal cord (16 cases) underwent caesarean section with an indication of fetal distress (Table IV). It was observed that most of the nuchal cords were of single loop (87.5%) and tight (69.74%).

Table-IV: Indications of caesarean section in cases with nuchal cord

Indications	Number of Cases
Fetal distress	16
Prolonged 2nd stage of labor	02
IUGR with failed induction	01
Post caesarean pregnancy	02
Total	21

Table-V: Distribution of cases as per variety of nuchal cord (n=152)

Variety	Loose	Tight	Total (%)
Single Loop	39	94	133 (87.5)
Multiple Loop	07	12	19 (12.5)
Total (%)	46 (30.26)	106 (69.74)	152 (100)

Table-VI: Relationship of operative delivery with nuchal cord (n=24)

Nuchal cord	Caesarean delivery	Vacuum delivery	Total
Tight loop	17	03	20
Loose loop	04	00	04
Single loop	14	01	15
Multiple loop	07	02	09

Table-VII: Apgar score of neonates with nuchal cords (n=152)

Apgar score	At 01 min		At 05 min	
	Tight Number (%)	Loose Number (%)	Tight Number (%)	Loose Number (%)
00-04	06 (05.66)	00	01 (00.94)	00
05-06	27 (25.47)	07 (15.22)	03 (02.83)	00
07-10	73 (68.87)	39 (84.78)	102 (96.23)	46 (100)
Total	106	46	106	46

Most of the neonates born with tight nuchal cord also showed low Apgar score in 1 min, but there was no significant difference (p= 0.06) of Apgar score between tight and loose nuchal cord after 5 minutes. No significant differences of mean length of the cord (51.56±9.07 and 50.18±8.26 cm), mean weight of the baby (2.82±0.48 and 2.88±0.62 kg) in cases with or without nuchal cord were observed.

Discussion

In 1962 Crawford first defined nuchal cord as the condition in which the umbilical cord was round at least once around the neck of the fetus⁴. Nuchal cords that

form early can resolve at any time or persist until term and coils may form shortly before delivery^{5,6}. The incidence of nuchal cord in this study was 9.23% of all hospital deliveries (152 out of 1646). The reported incidence in Indian population varied from 5.3% to 10.9%^{7,8} which is in concordance with present study. But Miser et al and Shrestha observed quite higher (24%) incidence^{9,10}.

Age of the majority of patients (46.71%) was within the range of 21-25 years, as expected as this age group consists of most fertile women. Multigravida comprised 61.2% and primigravida 38.8% which simulates some other studies like Gardiner et al; but Adinma didn't find any relation of parity with nuchal cord^{11,16}.

In this study number of nuchal loops varied from 1 to 4. The presence of 2 or more loops of cord around the neck was reported to affect between 2.5% to 8.3% of all pregnancies³. In fact 0.1% of fetuses have 4 or more loops of nuchal cords and the maximum reported number was 9¹¹. Total cases of heart rate variation in this study was 22 (14.47%), out of them 10 had variable deceleration which is similar to the study of KK Dhar et al and Janet D Larson^{3,12}. Kitagawa M in 1989 used analysis of umbilical cord gases and cardiotocogram and found positive relation of variable deceleration and low Apgar score and significant respiratory acidosis in cases with nuchal cord⁹.

Incidence of lower segment caesarean section (LSCS) with nuchal cord in this study was 13.81% and fetal distress was the most common cause (16 out of 21) and 14 of them had tight nuchal cord. Dhar et al found the incidence of LSCS 27.2% of case with tight nuchal cord and 15.7% with loose nuchal cords¹². Most of the babies in this study had Apgar score of 7-10 after 1 min (112 cases) and 5 min (148 case). The total number of cases with low Apgar score at 1 min was 40 (26.31%). Eight babies had Apgar score <7 after 05 min (5.20%) suggesting that any possible effect is only transient. Similar findings by other suggest that nuchal cords were not a major cause of fetal asphyxia^{5,12}.

According to Leonard Schaffer and colleagues neonatal birth weight was more in cases of longer nuchal cord. But Walker & Pye, like this study, found no significant difference of birth weight with or without, short or long nuchal cords^{13,14}. The difference in the mean length of the cord in cases with or without neck entanglement was also not significant. This study observed three cases of true knots in nuchal cord groups all of which underwent LSCS for fetal distress. Like some other studies Walker & Pye found male babies had longer cord than female babies and it was assumed due to higher level of intrauterine activities of male fetus¹³. Present study also observed that the proportion of males were significantly more than female among the neonates born with nuchal cords which

simulates with the findings of Rhoades DA et al¹⁵. Studied series had no perinatal mortality with nuchal cord which is similar to observation of Larson JD, Miser WF^{3,9,12}. But Adinma JI found positive correlation of tight nuchal cord and perinatal mortality¹⁶.

Conclusion

The presence of a nuchal cord per se is not found to be an indication of operative delivery. However, such patients require close monitoring during labour, preferably by continuous fetal electronic heart rate monitoring as tight and multiple nuchal loops were associated with persistent variable or late deceleration. Real time ultrasonic equipment, color doppler sonography, in some cases pulsed doppler sonography of the cord vessels is now indicated in situations with uncertain variable deceleration and / or other abnormal findings in the antepartum fetal heart rate registration. Findings of this study suggest that vaginal delivery can be attempted in spite of this ultrasonographic awareness.

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