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RESEARCH ARTICLE

FETO-MATERNAL OUTCOME OF ANTE-NATAL CARE PATIENTS WITH CORD AROUND THE NECK FINDING IN TERM PREGNANCY

Dr. Mugdha L. Jungari[1] and Dr. Palak Dang[2]

1. Associate Professor, Department of Obstetrics and Gynaecology, DattaMeghe Medical College and ShalinitaiMeghe Hospital and Research Centre, Wanadongri, Nagpur, India 441110.
2. Junior Resident, Department of Obstetrics and Gynaecology, DattaMeghe Medical College and ShalinitaiMeghe Hospital and Research Centre, Wanadongri, Nagpur, India 441110.

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Abstract

Umbilical cord may sometimes surround the fetal neck, often detected during routine ultrasonography or delivery. The cord around neckmay untwines spontaneously, however, the continued presence of cord loops around neck affects the fetal outcome.

Objectives: To study the incidence of cord around the neck finding (nuchal cord)and feto-maternal outcome.

Methodology: The retrospective study was conducted at a tertiary care hospital of Central India. During the study period of 18 months, out of 1672deliveries, 470 deliveries had nuchal cord. The relevant data was extracted from the hospital records.

Results: At the time of delivery, nuchal cord incidence was 28.1%. Out of 470 deliveries, 273 underwent LSCS with fetal distress possibly due to oligohydramnios as their prime indication. Low birth weight was seen among 26.8% newborns. 8.7 % newborns were admitted in NICU. However, no perinatal mortality was reported.

Conclusion: Presence of nuchal cord at the time of delivery is quite common. One must rely on clinical skills for pre-delivery diagnosis of nuchal cord, especially in rural and peri-urban areas,where last-trimester USG reports are not available. The nuchal cord when accompanied by oligohydramniosdoes interfereduringlabour, and the outcome of delivery with respect to fetal distress.

Introduction:-

Entangled umbilical cord is one of the commonest pathological findings among umbilical cord abnormalities [(1)], with an incidence range of 14.7% to 33.7% for all deliveries [(2)]. The term Nuchal cord is coined whenumbilicalcordentwines 360 degrees around the neck of fetus[(3)]. The nuchal cords are seen very commonly, having a prevalence of 6% to 37%,around 12% at 24 to 26 weeks, reaching 37% at full term [(4, 5)]. The main cause of a nuchal cord is thought to be excessive fetal movement, an abnormally long umbilical cord (>70-80 cm), a weak cord structure,oligohydramnios, having twins or multiples Lehtonen et al. observed that entanglement from longer umbilical cords increased the chances of complications [(5)]. Approximately half of the nuchal cords unravel before the fetus is delivered [(6)].

Corresponding Author:- Dr. Mugdha L. Jungari
Address**:-** Associate Professor, Department of Obstetrics and Gynaecology, DattaMeghe Medical College and Shalinitai Meghe Hospital and Research Centre, Wanadongri, Nagpur, India 441110.

Hippocrates considered it "One of The Great Dangers of The Eight Month" and mentioned it as "De OctimestriPartu" the nuchal cord and chest entanglement of umbilical cord. "When the nuchal cord persists until the term pregnancy, it will cause suffering to the mother and either perish or born difficulties to the fetus" [7]. The persistent nuchal cord is partially indicated by varying rates of fetal heart during first and second stages of labour.Although newborns with cord entanglement may require resuscitation, fetal or neonatal death can also be attributed to the nuchal cord [8]. The risk of meconium-stained liquor doubled, and abnormal foetal heart rate pattern tripled in nuchal cord labour. APGAR score < 7 was commoner in neonates with cord wrapping the neck (33.42 %) when compared to non-nuchal cord (6.69%). NICU admissions (33.42 %) and neonatal mortality (4.39 %) were also higher in nuchal cord delivery [9].

The current study was undertaken to determine the incidence of nuchal cord at delivery, and perinatal outcome in a peri-urban tertiary care hospital setting.

Objectives:-

1. To determine the incidence of cord around the neckat delivery
2. To study feto-maternal outcome in nuchal cord pregnancy.

Methodology:-

This retrospective study was conducted in peri-urban tertiary care hospital of central India. The hospital records of pregnant women delivering in the institute from January 2020 to December 2021 were considered for the study. Pregnant women aged <35 years, who delivered after 28 completed weeks of pregnancy, were included in the study. From the hospital records, demographic variable and indicators of feto-maternal outcomes were recorded in an excel sheet. Age, gravida, parity status, mode of delivery, fetal distress, presence of meconium, NICU admission and APGAR score after birth were all considered, based on which our results were compared. The data was analyzed using statistical software GraphPad Prism. The ethical committee guidance and clearance was obtained before starting the study.

Results:-

During the one-year study period,1672 pregnant women delivered in the institute, out of which 470 (28.1%) females had fetuses with cord entangled to the neck at the time of delivery. The age of pregnant women with nuchal cord at delivery ranged 21 to 35 years, with a mean age of 26.3 years.2/3rd of nuchal cord was seen among primigravida. The nuchal cord incidence was significantly higher among primigravida women aged 21-25 years. (P value 0.0001, Table -1).

Table 1:- Distribution of gravida status of cases as per age group.

Age group (In years)	Primigravida (n=310) (%)	Multigravida (n=160) (%)	Total (n=470) (%)
15-20	4(1.2%)	0(0%)	4(0.85%)
21-25	242(78%)	48(30%)	290(61.7%)
26-30	56(18%)	93(58.1%)	149(31.7%)
31-35	8(2.5%)	19(11.8%)	27(5.7%)

197 (42%) births were Normal Vaginal Delivery (NVD), while 273 pregnant females (58 %) underwent Lower Segment Caesarean Section (LSCS);the commonest indication for LSCS was oligohydramnios with fetal distress in 102 deliveries. (Table 2). Significant difference was observed in mode delivery due to presence or absence of nuchal cord. LSCS was more common among pregnant females with nuchal cord (P value 0.0001).

Table 2:- Mode of delivery in relation with nuchal cord.

Mode	With nuchal cord Number (%)	Without nuchal cord Number (%)	Total number (%)
LSCS	273(58.1%)	360 (30%)	633 (37.9%)
Normal delivery	197(41.9%)	842 (70%)	1039(62.1%)
Total	470	1202	1672

Meconium-stained liquor (MSL) was present in 280deliveries, which is indicative of fetal distress. All the 190 births with clear liquor were normal vaginal delivery. Out of the total 470 babies delivered, 41 babies (8.7%) were admitted in the NICU (Table 3). Nno significant difference was observed in NICU admission rate due to nuchal cord (P value- 0.11).Mean birth weight was 2.64kgs. Out of 470 births, 26.8% had low birth weight (28 babies birth weight <2 kgs and 98 babies had birth weight between 2 to 2.5 kgs) and remaining 344 (73.2%) babies had birth weight >2.5 kgs. However, there was no still birth or foetal death observed. The APGAR score in most of the cases was 7-10 after one minute (465 cases) and five minutes (470 cases). Five cases had APGAR score of 5-6 at one minute.

Table 3:- NICU admissions.

NICU admission	Nuchal cord present (n=470)	Nuchal cord absent(n=1202)	Total (n=1172)
Baby in NICU	41 (8.7%)	137 (11.4%)	178 (10.3%)
Baby not in NICU	429 (91.3%)	1065 (88.6%)	1494 (89.35%)

Presence of single loop was most common (61%) in bothprimigravida and multigravida in comparison to 2 or more loops (table 4).

Table 4:- Number of loops of cord seen in different gravid status.

Loops	Primigravida (n=310) %	Multigravida (n=160) %	Total (n=470) %
Single	198(63.87%)	88(55%)	286 (61%)
Two	92(29.67%)	53(33.12%)	145 (31%)
Multiple	20(6.45%)	19(11.87%)	39 (8%)

Among the 470 pregnancies with nuchal cord, oligohydramnios was present in 64% (302) pregnancies; out of which 188 (62.2%) underwent LSCS and remaining pregnancies delivered normally (Table 5).

Table 5:- Adequacy of Liquor and mode of delivery among women with nuchal cord at delivery.

Liquor	LSCS (n=273) %	NVD (n=197) %	Total (n=470) %
Oligohydramnios	188 (66.9%)	114 (57.9%)	302 (64.2%)
Adequate liquor	85 (33.1%)	83 (42.1%)	168 (35.8%)

Out 470 pregnant women with nuchal cord, 290 (61.7%) women had at least one term USG report. Out of 290 reports, nuchal cord was reported in 210 (72.4%) women only.

Discussion:-

Presence of nuchal cord was quite common with 28.1% incidence among deliveries occurred during the study period in the peri-urban tertiary care hospital. Sherer et al. (2020) observedlinear increase in nuchal cord(s) incidence with advancing gestational age, ranging between 15.8% and 30% of all term singleton deliveries [(10)]. Nuchal cord incidence of 33.7% and 35% respectively, in term and post-term deliveries was reported by Schäffer et al. (2005) [(11)]. Increased incidence of nuchal cord towards the term possibly signifies elaborate fetal activity or gradually decreasing amniotic fluid volume, or both [(11-15)].

The age range of 21-35 years was consistent with most fertile women age group. 2/3rd nuchal cord cases were seen among primigravida as reported by Gardiner et al. Adinma et al. did not find any relation between parity and nuchal cord[(16-18)].

In the current study, mode of delivery was LSCS in 58% cases of nuchal cord, which was significantly higher compared to cases without nuchal cord. Fetal distress was perceived to a greater extent in cases with cord around the neck finding leading to LSCS during second stage of labour. Fetal distress as evident by Meconium-Stained Liquor was seen among 60% cases with nuchal cord. Hinkson et al. concluded nuchal cord did not possess an unduly extensive risk of emergency LSCS due to fetal distress [(16, 19)]. Increased fetal heart rate abnormalities associated with nuchal cord might lead to increase chance of LSCS for presumed fetal distress [(19,20)], but no such associations was seen in a small sized sample group. Dhar et al. in their study observed the incidence of LSCS was in 39% of the

cases with tightly wrapped up nuchal cord [21]. Ogueh et al(2006) evaluated higher nuchal cord prevalence in pregnancies having undergone LSCS[22].

Like the current study, a towering aggregate of cases with single loop of cord around the neck was illustrated in primigravida and multigravida in comparison to two or more loops in other studies [23-24]. The incidence of multiple nuchal cords is generally inverse to the increasing number of loops involved. It is approximately 5% or lower for double nuchal cords.[25].

Hypoxia with chronic intermittent cord compression might lead to fetal growth restriction. At the same time smaller fetuses have more space to move around in the uterus, resulting in higher chances of umbilical cord entanglement [26,27]. 5% to 18% of all foetal asphyxia cases and and 10% of stillbirth may be result of umbilical cord complications[22]. The umbilical cord compression due to tight nuchal cord may lead to obstruction of blood flow in the umbilical vein, while continued blood outflow from the fetus through the thicker walled umbilical arteries causes hypovolemia, acidosis, and anemia [28]. In the current study, 26.8% newborns had low birth weight. Oligohydramnios was observed in 64% cases of nuchal cord. However, there was no still birth or foetal death observed.

The APGAR score in most of the cases was 7-10 after one minute (465 cases) and five minutes (470 cases). Only five babies had a lowAPGAR score of 5-6 at one minute. All babies had APGAR score more than seven after five minutes suggesting that possible transient effect only [11,29,30].

Among the 470 pregnancies with nuchal cord, at least one USG report during third trimester was present with 61.7% cases. Out of 290 reports, nuchal cord was reported in 210 (72.4%) women only. This signifies that in low- and middle-income countries where, repeated fetal monitoring with USG and Doppler is not feasible, clinicians must rely on their clinical skills. Nuchal cords prior to delivery could be gauged by of the fetal neck[10,31]. Positive test (sudden deceleration of fetal heart rate-FHR), indicates a probable risk of cord compression and close FHR monitoring is required in such cases. Mendez-Bauer et al. found a82.3% sensitivity and 89.1% specificity for trans-abdominal manual compression test[32]. Rigorous management with FHR monitoring is recommended during delivery when USG clearly reveals entangled umbilical cord and LSCS should be considered when non-reassuring fetal status is detected[33]. On USG, the “divot sign”, gray-scale sonographic sign associated with nuchal cordwhich was reported by Ranzini et al. (1999) remainsthe gold-standard (indirect), [34].

Conclusion:-

Nuchal cord presence at the time of delivery is quite common. In low-middle income countries like India, where last trimester USG reports are not readily available, especially in rural and peri-urban areas, one must rely on clinical skills for pre-delivery diagnosis of nuchal cord. Fetal monitoring during labour may indicate presence of fetal distress and may alter the course of actions. Incidence of nuchal cord was significantly higher among primigravida. Presence of oligohydramnios and growth restriction may also indicate presence of nuchal cord. Undiagnosed nuchal cord may result in adverse fetal outcome.

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