

Nuchal cord and perinatal outcome

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Abstract

Objective: to find out the incidence of nuchal cord at delivery, intrapartum complication and perinatal outcomes in the cases with nuchal cord.

Materials and methods: A prospective, cross-sectional, comparative study done at Kathmandu Medical College Teaching Hospital (KMCTH) between March 2006 to September 2006. Total 512 deliveries occurred during this period that were enrolled in the study and were analyzed for presence of nuchal cord at the time of delivery, number of coils whether loose or tight, intrapartum complications and perinatal outcome. The cases with nuchal cord at the time of delivery were taken as study group and the cases without nuchal cord served as control group. Outcome variables between the two groups were compared. Outcome variables used were meconium staining of liquor, rate of instrumental and caesarean delivery, intrapartum fetal heart rate (FHR) irregularities. As a measure of perinatal outcome Apgar score

< 7 at 1 minute and 5 minutes and incidence of neonatal unit admission was taken.

Results: Incidence of nuchal cord at the time of delivery was 22.85%. Incidence of single nuchal cord was highest (18.95%). Intrapartum complications like FHR irregularities and meconium staining of liquor were increased in nuchal cord group but statistically not significant. Instrumental delivery rate was high in nuchal cord group but statistically not significant (0.108). However, caesarean section rate was high in the group without nuchal cord (p=0.029). Apgar score < 7 at 1 minute was significantly low in nuchal cord group (p=0.010) but apgar score at 5 minutes and admission to neonatal unit was not more common.

Conclusion: Nuchal cord is not associated with adverse perinatal outcome.

Entanglement of umbilical cord around the fetal neck (Nuchal cord) is a common finding at delivery. It is often assumed that nuchal cord causes cord compression and thus lowbirthweight and intrapartum complications. The assumption that nuchal cord entanglement could cause cord compression and thus intrapartum complication is not recent. In 1896, Gould¹ mentioned Hippocrates' references² on nuchal cord. Hippocrates described in the "De Octimestri Partu" the nuchal and chest coiling of the umbilical cord, and regarded it as "One of the great dangers of the eight month". He also stated that 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. Several studies have been done to analyse the deliveries with nuchal cord with differing results. Although the nuchal cord is often blamed for most of the problems encountered during delivery, the actual significance that a nuchal cord has on the intrapartum events and perinatal outcome is controversial. This study was done to find out the incidence of nuchal cord at delivery, intrapartum complications like meconium staining of liquor, mode of delivery, and perinatal outcome in the cases with nuchal cord.

Materials and methods

This was a prospective, cross-sectional, comparative study conducted between March 2006 to September 2006 in the department of obstetrics

and gynaecology, Kathmandu medical college, teaching hospital.

All the pregnant women who delivered after twenty eight weeks of gestational age were enrolled in the study. The management of the cases was done according to the hospital protocol. Their labour events like meconium staining of liquor, fetal heart rate irregularities, mode of delivery, presence of nuchal cord and its number of loops, whether loose or tight, birth weight, sex of the baby, apgar score at 1 minute and 5 minute and admission to neonatal unit were noted.

A nuchal cord was considered to be loose when it could be easily uncoiled before delivery of the fetal trunk. When it needed to be clamped and cut before delivery of the trunk, the nuchal cord was considered tight.

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Foetal heart rate (FHR) monitoring was done with intermittent auscultation with stethoscope every 30 minute in first stage of labour and every 10 minute in second stage of labour during propulsive phase of labour and after every contraction in expulsive phase of second stage of labour when any FHR irregularities were encountered fetal heart monitoring was done more frequently. Persistent FHR irregularities (<110/minute and >180/minute) for 10 minute was considered as a sign of fetal distress. FHR irregularities lasting for less than 10 minute was termed as transient FHR irregularities. All the deliveries were attended by a team from obstetrics and pediatric department.

The cases with nuchal cord at the time of delivery were taken as study group and the cases which did not have nuchal cord served as control group. Variables like meconium staining of liquor, transient fetal heart rate (FHR) irregularities, fetal distress, instrumental delivery rate, caesarean section rate, apgar score <7 at 1 minute and 5 minute and admission to neonatal unit was taken as outcome variable. Outcome variables between the study group and control group were compared. Statistical analysis was done using Epi-info 6 by two sample test for continuous variables and chi-square test for discrete variables. Statistical significance was determined at the 5% level of significance ($p < 0.05$).

Results

During the seven month of study period total 512 women delivered after 28 weeks of gestation. Of the total deliveries 117 cases had nuchal cord making its incidence 22.85% of all the delivery. The incidence of single loop of cord was 18.95% while double, triple, and quadruple loops were 3.5%, 0.2% and 0.2% respectively. (Table 1) Of the total cases of nuchal cord 76.06% (n=89) were loose and 23.93% (n=28) were tight. Table 2.

Transient FHR irregularities was more common in nuchal cord group but statistically not significant ($p=0.19$). Similarly presence of meconium staining of the liquor was also more in study group than in control group but statistically not significant ($p=0.05$). Caesarean section rate in study group was actually significantly lower than control group [20% (n=24) and control group 30.8% (n=122), $p=0.02$]. Instrumental delivery in study group was 7.6% (n=9) and control group was 4.05% (n=16), statistically not significant ($p=0.10$). Table 3

Neonatal outcome was analyzed by apgar score at 1 minute and 5 minute and need for neonatal unit admission. Apgar score less than 7 at one minute was present in 24.78% (n=29) of newborn in study group and 14.68% (n= 58) of newborn in control group Which is statistically significant ($p=0.01$). Five minute apgar score less than seven in study

group was 2.5% (n=3) and 2.02% (n=8) in control group ($p=0.72$). Neonatal unit admission was needed by 24.78% of newborn in study group and 18.48% in control group, not reaching statistical significance ($p=0.13$). (Table 4)

Mean maternal age and parity in both the group were comparable. Mean maternal age of study group was 24.6 years and control was 24.5 years. Primigravida accounted for 52.9 % in study group and 54.7 % in control group. 47.1 % in study group and 45.3% in control group were multigravida.

Discussion

According to Larson, the occurrence of nuchal cord increases linearly from 5.8% at 20 weeks of gestation to 29% at 42 weeks³. The presence of multiple nuchal cords (2 or more loops) is estimated to affect between 2.5% to 8.3% of all deliveries⁴. The incidence of nuchal cord in this study was 22.85 % of all the deliveries after 28 weeks of gestation. It is similar to the incidences of the 23.7 % of all the deliveries in a study done by William F. Miser⁵. Incidences are slightly lower in studies done by Sheiner E. et al⁶, Pregrine et al⁷ and Mastro battista et al⁸ which are 14.7 %, 18% and 17% respectively. Schaffer et al⁹ in their study found the incidence to be 33.7 % among term deliveries and 35.1 % in post term deliveries. Incidence of multiple nuchal cords (two or more entanglement) was 3.9 % in this study which is similar to a study done by Larson et al³(3.8 %). Incidence of multiple nuchal cords was 5.8 % in term deliveries and 5.5% in post term deliveries in the study done by Schaffer et al⁹. Several studies have analyzed the effect of nuchal cord on intrapartum events and neonatal outcome with differing results.

This study found higher incidence of meconium staining of liquor in study group in comparison to control group ($p = 0.05$) but statistically not significant. Intrapartum FHR irregularities was also not more common in study group. Instrumental delivery rate was also slightly more in study group but statistically not significant ($p = 0.108$). These findings are similar to the findings of Peregrine et al⁷, Schaffer et al⁹, Mastrobattista et al⁸, and Larson et al³.

Cesarean section rate however was significantly lower in study group ($p = 0.029$). Sheiner et al⁶ and Mastrobattista et al⁸ in their study also found significantly lower cesarean section rate in women whose fetuses had nuchal cord at the time of delivery.

Apgar score < 7 at 1 minute was significantly more in study group ($p = 0.01$). This signifies birth asphyxia as a result of cord compression during

labour. However apgar score <7 at 5 minute and admission to neonatal unit was not significantly more which means primary neonatal adaptation is not impaired by nuchal cord compression. The findings are similar in the studies done by Larson et al, Mastrobattista et al ⁸, and Schaffer et al ⁹. However in the study by Peregrine et al ⁷ presence of nuchal cord did not significantly increase the risk of apgar score <7 at 1 minute. Contrary to

these findings Sheiner et al ⁶ in their study found 5 minute apgar score was < 7 in significantly more fetus without nuchal cord (p = 0.004), and perinatal mortality rate was also significantly more in the same group (p = 0.001).

Conclusion

Nuchal cord is not associated with adverse perinatal outcome.

Table 1: Incidence of nuchal cord

Type	n (%)
None	523 (74.1%)
Single nuchal cord	97 (18.95%)
Double nuchal cord	18 (3.5%)
Triple nuchal cord	1 (.2%)
Quadruple nuchal cord	1 (.2%)

Table 2: Types of nuchal cord

Type	Total	Loose	Tight
Single nuchal cord	97	81	16
Double nuchal cord	18	8	10
Triple nuchal cord	1	0	1
Quadruple nuchal cord	1	0	1
Total	117	89	28

Table 3: Intrapartum events in relation to nuchal cord

Intrapartum events	Total	Study group (n=117)	Control group (n=395)	p-value
Meconium staining of liquor	33	12 (10.2%)	21 (5.3%)	0.055
Instrumental delivery	25	9 (7.6%)	16 (4.05%)	0.108
Caesarean section	146	24 (20%)	122 (30.8%)	0.029
FHR irregularities	42	13 (11.1%)	29 (7.34%)	0.19

Table4: Apgar score and neonatal unit admission in relation to nuchal cord

Apgar score	Study group (N=117)	Control group	p-value
< 7 at 1 min	29 (24.78%)	58 (14.68%)	0.0105
< 7 at 5 min	3 (2.5%)	8 (2.02%)	0.72
Neonatal unit admission	29 (24.78)	73 (18.48%)	0.13

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