



“A Clinical Study Of Feto-Maternal Outcome In Relation To One Or More Than One Loops Of Cord Around Neck”

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INTRODUCTION

Nuchal cord, one or more loops is a common finding at delivery, but its clinical relevance is not entirely clear. Different results have been obtained from several studies that have analysed deliveries with nuchal cords¹⁻⁵.

Midwives have been taught, for over 200 years, that when the head is born in a vertex presentation, they should feel for the cord around the neck⁶, and, if found, loop it over the head, slip it over the shoulder or sever the cord. If the cord is loose, baby can be delivered normally^{7,8}. If the cord is too tight to go over infant's head, it can be slipped over the infant's shoulder and deliver the body through the cord, the cord can then be unwrapped from around the baby after birth. If the cord is too tight to slip back over the shoulder, one may use the somersault manoeuvre to deliver the baby^{9,10}. The cord can also be clamped and cut to allow for vaginal delivery if other methods of nuchal cord management are not feasible.

A tight cord will cause asphyxia to the baby or delay in delivery, abruption or even rupture⁵. Foetal asphyxia, deflexion attitudes and malpresentations are the sequel of this complication. Multiple nuchal cords have been associated with a greater risk of meconium being passed during labour and abnormal foetal heart rate patterns and the need for operative deliveries¹¹.

Nuchal cords have generally been considered to be rather benign^{3,5}. However there are various studies suggesting nuchal cord association with abnormal foetal heart rate patterns, operative vaginal delivery, increased umbilical artery acidemia, low 1-minute AGAR scores, decreased birth weight^{11,12}. A study also concluded that tight nuchal cords were associated with appreciable proportion of unexplained spastic quadriplegia and cerebral palsy¹³. Tight nuchal cord at birth has significant association with subclinical defects in both mental and psychomotor performance at 1 year¹⁴.

Although the nuchal cord is often blamed for most of the problem encountered during delivery, the actual significance that a nuchal cord has on intrapartum events and perinatal outcome remains controversial. To date, there is no prospective case control double-blind study looking at nuchal cords and observational studies vary in opinion as to the degree of poor outcomes. A recent review by Wilson of the American Academy of Ultrasonography Technicians recommends the documentation of umbilical cord issues¹⁵.

Considering the above facts, the present study was taken up to establish maternal complications, foetal complications, need for intervention and selection of mode of delivery in various cases one or more loops of cord around neck.

AIMS AND OBJECTIVES

AIMS:

1. To study the incidence of loop of cord around foetal neck. (One loop, more than one loop) with pregnancy more than 34 weeks.
2. To study foetal complication of cord around neck.
3. To study maternal complications of cord around neck.
4. To study the need for intervention and selection of mode of delivery in various cases of cord around neck.

OBJECTIVES:

To study the perinatal and maternal morbidity and mortality in cord around neck.

MATERIALS AND METHODS

The study is conducted at Padmashree Dr. D. Y. Patil Medical College and Research Centre, Pimpri, Pune from April 2012.

120 cases are selected from ANC and labour room and divided into two groups; 60 cases in control and 60 cases in study group.

Inclusion criteria:-

- Patient who has completed 34 weeks of gestational age and diagnosis has been established on the basis of USG.
- Patients with cord around neck diagnosed during delivery.
- Patients be included with normal progress of labour.

Exclusion criteria:-

- Gestational age less than 34 weeks.
- Gestational diabetes mellitus, pregnancy induced hypertension, Intra uterine growth retardation, Ante partum haemorrhage, multi fetal pregnancy, preterm labour, malpresentation.
- Chronic maternal illness that may affect the peri-natal outcome of the baby (i.e.) systemic disorders like deranged thyroid, renal failure, heart diseases, liver dysfunction, maternal anaemia.

Complete clinical assessment of patients with cord around neck of fetus is done, including maternal condition and maternal complications.

Foetal monitoring is done with the help of daily fetal movement count, non-stress test, USG, bio-physical profile and umbilical artery doppler.

Labour was monitored closely, taking into consideration fetal parameters like fetal heart rate variabilities, late deceleration, etc. All the patients in study and control groups were monitored throughout labour and the incidence of any intra-partum fetal asphyxia was noted.

The new born is assessed by taking it's APGAR score into consideration. In asphyxiated infants, the need for AMBU bagging, CPAP and the use of ventilator if required by the baby is noted.

All positive findings are compared between single loop of cord around neck, more than one loop of cord around neck and with control group.

OBSERVATIONS AND RESULTS

Table 1: Incidence of one or more than one loop of cord

| Number of loops | Nuchal cord group (n=60) |
|-----------------|--------------------------|
| 1 | 54 |
| 2 | 5 |
| 4 | 1 |
| Grand Total | 60 |

The above table shows the incidence of one or more than one loop of cord around neck in the group of 60 cases. Majority of the babies had one loop of cord neck i.e. 54 (90%) only 5 cases had 2 loops (8%) and there was only one case with 4 loops of cord around neck (2%) in this study.

Pie diagram showing incidence of one or more than one loop of cord

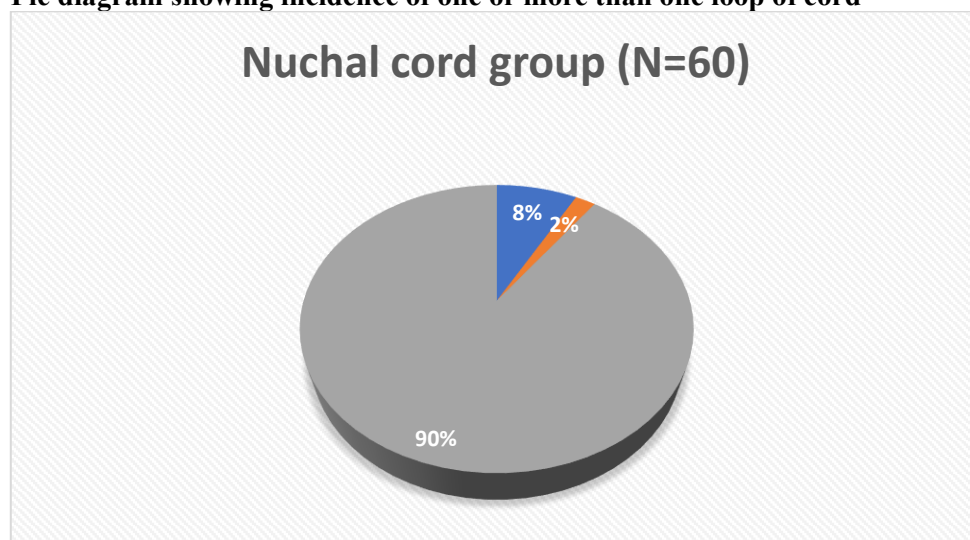


Table 2: Distribution of cases with respect to parity of the patient

| Parity | Without cord | Percentage | With cord | Percentage |
|--------------|--------------|------------|-----------|------------|
| Primi | 20 | 33.33 | 23 | 38.33 |
| G2 | 28 | 66.67 | 22 | 61.67 |
| G3 | 6 | | 8 | |
| G4 | 4 | | 4 | |
| G5 | 2 | | 3 | |
| Total | 60 | 100 | 60 | 100 |

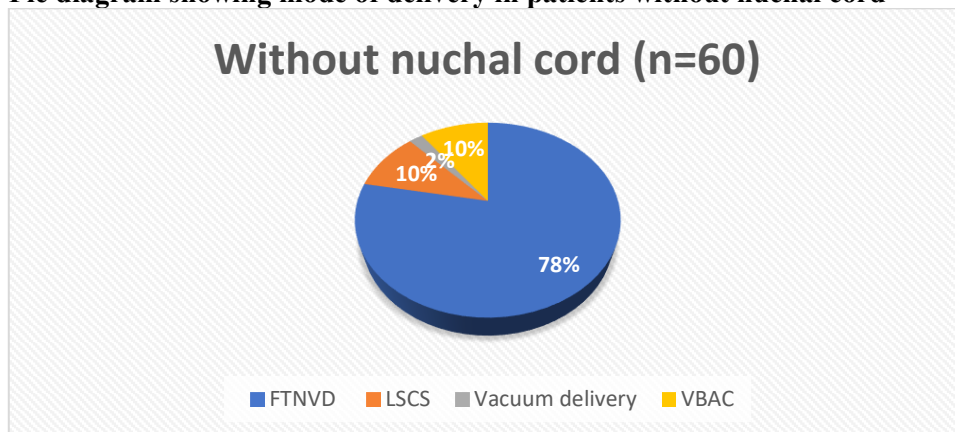
The above table shows the distribution of cases with respect to parity. Majority of cases with nuchal cord are found in multigravida (66.67%)

Table 3: Mode of delivery in patients with and without nuchal cord

| Mode of delivery | Without cord (n=60) | With cord (n=60) | Total |
|------------------|---------------------|------------------|-------------------|
| FTNVD | 47 (50%) | 47 (50%) | 94 (78.3%) |
| LSCS | 6 (35.3%) | 11 (64.7%) | 17 (14.2%) |
| Vacuum delivery | 1 (33.3%) | 2 (66.7%) | 3 (2.5%) |
| VBAC | 6 (10%) | 0 | 6 (5.0%) |
| Total | 60 (50%) | 60 (50%) | 120 (100%) |

The above table shows the mode of delivery in patients with and without nuchal cords. 11 cases in nuchal cord group (n=60) underwent LSCS when compared to 6 cases in group without nuchal cord (n=60). Only 1 patient required vacuum delivery for prolonged second stage of labour while in group without nuchal cord (n=60) compared to 2 cases in nuchal cord group (n=60). 2 patients presented with IUD, one was delivered vaginally other patient underwent LSCS i/v/o prev LSCS, both cases had 2 tight loops of cords around neck. P value is 0.038 (<0.05, statistically significant), inferring that nuchal cord has effect on mode of delivery.

Pie diagram showing mode of delivery in patients without nuchal cord



Pie diagram showing mode of delivery in patients with nuchal cord

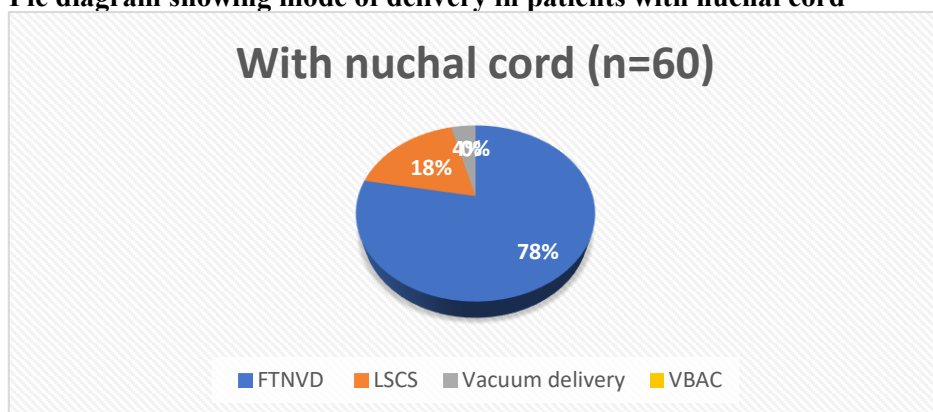
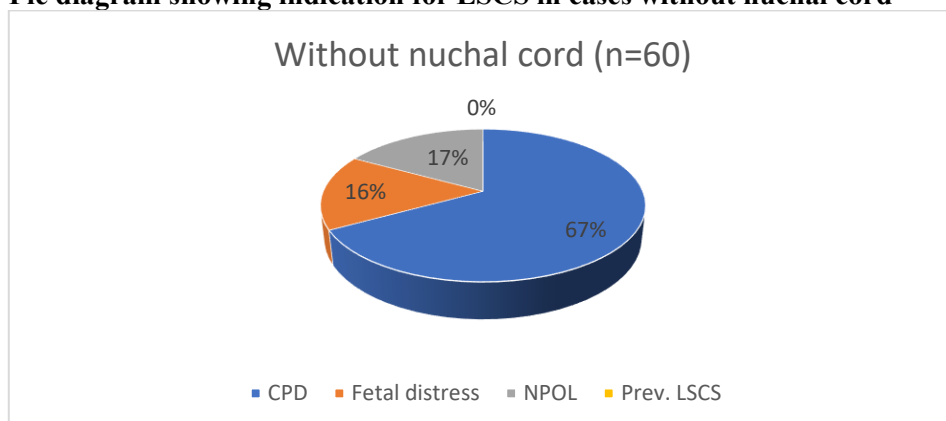


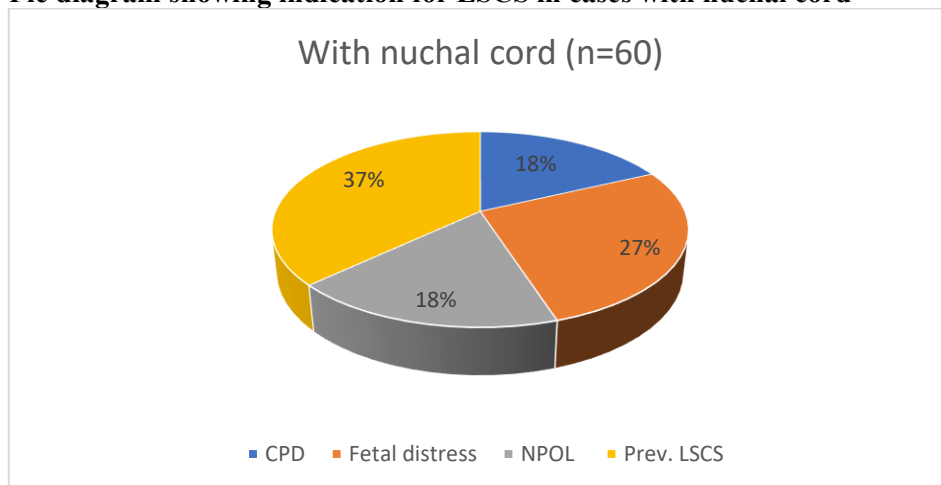
Table 4: Indication for LSCS in cases with and without nuchal cord

| Indication | Without nuchal cord (n=60) | With nuchal cord (n=60) | Total |
|----------------|----------------------------|-------------------------|------------------|
| CPD | 4 (66.7%) | 2 (33.3%) | 6 (35.3%) |
| Fetal distress | 1 (25.0%) | 3 (75.0%) | 4 (23.5) |
| NPOL | 1 (33.3%) | 2 (66.7%) | 3 (17.6%) |
| Prev. LSCS | 0 | 4 (100%) | 4 (23.5%) |
| Total | 6 (35.3%) | 11 (64.7%) | 17 (100%) |

The above table shows the indications for LSCS in cases with and without nuchal cords. Major indication of LSCS in cases without nuchal cords (n=60) was CPD. Fetal distress and NPOL are found more in the group with nuchal cords. P value is 0.201 (statistically not significant). In this study nuchal cord is not determined as an indication of LSCS.. Therefore though LSCS was performed for a valid indication, the presence of a nuchal cord did not influence the decision for LSCS.

Pie diagram showing indication for LSCS in cases without nuchal cord



Pie diagram showing indication for LSCS in cases with nuchal cord**Table 5: Birth weights of babies with and without nuchal cord**

| Nuchal cord | Mean birth weight |
|-------------|-------------------|
| Absent | 2.73 (0.40) |
| Present | 2.51 (0.39) |

The above table shows birth weights of babies with and without nuchal cords. The present study revealed that babies with nuchal cord, at term had lower birth weights when compared to those without nuchal cord ($p < 0.05$). Thus, inferring that the birth weight of babies is related to nuchal cords.

Table 6: Relation between length of umbilical cord and nuchal cord

| Number of loops around neck | Length in cm | | | | Total |
|-----------------------------|--------------|------------|------------|----------|------------|
| | 50-60 | 61-70 | 71-80 | >80 | |
| 0 | 12 (20.%) | 48 (80%) | 0 | 0 | 60 (50%) |
| 1 | 0 | 27 (50%) | 27 (50%) | 0 | 54 (45%) |
| 2 | 0 | 0 | 2 (40%) | 3 (60%) | 5 (4.2%) |
| 4 | 0 | 0 | 0 | 1 (100%) | 1 (0.8%) |
| Total | 12 (10.%) | 75 (62.5%) | 29 (24.2%) | 4 (3.3%) | 120 (100%) |

The above table shows the relation between length of umbilical cord and nuchal cord. Umbilical cord in babies with nuchal cords are longer than that of without nuchal cord. The p-value ($p < 0.001$) is statistically significant, inferring that the length of umbilical cords have an effect on the presence and absence of nuchal cord and increased lengths of cord are also associated with increased number of loops of cord around neck.

Table 7: Relation between FHR abnormalities and the presence of tight and loose loop of cord

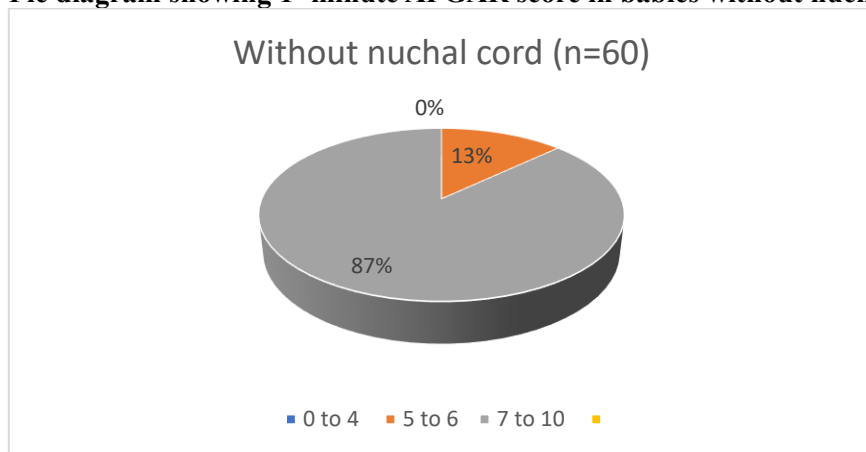
| FHR | Loose loop | Tight loop | Total |
|---------|------------|------------|-----------|
| Nil | 44 (97.8%) | 1 (2.2%) | 45 (75%) |
| Present | 5 (33.3%) | 10 (66.7%) | 15 (25%) |
| Total | 49 (81.7%) | 11 (18.3%) | 60 (100%) |

The above table shows the relation between FHR abnormalities and the presence of tight and loose loop of cord. In the group with nuchal cords ($n=60$), 11 cases had tight loop of cord around neck out of which 10 cases had FHR abnormalities. 44 cases had loose loop of cord around neck out of which 5 had FHR abnormalities. P value ($p < 0.001$) is statistically significant, inferring that FHR abnormalities are more often associated with tight nuchal cords.

Table 8: 1- minute APGAR score in babies with and without nuchal cord

| APGAR score | No cord | 1 cord | >1 cord | Present total |
|-------------|---------|--------|---------|---------------|
| 0 to 4 | | 2 | 3 | 5 |
| 5 to 6 | 8 | 12 | 2 | 14 |
| 7 to 10 | 52 | 41 | | 41 |

Pie diagram showing 1- minute APGAR score in babies without nuchal cord



The above table shows APGAR scores in new borns with and without nuchal cords. In cases with more than one loop of cord around neck 3 cases had APGAR score below 4 and out of them 2 cases were IUD had APGAR score 0. One case with 4 loops of cord around neck had one minute APGAR score 4. Out of 54 cases with single loop of cord around neck 2 cases had APGAR score below 4. In cases without nuchal cords no cases had APGAR score below 4. P value is 0.013* (statistically significant). Thus, inferring that nuchal cords are associated with low 1 minute APGAR scores.

Pie diagram showing 1- minute APGAR score in babies with nuchal cord

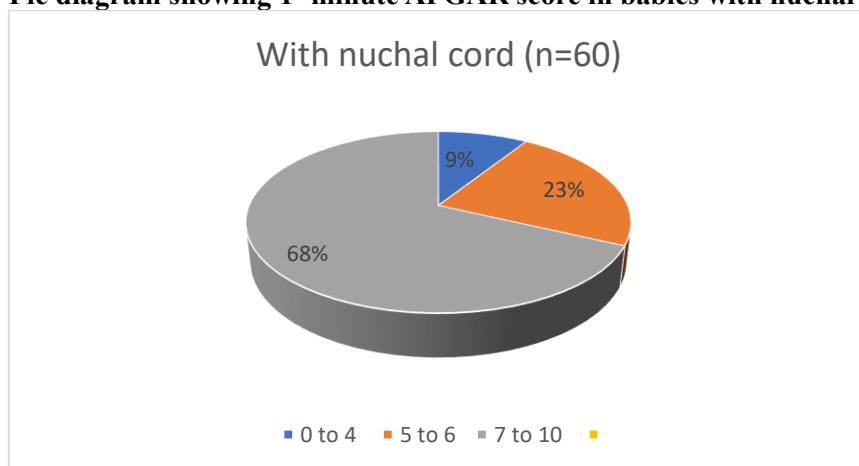
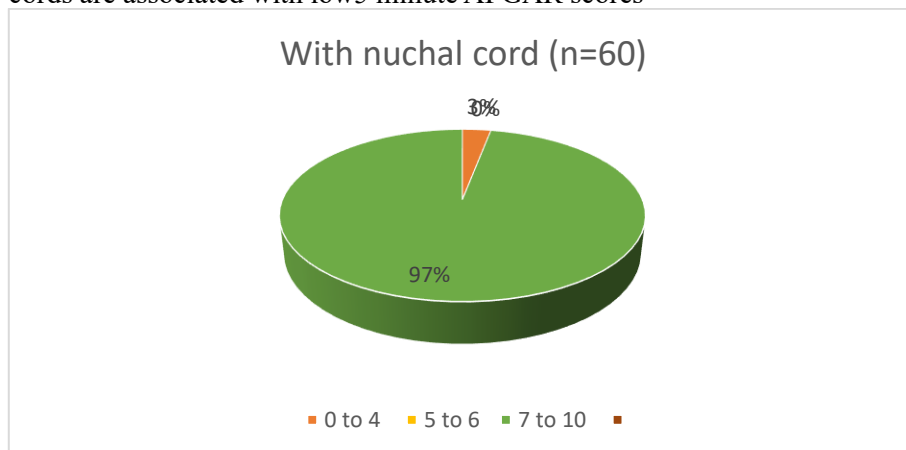


Table 9: 5- minute APGAR score in babies with and without nuchal cord

The above table shows APGAR scores at 5min in cases with and without nuchal cords. There were no cases without nuchal cords having APGAR below 4. Only 2 cases with 2 tight loops of cord around neck, which presented as IUD had APGAR score 0. p value 0.015* (statistically significant)). Thus inferring that nuchal cords are associated with low 5 minute APGAR scores



DISCUSSION

The present study was conducted at Padmashree Dr. D. Y. Patil Medical College and Research Centre, Pimpri, Pune from April 2012 to September 2014.

The incidence of one and more than one nuchal cords in this study was determined. 54 cases (90%) in the group with nuchal cords (n=60) had one loop of cord around neck and 5 cases (8%) had two loops of cord around neck. There was one case with 4 loops of cord ground neck (2%) in this study. The incidence of multiple nuchal cords (two or more entanglement) was 10% in the present study which is comparable to previous studies¹⁶.

Age of the majority of patients 46.66% with nuchal cords and 63.33% without nuchal cords were within the range of 21-25 years, as expected as this age group consists of most fertile women.

Multigravida comprised 61.66% of patients with nuchal cords and primigravida 38.33% which simulates some other studies like Oenderoglu LS et al; but Adinma didn't find any relation of parity with nuchal cord^{17,18}

Umbilical cords in babies with nuchal cords are longer than that without nuchal cord. The p-value (p <0.001) is statistically significant inferring that the length of umbilical cords have an effect on the presence and absence of nuchal cord and increased lengths of cords are also associated with increased number of loops of cord around neck^{10,11}

Several studies have been conducted and have analyzed the effect of nuchal cord on intrapartum events and neonatal outcome with controversial results. In the present study, fetal heart irregularities were seen in 15 cases with nuchal cord and 4 cases in group without nuchal cord. 2 patients presented with IUD, FHS was not recordable and both cases had 2 tight loops of cords around neck and delivered fresh still birth babies. Chi square analysis showed that nuchal cord is responsible for fetal heart rate abnormalities (p<0.05) similar to the studies of Janet D Larson et al. and Abdallah A et al.^{16,19}. In the present study it is suggestive that nuchal cords are associated with fetal heart rate abnormalities.

In the present study, group with nuchal cord has increased incidence of LSCS and instrumental deliveries. In the group with nuchal cords 18% underwent LSCS and 4% vacuum delivery whereas in the group without a nuchal cord only 10% underwent LSCS and 2% vacuum delivery (p-value 0.038* statistically significant), inferring that nuchal cord has effect on mode of delivery. In studies conducted by Sheiner et al and Mastrobattista et al a significantly lower caesarean section rate was seen, in women with nuchal cord^{20,21}.

Babies with nuchal cords are found to have a lower average weight as compared to babies without nuchal cords. The present study revealed that babies with nuchal cord, at term had lower birth weights when compared to those without nuchal cord (p<0.05). Thus inferring that the birth weight of babies is related to nuchal cords.

Nuchal cord group had a lower APGAR score compared to others. In cases with more than one loop of cord around neck, 3 cases had APGAR score below 4 and out of them 2 cases were IUD had APGAR score 0. One case with 4 loops of cord around neck had one minute APGAR score 4. Out of 54 cases with single loop of cord around neck 2 cases had APGAR score below 4. In cases without nuchal cords no cases had APGAR score below 4. P value is 0.013* (statistically significant). Thus, inferring that nuchal cords are associated with low 1 minute APGAR scores. The APGAR scores 5 min in cases with and without nuchal cords were compared and there were no cases without nuchal cords having APGAR below 4. Only 2 cases with 2 tight loops of cord around neck, which presented as IUD had APGAR score 0. p value 0.015* (statistically significant)). Thus, inferring that nuchal cords are associated with low 5 minute APGAR scores. A study by Tagliaferri S et al.²² also found low 1 minute APGAR scores.

Nuchal cord groups are more often admitted to NICU. Out of 60 cases without nuchal cord 2 babies were admitted to NICU, compared to 6 babies out of 60 patients with nuchal cord. 2 patients with 2 loops of cord around neck presented as IUD. p value is 0.048 (statistically significant). Thus inferring that nuchal cords are associated with increased NICU admissions.

CONCLUSION

The importance of nuchal cord in the management of labour has been debated for many years. Entanglement of the umbilical cord around the fetal neck (nuchal cord) is a common finding at delivery, but its clinical relevance is not entirely clear and several studies have analyzed deliveries with nuchal cords which show differing results and therefore this study was undertaken to determine the incidence of nuchal cord and to assess the intrapartum complications and perinatal outcome.

In the present study intrapartum events such as meconium staining of liquor and fetal heart rate irregularities were more commonly associated with nuchal cord. Two patients presented as IUD attributable to 2 loops of tight nuchal cord.

The presence of nuchal cord had statistical significance on the mode of delivery. The presence of nuchal cord had increased instrumental deliveries there by causing morbidity to the mother.

The birth weight of babies is related to nuchal cords. Babies with nuchal cords were found to have lower average weight.

Perinatal outcome of the babies as seen by the APGAR score and rate of NICU admission was statistically significant. Babies with nuchal cords are at higher risk of low 1 minute and 5 minute APGAR scores and NICU admissions and IUD. Hence nuchal cord is associated with adverse perinatal outcome.

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 antenatal period and labour, preferably by daily fetal movement counts, NST, Doppler USG, continuous fetal electronic heart rate monitoring during labour as tight and multiple nuchal loops were associated with persistent variable or late deceleration, low APGAR scores, NICU admissions and IUD.

SUMMARY

The present study was conducted at Padmashree Dr. D. Y. Patil Medical College and Research Centre, Pimpri, Pune from April 2012 to September 2014.

The exact perinatal effect of presence of nuchal cord in a newborn is still under debate, and therefore this study was undertaken to determine the incidence of nuchal cord and to assess the intrapartum complications and perinatal outcome.

In this study, 54 cases (90%) in the group with nuchal cords (n=60) had one loop of cord round neck and 5 cases (8%) had two loops of cord around neck. There was one case with 4 loops of cord around neck (2%) in this study.

Age of the majority of patients 46.66% with nuchal cords and 63.33% without nuchal cords were within the range of 21-25 years and multigravida comprised 61.66% of patients with nuchal cords.

Umbilical cords in babies with nuchal cords are longer than that without nuchal cord.

Fetal heart irregularities were seen in 15 cases with nuchal cord and 4 cases in group without nuchal cord. 2 patients presented with IUD, FHS was not recordable and both cases had 2 tight loops of cords around neck and delivered fresh still birth babies.

Nuchal cord has effect on mode of delivery, group with nuchal cord has increased incidence of LSCS and instrumental deliveries.

Nuchal cords are associated with low 1 minute and 5 minutes APGAR scores, and nuchal cords are associated with increased NICU admissions.

Therefore, though nuchal cord is associated with fetal heart rate abnormalities, mode of delivery, with low 1 minute and 5 minutes APGAR scores and NICU admissions, the mere presence of the cord doesn't change the mode of delivery. However, such patients require close monitoring during antenatal period and labour, preferably by daily fetal movement counts, NST, Doppler USG, continuous fetal electronic heart rate monitoring during labour.

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