

# Impact of Nuchal Cord on Perinatal Outcome and Mode of Delivery - A Survey at Tertiary Care Hospital

Shereen Sukhan, Drakhshan Nauman, Nadia Saif, Faiza Saghir and Fareeha Farooq

## ABSTRACT

**Objective:** To determine frequency of nuchal cord, its association with mode of delivery and perinatal outcome in newborns with nuchal cord.

**Study Design:** Descriptive case series study.

**Place and Duration of Study:** This study was conducted at the Department of Obstetrics and Gynaecology, Unit-2, Sir Ganga Ram Hospital, Lahore from 30-04-2014 to 29-10-2014.

**Materials and Methods:** All 210 patients fulfilling the inclusion/exclusion criteria presenting to Obstetrics and Gynaecology, Unit-2, Sir Ganga Ram Hospital, and Lahore were included in the study after informed consent. After complete history and physical examination, Doppler USG was carried out in all patients to diagnose the presence or absence of nuchal cord. All the patients were given trial of labour with continuous electronic fetal heart rate monitoring. Mode of delivery was decided by the researcher and mode of delivery noted. Presence or absence of nuchal cord also noted at time of delivery. Demographic data and outcome in all patients was recorded on pre-designed questionnaire. Perinatal outcome assessed by noting APGAR score at 1 min and 5 min and neonatal NICU admission, in nuchal cord group. Data was analysed using SPSS version 16. P-value  $< 0.05$  was taken as significant. Mean and standard deviation was calculated for age and gestational age. Chi square was used to compare mode of delivery in patients with or without nuchal cord. P value less than or equal to 0.05 was considered significant. Data was stratified for parity and type of nuchal cord to see the effect of these variables on the outcome. Chi square test was used post-stratification with p value  $\leq 0.05$  considered as significant.

**Results:** Total deliveries during study period were 210. Total 34 patients were diagnosed of having cord around neck so calculated incidence of cord around neck in our study is 16.2%. Mean age of the patients was  $27.04 \pm 2.5$  years. Mean gestational age was  $38.20 \pm 1.12$ . Out of 210 patients, 81 patients (38.6%) were primigravida while 129 patients (61.4%) were multigravida. Nuchal cord was present in 34 cases (16.2%). Out of these 34 cases of nuchal cord, 24 cases of loose nuchal cord and 10 cases of tight nuchal cords were observed. Caesarean section was carried out in 29 patients. 7 caesarean sections done in patients with nuchal cord and 22 sections done in patients without nuchal cord. Vaginal delivery was done in 181 (86%) patients including 2 vacuum deliveries. Out of 34 patients with nuchal cord, vaginal delivery was achieved in 27 (80%) patients and caesarean section was done in 7 cases (20%). This showed p-value of 0.210 (non significant).

**Conclusion:** This study suggests that nuchal cords occur commonly, loose or tight nuchal cords is not associated with increased chances of caesarean section and adverse perinatal outcome. Doing elective caesarean section in such cases only increases maternal morbidity without significant difference in neonatal outcome.

**Key Words:** Perinatal outcome, Nuchal cord, Caesarean section, APGAR score

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## INTRODUCTION

Department of Obstet and Gynae, Akhtar Saeed Medical and Dental College, Lahore.

Correspondence: Shereen Sukhan, Senior Registrar, Department of Obstet and Gynae, Akhtar Saeed Medical and Dental College, Lahore.

Contact No: 0300-4330903

Email: drdrakhshan@yahoo.com

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Nuchal cord is defined as loop of umbilical cord 360 degree around the fetal neck.<sup>1</sup> It is most frequent cord accident.<sup>2</sup> The prevalence of nuchal cord increases with advanced gestation. It is noted that overall prevalence is 5.8% at 20 weeks and 29% at 42 weeks of gestation. The prevalence at delivery varies from 28.2%-33.7%.<sup>3</sup> Colour Doppler Ultraound can detect cord around neck with  $> 90\%$  sensitivity.

There are two types of nuchal cord. Type A is freely sliding pattern which can undo itself (loose variety). Type B is nuchal cord that encircles the fetal neck in a locked pattern and cannot undo itself<sup>4</sup> (Tight variety). Problems and abnormality of the nuchal cord play a significant role in perinatal morbidity and mortality.<sup>5</sup> Multiple studies have demonstrated no

significant relation between nuchal cord and caesarean section or poor perinatal outcome.<sup>6</sup> However most stillbirth babies have demonstrated umbilical cord complication.<sup>7,8</sup> Multiple loops of umbilical cord increase the chances of intrauterine complications and low APGAR score.<sup>9</sup>

The exact perinatal effects of presence of nuchal cord are still under debate. The relationship of nuchal cord with induction and augmentation of labour, prolong 2nd stage of labour and abnormalities in fetal heart has been demonstrated.<sup>10</sup>

Nuchal cord is associated with fetal heart rate abnormalities during labour, owing to the pressure on cord. This leads to fetal distress and increased incidence of operative vaginal delivery and caesarean sections.

Only few local studies on impact of umbilical cord on mode of delivery and poor perinatal outcome have been done. So this study was done in tertiary care hospital of Pakistan to demonstrate the frequency of nuchal cord in term pregnancies and its impact on mode of delivery and perinatal outcome.

## MATERIALS AND METHODS

Descriptive case series conducted at the Department of Obstetrics and Gynaecology, Unit-2, Sir Ganga Ram Hospital, Lahore over a period of six months from 30-04-2014 to 29-10-2014. The calculated sample size was 210 cases

**Sampling Technique:** Non-probability, purposive sampling.

### Inclusion Criteria

- Reproductive age group 22 to 35 years.
- Singleton pregnancy (diagnosed on USG)
- Gestational age > 36 weeks (on dating scan)
- Any parity
- All previous vaginal deliveries

### Exclusion Criteria

- Patients with history of antepartum haemorrhage
- Previous history of caesarean section
- Breech presentation (on USG)
- Pre-eclampsia (blood pressure > 140/90 with proteinuria) and eclampsia (pre eclampsia associated with generalized tonic clonic fits).
- Placenta praevia (on USG)
- Transvers lie (on USG)

### Data collection procedure:

All 210 patients fulfilling the inclusion/exclusion criteria presenting to Obstetrics and Gynaecology, Unit-2, Sir Ganga Ram Hospital, and Lahore were included in the study after informed consent. After complete history and physical examination, Doppler USG was carried out in all patients to diagnose the presence or absence of nuchal cord. All the patients were given trial of labour with continuous electronic fetal heart rate monitoring. Mode of delivery was decided by the researcher and frequency of caesarean section due to fetal distress was estimated. Presence or

absence of nuchal cord also noted at time of delivery. Demographic data and outcome in all patients was recorded on pre-designed questionnaire. Perinatal outcome assessed by noting APGAR score at 1 min and 5 min and neonatal NICU admission, in nuchal cord group.

### Data analysis procedure:

The collected data was entered and analyzed in computer software SPSS software (version 16.0). Mean and standard deviation was calculated for age and gestational age. Frequencies of type of nuchal cord and its relation with mode of delivery noted. Chi square was used to compare caesarean section with or without nuchal cord. P value less than or equal to 0.05 was considered significant. Data was stratified for parity and type of nuchal cord to see the effect of these variables on the outcome. Chi square test was used post-stratification with p value  $\leq 0.05$  considered as significant. APGAR score of neonates of all patients with nuchal cord noted at 1min and 5 mins and neonatal admission in NICU also noted.

## RESULTS

A total of 210 patients were included in this study during the study period of six months from 30-04-2014 to 29-10-2014.

Regarding age distribution of patients, 180 (85.7%) were in the age range of 22-30 years and 30 patients (14.3%) were in the age range of 31-35 years. Mean age of the patients was  $27.04 \pm 2.5$  years. Mean gestational age was  $38.20 \pm 1.12$ .

Out of 210 patients, 81 patients (38.6%) were primigravida while 129 patients (61.4%) were multigravida. 9 (4.3%) primigravidas and 20 (9.5%) multigravidas were delivered by LSCS. 72 (34.2%) primigravida and 109 (52%) multigravidas were delivered normally. Nuchal cord was present in total 34 cases (16.2%). Out of these 34 cases of nuchal cord, 24 cases of loose nuchal cord and 10 cases of tight nuchal cords were observed.

Caesarean sections were carried out in 29 patients (13.8%). Out of these, 7 (20%) patients with nuchal cord landed into caesarean section. 181 (86%) patients were delivered vaginally including 2 vacuum delivery. Out of 34 patients with nuchal cord, vaginal delivery was achieved in 27 (80%) patients and caesarean section was done in 7 cases (20%). This showed p-value of 0.210 (non significant) (Table 1)

Stratification with regard to parity and type of nuchal cord is presented in tables 2 and 3, which again showed non significant results.

APGAR score of 34 babies born with nuchal cord was noted at 1min and 5 mins (Table 4). 10 neonates were having APGAR score of less than 7 at 1min. 4 neonates were having APGAR score less than 7 at 5 mins and needed admission in NICU. These 4 neonates were having meconium stained amniotic fluid in addition to

nuchal cord. Remaining 176 patients had neonates with good APGAR score. 2 neonates in each LSCS and vaginal delivery group had APGAR score < 7 at 5mins and were admitted in NICU. Luckily no perinatal mortality noted.

**Table No.1: Mode of Delivery in relation with Cord around Neck (n=210)**

Mode of Delivery	With CAN (n=34)		Without CAN (n=176)		Total (n=210)
	N	%	n	%	
LSCS	7	20.5%	22	12.5%	29
Vaginal Delivery (including vacuum delivery)	27	79.5%	154	87.5%	181
<b>Total</b>	<b>34</b>	<b>100%</b>	<b>176</b>	<b>100%</b>	<b>210</b>

P- value =0.210

**Table No.2: Stratification of Patients with regard to parity (n=210)**

Parity	Caesarean section		Total
	Yes	No	
Primigravida	09	72	81
Multigravida	20	109	129
<b>Total</b>	<b>29</b>	<b>181</b>	<b>210</b>

Chi Square= 0.81

P value = 0.369

**Table No.3: Stratification of patients with regard to type of nuchal cord (n=34)**

Nuchal cord type	Caesarean section		Total
	Yes	No	
Loose	05	19	24
Tight	02	08	10
<b>Total</b>	<b>07</b>	<b>27</b>	<b>34</b>

Chi Square= 0.00

P value = 0.956

**Table No.4: Relation of neonatal APGAR SCORE with CAN (n=34)**

APGAR SCORE	At 1 Min		At 5 Min	
	Normal Delivery (n=27)	LSCS (n=7)	Normal Delivery (n=27)	LSCS (n=7)
0-4	2 (5.8%)	1 (2.9%)	0	1 (2.9%)
5-6	5 (14.7%)	3 (8.8%)	2 (5.8%)	1 (2.9%)
7-10	20 (58.8%)	3 (8.8%)	25 (73.5%)	5 (14.7%)
<b>Total</b>	<b>34</b>		<b>34</b>	

## DISCUSSION

Cord around neck is well known problem encountered in term pregnancies and is notorious for fetal distress in labour, increased chances of caesarean sections and poor perinatal outcome. It is also a common reason of agony in pregnant women who come to know about cord around neck by ultrasonography. Many women opt for elective caesarean delivery to minimize risk of poor perinatal outcome.

Cord around neck is identified in 25% newborns.<sup>11</sup> and one loop of cord is present in 20-33% of term pregnancies. In my study, prevalence of nuchal cord is 16%. (34 cases out of total 210 cases). Many local studies support this finding. Nasreen A showed 14.85% prevalence of nuchal cord.<sup>12</sup> Contrasting result shown by Zulfiqar S who showed that frequency of tight nuchal cord was 32%.<sup>13</sup> An Indian study quoted 26.15% incidence of nuchal cord.<sup>14</sup> However another study documented low prevalence of nuchal cord (2.1%).<sup>15</sup>

In our study, there is no significant correlation between nuchal cord and maternal age and parity. A local study also documented no association between nuchal cord and maternal age.<sup>11</sup> Similarly other studies also showed no impact of nuchal cord on duration of pregnancy.<sup>11,16</sup>

Our study showed that rate of Caesarean sections with nuchal cord is 20% (7 out of 34) and vaginal delivery in 80% cases (27 out of 34). This finding confirmed by local study where incidence of caesarean section with nuchal cord was 26.7%.<sup>11</sup> Dhar et al. also concluded that incidence of caesarean section with tight nuchal cord was 27.2%.<sup>16</sup> Contrasting result was shown by another study where incidence of caesarean section with tight nuchal cord was 7.82%.<sup>17</sup> Another local study showed 66.7% cases of vaginal deliveries with nuchal cord.<sup>11</sup> A study by Nasreen A, showed that 50% cases with nuchal cord were delivered vaginally and 36% cases were delivered by caesarean section.<sup>12</sup> Comparison of these results showed that nuchal cord did not increase incidence of caesarean section.

The impact of nuchal cord on perinatal outcomes has been studied both locally and internationally. Many studies pointed out no unfavourable perinatal outcomes with nuchal cord and many controversies exist on association of nuchal cord and perinatal outcome.<sup>18</sup> Only 4 neonates out of 34 (11.7%) had APGAR score less than 7 at 5mins and needed NICU admission. These neonates were also having meconium stained liquor. This outcome was also confirmed by a local study where only 3 neonates with nuchal cord had APGAR score less than 7 at 5 mins.<sup>11</sup> Another local study showed APGAR score of < 7 at 5 mins in 8.04% cases.<sup>13</sup> Dhar et al also showed that 5.20% neonates were having APGAR score of <7 at 5 mins of life.<sup>16</sup> A retrospective population based study also confirmed that there is no association of nuchal cord with adverse

perinatal outcome.<sup>19</sup> These findings also confirmed by two other studies.<sup>20,21</sup>

## CONCLUSION

In conclusion, this study suggests that nuchal cords occur commonly, loose or tight nuchal cords may not be associated with increased chances of caesarean section and adverse perinatal outcome. Doing elective cesarean section in such cases only increases maternal morbidity without significant difference in neonatal outcome.

### Author's Contribution:

Concept & Design of Study: Shereen Sukhan  
 Drafting: Drakhshan Nauman  
 Data Analysis: Nadia Saif, Faiza Saghir, Fareeha Farooq  
 Revisiting Critically: Shereen Sukhan, Drakhshan Nauman  
 Final Approval of version: Shereen Sukhan

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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