

Effect of Nuchal Cord on Peri-Natal Outcome and Relationship with Mode of Delivery

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ABSTRACT

Objective: To compare peri-natal outcome with mode of delivery in patients without Nuchal cord and those with Nuchal cords including single, double and multiple loops.

Study Design: Retrospective study

Place and Duration of Study: This study was conducted at the Gynae Department Gaju Khan Medical College Sawabi, Pakistan from January 2019 to June 2019.

Materials and Methods: This was a retrospective study of 303 single gestation term pregnancies with spontaneous labor. Patients were grouped as without Nuchal cord and those with Nuchal cord including single, double and multiple turns. These were compared with perinatal outcome and delivery mode.

Results: This study showed that Nuchal cord was not associated with neonatal death, a bad Apgar score (<7) at 1 and 5 min. However, cases with multiple cords were shown to be associated with meconium-stained liquor, neonatal admission in Intensive care, fetal distress and emergency C-section.

Conclusion: Nuchal cord with multiple turns was associated with fetal distress but without affecting Apgar scores. Nuchal cord was not associated with adverse outcomes and prenatal ultrasound for this purpose is not required.

Key Words: Nuchal cord, Perinatal outcome, Multiple loops, Apgar scores, Caesarian section.

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INTRODUCTION

Nuchal cord is clinically controversial. The incidence can vary from 15–34%.¹⁻⁴ It has been traditionally believed that it can cause compression of cord, bradycardia in the fetus, meconium-stained liquor and frequent lower Apgar scores at 1 and 5 minutes, respectively.^{5,2} However, it has been shown that it is not associated low Apgar scores at 5 minutes, increased caesarean sections, and admission to neonatal intensive care unit or perinatal mortality.^{4,3,6} With wide availability of color Doppler Nuchal cord is increasingly being diagnosed but consensus guidelines have not been achieved regarding the management and counseling of such patients.² Additionally, the differences that may arise from variations in the number of Nuchal cord turns and their effect on management have also not been studied thoroughly.

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This study was therefore carried out to compare peri-natal outcome with mode of delivery in patients without Nuchal cord and those with nuchal cords including single, double and multiple loops, respectively.

MATERIALS AND METHODS

A retrospective study was carried out at Gynae Department Gaju Khan Medical College Sawabi, from January 2019 to June 2019 after approval from the Hospital's Ethics Committee. Data regarding occurrence of Nuchal cord and the number of turns is recorded in the wards register for each patient. All patient data was reviewed from the register and they were grouped as no Nuchal cord, Nuchal cord one, two and multiple turns respectively. Inclusion criteria were all term (37 week of gestation) pregnancies and spontaneous labor. Exclusion criteria were based on preterm infants, multiple pregnancies and patients without active labor who had elective caesarean section. Other data recorded for the purpose of the study included fetus distress that would require emergent caesarean section or assisted delivery, neonatal intensive care admission and fetal death. Statistical analysis was done with SPSS version 23 using Chi-square, T test and Fisher's exact test where appropriate. Results were considered statistically significant at $p \leq 0.05$.

RESULTS

Overall incidence of nuchal cord was 20.8 %. Its incidence in terms of loop turns for 1, 2 and multiple

turns was 53 (17.5%), 8 (2.6%) and 2 (0.7%), respectively as shown in Table-1.

Overall maternal age was 25.27 ± 0.141 years. Maternal age was statistically significant with p value 0.001 between the groups without nuchal cord and those with 1, 2 and multiple turns. Mean maternal age for the group without nuchal cord was 25.06 years and that for 1, 2 and multiple turns was 25.47, 29 and 29.5 years respectively. Parity was statistically significant with a p-value 0.001. Nulliparous women among the group without Nuchal cord were 89 (29.4%) and those with 1, 2 and multiple turns of cord were 53 (17.5%), 4 (1.3%) and 1 (0.3%), respectively. There were 151 (49.8%) multiparous women in the group without nuchal cord compared to 0, 4 (1.3%) and 1 (0.3%) women in the 1, 2 and multiple turns of cord groups respectively. Although fetal death was statistically significant at p-value 0.001 however there were a total of only 3 fetal deaths, 1 (0.3%) in the no nuchal cord group and 2

(0.6%) in the nuchal cord group with one each in the 1 and multiple turn groups respectively. Meconium stained liquor was statistically significant at p-value 0.024 with 57 (18.8%) patients in the group without nuchal cord and 11 (3.6%), 4 (1.3%) and 2 (0.7%) patients in the 1, 2 and multiple turn groups, respectively. However, analysis within 1, 2 and multiple loops showed that greater loops were associated with presence of meconium stained liquor at the statistically significant p-value of 0.014. Apgar score <7 was statistically insignificant at 1 minute (p-value = 0.075) and 5 minutes (p-value 0.286). There were 3 (1%) patients in the no cord group and 2 (0.7%), 0 and 1 (0.3%) patients in the 1, 2 and multiple turn loops groups respectively. This distribution for the 5-minute group was 3 (1%), 1 (0.3%), 0 and 1 (0.3%) patients for the cordless group and groups with 1, 2 and multiple turns respectively.

Table No.1: Details of incidence of nuchal card

N (%) [p-value]		No nuchal Cord N (%)	Nuchal cord		
			1 turn N (%)	2 turn N (%)	2 turn N (%)
		240 (79.2%)	53 (17.5%)	8 (2.6%)	2 (0.7%)
			63 (20.8%)		
Maternal age (Years)	25.27 ± 0.141 [p = 0.001]	25.06	25.47	29	29.5
Parity	Nulliparous	89 (29.4%)	53 (17.5%)	4 (1.3%)	1 (0.3%)
	Multiparous	151 (49.8%)	0	4 (1.3%)	1 (0.3%)
	p-value	0.001			
	[p = 0.001]	1 (0.3%)	1 (0.3%)	0	
Fetal Death	[p = 0.001]	1 (0.3%)	1 (0.3%)	0	1 (0.3%)
Meconium stained Liquor	[p = 0.024]	57 (18.8%)	11 (3.6%)	4 (1.3%)	2 (0.7%)
Apgar score <7	At 1 min [p = 0.075]	3 (1%)	2 (0.7%)	0	1 (0.3%)
	At 5 min [p = 0.286]	3 (1%)	1 (0.3%)	0	1 (0.3%)
Neonatal ICU admission	[p = 0.347]	115 (38%)	29 (9.6%)	3 (1%)	2 (0.7%)
Fetal distress	[p = 0.128]	18 (5.9%)	3 (1%)	1 (0.3%)	1 (0.3%)
	Spontaneous NVD	178 (58.7%)	45 (14.9%)	7 (2.3%)	1 (0.3%)
Mode of delivery	Emergent Cesarean	49 (16.2%)	5 (1.7%)	1 (0.3%)	1 (0.3%)
	Instrumental	13 (4.3%)	3 (1%)	0	0
	p-value	0.471			
Spontaneous NVD	as whole group	178 (58.7%)	53 (17.5%)		
	p-value	0.098			
Emergent Cesarean	as whole group	49 (16.2%)	7 (2.3%)		
	p-value	0.09			
Instrumental delivery	as whole group	13 (4.3%)	3 (1%)		
	p-value	0.836			

Neonatal ICU admission was not statistically significant as the p value was 0.347. A total of 115 (38%) neonates were admitted to ICU in the cordless group where 29 (9.6%), 3 (1%) and 2 (0.7%) patients were admitted to ICU in the 1, 2 and multiple turns of loops groups respectively. Fetal distress was statistically insignificant with a p-value of 0.128. There were 18 (5.9%) patients with fetal distress requiring emergent C-section or instrumental delivery in the cordless group compared to 3 (1%), 1 (0.3%) and 1 (0.3%) patients in the 1, 2 and multiple loop turns groups, respectively. However, within turn loops statistical significance was achieved as more of the turn loops i.e. 3 was associated more with requirement for emergent treatment with p-value of 0.001. Mode of delivery was statistically insignificant as the p-value for groups without cord and that with nuchal cord as a whole was 0.22. Patients that delivered with spontaneous NVD in the cordless group were 178 (58.7%) compared to 45 (14.9%), 7 (2.3%) and 1 (0.3%) patients in the 1, 2 and multiple turn groups respectively. The group with nuchal cord was associated with more spontaneous vaginal deliveries than the group without nuchal cord, p-value 0.001. However, 1 and 2 turns were associated with greater spontaneous NVDs 45 (71.4%) and 7 (11.1%) whereas multiple turns sub group was associated with less spontaneous NVDs 1 (1.6%). Emergent C-section was performed in 49 (16.2%) patients in the cordless group compared to 5 (1.7%), 1 (0.3%) and 1 (0.3%) patients in the 1, 2 and multiple turn groups respectively. The group with nuchal cord was associated with fewer Emergent C-sections than the group without nuchal cord, p-value 0.001. Lastly Instrumental delivery was performed only in 16 patients with 13 (4.3%) in the cordless group and 3 (1%) patients in 1 turn of loop group respectively.

DISCUSSION

The incidence of nuchal cord in the present study was 63 (20.8%) which is less than that in comparable international studies.¹⁻⁴ Nuchal cord as a whole was not associated with low Apgar scores (<7) at 1 or 5 minutes, admission to the neonatal ICU or emergency caesarean section and this is in accordance with similar findings reported in international literature.^{2,3,4,7} Schaffer et al. and Assimakopoulos et al. showed that nuchal cord was associated with lower Apgar scores (<7) at 1 minute^{7,8} but this was not supported by our data which is also in accordance with Kong et al. and other international studies.² Comparison of Nuchal cord as single turn and its absence was compared by Schaffer et al. and Larson et al.^{7,9} Schaffer et al. showed that multiple cords was associated more frequently with meconium-stained liquor without any rise in low Apgar (<7) at 5 minutes or admission to Neonatal ICU. Their study did not show any change in the delivery mode.⁷ Larson et al. showed that meconium-stained liquor and

operative vaginal deliveries was associated more with multiple nuchal cords but low Apgar score <7 at 5 minute was not associated with it.⁹ Narang et al. showed that presence of nuchal cord was associated more frequently with meconium-stained liquor without any difference between the number of loops.¹⁰ In our study we compared in various ways absence of nuchal cord with nuchal cord as a whole and where there were clear clinical implications with nuchal cord as single, double and multiple loops of the cord. This has been previously studied by Kong et al. as well but we are of the opinion that such a stratification is more helpful regarding clinical implications and management.² Among variables associated with greater loops of nuchal cord were meconium stained liquor, admission to neonatal ICU, emergent caesarean section and fetal distress requiring a caesarean or instrument delivery. This was greatest for multiple turns however there were only 2 (0.7%) such patients in the whole study group which is a very small cohort. Multiple turns of the cord are fetuses that more likely require greater monitoring and care including admission to neonatal ICU and prevention of complications such as aspiration of meconium. The clinical implication which arises here is that if such a condition is detected antenatally on an ultrasound pre-emptive preparation for handling with such and related counselling can be provided in advance.

In our study association of multiple turns of the cord was statistically significant for low (<7) Apgar scores at 1 and 5 minutes thereby recommending avoiding a vaginal delivery in such cases. This is in contrast to Kong et al. where this was not statistically significant and the authors recommended vaginal deliveries.² The present study however lacks the cohort size of Kong et al. and a larger study population will clarify this further. Multiple turns were however associated more frequently with meconium stained liquor, fetal distress and emergent C-section or delivery with instruments which is in accordance with international studies.²

Nuchal cord is diagnosed antenatally either by an ultrasound or suspicion such as a non-engaged fetal head or meconium-stained liquor. In this regard Tamrakar et al. recommended that a non-engaged fetal head should serve as the basis for referral to a tertiary hospital and confirmation with an ultrasound.¹¹ In the present study we found that among the variables associated more frequently with 1 or 2 turns of the cord are low (<7) Apgar scores at 5 minutes (p=0.035), meconium stained liquor (p=0.008) and fetal death (p=0.003). This is in contrast to Kong et al. who showed that 1 and 2 turns were not associated with poorer outcomes. We still recommend that based on suspicion screening should be performed for safety and any medico legal concerns.

Nuchal cord of multiple turns is rare with incidence almost 0.4% in some studies.² Kong et al. and others

therefore recommended disregarding screening as a routine for early labor as this is not cost-effective. Instead they recommended meconium-stained liquor as the basis for suspecting fetal distress and using this for pre-emptively considering other interventions such as emergent caesarean or instrumental deliveries.

Nuchal cord of multiple turns is specifically associated with more frequent adverse fetal effects but no consensus guidelines have been reached so far as for their management. Individual center preferences have led to using nuchal cord as an indication for elective caesareans.¹² Kong et al. still recommended that before an elective C-section in such instances a repeat ultrasound should be performed.²

Nuchal cord especially single or double turns has not been consistently shown to be associated with adverse fetal outcomes in international literature. Therefore, a routine Caesarean should not be recommended in every case. The adverse effects of such a policy are obvious. Uterine rupture, subsequent adherence of placenta in further pregnancies, placenta previa and frequent respiratory complications in the fetus.^{2,13}

We plan to include a larger cohort in the future to add to the other literature on the subject. These and other studies should serve as the basis for consensus. These can then be used to reach guidelines and management protocols which will help establish algorithms for dealing with nuchal cords, clarify counselling strategies and prevent avoidable caesareans. A clear antenatal approach towards nuchal cords will go a long way towards relieving mother and attendant anxiety associated with cases.

CONCLUSION

Nuchal cord with multiple turns was associated with fetal distress but without affecting Apgar scores. Nuchal cord was not associated with adverse outcomes and prenatal ultrasound for this purpose is not required.

Author's Contribution:

Concept & Design of Study:	Seema Gul Salman
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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