International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2018; 2(5): 19-23
Received: 28-07-2018
Accepted: 29-08-2018

Dr. Pragati Meena
Department of Obstetrics & Gynaecology, National Institute of Medical Sciences and Research Institute, Shobha Nagar, Jaipur, Rajasthan, India

Dr. Poonam Bhojwani
Department of Obstetrics & Gynaecology, National Institute of Medical Sciences and Research Institute, Shobha Nagar, Jaipur, Rajasthan, India

Dr. Gajendra Singh Verma
Department of Obstetrics & Gynaecology, National Institute of Medical Sciences and Research Institute, Shobha Nagar, Jaipur, Rajasthan, India

Correspondence
Dr. Poonam Bhojwani
Department of Obstetrics & Gynaecology, National Institute of Medical Sciences and Research Institute, Shobha Nagar, Jaipur, Rajasthan, India

Effects of nuchal cord on fetomaternal outcome: An obstetrician challenge

Dr. Pragati Meena, Dr. Poonam Bhojwani, Dr. Gajendra Singh Verma

Abstract
Objective: The objectives of the this study were to compare need of medical and surgical interventions and progress of labor, and feto-maternal outcome in patients with cord round neck versus without cord round neck at onset of labor or at term gestation.
Methodology: This study was performed at NIMS Medical College Jaipur from January 2015 to January 2017. Total 200 cases were enrolled for a study, over a 2 year period. Among 200 patients, 100 control without cord round neck and 100 had cord round neck.
Results: Among control groups 91% women delivered vaginally. Cesarean section was done in only 24% cases and 75% cases had delivered vaginally. Instrumental delivery in1%. Neonatal variables & obstetrical outcome were compared in tight nuchal cord groups and loose cord. In our Control group Majority of patients 75% were delivered vaginally. Loose nuchal cord does not associated with any adverse maternal & perinatal outcome. Tight cord round the neck associated with increased NICU admission with increased risk of low Apgar score. Evidence of fetal distress seen in 16% cases and outcome was poor in 3% cases.
Conclusion: This is reasonably concluded from this study that cord round fetal neck remains a subject of anxiety for the paediatrician and for obstetrician & for the patient herself. Although with efficient mechanical supervision and by clinical observation "adverse circumstances which effecting the fetus will be averted in time although they do occur.

Keywords: fetal distress; prenatal outcome

Introduction
A “nuchal cord” when umbilical cord becomes wrapped around 360 degrees oto the fetal neck. Nuchal cords prevalence rates is 6% to 36%. More then half of nuchal cords resolve before delivery. Intrauterine life, sustained only by a tortuous vein and two small arteries passes through flexible cord1. Every individual during his or her brief intrauterine existence is dependent on the umbilical cord and placenta, because they are liver and the kidney and they are the lungs for them. These are the only organs which is responsible for vital functions during intrauterine life. The implications of any deviation from normal in the functioning of the umbilical cord will lead to adversities in the fetus which causes intrauterine growth retardation or intrauterine fetal demise. Growth retardation and delayed milestone also found in some cases. 21st century obstetricians have focused their attention to reform the treatment of conditions that can hamper healthy fetal growth and a successful fetal outcome. Since, pregnancy is a heavenly experience and the growth and development of fetus in the womb is a bliss. Funis extends from the umbilicus of the fetal surface to placenta or chronic plate. Average length of cord is 55 cm with 1-2.5 cm in diameter and range of 30-100 cm2. It contains one umbilical vein and two umbilical arteries. Deoxygenated or venous like blood flows to the placenta through a single umbilical vein. The conditions that lead to impaired circulation through the umbilical cord like coiling of umbilical cord around the fetal neck and cord accidents, cord compression due to cord entanglement can cause fetal hypoxia leading to ante partum and intra partum fetal demise and poor fetal outcome like delayed milestone with growth retardation related consequences Nuchal cord is defined as 360 degree coil of umbilical cord around the fetal neck. Adverse fetal outcomes have of been linked to nuchal cord and therefore the management of third trimester of pregnancy and labour has been debated for decades. Several studies have reported one loop of nuchal cord in 20-34% of deliveries. Dr Crawford was commented on nuchal cord "It is all the more remarkable, therefore, that little work has been done to analyze its effects during labor and delivery.Nuchal cord has been classified into two types by Collins at the time of delivery (2002)3.

1. Type A – cord encircles the whole (360 degree) neck in an unlocked manner.

2. Type B – Cord encircles the neck in a locked manner or a hitch which cannot be undone ends up as a true knot.

Up to now, there was no prospective case control double-blind study and observational studies looking at nuchal cords and vary in opinions in term of of poor feto-maternal outcomes. Also these studies does not included other forms of umbilical cord form was considered a nuchal cord. Tight Cord around the Neck Syndrome {tCAN} is cluster of cardiorespiratory and neurological signs and symptoms associated with some physical features secondary to tight cord. A studies have shown that tCAN or nuchal cord can affect the outcome of delivery and also have few long-term effects on the infant. tCAN cause Umbilical cord compression that leads to obstruction of blood flowt in thin walled umbilical vein and infant's blood continues to be pumped out of baby through the thicker walled umbilical arteries that causes hypotension & hypovolemia resulting acidosis Type B nuchal cord pattern directly related with fetal morbidity and mortality. Nuchal cord can also be classified as being tight or loose. It is considered as loose when the encircled cord can easily be unlooped and as tight when it encirclement is such that is cannot be easily un looped and. A tight nuchal cord has to be clamped and divided prior to completing the delivery whereas in presence of a loose nuchal cord the delivery can most of the times be conducted in usual manner. A loose nuchal cord is not usually associated with adverse maternal fetal outcome whereas a tight nuchal cord result in prolonged first and second stages of labor, fetal heart rate abnormalities, meconium staining of liquor during labor, greater needs for caesarian section, lower Apgar scores, acidosis in fetus, admission to neonatal intensive care unit and rare instances in fetal death. A nuchal cord is widely accepted as the case of fetal demise when no other cause of fetal death is ascertained. Although many obstetricians have considered it to be of significance. Therefore a large number of maternal and fetal complications can be avoided if the nuchal cord is diagnosed in antepartum or early intrapartum period, a close vigilance of patients with nuchal cord and early detection of fetal distress in such patients help to take early decision of operative intervention the term "nuchal cord" is synonymous with nuchal loop and cord around neck.

Materials and methods

This prospective simple observational study was conducted at NIMS Medical College and Hospital Jaipur from january 2015 to January 2017. This study included 200 Primigravida patient with term gestation, out of them 100 patients without cord round neck and 100 Patients with cord around neck, who were admitted in labour room. First 100 cases were enrolled for the study who fulfilling inclusion criteria. Gestational age was calculated from their reliable last menstrual history and by early sonographic measurement of CRL. Control 100 patients were selected those were matched for gestational age and maternal age, and without cord round neck, Patients were excluded from study if they Multi gravida, Malpresentation, Double/ multiple of loop of cord around Neck, with any medical illness and surgical illness with any obstetrics complication like Fetal Anomalies, Antepartum Haemorrhage, PIH,IUGR, Presence of Medical & Surgical Illness, Oligohydramnios, Polyhydramnios, Cephalo Pelvic Disproportion & Obstetrics complication was excluded from study. My study was approved by institutional review board of my college.

Methodology

A detailed history of duration of amenorrhoea, gravidity, duration of pregnancy and history of labour pains, regarding history of toxemia, hypertension, antepartum hemorrhage was taken. General physical examination (i.e. height, weight), abdominal examination for fundal height, lie, estimated fetal weight, palpable uterine contractions and fetal heart rate presentation, amount of liquor, engagement, per vaginal examination was done for assessment of bishop score (cervical dilatation and effacement) membrane status, presentation and pelvic adequacy assessment was done. Modified Bishop score was calculated. All routine blood investigations along with ultrasound for fetal well being was done. Patients ≥37 weeks gestation without labor pain, were induced by oral/intracervical prostaglandins. Duration of latent phase of labour was measured and patients with inadequate uterine contractions were augmented with oxytocin. The course of labour in all the patients was recorded on partograph. All the patients were studied in detail regarding to the course of labor, mode of delivery, fetomaternal outcome and interventions required. Colour Doppler study was required for confirmation of diagnosis4 These variables were recorded eg. gestational age, maternal age at the time of delivery, parity, fetal presentation, birth weight, Apgar score at the 1st and 5th minutes, transfer to the neonatology unit, the presence of nuchal cord at delivery, the number of loops and whether it was loose or tight, mode of delivery (normal vaginal delivery, instrumental delivery, cesarean section) abruptio placenta, the notice of fetal distress during labor based on presence of meconium in the amniotic fluid and/or abnormal fetal heart rate. By Statistical Analysis, all study group Patients were divided into control & case and all data were analyzed by chi-square test.

Discussion and results

Present study was conducted on 200 pregnant women ≥37 weeks gestational age in the department of obstetrics and gynaecology, NIMS Medical College, Jaipur with the aim of detecting feto-maternal outcome in patients with single loop of nuchal cord. Age and gravidity has no relation with presence of nuchal cord. Mean gestational age 38.67 weeks. Cord length varied from 35-120 cm, mean cord length was 57.61 cm. Majority of 75% cases were delivered vaginally without any maternal and fetal morbidity it indicates that cord round the neck is not an indication for cesarean until unless cord was tight and causing fetal distress. Loose nuchal cord not associated with any adverse perinatal outcomes. However, tight nuchal cord is associated with increased risk of low apgar score and increased NICU admission. Ultrasound diagnosis of a nuchal cord at term gestation not an indication of elective cesarean section5.6. In 16% cases F *et al* distress was seen and in 3% cases outcome was poor. As compared to control group fetal outcome was poor only in 0 % and fetal distress was seen in only 9% patients. In 17% cases. The baby shifted to NICU in hence nuchal cord is a important cause of perinatal morbidity and mortality. Maternal outcome was good as 100% in both control and cases. Nuchal cord also increases the incidence of instrumental delivery more (1% vs 0%) in cases as compared to control group. Hospital stay was prolonged in 17% cases as compared to control in which it was only 4%. The prolonged hospital stay was as a result of either caesarean, forceps delivery and baby shifted to NICU. The new born who born dead, all had tight loop of cord round neck. Hence tightness of cord is more important in causing intrauterine fetal death7,8. Vaginal delivery was possible in majority of cases, independent of cord length, no. of loops and tightness but the outcome of newborn was affected. So length of cord, no. of loops round the neck and tightness of cord all are important to

perinatal outcome, mode of delivery, fetal distress and increase hospital stay of mother & baby. 33% patients underwent Cesarean section in our study out of which only 9% were without cord round the neck group and 24% patients were with nuchal cord. Nuchal cord is a very potent factor that is responsible for some abnormal parameters during intrapartum period & leading to cesarean section. Fetal distress was the most common factor for Cesarean section. Apgar score was definitely very low at 1 min, 5 min and 15 min in the patients with nuchal cord as compared to women without nuchal cord. Neonatal weight and NICU admissions were affected in nuchal cord group as compared to without nuchal cord cases. Color Doppler ultrasounds negative predictive value is 96.08 and positive predictive value 89.88. Color doppler ultrasound Sensitivity in diagnosing nuchal cord according to our study is 95.64% and specificity is 90.64%. Ultrasound is very reliable modality in diagnosing in nuchal cord and this the gold standard for delivering cord round neck. It c concluded from our study that cord round fetal neck remains a subject of anxiety for the obstetrician and pediatrician and for the patient herself. Although with efficient clinical and mechanical supervision "adverse circumstances effecting the fetus can be averted in time although they do occur. Hence message for the obstetrician as per this study is to closely observe a patient with nuchal cord if already diagnosed9, 10 Although more than half participants thought that ultrasound scan necessary to detect nuchal cord at term gestation, but this is not necessary. Almost all participants have continuous fetal heart rate monitoring with CTG during labour in NIMS Hospital, with presence of nuchal cord causing variable fetal heart rate decelerations during labour, this was detected by cardiotocography and appropriate interventions as assisted delivery /instrumental delivery and fetal blood sampling was performed accordingly11, 12. Avoiding routine ultrasound scans for nuchal cord reduce needless maternal anxiety and unnecessary caesarean sections on patients request. 69.8% participants thought that it is necessary to deliver the fetus early and 71.8% thought that caesarean section must be performed for Nuchal cord. In our study, the presence or absence of umbilical cord entanglement did not significantly affect the mode delivery. There were no significant difference in rate of cesarean section based on the presence or absence of umbilical cord entanglement. These finding are very similar to that of the majority of past studies on nuchal cord.13, 14, 15.

Results

Among 200 deliveries, only 47.5% had a nuchal cord documented at birth of the total cases of nuchal cord, out of them 15% were tight and 80% cord were found loose. Fetomaternal Outcome were studied & these are described below.

Table 1: Distribution of study participants according to age

Age (yrs)	Case		Control		Total	
	No.	%	No.	%	No.	%
<20	1	1.00	3	3.00	4	2.00
20-25	52	52.00	43	43.00	95	47.50
25-30	45	45.00	51	51.00	96	48.00
>30	2	2.00	3	3.00	5	2.50
Total	100	100.00	100	100.00	200	100.00

Chi-Square = 2.428 with 3 Degrees of Freedom; P = 0.666

This table shows majority of patients in control group belongs to age group b/w 25-30years is 51 % and 52% patient with cord around the neck belongs to 20 -25 years age group. CHI-SQUARE = 2.428 WITH 3 DEGREES OF FREEDOM; P = 0.666 Age wise distribution of case study group and control group, indicates that maximum no. of 52% case and 45% of control group also belong to 20-30 years. The mean age group in control was 24.52 years with SD of 2.76 and mean age group of cases in present study was 23.84 with SD of 2. Majority 88% of the cord round neck was diagnosed by color doppler USG before delivery, while 12% case diagnosed after delivery. CHI-SQUARE = 13.461 WITH 1 DEGREE OF FREEDOM; P = 0.000

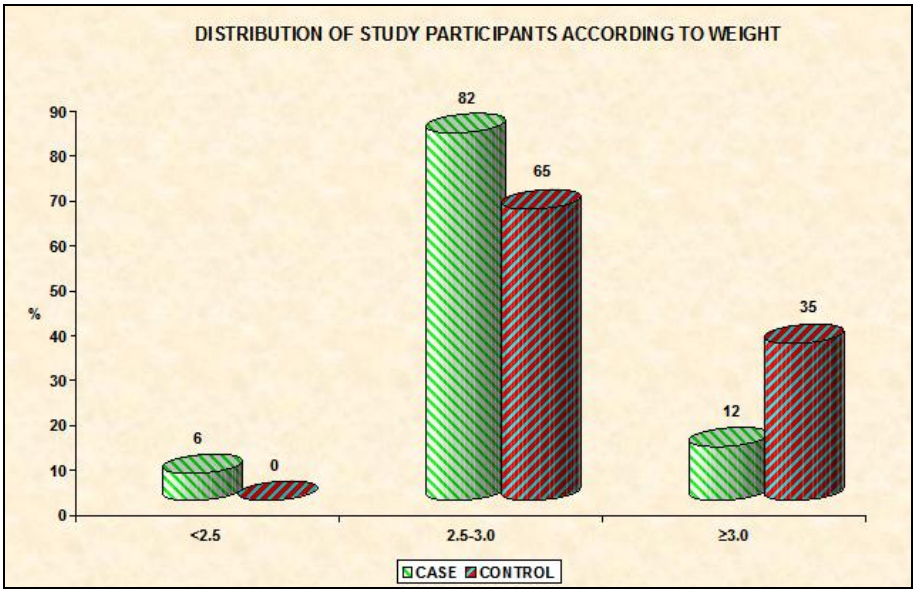

Fig 1: Distribution of study participants according to weight

The above table shows that maximum fetuses 82% of case group having weight ranging between 2.5-3 kg and 65% of control group also belongs to same weight range. Indicates that cord round neck definitely affect birth weight of baby. There were significant association was found between cord neck round and birth weight. Head fixed in 86% of case study group and 95% of control group. Head floating in 14% of study group and 5% of control group.This indicates that frequency of floating head at

term or in latent phase is more with nuchal cord. This is not significant, but again needing close supervision to avoid neonatal morbidity and mortality.

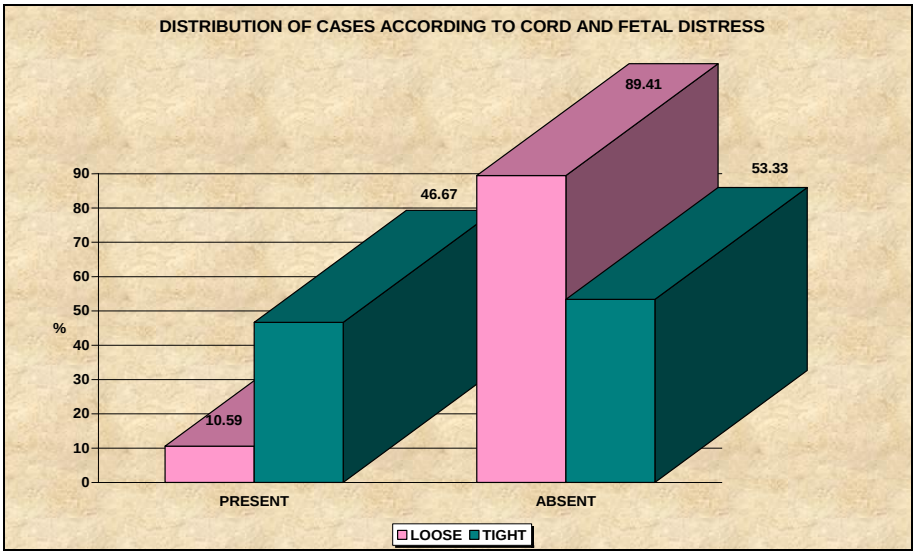

Fig 2: Distribution of cases according to cord and fetal distress

Chi-Square = 9.810 with 1 Degree of Freedom; P = 0.002This table shows that and 10.59% had fetal distress with loose nuchal cord and tight nuchal cord causing fetal distress in 46.67%. This indicates that nuchal cord cases need extra vigilance to avoid catastrophes due to cord compression. This indicates that despite of highly efficient supervision apgar score was still very low, on analyzing this group patient was with tight nuchal cord loop but till nowdays no methods are available to measure length of cord and to predict how short it will become after looping. Mean cord length in study group 57.61% with SD 11.32 & in control group mean cord length 45.76% with SD with 4.54This indicates that, in the study group the umbilical cord was longer as important reason for looping it around the fetal neck.

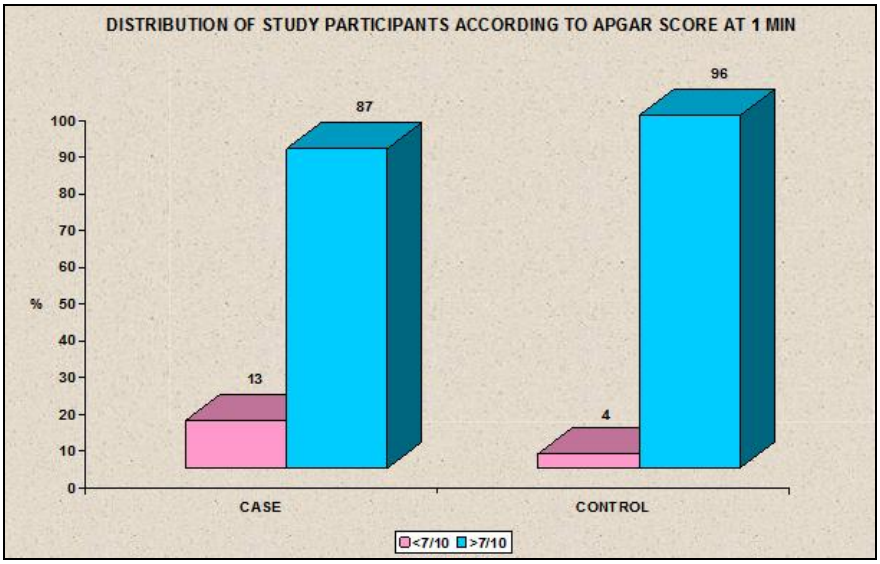

Fig 3: Distribution of study participants according to Apgar score at 1 min

*Chi-Square = 4.124 with 1 Degree of Freedom; P = 0.042 **Chi-Square = 1.930 with 1 Degree of Freedom; P = 0.165Table shows that Apgar score below <7/10 in control group which only 4% had apgar score below 7/10, at 1 min and 5 minute is 12.9% and 10% cases respectively. Although by modern color Doppler ultrasound technique we find out the number of loops but still it is not 100% efficacious. This indicates that cord round neck definitely affect apgar score of child at birth, there were significant effect of nuchal cord on apgar score of the neonate in study group, this indicates that despite highly efficient supervision agar score was found to be low at 1 min and 5 min on analyzing this group of patient it was with tight nuchap cord loop. Neonates were had low apgar score at 1 min, 5 min and 15 min interval due to asphyxia probably by strangulating loop of nuchal cord. This indicates that cord round neck definitely affect NICU admission of baby. The above table indicates that hospital stay was prolonged (NICU) in case group 17.1% as compared to control group (4.01%). Child birth is accomplished by a higher mortality then any other physiological event and this may be considered as the most hazardous period for mother as well baby. Childbirth is considered to be rebirth for the mother. The evil of consequences of length of cord have been well realized. The presents study has been carried out to find out influence of cord round the effect on apgar score, complications during

labour, effect of tightness of cord is studied.

Table 2: Group Statistics

	Group	N	Mean	Std. Deviation	'p' value*
Age (yrs)	Case	100	24.2500	2.65670	.482
	Control	100	24.5200	2.76880	
Gestational Age (wks)	Case	100	38.6200	1.30871	.780
	Control	100	38.6700	1.22314	
Weight (kg)	Case	100	2.7260	.17152	.000
	Control	100	2.8945	.14939	
Cord length (cm)	Case	99	57.6162	11.32066	.000
	Control	100	45.7600	4.54410	

So majority of cases and control belongs to same age group 21-25 years. This is so because this is the most fertile age group. The mean age of cases was 24.25 years with SD 2.65. The mean age of control was 24.52 with SD for 2.76. Table shows that mean weight of newborn was 2.72 with SD 0.17 in case group among control group mean weight was 2.89 with SD of 0.14.This indicates weight of majority of newborn was between 2.6 to 3 kg. Color doppler ultrasounds negative predictive value is 96.08 and positive predictive value 89.88. Color doppler ultrasound Sensitivity in diagnosing nuchal cord according to our study is 95.64% and specificity is 90.64%. Ultrasound is very reliable modality in diagnosing in nuchal cord and this the gold standard for delivering cord round neck. It c concluded from our study that cord round fetal neck remains a subject of anxiety for the obstetrician and pediatrician and for the patient herself. In our study color Doppler sensitivity was similar to observations those of XUI *et al*... (1993), Romero *et al*... (2000), Poljak B *et al*... (2001) and Aksoy U *et al*... (2002) who reported the sensitivity of color Doppler in detecting nuchal cord to be 98.5%, 97%, 94.1%, 95.0% respectively. Such high figure for sensitivity are obtained only if the color Doppler is performed late during the 3rd trimester of pregnancy as suggested by Collins JH *et al*... (1995), nuchal cord entanglement can resolve at any time or may persist till term. It is very common now days for nuchal cord is the indication for caesarean section in India, which accounted about 20.1% to 25.4% of the indications in a Tertiary teaching hospital. Although this study showed that participants born in india were more worried about nuchal cord than those born in other country. Most of patients with in both groups believed that nuchal cord reduces the chance of successful vaginal delivery (>86%) & nuchal cord causes intrauterine death (>79%). Despite of all variable levels of education, most of patients believed that nuchal cord causes fetal death during intrapartum period (>85%). ≥70% patients thought that caesarean section was must due to presence of nuchal cord. Therefore, it was apparent seen that misconceptions that clinical implications of cord were widely spread among all groups patients.

Conclusion

Sensitivity of color doppler USG in diagnosing nuchal cord according to study is 95.64%, where as specificity stands at 90.64%, negative predictive value 96.08 was and positive predictive value 89.88 was. Ultrasound is very reliable modality in diagnosing in nuchal cord, even then direct visualization of nuchal cord of the neonate at delivery is without fallacy and this the gold standard for delivering cord round neck. It concluded from our study that nuchal cord remains a challenge for the pediatrician & for the patient herself, and obstetrician. Although nowdays with efficient clinical and mechanical meticulous supervision all adverse circumstances which effecting the fetus are averted within time although they do occur. Hence the message for the obstetrician and pediatrician as per this study is to closely meticulously observe a already diagnosed patients with nuchal cord. Conflict of Interests the authors confirm that the results of this paper have not been distorted by research funding. The authors declare that they have no conflict of interests to declare.

References

1. Kong CW, Lee DH, Chan LW, To WW. Impact of nuchal cord on fetal outcomes, mode of delivery, and management: a questionnaire survey of pregnant women. Hong Kong Med J. 2015; 21:143-8.
2. Peregrine E, O'Brien P, Jauniaux E. Ultrasound detection of nuchal cord prior to labor induction and the risk of Cesarean section. Ultrasound Obstet Gynecol. 2005; 25:160-4.
3. Peesay Morarji. Cord around the neck syndrome.BMC Pregnancy and Childbirth. 2012, 12:A6.
4. Peesay M, Mehta Nitin: Cord Around the Neck Syndrome. 2011: 6 (2):11-12.
5. Bernad ES, Craina M, Tudor A, Bernad SI. Perinatal outcome associated with nuchal umbilical cord, Clinical and Experimental Obstetrics and Gynecology. 39(4):494-497.
6. Kong CW, Chan LW, To WW. The impact of nuchal cord on fetal outcomes, mode of delivery, and its management: a questionnaire survey on all Hong Kong Obstetricians and Gynaecologists. Hong Kong J Gynaecol Obstet Midwifery. 2015; 15:131-7.
7. Kong CW, Chan LW, To WW. Neonatal outcome and mode of delivery in the presence of nuchal cord loops: implications on patient counselling and the mode of delivery. Arch Gynecol Obstet. 2015; 292:283-9.
8. Cho FN, Liu CB, Li JY, Carey JR, Liou WS. Absent fetal movement and brain sparing effect associated with multiple tight nuchal cords. Taiwan J Obstet Gynecol. 2013; 52(3):457-9.
9. Kobayashi N, Aoki S, Oba MS, Takahashi T, Hirahara F. Effect of Umbilical Cord Entanglement and Position on Pregnancy Outcomes. Obstet Gynecol Int. 2015, 342065.
10. Balkawade NU, Shinde MA. Study of length of umbilical cord and fetal outcome: a study of 1,000 deliveries. J Obstet Gynaecol India. 2012; 62(5):520-5.
11. Kobayashi Natsuko, Mari S. Oba Takahashi Tsuneo, Hirahara Fumiki. Effect of Umbilical Cord Entanglement and Position on Pregnancy Outcomes Obstetrics and Gynecology International, 2015.
12. Nida Ergin Rahime MD, Yayla MD Murat, Seda Ergin MD. Fetal demise due to cord entanglement in the early second trimester. Proc Bayl Univ Med Cent. 2014; 27(2):143-144.
13. Bernad ES, Craina M, Tudor A, Bernad SI. Perinatal outcome associated with nuchal umbilical cord, Clinical and Experimental Obstetrics and Gynecology, 39(4):494497.
14. Narang Y, Vaid NB, Jain S *et al*. Is nuchal cord justified as a cause of obstetrician anxiety? Archives of Gynecology and Obstetrics. 289(4):795-801.
15. Tamrakar SR. Incidence of nuchal cord, mode of delivery and perinatal outcome: a notable experience in Dhulikhel Hospital—Kathmandu University Hospital, Nepal Medical College Journal, 15(1):40-45.