

Research article

Nuchal Cord and Perinatal Outcome at the Yaounde General Hospital, Cameroon

J. D. Kemfang Ngowa,^{1,2} J. M. Kasia,^{1,2} I. Nsangou,³ C. Zedjom,³ I. Domkan,⁴ F. Morfaw,¹ and B. Bossiko²

¹Department of Obstetrics & Gynecology, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, P.O. Box 1364, Yaounde, Cameroon

²Yaounde General Hospital, P.O. Box 5408, Yaounde, Cameroon

³Department of Pediatrics, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, P.O. Box 1364, Yaounde, Cameroon

⁴Higher Center of Health Sciences, Catholic University of Central Africa, P.O. Box 11628, Yaounde, Cameroon
Address correspondence to J. D. Kemfang Ngowa, jdkemfang@yahoo.fr

Received 6 December 2010; Accepted 31 January 2011

Abstract The aim of this study was to determine the incidence of nuchal cord at delivery and perinatal outcome. We conducted a retrospective descriptive study from 1992–2008 at the Yaounde General Hospital. Obstetrical and neonatal variables were compared in the loose and tight nuchal cord groups and a control group (no nuchal cord). Of 9275 deliveries recorded, 16.2% had a nuchal cord. Of these nuchal cords, 75.81% were loose and 24.18% were tight. Cesarean delivery rate was lower in the loose and tight nuchal cord groups when compared with control group ($P < .001$; $P < .05$). Low Apgar scores < 7 at the 1st and 5th minutes were less in the loose nuchal cord group when compared with control group ($P = .06$, $P = .7$). In tight nuchal cord group, low Apgar score < 7 at the 1st minute was significantly higher, when low Apgar score < 7 at the 5th minute was non significantly higher when compared with control group ($P < .001$, $P = .14$). Transfer rate to neonatology unit was lower in the loose and tight nuchal cord than in the control group. Loose nuchal cord may not be associated with adverse perinatal outcome. However, tight nuchal cord may be associated with increased risk of low Apgar score < 7 at the 1st minute. Consequently, the ultrasound diagnosis of a nuchal cord at the end of pregnancy should not be the indication of elective cesarean delivery.

Keywords nuchal cord; perinatal outcome; Apgar score

1 Introduction

A nuchal cord occurs when the umbilical cord becomes wrapped 360 degrees around the fetal neck. Nuchal cords are very common, with prevalence rates ranging between 6% to 37% [5, 8]. The prevalence increases with the duration of pregnancy, from 5.8% at 20 weeks gestation up to 29% at 42 weeks [5].

Baden in 1955 wrote: “intra uterine life, which is sustained only by two small arteries and a tortuous vein coursing through a long flexible cord, hangs by a very delicate thread” [7]. It seems that this delicate thread too often is wrapped around the newborn’s neck. If the umbilical cord becomes overstretched or compressed during labour, it usually leads to temporal fetal bradycardia [3]. Much like a hangman’s noose, the nuchal cord is often blamed for problems that are encountered during delivery and is often cited as a major cause of fetal distress and perinatal mortality [14].

Several studies have been done to analyze deliveries with nuchal cord and have yielded varying results [2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 15]. Given the improvement in ultrasound technique and accessibility, the detection rate of nuchal cord has increased steadily [1]. However, the insufficiency in data regarding the role of nuchal cord in fetal morbidity and mortality is a source of anxiety and frustration to both parturients and healthcare professionals [12].

The purpose of this study was to determine the incidence of nuchal cord at delivery and to assess the perinatal outcome.

2 Patients and methods

We retrospectively reviewed all deliveries recorded at the Yaounde General Hospital Maternity during 16 years, from March 1992 to December 2008. Included in our study were all deliveries with gestation age of twenty eight weeks and above.

There were a total of 9334 deliveries during the study period. We excluded 59 cases due to incomplete data. The following variables were recorded: maternal age; gestational age at delivery; parity; fetal presentation; mode of delivery (normal vaginal delivery, instrumental delivery, cesarean section); abruptio placenta; the notion of fetal

Characteristics	Loose nuchal cord group <i>n</i> = 1138	Control group <i>n</i> = 7774	<i>P</i>
Mean maternal age (years)	29, 98 ± 5, 42	29.74 ± 5.61	.98
Mean gestational age at delivery (weeks)	39, 01 ± 1, 69	38.61 ± 2.17	< .001
Primiparity	320 (28.11%)	2401 (30.88%)	.09
Breech presentation	0	41 (0.52%)	—
Abruptio placenta	1 (0.00%)	45 (0.57%)	—
Vaginal delivery	887 (78.35%)	5833 (75.03%)	.032
Emergency cesarean	28 (2.46%)	608 (7.82%)	< .001
Instrumental delivery	7 (0.61%)	72 (0.92%)	.39
Mean birth weight	3223 g ± 490	3173 g ± 571	< .001
Fetal distress	18 (1.58%)	227 (2.91%)	.01
Apgar score 1st < 7	117 (10.28%)	958 (12.32%)	.06
Apgar score 5th < 7	16 (1.40%)	122 (1.56%)	.7
Transfer to the neonatology unit	89 (7.82%)	1135 (14.59%)	< .001

Table 1: Comparison between loose nuchal cord group and control group.

distress during labor based on presence of meconium in the amniotic fluid and/or abnormal fetal heart rate; 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. A nuchal cord was considered to be loose when it could be easily uncoiled before delivery of the fetal trunk. When the nuchal cord needed to be clamped and cut before delivery of the trunk, it was considered to be tight. The diagnosis of nuchal cord was made at the time of delivery.

We divided the cases of nuchal cord into loose and tight nuchal cord groups and we considered a control group composed of deliveries without nuchal cord. Statistical analyses were performed using the SPSS package version 16.0. We calculated means and/or percentages for the different variables. Comparisons were done between loose and tight nuchal cord groups and control group. Statistical significance was ascertained using the chi square test or Fisher's exact test for differences in qualitative variables and the Student's *t*-test for differences in continuous variables. A *P*-value < .05 was considered to be statistically significant.

3 Results

Out of the 9275 deliveries that occurred during the study period, 16.2% had a nuchal cord documented at birth (*n* = 1501). The incidence of a single loop nuchal cord was 14.18% while that of double and triple loops were respectively 1.67% and 0.32%. Of the total cases of nuchal cord, 75.81% were loose and 24.19% were tight.

The comparison between the loose nuchal cord group and the control group is presented in Table 1. The rate of vaginal delivery was significantly higher (*P* < .001) in the loose nuchal cord group than in the control group. The rate of emergency cesarean section was significantly lower in

this group than in the control group (*P* < .001). Concerning the perinatal outcome, rates of low Apgar scores at the 1st and 5th minutes and transfer to neonatology unit were lower in the loose nuchal cord group than in the control group.

The comparison between the tight nuchal cord group and the control group is shown in Table 2. In the tight nuchal cord group, the rates of vaginal and instrumental deliveries were higher, while emergency cesarean delivery rate was lower than in the control group. The rate of low Apgar scores at the 1st minute was significantly higher in the tight nuchal cord group than in the control group (*P* < .001). However, the rate of low Apgar scores at the 5th minute was decreased and remaining non significantly higher than in control group (*P* = .14). Also, the rate of transfer to neonatology unit was lower in this group than in the control group (*P* < .001).

4 Discussion

Larson et al. [5] reported that the occurrence of nuchal cord increases linearly from 5.8% at 20 weeks of gestation to 29% at 42 weeks. The incidence of nuchal cord in this study was 16.2% of all the deliveries at twenty eight weeks of gestation and above. Our incidence rate is comparable to 14.7%, 18% and 17% reported in some studies [6,9,12]. It is, however, lower than the 22.85% and 33.7% reported by Schaffer et al. and Shrestha et al. [11,13], respectively. These differences could be explained by the small sample size (512 deliveries) used by Shrestha et al. [13] and the fact that study population was only the term pregnancies in the study conducted by Schaffer et al. [11].

The incidence rate of multiple nuchal cords (more than one loop) in our study (1.99%) was similar to the 2% reported by Miser William [7]. It was lower to those reported by Larson et al., Schaffer et al. and Shrestha et al. [4,11,13] which were 3.8%, 5.8% and 3.9%, respectively.

Characteristics	Tight nuchal cord group <i>n</i> = 363	Control group <i>n</i> = 7774	<i>P</i>
Mean maternal age (years)	29, 89 ± 5, 46	29.74 ± 5.61	.3
Mean gestational age at delivery (weeks)	39, 11 ± 1, 81	38.61 ± 2.17	< .001
Primiparity	110 (30.30%)	2401 (30.88%)	.60
Breech presentation	0	41 (0.52%)	—
Abruptio placenta	0	45 (0.57%)	—
Vaginal delivery	288 (77.33%)	5833 (75.03%)	.37
Emergency cesarean	13 (3.58%)	608 (7.82%)	< .05
Instrumental delivery	7 (1.92%)	72 (0.92%)	.1
Mean birth weight	3307 g ± 446	3173 g ± 571	< .001
Fetal distress	8 (2.20%)	227 (2.91%)	.4
Apgar score 1st < 7	83 (22.86%)	958 (12.32%)	< .001
Apgar score 5th < 7	10 (2.75%)	122 (1.56%)	.14
Transfer to the neonatology unit	28 (7.71%)	1135 (14.59%)	< .001

Table 2: Comparison between tight nuchal cord group and control group.

This difference could be due also to the difference in sample sizes and the difference in the gestational age considered for the studies population in these studies.

The rate of emergency cesarean in our study was significantly lower in the loose and tight nuchal cord groups than in the control group. This was similar to the findings of Sheiner et al., Mastrobattista et al. and Shrestha et al. [6, 12, 13]. This result suggested that the presence of nuchal cord does not increase the risk of cesarean section during labor. Therefore, higher rate of cesarean delivery in control group could be explained by the more represented in this group of breech presentation, abruptio placenta and fetal distress.

There was no significant difference in the rates of instrumental delivery in the loose and tight nuchal cord groups when compared to the control group. These findings were similar to those of some authors [6, 9, 11, 13].

Mean birth weight was significantly higher in the loose and tight nuchal cord groups than in the control group ($P < .001$). Sheiner et al. [12] reported similar findings, contrary to Sadan et al. [10] who reported lower mean birth weights in the nuchal cord group even though this difference was not statistically significant ($P = .17$). There is no obvious explication of this difference.

The rate of fetal distress in this study was lower in the loose and tight nuchal cord groups than in the control group ($P < .01$ and $P = .4$, resp.). Several authors found no significant difference in the rates of fetal distress between the nuchal cord group and the control group [4, 6, 9, 11, 13]. On the contrary, Sheiner et al. [12] reported the significantly higher rates of non-reassuring fetal heart rate in the nuchal cord group than in the control group ($P < .001$).

In our study, low Apgar scores < 7 at the 1st and 5th minutes were lower in the loose nuchal cord group while in the tight nuchal cord group, the rate of low Apgar scores < 7 at the 1st minute was significantly higher than in the

control group ($P < .001$), while low Apgar score rates < 7 at the 5th minute was non significantly higher than in the control group ($P = .14$). This implies that birth asphyxia is as a result of cord compression during labor in the presence of a tight nuchal cord, but the decrease of low Apgar score rate < 7 at the 5th minute in the tight nuchal cord group indicates that primary neonatal adaptation is not impaired by tight nuchal cord. These findings are similar to those of some authors [4, 6, 11, 13].

Peregrine et al. [9] reported that the presence of a nuchal cord did not significantly increase the rate of low Apgar scores < 7 at the 1st and 5th minutes than in the control group. However, Peregrine et al. [9] did not differentiate the loose and tight nuchal cord groups. Similar to other studies [6, 9, 12, 13], our study did not find an increase in the rate of transfer to the neonatology unit in both nuchal cord groups. However, the limits of this study were that the analysis did not control for some confounders of perinatal outcomes such as gestational age at delivery, birth weight and fetal presentation.

5 Conclusion

Loose nuchal cord may not be associated with adverse perinatal outcome. However, tight nuchal cord may be associated with increased risk of low Apgar score < 7 at the 1st minute without an associated increase in transfer rates to neonatology unit. Consequently, the ultrasound diagnosis of a nuchal cord at the end of pregnancy should not be the indication of elective cesarean delivery.

References

- [1] E. Assimakopoulos, M. Zafarakas, P. Garmiris, D. G. Goulis, A. P. Athanasiadis, K. Dragoumis, et al., *Nuchal cord detected by ultrasound at term is associated with mode of delivery and perinatal outcome*, Eur J Obstet Gynecol Reprod Biol, 123 (2005), 188–192.

- [2] J. F. Clapp III, W. Stepanchak, K. Hashimoto, H. Ehrenberg, and B. Lopez, *The natural history of antenatal nuchal cords*, Am J Obstet Gynecol, 189 (2003), 488–493.
- [3] H. S. Hansen and B. Hillersborg, *Antepartum looping of the umbilical cord*, Acta Obstet Gynecol Scand, 67 (1988), 475–476.
- [4] J. D. Larson, W. F. Rayburn, S. Crosby, and G. R. Thurnau, *Multiple nuchal cord entanglement and intrapartum complications*, Am J Obstet Gynaecol, 173 (1995), 1228–1231.
- [5] J. D. Larson, W. F. Rayburn, and V. L. Harlan, *Nuchal cord entanglement and gestational age*, Amer J Perinatol, 14 (1997), 555–557.
- [6] J. M. Mastrobattista, L. M. Hollier, E. R. Yeomons, S. M. Ramin, M. C. Day, A. Sosa, et al., *Effects of nuchal cord on birthweight and immediate neonatal outcomes*, Amer J Perinatol, 22 (2005), 83–85.
- [7] W. F. Miser, *Outcome of infants born with nuchal cords*, J Fam Pract, 34 (1992), 441–445.
- [8] Nuchal cord, http://en.wikipedia.org/wiki/Nuchal_cord, 2010.
- [9] E. Peregrine, P. O'Brien, and E. Jauniaux, *Ultrasound detection of nuchal cord prior to labour induction and the risk of cesarean section*, Ultrasound Obstet Gynecol, 25 (2005), 160–164.
- [10] O. Sadan, Z. Fleischfarb, S. Everon, A. Golan, and S. Lurie, *Cord around the neck: should it be severed at delivery? A randomized controlled study*, Amer J Perinatol, 24 (2007), 61–64.
- [11] L. Schaffer, T. Burkhardt, R. Zimmermann, and J. Kurmanavicius, *Nuchal cords in term and post term deliveries—Do we need to know?*, Obstet and Gynecol, 106 (2005), 23–28.
- [12] E. Sheiner, J. S. Abramowicz, A. Levy, T. Silberstein, M. Mazor, and R. Hershkovitz, *Nuchal cord is not associated with adverse perinatal outcome*, Arch Gynecol Obstet, 274 (2006), 81–83.
- [13] N. S. Shresta and N. Singh, *Nuchal cord and perinatal outcome*, Kathmandu Univ Med J (KUMJ), 5 (2007), 360–363.
- [14] D. B. Singer and T. Macpherson, *Fetal death and the macerated stillborn fetus*, in Textbook of Fetal and Perinatal Pathology, J. S. Wigglesworth and D. B. Singer, eds., vol. 1, Blackwell Scientific Publications, Boston, 1991, 266–267.
- [15] W. N. Spellacy, H. Gravem, and R. O. Fisch, *The umbilical cord complications of true knots, nuchal coils, and cords around the body. Report from the collaborative study of cerebral palsy*, Am J Obstet Gynecol, 94 (1966), 1136–1142.