

Cordonal risk: perinatal e maternal outcomes

A. GUIRRERI¹, V. GIALLOMBARDO¹, A. PIPARI¹, G. LO BALBO¹, G. LO DICO¹

SUMMARY: **Cordonal risk: perinatal and maternal outcomes.**

A. GUIRRERI, V. GIALLOMBARDO, A. PIPARI, G. LO BALBO,
G. LO DICO

Objective. *The study assessed the incidence of the funicular pathology, the foetal cardiotocographic abnormalities, the mode of delivery and the perinatal outcome.*

Methods. *A retrospective study was carried out on a total of 3.186 pregnant women who gave birth at the U.O.C. Gynaecology and Obstetrics, University Hospital "Paolo Giaccone" over a period of three years from the 1st January, 2012 to the 31st December, 2015. The patients involved in the study were nulliparous and multiparous women at term of pregnancy with a single foetus in cephalic presentation, in spontaneous or induced labour, who were diagnosed with a funicular pathology at birth.*

Results. *Funicular anomalies were diagnosed in 280 women (8.7%), of whom 153 (55%) were nulliparous and 127 (45%) were multiparous. Nuchal cord was the most frequently observed anomaly with 233 cases (83.2%). In 270 cases (96.4%) the 1-minute Apgar score was ≥ 7 , in 8 cases (2.8%) it was between 4 and 6, and in 2 cases (0.7%) it was lower than 4. In 279 cases (99.6%) the 5-minute Apgar score was >7 and only in one case (0.4%) it was between 4 and 6. In none of these cases was admission to the NICU necessary. In 182 cases (65%) there was no cardiotocographic alteration; in 63 cases (22%) saltatory heart rate patterns were recorded; in 33 cases (12%) variable decelerations were observed; in 2 cases (0.7%) bradycardia was detected. Spontaneous delivery was observed in 149 cases (53.2%), while a caesarean section was necessary in 131 cases (46.8%), of which 11 (8.4%) were referable to cardiotocographic abnormalities caused by the funicular pathology.*

Conclusions. *In our experience, the funicular pathology is rarely associated with adverse perinatal outcomes. That is why it should not influence the management of childbirth, as well as labour, and should be looked for only in the case of a non-reassuring CTG pattern.*

KEY WORDS: Funicular pathology - Nuchal cord - Mode of delivery - Cardiotocography - Perinatal outcome.
Patologia funicolare - Funicolo nucale - Modalità del parto - Cardiotocografia - Outcome perinatale.

RIASSUNTO: **Rischio cordonale: outcome perinatale e materno.**

A. GUIRRERI, V. GIALLOMBARDO, A. PIPARI, G. LO BALBO,
G. LO DICO

Obiettivo. *Lo studio ha valutato l'incidenza della patologia funicolare, modificazioni della cardiotocografia fetale, modalità del parto, outcome perinatale.*

Metodi. *È stato condotto uno studio retrospettivo su 3.186 gravide che hanno partorito presso l'U.O.C. di Ginecologia e Ostetricia, Policlinico Universitario "Paolo Giaccone" nel periodo compreso tra 01/01/2012 ed il 31/12/2015. Sono state incluse nello studio le donne nullipare e pluripare a termine di gravidanza con feto singolo in presentazione cefalica, in travaglio spontaneo o indotto, in cui alla nascita è stata riscontrata una patologia funicolare.*

Risultati. *Sono state riscontrate anomalie funicolari in 280 casi pari all'8,7%, di cui 153 (55%) sono nullipare e 127 (45%) sono pluripare. L'anomalia più frequentemente riscontrata è il giro di funicolo intorno al collo in 233 casi (83,2%). L'indice di Apgar al primo minuto in 270 casi (96,4%) è stato ≥ 7 , in 8 (2,8%) è stato compreso tra 4 e 6, in 2 casi (0,7%) è stato inferiore a 4. L'indice di Apgar al quinto minuto è stato in 279 casi (99,6%) >7 , in un solo caso (0,4%) è stato compreso tra 4 e 6. In nessun caso è stato necessario il ricovero in UTIN. In 182 casi (65%) nessuna alterazione cardiotocografica, in 63 casi (22%) tracciati di tipo saltatorio; in 33 (12%) decelerazioni variabili; in 2 casi (0,7%) bradicardia. In 149 casi (53,2%) è stato osservato il parto spontaneo, in 131 (46,8%) il taglio cesareo di cui 11 casi (8,4%) riconducibili ad alterazioni cardiotocografiche da patologia funicolare.*

Conclusioni. *La patologia funicolare, nella nostra esperienza, raramente è associata ad esiti perinatali avversi, quindi non dovrebbe influenzare la gestione del parto, del travaglio e dovrebbe essere ricercata solo in presenza di un tracciato cardiotocografico non rassicurante.*

Introduction

The umbilical cord together with the placenta serve a paramount role in intrauterine life of the foetus. The funicular pathology arises when the umbilical cord be-

¹ Department of Gynecology and Obstetrics, "Policlinico Paolo Giaccone", University of Palermo, Palermo, Italy

Corresponding author: Antonella Guirrerri,
e-mail: dottguirrerriantonella@gmail.com

© Copyright 2017, CIC Edizioni Internazionali, Roma

comes wrapped around the foetal neck and/or body, through anomalies related to the length and the structure, and through true knots. Nuchal cords are the most common cause for this disease. However they are rare before the 20th gestational week, because the ratio between the length of the cord and the size of the foetal body prevents the umbilical cord from becoming wrapped around the foetal neck and/or body. About 28% of all pregnancies has a single loop of umbilical cord wrapped around the neck and about 3.7% of these have two or more loops.

The older the gestational age, the higher the likelihood that the umbilical cord becomes wrapped: 10% around the 24th week, 18% around the 32nd week, 30% towards the end of the pregnancy. In approximately 20-25% of the cases the problem disappears spontaneously before childbirth (1). The role of the funicular pathology in the perinatal outcome and in fetal mortality is controversial. A cord loop facilitates the compression of the umbilical cord itself. This leads to an increase in the umbilical arteries resistance, and thus to a heart rate reduction, a decrease of the cardiac output and consequently to metabolic acidosis.

Some authors pointed out that the nuchal cord is associated neither with adverse neonatal outcome nor with a higher rate of emergency caesarean section (2). However, other studies show the existence of an association with a higher incidence of variable decelerations in both the first and the second stage of labour, acidosis, increased incidence of a low Apgar score in the first minute, meconium stained amniotic fluid, neonatal resuscitation, use of intensive care and possible perinatal death (3-5).

Perinatal adverse events seem to be related to the number of cord loops. Guidelines regarding the management of these pregnant women do not exist. The management varies depending on the country, on the centre and on the obstetrician.

Materials and methods

A retrospective study was carried out on a total of 3.186 pregnant women who gave birth at the U.O.C. Gynaecology and Obstetrics, University Hospital "Paolo Giaccone" over a period of three years from the 1st January, 2012 to the 31st December, 2015. The patients involved in the study were nulliparous and multiparous women at term of pregnancy (> 37.6 and > 41.6 weeks) with a single foetus in cephalic presentation, in spontaneous or induced labor, who were diagnosed with a funicular pathology at birth.

The aim of this study was to assess:

- the funicular pathology incidence (length, structural, insertion anomalies, true cord knot, prolapse or procidentia);

- fetal cardiotocographic abnormalities (variable decelerations);
 - mode of delivery (spontaneous or operational);
 - perinatal outcome (Apgar score at 1st and 5th minute, admission to SICU, meconium stained fluid);
- All of the data regarding the pregnant women, who were diagnosed with the funicular pathology at birth, were collected in a special database created with Microsoft Excel.

Results

From the 1st January, 2012 to the 31st December, 2015, 3.186 pregnant women gave birth and in 280 cases (8.7%) funicular anomalies were diagnosed.

The age of pregnant women ranges from a minimum of 17 years to a maximum of 47 years.

154 pregnant women (55%) were nulliparous, while 126 (45%) were multiparous. The umbilical cord abnormalities observed were the following:

- umbilical cord wrapped around the neck, 233 cases (83.2%);
- length abnormalities, 22 cases (8%);
- insertion abnormalities, 10 cases (3.5%);
- structural abnormalities, 4 cases (1.4%);
- true knots, 7 cases (2.5%) (Figure 1);
- prolapse or procidentia, 4 cases (1.4%) (Figure 2).

The neonatal outcome: in 270 cases (96.4%) the 1-minute Apgar score was > 7, in 8 cases (2.8%) it was between > 4 and < 6, in 2 cases (0,7%) it was < 4.

The Apgar score at the 5th minute was > 7 in 279 cases (99.6%), while in only one case (0.4%) it was between > 4 and < 6 (Table 1).

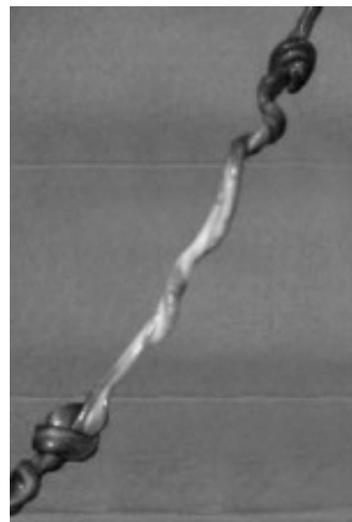


Figure 1 - True knot.



Figure 2 - Vasa previa.

Admission to the NICU was not necessary under any circumstances.

The meconium stained amniotic fluid was found in 15 cases (5.3%). No cardiocographic change was observed in 182 cases (65%), saltatory heart rate patterns were recorded in 63 cases (22,5%) and variable decelerations were observed in 33 cases (12%), of which 24% was typical, 7% was atypical DV and 2% was bradycardia.

Spontaneous delivery was observed in 149 cases (53.2%), while a caesarean section was necessary in 131

cases (46.8%), of which 120 cases not referable to the funicular pathology, while 11 cases (8.4%) referable to cardiocographic abnormalities caused by the funicular pathology (Table 2).

Discussion

The figures of our study showed an incidence of funicular diseases equal to 10.1%. Nuchal cord is the most common condition with an incidence of 8.2% on the population studied. These figures, in line with the results obtained by some Authors (incidence of 8% and 9.2%) (6), are lower than many figures in the literature reporting a frequency from 15% to 33% (7). On the other hand they are higher than Kumera's and Dhor's figures report an incidence of 2.4% and 5.74%. The extensive heterogeneity of the figures reported in the literature shows the great difficulty in determining such a complex pathological entity. The 1-minute and 5-minute Apgar score at of <7 showed an incidence equal to that of the normal population, in accordance with some figures reported in the literature (1, 2, 8-10). In contrast, some studies pointed out a high incidence of the 1-minute Apgar score of <7 in presence of the funicular pathology (1, 4, 11). Larson et al. compared the neonatal outcomes of a group of foetuses with a number of cord loops around the neck <= 2 with a group of foetuses with one loop or no loo-

TABLE 1 - 1° AND 5° MINUTE APGAR SCORE.

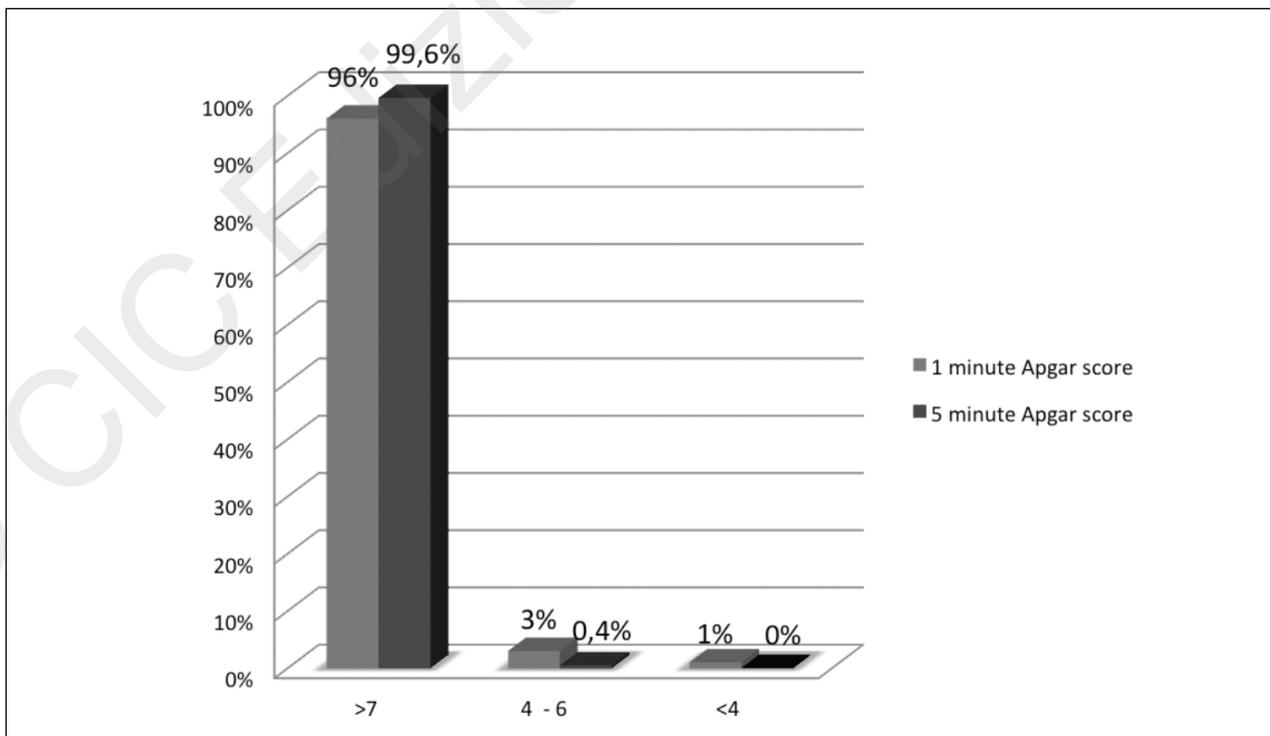


TABLE 2 - INDICATION FOR CAESAREAN SECTION.

Indication for caesarean section	No. (131 caesarean sections)	%
Foetal distress	11	8,4%
Failed induction	8	6,1%
Cervical dystocia	43	32,8%
Presenting part not engaged	16	12,2%
No progression of the presenting part	12	9,2%
Foetal-pelvic disproportion	9	6,9%
Other	32	24,4%

ps at all. The study showed that multiple loops => 2 around the neck are associated with a higher incidence of meconium stained amniotic fluid, cardiocographic abnormalities during the advanced stage of labour, a higher incidence of operative vaginal delivery, a slight acidosis of the umbilical artery, an increased incidence of the 5-minute Apgar score of <7 at birth and a non-increased birth rate (12).

Similarly Shaffer et al. compared the outcome of a group with multiple loops around the neck (≥ 2) with a group with one loop or no loops at all (13). All groups were divided into pregnancy at term and post-term pregnancy.

References

- Singh Gurneesh, Dasgupta Ellora. Nuchal cord and its outcome: a retrospective analysis. *J Obstet Gynecol India*. 2008 May/June;58(3).
- Sheiner E, Abramowicz JS, Levy A, Silberstein T, Mazor M, Herskovitz R. Nuchal cord is not associated with adverse perinatal outcome. *Arch Gynecol Obstet*. 2006 May;274(2):81-3.
- Jeong-Kyu Hoh, Young-Mo Sung, Moon-Il Park. Fetal heart rate parameters and perinatal outcomes in fetuses with nuchal cords. *The Journal of Obstetrics and Gynaecology Research*. 2012;38(2):358-363.
- Clapp JF, Stepanchak W, Hashimoto K, Ehrenberg H, Lopez B. The natural history of antenatal nuchal cords. *Am J Obstet Gynecol*. 2003;189:488-493.
- Rhoades DA, Latza U, Mueller BA. Risk factors and outcomes associated with nuchal cord: a population-based study. *J Reprod Med*. 1999;44:39-45.
- Mastrobattista JM, Hollier LM, Yeomans ER, Ramin SM, Day MC, Sosa A, Gilstrap LC 3rd. Effects of nuchal cord on birthweight and immediate neonatal outcomes. *Am J Perinatol*. 2005 Feb;22(2):83-5.
- 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 Aug;292(2):283-9.
- Begum AA, Sultana H, Hasan R, Ahmed M. A Clinical Study of Fetal Outcome in Cases of Nuchal Cord. *JAFMC Bangladesh*. 2011;7(1):25-27.
- Assimakopoulos E, Zafrakas M, Garmiris P, Goulis DG, Athanasiadis AP, Dragoumis K, Bontis J. Nuchal cord detected by ultrasound at term is associated with mode of delivery and perinatal outcome. *Eur J Obstet Gynecol Reprod Biol*. 2005 Dec 1;123(2):188-92.
- Reed R, Barnes M, Allan J. Nuchal cords: Sharing the evidence with parents. *British Journal of Midwifery*. 2009;17(2):106-109.
- Krakowiak P, Smith EN, de Bruyn G, Lydon-Rochelle MT. Risk factors and outcomes associated with a short umbilical cord. *Obstet Gynecol*. 2004 Jan;103(1):119-27.
- Larson JD, Rayburn WF, Crosby S, Thurnau GR. Multiple nuchal cord entanglements and intrapartum complications. *Am J Obstet Gynecol*. 1995;173:1228-31.
- Schäffer L, Burkhardt T, Zimmermann R, Kurmanavicius J. Nuchal cords in term and postterm deliveries--do we need to know? *Obstet Gynecol*. 2005 Jul;106(1):23-8.
- Yum Narang, Neelam Bala Vaid, Sandhya Jain, Amita Suneja, Kiran Guleria, MMA Faridi, Bindiya Gupta. Is Nuchal Cord Justified as a Cause of Obstetrician Anxiety? *Archives of Gynecology and Obstetrics*. 2015;291(1):3-3.
- 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(2):143-8.

The Authors observed a high incidence of meconium stained amniotic fluid only in the post-term pregnancy group with multiple loops, while they did not notice any increase in the Apgar score of <7, the hospitalization of newborns in intensive care and the operative delivery. Narang et al. (14) highlighted that cord loops around the neck, both single and multiple, are associated with no difference with a high incidence of meconium-stained fluid and not-reassuring foetal heart rate patterns during labour. In their study, Chai Wah Kong et al. pointed out that only the group with multiple cord loops ≥ 3 is associated with a high incidence of foetal distress, which requires caesarean section or instrumental delivery (15). The higher incidence of meconium stained amniotic fluid could explain the higher number of admissions to the NICU for observation and monitoring, aimed to exclude the meconium aspiration syndrome.

Conclusion

In our experience, the funicular pathology is rarely associated with adverse perinatal outcomes. That is why it should not influence the management of childbirth, as well as labour, and should be looked for only in the case of a non-reassuring CTG pattern.