Cordial risk: perinatal and maternal outcomes

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

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.

Summary: Cordial 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.


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-
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:
- 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).
Admission to the NICU was not necessary under any circumstances.

The meconium stained amniotic fluid was found in 15 cases (5.3%). No cardiotocographic 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 cardiotocographic 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). Larsson 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>
<thead>
<tr>
<th>Score</th>
<th>1 minute Apgar score</th>
<th>5 minute Apgar score</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;7</td>
<td>96%</td>
<td>99.6%</td>
</tr>
<tr>
<td>4 - 6</td>
<td>3%</td>
<td>0.4%</td>
</tr>
<tr>
<td>&lt;4</td>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>
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.

### References


