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A case of a new-born with a four loops nuchal cord rescued from severe neonatal asphyxia: have we learn anything new?

Cas d'un nouveau-né avec un circulaire du cordon ombilical à quatre tours sauvé d'une asphyxie néonatale sévère : Quelles leçons avons-nous apprises ?

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ABSTRACT

Nuchal cord, where the umbilical cord wraps around the baby's neck or other part of the body, is common during delivery and usually harmless. We report a case of a 30-year-old woman, G3P2 with a history of nuchal cord in prior pregnancies, one resulting in a stillbirth. She delivered a baby girl with four loops of nuchal cord and severe neonatal asphyxia through elective caesarean section. The baby was resuscitated and recovered in the neonatal intensive care unit. This case highlights the importance of a high suspicion for complications in women with a history of nuchal cord. It also emphasizes the need for detailed reporting of nuchal cord presentations on ultrasound, including the number and tightness of loops. Finally, the case underscores the need for preparation for potential resuscitation measures in deliveries with a prenatal diagnosis of multiple nuchal cord loops.

RESUME

Le circulaire du cordon, qui se produit lorsque le cordon s'enroule autour du cou ou d'une autre partie du corps du fœtus, est fréquent pendant l'accouchement et généralement sans complications néonatales. Nous présentons le cas d'une femme de 30 ans, G3P2, ayant des antécédents de circulaire du cordon ombilical lors de grossesses précédentes, l'une d'entre elle ayant abouti à un mort-né. Elle a accouché d'une petite fille par césarienne programmée, présentant un circulaire avec quatre tours de spires et une asphyxie néonatale sévère. Le nouveau-né a été réanimé et a récupéré dans l'unité de soins intensifs néonatals. Ce cas met en évidence l'importance d'un indice de suspicion élevé en cas d'antécédents de circulaire du cordon ombilical. Il souligne également la nécessité d'un examen minutieux du nombre de tours de spires et de la sévérité du circulaire lors du diagnostic échographique. Enfin, il souligne la nécessité de se préparer à une éventuelle réanimation néonatale en cas de diagnostic prénatal de circulaire du cordon ombilical à tours multiples.

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Introduction

Nuchal cord is an abnormality of umbilical cord characterized by the entanglement of the cord around the neck or when the umbilical cord is wrapped around the neck 360 degrees [1, 2]. The incidence of nuchal cord varies in the literature from 5 to more than 35% and many authors reports increasing rate with the advancing gestational age from 20 weeks [1, 3]. Prior to delivery, obstetricians can assess presence of nuchal cords clinically by a test that involves transabdominal manual compression of the fetal neck. If compression of fetal neck elicits fetal heart rate decelerations (FHR), the test is considered positive.

The diagnosis of nuchal cord can be done during the antenatal period using the ultrasound which can describe the number of loops, the tightness and the part of fetal body entangled. Ultrasonography with Doppler imaging is considered the gold standard for the diagnosis [4] but the presence of nuchal cord does not usually change the neonatal outcome in the majority of cases [4-6].

Nuchal cord can lead to compression which can obstruct the blood flow in the umbilical vein but the infant artery may continue to pump blood outside the fetus; this can result to hypovolemia, acidosis and anemia [2]. Despite all these potential adverse fetal outcomes, there is a lot of controversies on the management of the nuchal cord during pregnancy with few authors advocating for systematic sonographic screening during the third trimester [1, 7 and 8] while the vast majority only recommend more cautious fetal heart monitoring during labor [6, 9, 10]. The incidence of nuchal cord with multiple loops is reported to vary from 1.99 %[4] to 5.8% [9, 10] and the occurrence of adverse outcomes is higher compared to single loop but vaginal delivery is not contra-indicated [9]. We report a case of early neonatal birth asphyxia after a caesarean section due to a nuchal cord with four loops which warranted a neonatal resuscitation. Recommendations on the management are revisited.

Case presentation

A 30-year-old, G3P3002 delivered a female baby with four loops nuchal cord entanglement through caesarean section (CS) on August 25, 2022. She had a past history of stillbirth during the first delivery 7 years ago due to a tight nuchal cord. Her second child was born through caesarean section indicated for non-reassuring clinical fetal heart rate 5 years ago and a loose nuchal cord was also discovered during the CS.

The index pregnancy was followed at a district hospital (first level referral) till the 36th week of pregnancy when she was referred to us for further management. During the antenatal period, she received all the routine drugs supplementation according to National recommendations: Iron and Folic acid, monthly dose of intermittent malaria treatment using Sulfadoxine Pyrimethamine from the 13th gestational week; Antitetanic toxoid was also taken accordingly. Following laboratory investigations were done with no abnormal findings reported in the table 1 below:

Table 1: laboratory tests done with reported results

Laboratory tests done	Results
Blood group and Rhesus	O rhesus positive
Haemoglobin electrophoresis	AA
Toxoplasmosis serology	IgG positive at 66 IU/ml and IgM: negative
Rubella serology	IgG positive at 66 IU/ml and IgM: negative
Veneral Disease Research Laboratory (VDRL) and Treponema Pallidum Haemagglutinin Assay (TPHA)	Negative
Blood sugar level	72 milligrams per liter at 12 weeks

Three obstetrical ultrasounds were done at 11, 24 and 32 weeks respectively with no abnormal findings reported and in particular no nuchal cord described. The obstetrical assessment at 36 weeks included a physical examination with Leopold maneuver revealing a cephalic presentation with the head not engaged and a normal fetal heart tone (FHR) varying between 132 and 146 beats per minute (bpm), the estimation of fetal weight was difficult because of the high body mass index (BMI = 32 kg/m^2 before pregnancy); we found 2700 g± 275 g using the

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Johnson formula. The digital vaginal examination found a normal inlet with an obstetrical conjugate estimated at 11.3 centimeters and non-prominent ischial spines.

After counselling, a shared decision of trial of labor or vaginal birth (TOLAC) was taken, provided there is spontaneous onset of labor before 41 completed weeks of pregnancy. On the follow-up visit at 40 weeks and 4 days, there was no uterine contractions and the patient reported reduced fetal movements. An ultrasound done to assess the fetal wellbeing found a normal fetal heart rate of 142 bpm, sufficient amniotic fluid quantity and a cord around the neck. A decision was taken for a planned CS the next day. A preoperative workup including full blood count and coagulation profile tests were all normal. A lower uterine segment caesarean section was performed and a live female baby in cephalic presentation was delivered with a nuchal cord with 4 loops around the neck, Apgar score of 3/10, bluish color and asphyxiated (see **figures 1 and 2**).

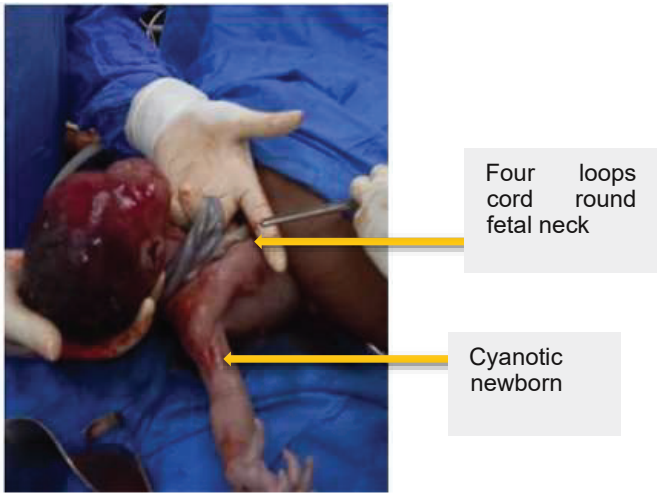

Figure 1: Tight nuchal cord with 4 loops: asphyxiated neonate

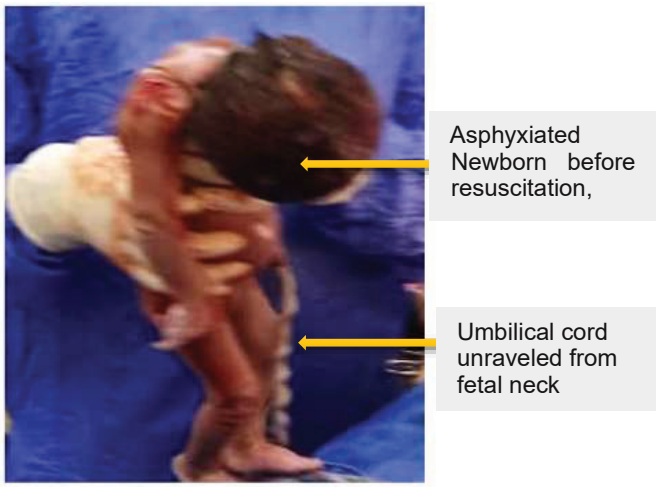

Figure 2: Cord untwisted from the neonate's neck: 81 cm long

Resuscitation was done, obtaining a 5-minute Apgar score of 5/10. The new-born baby was admitted in the neonatal intensive care unit but recovered very fast within 24 hours. The full blood count and blood ionogram done were normal. The umbilical cord was centrally inserted on the placenta and measured 81 cm. The mother had an uneventful postoperative evolution and was discharged from the hospital at day 5 post caesarean section.

Discussion

Nuchal cord is a frequent situation in pregnancy but the multiple loops variety is relatively rare, with reported incidence of 1.99 to 5.8% [3, 10]. Risk factors of nuchal cord described in the literature include Primiparity, male sex of the fetus, post-term pregnancy (> 42 weeks), and umbilical cord length > 70 cm [1, 7, 11, 12]. Likewise, our patient had a prolonged pregnancy, although not up to 42 weeks, the umbilical cord measured 81cm but on the contrary, she was a multiparous and had a female baby. Our patient also had past history of nuchal cord in all her 2 two previous pregnancies but this has not been described before as a risk factor.

The patient complained of reduced foetal movement and a cord entanglement was seen at ultrasound done that same day but the number of loops were not described. This is consistent with what is described in the literature concerning the diagnosis of nuchal cord; in fact, the diagnosis of nuchal cord can be done during the antenatal period using the ultrasound which can describe the number of loops, the tightness and the part of fetal body entangled. Ultrasonography with Doppler imaging is considered the gold standard for the diagnosis [4, 13]. The majority of cases of nuchal cord is discovered during the delivery of the fetal head and many authors report no significant difference in the neonatal outcomes in case of single loop [1, 5, and 7].

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Although caesarean section is done in the majority of cases [8], vaginal delivery is possible without increased rate of adverse fetal and neonatal outcomes even in case of multiple loops. Wang et al. reported a case of nuchal cord with 8 loops managed by vaginal delivery with just some transient adverse neonatal complications like low Apgar at one and five minutes, admission in neonatal intensive care unit (NICU) [9]. In our case, we performed a caesarean section for a different reason (previous scar and poor obstetrical history) and the finding of an asphyxiated baby was unforeseen. Like in this case, similar adverse neonatal outcomes have been reported when the nuchal cord has multiple loops and more so if the entanglement is tight [5, 7, and 9]. We attribute the favorable evolution of the child condition to the presence of skilled pediatrician and a good neonatal intensive care with oxygen therapy facilities.

Conclusion

This case shows a rare situation of severe neonatal asphyxia caused by four loops of nuchal cord. The baby survived due to immediate medical attention.

Lessons from this case include:

1) The importance of a high clinical index of suspicion of recurrence and complications in women with a history of nuchal cord.
2) The emphasis on the need for detailed reporting of nuchal cord presentations on ultrasound, including the number and tightness of loops.
3) Finally, the case underscores the need for preparation for potential resuscitation measures in deliveries with a prenatal diagnosis of multiple nuchal cord loops.

Conflict of interest

None declared.

Authors' contributions

RT managed the case, drafted and wrote the report. IBE, YO, MN and TNN review the paper and contributed in literature review. All the authors approved the final version.

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