



Triple knot of umbilical cord – case report and review of literature

Potrójny węzeł pępowinowy – opis przypadku i przegląd literatury

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ABSTRACT

Multiple true nodes of the umbilical cord are rarely described in literature and refer to patients suffering from pregnancy complications, such as intrauterine growth restriction, or oligohydramnios. We present a case of a 30-year-old woman, admitted for labor induction in the 41st week of her first pregnancy. After rupture of the membranes with no signs of infection, the patient had labor induced with oxytocin infusion, which had to be discontinued due to abnormalities in the cardiotocography, which persisted after infusion cessation and required an emergency cesarean section to be performed, during which a healthy male baby was born.

The triple true node located 24 cm from the placental umbilical insertion was discovered in the 62 cm long umbilical cord, which had not been suspected ultrasonographically during the pregnancy.

To our knowledge, our case is the first to date to illustrate the presence of multiple nodes of the umbilical cord, which did not lead to complications during pregnancy, but resulted in an urgent cesarean section. Our case illustrates a possible clinical challenge that may be faced by almost every practicing obstetrician-gynecologist.

KEYWORDS

cesarean section, knot, obstetrics, umbilical cord

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STRESZCZENIE

Mnogie węzły prawdziwe pępowiny są rzadko opisywane w literaturze i zazwyczaj dotyczą pacjentek, u których dochodzi do powikłań ciąży takich jak wewnątrzmaciczne zahamowanie wzrostu czy małowodzie. W pracy przedstawiono opis przypadku 30-letniej kobiety, przyjętej do indukcji porodu w 41. tygodniu pierwszej ciąży. Po pęknięciu błon płodowych bez cech infekcji pacjentce indukowano poród wlewem oksytocyny, który jednak musiał zostać przerwany z powodu nieprawidłowości w zapisie kardiokardiograficznym utrzymujących się po zaprzestaniu wlewu, co skutkowało koniecznością wykonania pilnego cięcia cesarskiego, podczas którego urodził się zdrowy noworodek płci męskiej.

Analiza 62-centymetrowej pępowiny wykazała potrójny węzeł prawdziwy zlokalizowany 24 cm od końca łożyskowego pępowiny, którego nie uwidoczono ultrasonograficznie podczas ciąży.

Według naszej wiedzy opisany przypadek jest pierwszym do tej pory, ilustrującym obecność mnogiego węzła pępowinowego, który nie prowadził do powikłań w czasie ciąży, ale skutkowało koniecznością pilnego cięcia cesarskiego. Przypadek ilustruje możliwe wyzwania kliniczne, z którym może się spotkać niemal każdy położnik-ginekolog.

SŁOWA KLUCZOWE

cięcie cesarskie, pępowina, położnictwo, węzeł

INTRODUCTION

True umbilical knots represent one of the less frequent pathologies of the placental-umbilical complex. Literature data report their frequency at 0.3–1.5% [1,2]. The occurrence of umbilical knots does not often lead to fetal complications; however, if the blood flow in the umbilical cord is restricted due to excessive constriction, the risk of fetal growth restriction and even stillbirth and other perinatal complications increases significantly [1,3].

CASE REPORT

A 30-year-old woman with no prior comorbidities was admitted in the 41st week of her first pregnancy to induce labor. During the pregnancy, she had been regularly monitored ambulatorily, had no hospitalizations, and received no medications. The pregnancy was spontaneous, and the serial ultrasound assessments revealed no pathology, with fetal biometrics consistent with the time of amenorrhea. On the first night after admission, the patient's membranes ruptured, despite no cervical dilation and no contractions. At that time, she had no laboratory signs of infection, with reference values of C-reactive

protein and white blood count, and a negative vaginal-rectal swab for group B streptococcus (GBS).

As a result of the post-term pregnancy and the fact that the membranes had already ruptured, labor was induced by oxytocin infusion. Due to the late and variable decelerations observed in the cardiotocography recording, it was decided to discontinue the oxytocin infusion. In the following minutes, the persistence of uterine contractile action and the presence of abnormalities in the cardiotocography (CTG) recording were continuously observed (Figure 1A).

A decision was made to perform an emergency cesarean section. A male baby was born, with a weight of 3460 g, a body length of 55 cm, and 10 Apgar points.

Analysis of the umbilical cord and placenta showed an umbilical cord length of 62 cm, with the presence of a triple true node located 24 cm from the placental umbilical insertion (Figure 1B). The neonate was transferred to the neonatal unit, where no abnormalities were observed in the physical examination or laboratory tests. The umbilical cord blood showed a pH of 7.345, with a mildly elevated dioxide concentration ($p\text{CO}_2$ – 48.4 mm Hg) and bicarbonate concentration at the lower limit of reference (HCO_3 – 21.1 mmol/L) and a slightly elevated lactate concentration of 2.7 mmol/L. The patient gave informed consent for publication of the case report, provided her utmost anonymity.

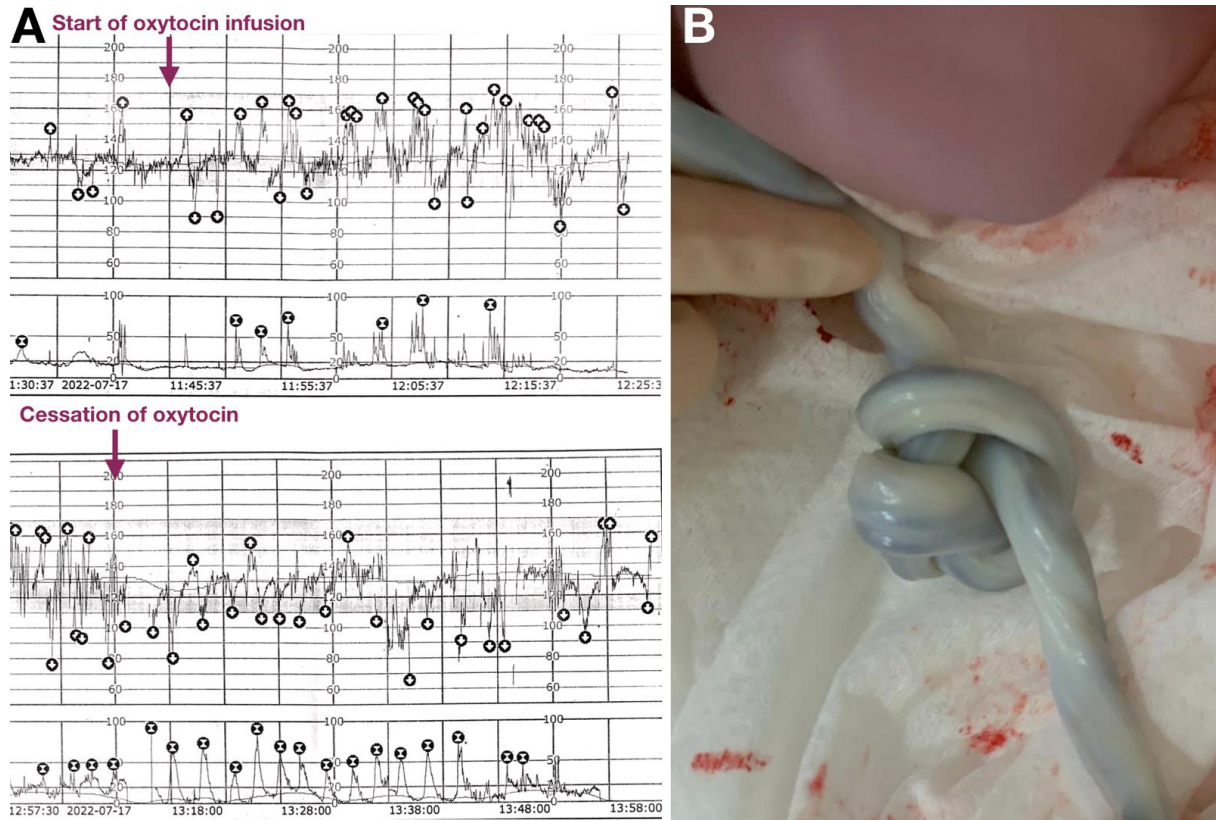


Fig. 1. A – cardiotocographic recording demonstrating late and variable decelerations (arrows down) and contractions (hourglasses) after administration and cessation of oxytocin infusion; B – photograph of triple umbilical cord knot immediately after cesarean section.

DISCUSSION

Numerous risk factors for true umbilical knots have been identified, including multiple pregnancies, short fetal length, and low weight, a male fetus, or the presence of gestational diabetes [4]. It should be noted that none of the aforementioned risk factors were described in either the patient or the fetus and serial repeat ultrasound examinations during pregnancy did not identify any abnormalities.

It must be added, however, that ultrasound can identify the presence of an umbilical node only in a limited number of pregnant women. In a large analysis of 5,575 deliveries, a true umbilical cord knot at birth was found in 18 patients. In all these women the ultrasound images were retrospectively analyzed, finding that all had normal ultrasound findings in the second trimester with no umbilical cord abnormalities, while 72% had color Doppler ultrasound in the third trimester, in which no umbilical cord abnormalities were found [2]. Without a doubt, the significantly better quality of the ultrasound devices that are currently in use should be taken into account, but the results indicate the possible difficulties in identifying umbilical nodes during pregnancy. Worth noting is the fact that in the case that we presented, despite the presence of a triple

umbilical node, there were no abnormalities in the umbilical artery Doppler assessment.

Our case illustrates the clinical challenges that almost every practicing obstetrician-gynecologist may face. Indeed, it should be noted that, although references to cases of multiple true nodes on the umbilical cord can be found in the literature, we have not come across a case of a patient in whom multiple nodes would not lead to complications already during pregnancy. For example, a 2007 paper by Clerici et al. [5] described five nodes on an umbilical cord that had caused complications – i.e. anhydramnios and fetal growth restriction – diagnosed as early as at the 18th week of gestation.

In the second case described, in which four umbilical cord knots were identified, the first ultrasound abnormality (placenta previa) was found at 15 + 1 weeks gestation, while at 20 + 5 weeks gestation the patient was diagnosed with oligohydramnios, which resolved in the further course of the pregnancy [6]. Furthermore, regularly assessed flow in the umbilical arteries indicated continuously maintained abnormalities from 27 + 2 weeks' gestation onwards. Therefore both of the above cases refer to situations where it is possible to identify in advance that the patient might be at higher risk of perinatal complications. Meanwhile, in the case of multiple



umbilical cord nodes presented by us, no abnormalities were identified by antenatal testing until the onset of labor.

Despite multiple studies assessing the possible association between the presence of true umbilical cord nodes and complications during pregnancy or labor, the

phenomenon is still being debated. In our study, we presented the case of a patient who, despite the presence of a triple true umbilical cord node, had no abnormalities during pregnancy, but after the onset of labor, multiple decelerations occurred, resulting in the need for an emergency cesarean section.

Author's contribution

Study design – M. Manasar-Dyrbuś, R. Stojko

Manuscript preparation – M. Manasar-Dyrbuś, P. Gibala

Literature research – J. Sójka-Kupny, P. Gibala

Final approval of the version to be published – R. Stojko

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