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Umbilical cord complications
in two subsequent pregnancies

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True knots or enforcements of the umbilical cord are potentially hazardous circumstances for the fetus. Decrease of umbilical cord blood flow may lead to intrauterine growth restriction or fetal distress with sometimes grave consequences. Antenatal diagnosis (e.g. by ultrasound) that eventually could influence the course of pregnancy may be challenging. Most relevant factors predisposing for cord knots such as elongation of the umbilical cord, polyhydramnios and small fetus may recur in subsequent pregnancies.

Here we report on a 26-year-old G2/P1 presenting at 38 weeks with diminished fetal movements. Eleven months ago she had delivered a stillborn at 33 weeks of gestation. The intrauterine death was due to strangulation with an umbilical cord of 83 cm in length, tightened in 4 loops around the neck of the fetus.

The current pregnancy was complicated by gestational diabetes diagnosed at 28 weeks. A frequently changing fetal presentation was noted up to 37 weeks. Prior to this pregnancy, the maternal BMI had been 24, weight gain during pregnancy totalled 20 kg, with no polyhydramnios.

Upon arrival, there was a suspicious non stress test with lack of beat-to-beat variability and variable decelerations. Doppler ultrasonography showed an abnormal flow pattern in both umbilical arteries.



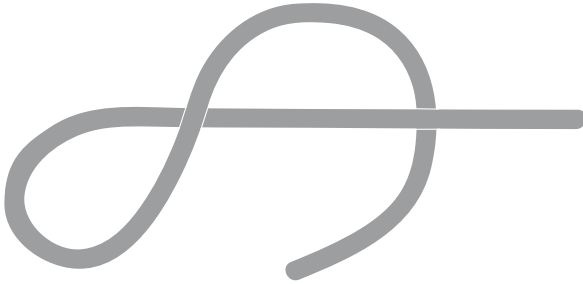
Fig. 1

CTG strip showing poor beat-to-beat variability and variable deceleration.

True complex knot.

Fig. 2





Flemish or Savoy knot.



Fig. 3

A cesarean section was performed, delivering a healthy female newborn infant (birth weight 3540 g, Apgar 9, 10, 10 at 1, 5 and 10 minutes, respectively). Her postnatal course was uneventful.

The umbilical cord showed a true complex knot (Fig. 1), equal to what is called an eight knot, Flemish or Savoy knot in mountaineering or sailing. This umbilical cord knot was considered to be responsible for the suspicious findings prior to delivery.

DISCUSSION

The incidence of true knots of the umbilical cord has been estimated to range between 0.3 to 2.1 percent of all births (1, 2). It is associated with increased perinatal morbidity and mortality. Although most knots are loose and therefore do not impact on perinatal outcome, in utero tightening of the knot may decrease umbilical blood flow and lead to subsequent fetal distress, intrauterine growth retardation, asphyxia or even intrauterine death (3-5). Predisposing factors include long umbilical cords (normal: 50-60 cm), polyhydramnios, small fetus, male gender, amniocentesis and monoamniotic twin pregnancy (2, 6, 5). True knots are thought to be formed between 9-12 weeks of gestation when there is copious amniotic fluid. There is also some evidence that knots may be formed during labor [3]. Identifying a true cord knot by ultrasound antenatally is difficult and time-consuming, and the use of Doppler measurements are

restricted to skilled examiners and pregnancies with elevated risk for knots such as polyhydramnios (2, 6, 7). Complex or compound true knots are even rarer with unknown incidence and only few reports in literature (8, 9). Some of them consist of two topologically distinct knots that are "tied" at separate times. There is an association between true cord knots and other cord complications, such as cord around the neck and cord prolapse (6). Recurrent fetal deaths after recurrent cord strictures or torsion have been observed in the same woman (11, 12).

The case presented here documents the potentially grave consequences of reduced umbilical blood flow due to cord compression or knot formation. This is the first report of umbilical cord knot complications in subsequent pregnancies of the same mother, maybe due to persistent risk factors. Elongation of the umbilical cord may have been the reason for cord entanglement in the first and the true complex cord knot in the second baby, but unfortunately total length of the cord was only measured after intrauterine death in the first pregnancy. It is unknown if the umbilical cord length is genetically determined. No other evident risk factors were detected.

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