CASE REPORT

True Knot in Umbilical Cord: A Case report

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Abstract

True knot in umbilical cord is rare intrauterine manifestation. The actual incidence of true cord is approximately 0.8% only. The complication of true knot is associated with fetal morbidity and in rare instances fetal death can also occur. The diagnosis of true knot can be done during intrauterine life with ultrasonography but its sensitivity and specificity is less informative.

No definite indication for mode of delivery, however fetal compromise is seen with some cases. Risk associated with it should be to patient and informed choice of route of delivery should be given. Mostly incidental diagnosis done during USG and some cases seen during delivery by examination.

Management during labor depends on fetal parameter not on the basis of diagnosis of true knot in umbilical cord. Favorable outcome occurs in antenatally diagnosed case and close monitoring of the case during antenatal and intrapartum period.

Keywords: Fetal distress, Knot, Umbilical Cord

Introduction

True knot is actual knot formed in umbilical cord, while false knot is simple bulging in umbilical cord formed by looping of vessels or thickening of Wharton's jelly.[1] There are various complications and abnormalities in the umbilical cord. Common complications associated with true knot are small for gestational age (SGA), low APGAR (appearance, pulse, grimace, activity and respiration), fetal hypoxia and even fetal demise.[2]

Among them knot in umbilical cord is quite a rare condition. True knot in umbilical cord is far rarer then false or pseudo knot. Exact mechanism of occurrence of knot is not well known but the proposed mechanism is trauma to the cord and fetal movement leads to knot formation.

Established prenatal management guideline have not yet been investigated and recommended despite of having higher adverse perinatal outcome associated with true knot of umbilical cord. True knot may lead to fetal hypoxemia and intrauterine fetal death.

Case Report

A 22 year's old primigravida presented in labor room with pain abdomen and per vaginal discharge.According to her first day of last menstrual period her period of gestation was 40 weeks and 4 days. Her systemic examination and vitals were stable. Abdominal examination revealed uterus size of term size and fetal heart rate irregular with rate of maximum of 180 and minimum of 90 beat per minute. Vaginal examination revealed she was in latent phase of labor with three centimeter cervical dilation and longitudinal vaginal septum with two vaginal orifices. After reposition, fluid supplement and oxygen fetal heart rate remained irregular and maximum rate of more than 180 beat per minute so cesarean delivery was planned for persistent fetal tachycardia (fetal distress) and 3.1 kg male fetus with APGAR score 6 and 7 at one and five minute respectively was delivered by emergency caesarean section. Newborn was handover to pediatrics on duty team. Intraoperative finding was normal except a single true knot present in umbilical cord towards fetal end nearly 10 cm away from fetal end as shown figure below. True knot was tight and did not slip by itself. Her

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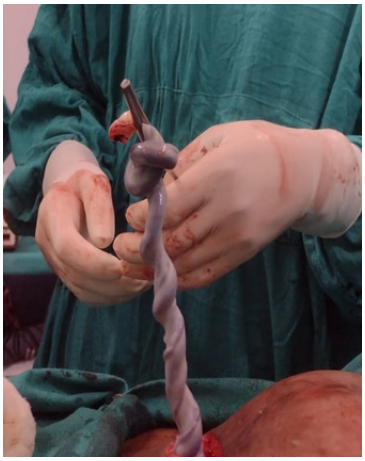
all previous scan including anomaly scan were normal. She did her regular antenatal visit to another center and admitted to tertiary care center for false labor pain secondary to urinary tract infection. At that time according to patient vaginal examination was done and nothing mentioned about vaginal septum.

The post-operative period remained uneventful and newborn was kept in SNCU (Semi-neonatal intensive care unit) for 24 hours. No further intensive care needed for the newborn and the baby was shifted to mother's side. This true knot in umbilical cord is one of the rare incidence and can leads to fetal morbidity and mortality. Diagnosis was incidental during delivery in our case. Fortunately,timely intervention reduces the probable further complication.



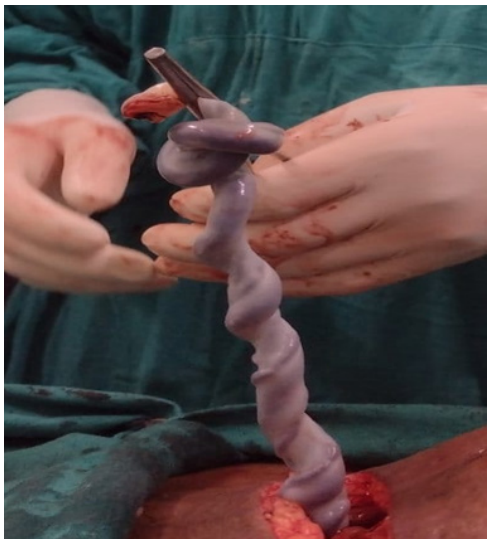


Fig 1: True knot in Umbilical cord during caesarean section

Discussion

The natural incidence of true knot in single umbilical cord is 0.5-2%. Some complication associated true knot are dangerous.[3]Active management during labor have paramount role for the normal fetal outcome. The main concept of active management of true knot of umbilical cord (TKUC) is to reduce complication like birth asphyxia and fetal death.[4]

The incidence of TKUC was about 0.8%, the TKUC was not associated with increase rate of stillbirth as compared to patient without true knot. The risk factors associated with the true knot are maternal age, multigravida, multiparty, BMI, previous spontaneous abortion, polyhydramnios and diabetes mellitus.[5]

There is no definitive radiologic sign to diagnosis of true knot; however, in cases of normal amniotic fluid it is possible to diagnose the true knot with greater sensitivity. Routinely, true knot in umbilical cord is easily missed as it does not have specific diagnostic criteria.[6]

There are lots of evidence that shows usefulness of Doppler ultrasound in diagnosis of a true knot in the umbilical cord. In Doppler scan clear image of knot can be seen with more accuracy as comparison to normal USG scans.[6]

The Doppler ultrasound is currently considered as gold standard for diagnosis of cord abnormalities and "hanging noose sign" or "four-leaf-clover sign" are some historical sign seen in Doppler study.[3] In our case, Doppler study was not performed.

The significance of true knot in the umbilical is controversial but long term follow up revealed complication such as intrauterine fetal death (IUFD), meconium-stained amniotic fluid, low APGAR score, preterm delivery and caesarean deliveries. There is no long term neurological association with true knot in umbilical cord.[7]

CTG (Cardiotopography) is useful modality for the detection of abnormal heart rate in fetal compromise and also useful in true knot in umbilical cord. Home monitoring with Tele-CTG has demonstrated increased detection of abnormal heart rate in cases of true knots of umbilical cord, and decreased fetal movement but its feasibility is not defined.[8]

There can be more chance of unrecognized morphological and circulatory problem in case of true knot of umbilical cord, which may cause acute fetal hypoxia that can be seen in umbilical-cerebral Doppler ratio. The tightening of umbilical cord occurs due to either tangling fetal feet around cord or by clutching the cord with a hand. True knot are not always amenable for prenatal diagnosis andis not always associated with adverse perinatal outcome.[9]

Prenatal diagnosis of true knots in umbilical cord should not change the planned obstetric approach; however it creates an ethical dilemma for obstetricians for informing the finding to patient and patient party and medico-legal implications associated with true knot of umbilical cord.[10]

The recommended management option in patient without labor is expectant management with interval fetal monitoring. Cesarean delivery is not absolute indication for true knots in prenatal ultrasound, although final decision should be made by patient. The continuous electronic fetal monitoring during labor is crucial for intrapartum monitoring of possible complication of true knot of umbilical cord.[11]

In our case, the true knot was incidental finding during caesarean section done for persistent fetal tachycardia (fetal distress). Postoperative fetal and maternal condition was normal except for 24-hour observation of fetus in SNCU. True knots in umbilical cord is incidental or even missed in most of the cases so management depend on fetal monitoring during antenatal and intra partum period.

Conclusion

There is no definitive diagnosis of true umbilical cord during prenatal period and tailored management with antenatal and

intrapartum continuous fetal monitoring should be done in diagnosed true knots. Incidental diagnosis during delivery of fetus often common.

Conflict of Interest: none

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