



True Umbilical Cord Knot Leading to Fetal Distress – an Obstetric Emergency

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Background: Umbilical cord true knot is a rare condition which affects about 1% of all pregnancies. Though the incidence is lower, it often goes undetected in antenatal period despite the availability of prenatal sonography and may lead to a compromised fetal outcome as presented in this case. In this case the presence of true knot of umbilical cord was missed despite routine sonography done just 1 week prior to delivery, when patient presented to casualty with complaints of decreased fetal movements since 24 hours. This modality is said to be associated with adverse fetal outcome such as birth asphyxia or in adverse cases intra uterine fetal demise. Risk factors include long cord, polyhydramnios, small sized fetus, etc.

Case Summary: 27 years old gravida two, para two, with 1 live issue with k/c/o hypothyroidism with previous lesions came with complaints of decreased fetal movement since 24 hours at 36 weeks 3 days of gestational period. The patient recorded regular ANC checkups and routine investigations within normal limits. Her USG scan done at 34.2 wks showing single loop of cord around neck and normal doppler findings. On examination her vitals were normal. Her abdominal examination showed uterus of 34 wks size, longitudinal lie, cephalic presentation and irritable with mild contractions present with scar tenderness. Her FHS were present/irregular/112 bpm with less variability. On p/v examination os was admitting tip of finger, cervix soft, 25% effaced, station high up, presenting part vertex, membrane present. She was advised admission and a cardio-

tocography (CTG) was done which showed recurrent deep atypical variable decelerations with decreased beat to beat variability. An emergent cesarean section was taken. Newborn was a female diagnosed with true umbilical cord knot, 2 cm away from fetal insertion with cord length of 84 cm. The baby was shifted to NICU in view of respiratory distress.

Conclusion: Despite of modern day ultrasonography and Doppler studies, true umbilical cord knot still remains a lesser diagnosed entity and so every pregnant patients should be monitored carefully with a watch for daily fetal movement count (DFMC) and weekly non stress test (NST) for fetal well being.

Keywords: True umbilical cord knot; DFMC; NST; CTG.

1. INTRODUCTION

True knot of umbilical cord is a very rare entity [1]. Incidence of true knot reported ranges from 0.3% to 2% [2-3]. Number of cases reported are 1 in 100 pregnant females. This knot occurs when one umbilical cord segment loops around itself. They are said to develop early in pregnancy when intra uterine space is available for excessive fetal movements or when fetal slippage occurs through a loop of cord around neck. Later, as the fetus enlarges, it may result into tightening of knot leading to constriction or hematoma formation which may lead to fetal hypoxia, fetal distress, neurologic impairment and in some cases even fetal demise. True knots are associated with conditions that allow increased fetal movement like multigravida, long cord length, monoamniotic twins, polyhydramnios, small size fetus and gestational diabetes [4]. Umbilical cord length also has a vital role to play in formation of true knot. Normally, length of umbilical cord measures between 55-61 cm; cord of length more than 93 cm is found to be associated with higher risk of cord entanglement [4-7]. It is difficult to diagnose true knot in antenatal period even with use of ultrasonography as there are no characteristic findings. Hence this rare case of true knot is presented here.

2. CASE REPORT

A 27 years old booked, gravida two, para two, with 1 live issue, presented to casualty with complains of decreased fetal movement since 24 hours at 36 weeks 3 days period of gestation. Her previous baby was delivered by cesarean section 6 yrs back in view of thick meconium stained liquor. She had regular antenatal checkups and her antenatal blood workup was within normal limits throughout pregnancy. She was a known case of hypothyroidism and was on tablet thyroxine 75 mcg since 6 years.

Her recent ultrasonography done at 34.2 weeks revealed a single live intra uterine fetus of average gestational age 34 weeks and corresponding to effective fetal weight of 2256 gms with liquor index less than adequate, AFI 7 and right sided posteriorly placed placenta with grade 2 maturity and previous scar thickness of 3.4 mm with all other fetal growth parameters within normal limits. A single umbilical cord loop around neck was also detected on ultrasonography. Doppler ultrasound showed normal flow and spectral waveform.

Patient was admitted, and routine investigations were sent. On examination her general condition was fair and she was afebrile on touch. Her pulse rate was 88 bpm, normovolaemic, regular and blood pressure was 120/90 mm hg taken in right arm in supine position. She had no pallor or oedema on examination. CVS and RS were found to be within normal limits. Her routine blood investigations were within normal limits. On abdominal examination, uterus was 34 wk size, longitudinal lie, cephalic and irritable with mild contractions present. Previous cesarean section scar was present which was tender on palpation. Her FHS were present and irregular with 112 bpm showing less variability. On P/V examination internal os was closed, external os was admitting a tip of finger, cervix posterior, soft to touch, 25% effaced with cervical length of about 4 cm, station high up, presenting part vertex, membrane present. Her Modified Bishop Score was assessed to be 2. A cardiotocogram (CTG) was done which showed recurrent deep atypical variable decelerations with decrease in beat to beat variability and which were not resolved medically.

An emergency cesarean section was undertaken, under spinal anaesthesia in view of fetal distress and non reassuring CTG changes showing atypical recurrent decelerations. A true umbilical cord knot, 2 cm away from fetal

insertion with a single loop of cord around neck with cord length of about 84 cm was observed. The newborn was a female weighing 2.1 kg with an APGAR score at minute 1 and 5 of 7/10 and 8/10 respectively, with signs of flaring and chest retractions present suggestive of respiratory distress. An ABG was performed which showed moderate acidosis (arterial ph: 7.14 [normal range: 7.20 to 7.45]; pCO₂ 56.6 mm hg [normal range 45±15]; base : - 8 mEq/l [normal 5 to -12]. The baby was shifted to NICU in view of respiratory distress and was put on oxygen by nasal prongs and injection ampicillin and gentamicin were started. The baby showed good recovery and was shifted to mother side after 3 days with no oxygen support required. The maternal postpartum and newborn developments were satisfactory.



Fig. 1. Umbilical cord knot

3. DISCUSSION

Antenatal diagnosis of true umbilical cord knot has not been commonly reported. True knots may arise due to fetal movements in utero, long cord, polyhydramnios, mono amniotic twins. Other factors predisposing to true knot are advanced maternal age, multiparity etc. True knots are known to occur at any gestational age , but more commonly during early pregnancy when more intra uterine space is available. During scanning, the whole length of cord is not routinely seen; moreover during third trimester, parts of the cord may be obscured or concealed by the fetus, which often results into missing out on diagnosis of cord knot. Hence

ultrasonography for diagnosis of true knot can be misleading [8].

Nevertheless, there have been evidence of ultrasonographic demonstration of cloverleaf pattern on gray scale images, prenatally for detection of true umbilical cord knot [9]. In this case, ultrasound was done at 34.2 weeks but the diagnosis was missed. It has been reported that when the knot tightens, the umbilical cord vessels get compressed leading to a 4-fold increase in fetal loss. However, a number of authors have concluded that ultrasound prenatal diagnosis, especially during third trimester is important as it facilitates in checking fetal well being during pregnancy and in labour [10-15].

4. CONCLUSION

There is no reliable method to diagnose true knot despite modern USG and Color doppler scans, and hence daily fetal monitoring, routine USG scans with Doppler and weekly NST monitoring is of utmost importance and should be done in all ANC patients. Moreover continuous cardiocotogram should be monitored for all laboring patients as descent of fetal head may also lead to tightening of knot resulting into constriction of vasculature and adverse fetal outcome.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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