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Case Report

Rare cause of stillbirth: a true knot and loop of cord: case report

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ABSTRACT

True knot is an extremely rare condition of the umbilical cord. It affects around 0.3-1.3% of all the pregnancies. It can be loose without obstructing the blood flow to the foetus or can be tight enough to exsanguinate the foetus by compromising the blood flow towards the foetus. A 26 years old, gravida 2, para 1, live 1, with previous 1 caesarean section with hypothyroidism came at 40 weeks POG in labour. No complaints. Antenatal history was uneventful. On examination, patient was stable. Patient was explained risk and demits of TOLAC verses ERCD and opted for TOLAC. Delivered a limp baby. There was presence of one tight loop of cord around neck and one tight true knot over the umbilical cord leading to stillbirth. The umbilical cord is the only blood supply to the foetus during the antepartum and intrapartum period. If the true knot is loose, it will not lead to foetal compromise since foetal circulation is maintained. However, at the time of fetal descent through the birth canal, the knot could be tightened. The tightening knot can occlude fetal circulation resulting in an intrauterine demise. The process of delivery should be very careful and if any fetal distress or non-reactive CTG is present, then an emergency caesarean section must be done. Routine continuous cardiotocography can be the best modality to pick distress at the earliest and to achieve a good outcome of the neonate. A good ultrasonologist can detect nuchal cord and true knot during the antenatal scan.

Keywords: True knot, Nuchal cord, Stillbirth

INTRODUCTION

True knot is an extremely rare condition of the umbilical cord. It affects around 0.3-1.3% of all the pregnancies.¹ It is defined as an actual knot over a segment of the umbilical cord, formed from slippage of foetus through the loop of cord.² It can be loose without obstructing the blood flow to the foetus or can be tight enough to exsanguinate the foetus by compromising the blood flow towards the foetus.² A four-fold increase in the risk of fetal loss has been attributed to true knot.² High risk factors for true knot cord: advanced maternal age, multiparty, polyhydramnios, long umbilical cord, diabetes mellitus, monoamniotic twins.³⁻⁵

True knot can be diagnosed antenatally, though rare or can be an incidental findings found during delivery. In the majority of cases, true knots doesn't have a clinical significance, however, it can also lead to intra uterine fetal

demise or stillbirths. A nuchal cord is defined as more than 360 degree wrapping of the umbilical cord around the neck of the foetus. Its incidence is 10-29% and increases with advancing gestation.⁵ Most obstetricians are often concerned and perplexed about the exact time of formation of true knot of the umbilical cord. In general, the belief is that true knot of the cord is formed between 9 and 12 weeks of gestation.²

We presented a rare case of true knot along with one nuchal cord leading to an early neonatal death.

CASE REPORT

A 26 years old, booked at 18 weeks, gravida 2, para 1, live 1, with one previous caesarean section with hypothyroidism came to the emergency at 40 weeks period of gestation in labour. There was no complaints of

decrease fetal movements, bleeding or leaking per vaginum. Antenatal history was uneventful. On examination, patient was stable with fundal height corresponding to the period of gestation, cephalic presentation, average liquor and no scar tenderness. Fetal heart rate was regular.

On vaginal examination, Bishop score was 3, with adequate pelvis. Patient opted for TOLAC after being explained the risks and benefits of TOLAC (trial of labour after caesarean section) versus ERCDC (elective repeat caesarean delivery). Her NST at admission was reactive with no decelerations. Her labour progressed and she was put on continuous CTG monitoring in view of previous history of caesarean section. The total duration of active labour was 3 hours 20 minutes and of 2nd stage of labour was 20 minutes. Patient delivered a baby girl, who was limp, with a baby weight of 3780 gram. There was presence of one tight loop of cord around neck and one tight true knot over the umbilical cord. The baby was immediately handed to the paediatrician but despite resuscitation, the baby couldn't survive and declared as early neonatal death. Apgar score was 1 at 1 min and 0 at 5 min.



Figure 1: Complete placenta along with umbilical cord and true knot.



Figure 2: Close up of true knot.

DISCUSSION

The umbilical cord is the only blood supply to the foetus during the antepartum and intra-partum period. Any abnormalities of the umbilical cord can have deleterious effects on the foetus.

A true knot arises due to slippage of foetus through the loop of cord while moving in the amniotic fluid. It is more likely to occur during early gestation due to more amniotic fluid and greater fetal movements during that gestation. True knot can have a 4-fold increase in the incidence of fetal loss.²

If the GA is near term, a trial of labour can be attempted, since the majority of knots seem to be protected against occlusion by the greater thickness of Wharton's jelly and the large cord radius at this GA. If loose, a true knot will not lead to foetal compromise since foetal circulation is maintained.^{2,13,14} However, at the time of fetal descent through the birth canal, the knot could be tightened. The tightening knot can occlude fetal circulation resulting in an intrauterine demise. Therefore, the Wharton's jelly surrounding the fetal vessels has the potential of withstanding significant torsional and compressional forces. Occasionally, adequate Wharton's jelly may not develop in all segments of the cord. When this occurs, the fetal vessels are no longer protected from torsional forces and they are prone to occlusion if twisted sufficiently leading to fetal demise in utero.^{2,13}

It can also lead to increased risk of NICU stay, premature births, small for gestational age babies, intra uterine fetal demise and a low Apgar score at delivery [6]. It can also lead to increased rate of caesarean deliveries.² A true knot at delivery is a rare finding, benign and not a cause of concern.⁷ In a study done by Raisanen et al it showed that a true umbilical cord knot can lead to increased incidence of SGA, Premature births and fetal demise.⁶ The process of delivery should be very careful and if any fetal distress or non-reactive CTG is present, then an emergency caesarean section must be done.⁸

A tight nuchal cord has an incidence of 6% at 20 weeks of gestation and increases upto 29% at 42 weeks of gestation.⁹ A tight cord around neck can lead to cardio-respiratory symptoms, neurological symptoms which are unique and are known under tCAN syndrome.⁸ It can also lead to long term neurological defect in the newborn. Nuchal cord can cause cord compression, causing obstruction of blood flow in the umbilical vein leading to hypovolemia, hypotension and fetal hypoxia.⁶ Nuchal cord can be loose or tight, single or multiple. In our case, it was single and tight.

Single nuchal cord and true knot in the umbilical cord are often incidental findings found at the time of delivery in a case of non-hypoxic newborn born without any distress.¹⁰ True knots are incidental findings during the time of delivery as their detection rate prenatally is only 12%, that

too, when the targeted scan is done for the cord.¹¹ They mostly remain undetected during the antenatal period. If any pathology is suspected during any scan, it can be confirmed with the help of complementary diagnostic modality like a 2D or a 3D HD Flow, as stated by Guzikowski in his study.¹² In this patient, the presence of true knot along with nuchal cord probably lead to acute distress in second stage of labour during rapid fetal descent leading to low Apgar score and early neonatal death.

Therefore, a more vigilant monitoring with a cardiotocograph should be done and an urgent delivery should be carried out in the presence of an abnormal fetal heart rate preferably caesarean delivery.

CONCLUSION

A true knot along with a tight nuchal cord may be associated with an increased risk of adverse perinatal outcome as compared to any of the abnormality alone. Routine continuous cardiotocography can be the best modality to pick distress at the earliest and to achieve a good outcome of the neonate.

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