

JUST MISS – DUE TO ABNORMALITIES OF THE STRING OF LIFE (UMBILICAL CORD) AND TREE OF LIFE (PLACENTA)

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Abstract

The fetus's lifeline is the umbilical cord can have abnormalities in its length, coil, contents knots, and attachments to endanger the life of the fetus. So also is the placenta – the tree of life. An essential component throughout pregnancy is a healthy umbilical cord. However, occasionally, certain anomalies like an abnormally lengthy umbilical chord may cause it to become compromised. They may have serious repercussions even if they typically result in a healthy baby. Four percent of pregnancies have excessively lengthy umbilical cords, which increase the chance of nuchal presentation and endanger the foetus. We report a case of a primi at 37 weeks of gestation in labour Emergency LSCS was done because USG confirmed the presence of an umbilical cord beneath the presenting part. It was a Just miss from a catastrophe due to multiple abnormalities like an excessively long Umbilical cord, cord presentation increased umbilical coil index, Battle door placenta, and velamentous vessel. An in-depth evaluation of the placenta and umbilical chord during the growth scan would help us to plan elective LSCS keeping in mind the adverse perinatal outcome because of these abnormalities of the placenta and umbilical cord.

Keywords: Excessively Long Umbilical Cord, Velamentous Vessel, Umbilical Coil, Battle Door Placenta Cord Presentation.

INTRODUCTION

The placenta and foetus are connected vitally by the umbilical cord (UC). The placenta supplies essential nutrients for the growth of the foetus. One The embryologic phase between Weeks 5 and 7 of gestation is when the UC starts to mature. The umbilical vessels are comprised of one vein carrying oxygenated blood and two arteries carrying deoxygenated blood.

Two Excessively long umbilical cords (ELUCs) put patients at risk for stasis, which can lead to thrombosis. Elongated UCs can also alter heart dynamics and raise peripheral vascular resistance.³The morbidity and mortality of the foetus can be elevated by UC anomalies such as stricture, short or long cords, hyper- or hypo-coiling, and single umbilical arteries.⁴ The chord must be longer than 100 cm in order to be deemed unusually long. Additionally, it increases the risk of cord entanglement in 4% of placentae.⁵

As a result, babies with excessive long umbilical cord (ELUC) frequently experience hypoxia to varying degrees during pregnancy, which can result in intrauterine growth or even death.⁴ In fact, even the delivery of these newborns is a risky procedure; if the fetus experiences significant hypoxia and deadly distress, a routine delivery may turn into an urgent, high-risk cesarean operation.

Case Report

26 years old PrimiAdmitted with labour pain at 37 weeks POG. Latest USG (35 weeks POG) → Single IU gestation n corresponding to 35 weeks, Fundal placenta; Liquor adequate EF wt 2560 ± 256 gms.

O/E – Moderate contractions 45” / 5 minutes

Head engaged

FH was 80 to 90/mt

PV – Cervix was 50% effaced

Soft, 4cm dilated

Vertex at 0 station

Tense bag of membranes(Could feel the cord through the membranes beneath the presenting part)

Management

- Emergency USG in LR
- Cord presentation confirmed
- Counselling about the perils of spontaneous rupture of membranes and cord prolapse
- Taken for Emergency LSCS (Shifted to OT in steep head-down position)

I O Findings

Baby – Single term, alive, girl 2.6 kg; cried at birth

Umbilical cord – excessively long cord (129 cm),

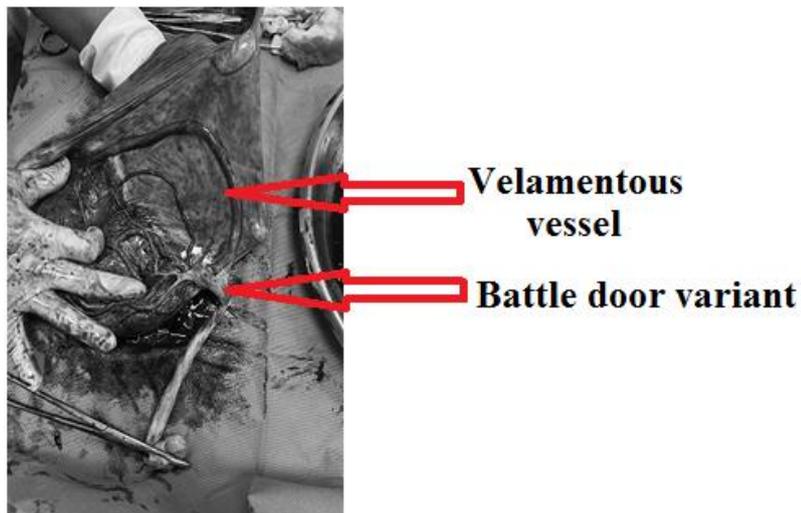
No cords. The cord was hypercoiled. There were 55 coils. The umbilical coil index was 0.426

The loop of cord was beneath the presenting part

Placenta – 300 gms, battle door variant

Major vessel was running across the membrane (Velamentous Vessel)





Velamentous Vessel / Furcate

Velamentous blood vessels insert into the placental disc without protective Wharton's jelly covering. If it bifurcates before inserting, its furcate (Variant of velamentous). Incidence is 0.1%. When the vessels run in the membrane below the presenting fetal part, it can rupture spontaneously or due to ARM (Benkiser Syndrome), Causing fetal exsanguinations. 33% - 100% mortality if not diagnosed and taken up for LSCS. At times it can be just compressed leading to fetal hypoxia. Diagnosis through USG - Early enough – to prevent adverse events and Late enough – to avoid prematurity

Battle door Placenta (marginal)

BATTLEDORE INSERTION



Insertion of UC at/near placenta margin. Incidence is 7 – 9 % in singleton and 24 – 33 % in twins

Possible complications are preterm labour, fetal distress and intra uterine growth retardation. There is a chance for cord compression while planning vaginal delivery when there is low placental implantation.

Umbilical Coil Index

Normal Umbilical coil index is 1 coil / 5cm (0.17/cm) when it is > 90th centile (> 0.30) (> 1 coil/5cm) it is hypercoiling. Incidence of hypercoiled cord is 6 to 21%. It is associated with PIH in mothers and does have adverse perinatal outcomes like meconium-stained liquor, Fetal growth retardation, Foetal distress, prematurity, low score on Apgar, Low ponderal index & increased perinatal mortality.

DISCUSSION

In an embryo, the umbilical cord is in charge of both feeding and eliminating fetal waste. Therefore, a full-term, uneventful pregnancy that ends in the birth of a healthy baby depends on the shape and function of the umbilical cord. The placental chord or umbilical cord is typically between 50 and 60 centimeters long, with two arteries and a vein.⁴ Cords that are unusually long or short, respectively, are measured at more than 100 centimeters and less than 30 centimeters.⁵ Umbilical abnormalities typically result in several issues for the mother and the developing foetus.

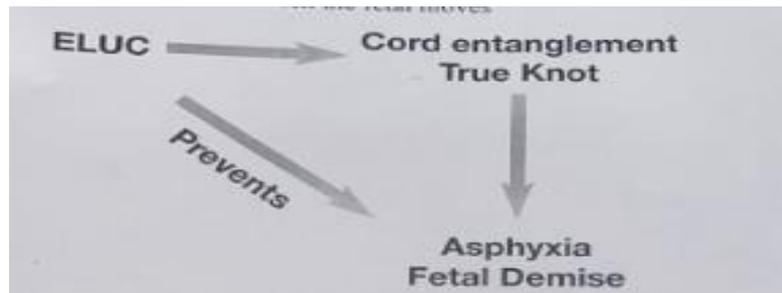
The length of the cable varied from 24 to 124 cm in a study conducted by NU Balkawade et al³. The chord length averaged 63.86 cm±15.69. The group with cord lengths between 51 and 60 cm had the highest number of cases. Factors correlating with Excessive Long UC (ELUC) (≥ 100 cm) (Incidence 4% majd Hanna et al)⁶ are maternal height, Pre pregnancy wt, Pregnancy wt gain, ↑ parity, Familial, Male fetus¹², Chronic diseases – Dm/HT and Different protein expression pattern of genes involved in cell proliferation.

ELUC and the possible adverse events (Hanna et al)⁶ are cord entanglement (6% at 20 weeks. 29% at 42 weeks), nuchal cord → 24 to 28% (Single) 0.5 to 3.3% (Multiple) (It takes three or more loops to produce unfavourable results), cord knots, cord prolapse, cord compression (Clinical signs → hiccups, hyperactivity), thrombosis (Stasis is a risk factor for Virchow's Triad that is predisposed by ELUC), impact peripheral vascular resistance and heart dynamics, low perfusion → IUGR preeclampsia (VEGF and m RNA expression) and abnormal behavior control and hyperactive behavior (Na eye).

Controversial studies about ELUC and Poor perinatal outcome are Itakura et al ⁸ – 160 cm cord 8 times around neck with IUGR Fetal distress, Habek et al ⁹ – 190 cm cord 6 times around neck with no complications, Hanna et al ⁶ – 150 cm 2 times cord around neck had true knot with no complications and ELUCs reduce the likelihood that knots will tighten when the foetus moves, according to a study by Suzuki et al. 10 on 32,315 women.

ELUC abnormalities accounted for 2.5% to 30% of still birth ¹¹ after 32 weeks

So whether ELUC causes cord entanglement and true knot leading to asphyxia / fetal demise or prevents such complications remains a topic of debate till date.



Cord prolapse is the most dangerous complications of long umbilical cord, and it can result in stillbirth. The risk of cord entanglements, emergency births, fatal placental vasculopathy, intrauterine foetal death, and neurological abnormalities is increased in cases of long cords¹¹.

Less frequently occurring anomalies include real and false cord knots, cord cysts, and a single-artery cord. Among these anomalies, a cord with true knots is extremely uncommon, with a 0.3%–2% chance of occurring. This happens when the fetus passes through an umbilical cord loop after flipping inside the amniotic sac. In light of this, there is very little chance that the birth cord will create two real knots.^{9,10}

A 2018 study looked into the frequency of problems in 340 pregnancies involving a tangled umbilical cord. These cases were found to have a 13.5% prevalence of needing to be admitted to the intensive care unit (NICU) for newborns, a 0.9% fatality rate, an 8.6% rate of premature births under 37 weeks, a 6.5% rate of low birth weights (BW) under 2,500 g, a 12.1% rate of small for gestational age (SGA) under 90%, a 9.4% rate of minute 1 Apgar scores <7, and a 5.3% rate of minute 5 Apgar scores <7.8. These true knots may not show any signs before problems arise and just slightly reduce fetal movements in utero around week 37 throughout pregnancy.¹²

Recommendation

In this era of imaging technology 3D / 4D USG + Colour Doppler can be best for detailed assessment of foeto maternal unit. We should go for the detailed assessment of the placenta and umbilical cord. This assessment should be in par with fetal assessment. If placental and Umbilical cord anomalies are diagnosed well in advance then delivery can be well orchestrated if not then the fetus will be in jeopardy.

Conflict of Interest- None declared

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Conflicts of interest: There are no conflicts of interest.

Ethical statement:

Institutional ethical committee accepted and approved this study. Ethical approval for the study was given by the Vinayaka Mission's Kirupananda Variyar Medical College and Hospital, Salem, Institutional Ethical Committee vide Reference number: VMKVMC& H/ IEC/22/110 Dated: 24.09.2022. Written consent was obtained from study participants prior to the study. The confidentiality of the study participants was maintained. Informed written consent was obtained from the study participants.

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Authors' contributions:

Dr Divya. M- conceptualization, data curation, investigation; **Dr B. Jeyamani** writing—original draft, writing—review and editing. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. All authors have read and agreed to the published version of the manuscript.

Data Availability:

All datasets generated or analysed during this study are included in the manuscript.

Informed Consent:

Written informed consent was obtained from the participants before enrolling in the study

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