True knot of the umbilical cord is reported to occur in about 1.1%-1.27% of pregnancies. Surprisingly, although the prevalence mentioned above seems to be very high,\(^{(1-5)}\) it is a very rare condition (less than 1%) in our institute, which has a university hospital setting. Furthermore, after searching the English literature on pubmed, to our knowledge the umbilical cord true knot has never been reported from Thailand. The antenatal diagnosis of this situation is also difficult, even with ultrasound. Once the diagnosis has been made in a viable fetus, cesarean section may be the appropriate choice to reduce perinatal morbidity and mortality, since antepartum fetal death among these fetuses was at a higher rate than that in a control group.\(^{(2,3,5)}\) Moreover, fetal distress and fetal acidosis are also more common.\(^{(2,6)}\) On the other hand, some authors found comparable outcomes between groups.\(^{(3)}\) Therefore, the most appropriate approach to umbilical true knots still remains controversial. This case report probably gives some insights concerning the management.

**Case report**

**TRUE KNOT OF THE UMBILICAL CORD IN A NEAR TERM PREGNANCY UNDERGOING SPONTANEOUS VAGINAL DELIVERY**

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**Abstract** A near term pregnant (36+4 weeks of gestation) woman presented with premature rupture of the membranes (PROM). Misoprostol was then given for induction of labor. The course of labor and fetal heart rate were normal. Spontaneous vaginal delivery was achieved. At delivery, two loops of nuchal cord with true knot of the umbilical cord were noted. The male infant was born with birth weight of 2730 gm ad Apgar scores of 8 and 10 at 1 and 5 minutes, respectively. The case presented here suggests that true knot of the umbilical cord is not always contraindication for vaginal delivery. As long as fetal surveillance shows reassuring, cesarean section may be unnecessary. *Chiang Mai Medical Journal 2008;47(1): 33-37.*

**Keywords:** true knot, umbilical cord, premature rupture of the membranes, nuchal cord, Apgar scores
Case report

A 28 year–old pregnant woman, G3 P0020, had had two previous induced abortions. The first was in the first trimester by suction curettage 10 years ago, and the second by misoprostol use 8 years ago, both without any complication. She presented at 36+4 weeks of gestation with PROM (premature rupture of the membranes) 1 hour before admission. Cervical examination showed gross leakage of clear amniotic fluid per os, with 1 cm of dilatation and minimal cervical effacement. On abdominal examination, her fundal height was 34 cm above the pubic symphysis, and the fetal back was on the right side with head engagement.

Single dose misoprostol at 100 mcg orally was then prescribed for labor induction. On admission, the fetal heart rate baseline was stable at between 120-140 bpm with occasional accelerations, and no deceleration detected during labor. The progression of labor was uneventful. Spontaneous vaginal delivery occurred within 4 hours after admission. At delivery, one loop of the nuchal cord and another of a true knot of the umbilical cord were detected, as shown in Figure 1 and 2, respectively.

The male infant was born with a birthweight of 2,730 gm and Apgar scores of 8 and 10 at 1 and 5 minutes, respectively. No gross anomaly was seen. The placental weighed 500 gm and the length of the umbilical cord was 100 cm.

Discussion

Although previous reports showed that the occurrence of a true knot may be in as many as 1.2% of pregnancies, with a higher prevalence in term pregnancy, we have found it surprisingly rare from our extensive experience of deliveries at Maharaj Nakorn Chiang Mai Hospital. Moreover, we found no reports in PubMed of umbilical cord true knots from Thailand. Therefore, the true incidence may be varied among different populations. The risk factors concerning the true knot of umbilical cords include hydramnios, previous genetic

Figure 1. Nuchal cord and true not.
amniocentesis, gestational diabetes, male fetus, multiparity, advanced maternal age, obesity and prolonged gravidity.\(^3\)\(^{-5}\) There was no obvious risk factor noted in the case presented here. Theoretically, a long umbilical cord of 100 cm, as in this case, may be associated with the true knot. Furthermore, very active fetal movement may also predispose to the occurrence of a true knot, like, the nuchal cord observed in the case presented here.

Currently, antenatal diagnosis of true knots with ultrasound is made more than in the past. Together with the fact that this condition is associated with higher perinatal morbidity and mortality rates, and several authors have strongly recommended cesarean section when
the prenatal diagnosis of true knots is made. However, the case presented here suggested that normal delivery with a successful outcome and no complication is possible.

Theoretically, fetal well-being depends on the tightness of the knot. If the knot is loose, the umbilical circulation is unlikely to be obstructed and fetal distress will not occur. On the contrary, tightness with obstruction will affect the circulation with subsequent fetal distress or fetal death. Based on this fact, assessment of umbilical circulatory obstruction should be the first approach rather than universal cesarean section, as suggested by some authors. If intrapartum fetal monitoring demonstrates no variable deceleration, indicating cord obstruction, cesarean section is probably not necessary, but close monitoring throughout the labor course is still mandatory.

The case presented here suggests that when the true knot is diagnosed, intensive fetal surveillance is strongly recommend and cesarean section may be avoided, especially in cases with no other indications.

The loose true knot did not affect vascular perfusion, so fetal distress, meconium stained amniotic fluid, or still birth were not consequences. This case report is an example supporting the studies which found that vaginal delivery with fetal monitoring can be done safely in some cases.(3,7)

If this process was to occur for a long duration before delivery, it might lead to still birth of the fetus, because no additional method of fetal monitoring would be done in a low-risk pregnancy, and a tight knot after fetal movement would disrupt vascular perfusion.

However, prenatal diagnosis of the true knot is quite difficult, even through ultrasound. To diagnose the true knot, we must speculate the entire length of the umbilical cord. This is time consuming, as each ultrasound and normal scan does not guarantee findings for the whole duration of the pregnancy. Therefore, a screening may be considered only in high risk cases, but the appropriate time and interval of screening are still doubtful.

In conclusion, although true knot of the umbilical cord presents a high risk situation to the fetus, possibly leading to fetal distress and intrauterine fetal death, vaginal delivery can possibly be performed safely, as in this case.

References
สายสะดือผูกเป็นปม : รายงานการเกิดคลอดที่เกิดเองทางช่องคลอดอย่างปลอดภัย

สาภิพ ฟงชม, ท.บ.
ภาควิชาสูติศาสตร์และวิทยาศาสตร์ทรวงอก, คณะแพทยศาสตร์, มหาวิทยาลัยเชียงใหม่

บทคัดย่อ รายงานสถิติการเกิดครรภ์อายุครรภ์ 36+4 สัปดาห์ มีภาวะน้ำเดินก่อนการเจ็บครรภ์ทำให้เกิดเกิดคลอดโดยสะดวกทางช่องคลอด การดำเนินการคลอดและอัตราการเต้นของทารกในการคลอดเป็นไปอย่างปกติ ได้ทำการคลอดปกติ ขณะทารกคลอดพบมีสายสะดือพันคอ 2 รอบและมีสายสะดือผูกเป็นปม คลอดก่อนกำหนด ออกนมปากทารก 2,730 กรัม คะแนนแอพการ์ที่ 1 และ 5 นาทีหลังคลอด = 8 และ 10 ตามลำดับแสดงให้เห็นว่าแม้จะมีสายสะดือผูกเป็นปมเกิดมรณะการเจ็บครรภ์ทางช่องคลอดโดยยังปลอดภัย โดยไม่ต้องทำการผ่าตัดคลอดเสมอไป เชิงในแนวEARA 2550;47(1):33-37.

คำสำคัญ: สายสะดือผูกเป็นปม ภาวะน้ำเดินก่อนการเจ็บครรภ์ เร่งคลอด คะแนนแอพการ์