

# Sonographic detection of umbilical cord presentation before induction of labor or labor admission: Presentation of 4 cases

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### ABSTRACT

Umbilical cord prolapse is a serious obstetric emergency that endangers the life of the baby. Perinatal mortality is as high as 44% when it occurs outside a well-equipped hospital. Women with malpresentations and positions, multifetal pregnancies, and polyhydramnios are at risk of developing this complication. Detection of cord presentation by transvaginal sonography before induction of labor, or at the time of labor admission, can prevent this potentially fatal obstetric emergency. We present successfully managed four cases of cord presentation at our institution.

**Key words:** Cord presentation; cord prolapse; induction of labour; trans- vaginal sonography.

### Introduction

The prolapse of the umbilical cord complicates 1 in 600-1000 pregnancies, and the perinatal mortality rate was estimated at 6.8%.<sup>[1,2]</sup> Perinatal outcome mainly depends on gestational age and the place where cord prolapse occurred. When the prolapse occurs outside the hospital, mortality rates as high as 44% have been reported, compared to 3% when this occurs inside a well-equipped hospital.<sup>[3]</sup> Even though risk factors like polyhydramnios, malpresentations, multifetal pregnancies, and preterm labor predispose to cord presentation and prolapse, this problem can also occur even with vertex presentation at term. The suspicion for cord presentation, cord prolapse or cord around the neck usually arises when variable decelerations observed during labor with active uterine contractions.<sup>[4]</sup> The compression of the umbilical cord (UC) can lead to either profound or total acute asphyxia or sub-acute hypoxia with different neonatal outcomes. It may result in fetal death, neonatal

encephalopathy, or long-term sequelae like cerebral palsy in both preterm and term infants.<sup>[5]</sup> Cord presentation in forewater can be detected by transvaginal sonography before induction of labor, or on labor admission. Cord prolapse, a potentially fatal obstetric emergency can be averted by doing elective cesarean section. We present successfully managed four cases of cord presentation at our institution.

### Case Report

Between 2018 October and September 2019, 376 deliveries occurred at our hospital. All women underwent forewater scanning as a part of a different study, either before induction of labor, or when the women presented with labor pains

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at term. Four cases of cord presentation were detected accidentally during that study. Findings of three cases are shown in Video 1.

Case 1 was primy gravida at 37 weeks gestation, Case 2 was G3, P2, L2 at 39 weeks + 3 days gestation, Case 3 was G3, P2, L2 at 40 weeks + 5 days gestation, and Case 4 was G5, P4, L3, D1, at 39 weeks gestation. All the women had vertex presentation, and none of them had any other risk factors. Routine antenatal investigations for all women were done, and the results were well within normal limits.

### Management

For Cases 1 and 2, we did elective cesarean sections as a preventive measure to prevent cord prolapse.

### Case 3

G3, P2, L2 woman at 40 weeks + 5 days gestation presented with labor pains. Per abdomen, it was a cephalic presentation, at 2/5 descent. FHR was good with normal rate and rhythm. P/V, Cervix 30% effaced, soft, 3-4 cm dilated, Vertex at -2 station. On forewater scanning by transvaginal sonography, umbilical cord presentation was detected [Figure 1 and Video 1]. The woman was on the delivery table, and we were getting ready for the cesarean section. The anesthetist was out of the station, and he needed some time to reach the hospital. Meanwhile, the membrane ruptured spontaneously and the cord prolapse occurred. The liquor was Grade 1 meconium stained, and the uterus was acting. The fetal heart tracing showed variable decelerations [Figure 2]. The woman was kept in the left lateral position, and the foot end was elevated to a steep head low position [Figure 2]. Full hand was inserted into the vagina, and the head was dislodged from the pelvis and pushed towards the chest to relieve cord compression.

Low dose isoxsuprine hydrochloride rapid infusion tocolysis was given to resuscitate the fetus and buy some time for cesarean section.<sup>[6]</sup> For this, 10 milligrams of isoxsuprine hydrochloride in 500 ml of dextrose saline (DNS/NS/RL) was run at the rate of 180-200 drops/min. Cardiotocography (CTG) was recorded throughout

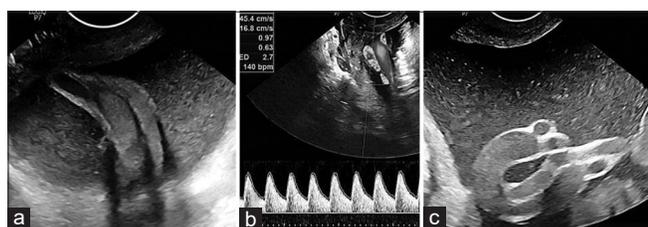


Figure 1: (Original) a and c. Cord presentation detected by forewater transvaginal sonography in Cases 1 and 3. b. Blood flow confirmed by color Doppler

the procedure and the FHR was monitored [Figure 2]. There was a significant reduction in uterine activity, and the variable decelerations were replaced by normal rate and rhythm within 14 min. We ran three bottles of low dose isoxsuprine hydrochloride infusion (<https://youtu.be/1vug4rtD14s>). When the anesthetist reached, we shifted the woman in lying down position to the operation room.

We draped the surgical site and put towels before anesthesia. We replaced low dose isoxsuprine infusion with rapid ring lactate infusion. We made the woman sit, and the spinal anesthesia was given quickly. The abdomen was opened, and the baby was taken out by lower (uterine) segment cesarean section (LSCS). Female baby, and the Apgar score at 1 minute was 9/10, and the birth weight was 3.2 kg. The blood loss during the surgery was well within normal limits and there was no atonic postpartum hemorrhage (PPH). The duration between diagnosis of cord prolapse to delivery of the baby in this case was 1 h and 30 min.

### Case 4

G5, P4, L2, D1 woman at 39 weeks gestation, cord presentation was detected while undergoing forewater scanning before induction of labor. In this case, as she was multigravida with average estimated fetal weight, we attempted vaginal delivery with double settings. On P/V examination, the cervix was 20-30% effaced, intermediate soft, mid-position, admitting one finger, and the vertex was at -2 station. Under strict aseptic precautions, we inserted 22F Foleys catheter through the cervix and the bulb was filled with 70 ml of distilled water. After 4 h and 30 min, the bulb was expelled spontaneously. The uterus was mildly acting, and the membrane was intact. As the loop of the cord was detected in the bag of forewater on ultrasonography, we decided for cesarean section. We shifted the woman to the operation room and we were getting ready for LSCS. The membrane ruptured spontaneously and the umbilical cord prolapsed out of vagina. Immediate LSCS was done under general anesthesia. It was a male baby with Apgar score of 9/10 at 1 minute and birth weight was 3.2 kg. The postoperative period was uneventful.

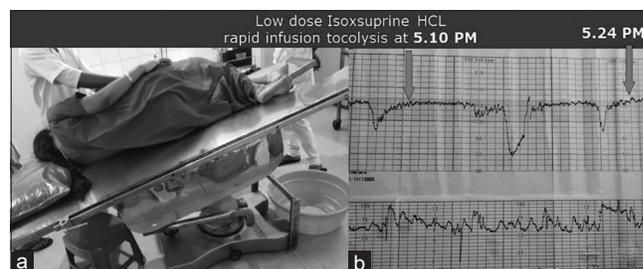


Figure 2: (Original) a. Woman in left lateral position with steep head low position. b. Variable decelerations were replaced by normal rhythm and variability within 14 min

## Discussion

Umbilical cord prolapse is a serious complication that can occur during labor, which can endanger the life of the baby. Cord compression can result in instant fetal death, ischemic hypoxic encephalopathy, neonatal convulsions, and long-term sequelae like cerebral palsy.<sup>[5]</sup> The mechanism of fetal compromise, a near-total or total acute asphyxia, which occurs when the umbilical cord gets compressed between the fetal head and bony pelvis.<sup>[7]</sup> This results in failure of the normal autoregulatory mechanisms of the brain, resulting in hypotension and severe bradycardia. This leads to diminished cerebral perfusion and cell death of the brainstem.<sup>[5]</sup> All these catastrophic events can be prevented if cord presentation can be detected before induction of labor or in early labor before membrane ruptures. The ultrasound diagnosis of funic presentation has been reported by several authors, who all recommended elective cesarean section.<sup>[8-10]</sup> In selected multiparous women, with a small or average baby with a cephalic presentation, a successful vaginal delivery can be accomplished in a double setup, under close fetal heart monitoring. But, this is a highly risky exercise in this litigation era.

In our case series, in Cases 1 and 2, we did elective cesarean section to prevent cord prolapse and its consequences. In Case 3, membrane ruptured spontaneously and cord prolapse occurred while we were getting ready for cesarean section. By using low dose isoxsuprine hydrochloride rapid infusion tocolysis, we could significantly reduce the uterine activity, resuscitate the fetus in utero, and could buy time for the anesthetist to reach.<sup>[6]</sup> Despite cord prolapse-delivery interval was 1 h and 30 min, the Apgar score of the baby at 1 minute was 9/10.

In Case 4, as she was multigravida with average baby and with vertex presentation, we tried for normal vaginal delivery. We used 22F Foleys catheter to prime the cervix. We inflated the bulb with 70 ml of distilled water to prevent cord prolapse in the early stages of labor. As mentioned earlier, the membrane ruptured spontaneously and the cord prolapse occurred while the woman was on the operation table. We did cesarean section and saved the baby.

In our four cases of cord presentation, two cases promptly had cord prolapse after membrane rupture. This shows cesarean section is a safe option before the rupture of membranes to avoid an obstetric emergency.

## Conclusion

Transvaginal sonography of forewater before induction of labor, or in early labor helps to detect cord presentation. Cord prolapse, a potentially dangerous obstetric emergency can be

avoided by doing elective cesarean section. Low dose isoxsuprine hydrochloride rapid infusion tocolysis is an effective method to reduce uterine activity significantly, resuscitate the fetus, and buy some time for definitive action like cesarean section.

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## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Ethical approval

Written and informed consent was obtained from all women of this case series for publication.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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