



# Primary C-section for a non-reassuring fetal heart rate following a Velamentous cord insertion diagnosis

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## Introduction

- Velamentous cord insertion (VCI) is a type of abnormal placenta cord insertion where a lack of Wharton's jelly surrounding the vessels leaves them exposed and attached to the membranes, rather than into the placenta.<sup>1</sup>
- Exposure of the vessels could result in cord compression, rupture, or reduced blood flow to the fetus.<sup>1,2</sup>
- Common risk factors include, IVF, multiple gestation, nulliparity previous history VCI or marginal cord insertion.<sup>3,4</sup>
- Placenta implantation abnormalities increase perinatal risks.<sup>5</sup>
- VCI is associated with adverse pregnancy outcomes, including but not limited to, increased risks of neonatal and fetal death, preterm labor, abnormal fetal heart rate tracings, emergency C-sections, small for gestational age infants, twin to twin transfusion syndrome, and birth weight discordance in monozygotic twins.<sup>1,2,5</sup>
- This form of placenta cord insertion occurs in less than 1% of singleton pregnancies and could be as as many as 40% of twin pregnancies.<sup>4</sup> Due to rarity of condition, it is commonly overlooked in singleton pregnancies.<sup>7</sup>
- A lot is unknown regarding the development of VCI. However, the mechanism for the development of VCI is thought to be from either the trophoblast or polarity theories.<sup>8</sup>
- VCI correlated with conception with IVF more strongly correlates with the trophoblast theory of the early placenta migrating to a more vascular area, leaving the umbilical cord in its original position, which has now become either a marginal or velamentous insertion.<sup>8</sup>
- The diagnosis of VCI can be made on ultrasound or via gross examination of the placenta post-delivery.<sup>6</sup>

Figure 2: Gross Examination of VCI Placenta



## Case Description

### History:

- 40-year-old, G2P0010, nulliparous African American female presented at 39 weeks and 6 days for induction of labor with oral misoprostol
- Patient had a history significant for infertility, which resulted in the use in-vitro fertilization for conception
- Patient received appropriate prenatal care throughout pregnancy
- Past Medical History: infertility, endometriosis, and genital herpes simplex virus
- Allergies: no known drug allergies
- Past Surgical History: laparoscopy, 2013, for endometriosis, in-vitro fertilization, 2021, for infertility
- Family History: negative history of infection and genetic screening
- Review of systems: unremarkable

### Physical Exam:

- Vital signs:
- Temperature: 37.3 C
  - Maternal Heart Rate: 83 beats per minute
  - Respiration Rate: 20 breaths per minute
  - Blood Pressure: 123/81 mmHg
  - Height: 5'6"
  - Weight: 106kg
  - Sterile Vaginal Exam: closed/50%/-3
  - Fetal Heart Rate: mix of Category 1 and 2
  - Remainder of physical exam: within normal limits

### Diagnostic Testing:

- 19 week 6 day ultrasound revealed a posterior placenta with a three vessel cord with a velamentous insertion. No evidence of placenta previa. Amniotic fluid volume determined to be normal with a maximum ventricle pocket of 4cm
- Ultrasound follow up every 4-6 weeks for fetal growth secondary to velamentous cord insertion was recommended
  - Fetal growth WNL
- Weekly fetal testing starting at 36weeks due to velamentous cord insertion was recommended
  - Non-reactive NST at 37 weeks
- Figure 2 shows final diagnosis of velamentous cord insertion was confirmed via gross examination of the placenta upon delivery

## Patient Management

Decision for C-section based on:

- Non-reassuring category 2 fetal heart rate tracing, with baseline of 150 bpm, minimal to moderate variability, no accelerations, and a prolonged deceleration to 100 bpm for 2 minutes following a contraction
- Unsure if deceleration was due to a cord compression resulting from VCI or another anomaly unaccounted for
- Patient was remote from delivery with a closed cervix, after administration of misoprostol

## Discussion

- Sonographic examination sensitivity for the detection of VCI ranges from 22.2-100%.<sup>6</sup>
- Through the sonographic examination and identification of the placental cord insertion site and use of color Doppler ultrasound techniques, there is an increase in the detection of VCI and other placental cord insertion anomalies.<sup>7</sup>
- See Figure 3 for VCI ultrasound examples
- Better sonographic detection seen with lower maternal BMI, an anterior placenta in singletons, and a posterior placenta in twins.<sup>6</sup>

## Conclusion

- Prenatal detection via ultrasonography of an abnormal placenta cord insertion site can help identify those at risk of obstetrical complications.
- IVF pts should be made aware of potential for VCI.
- Even with regular prenatal care and ultrasound screenings, complications due to VCI can still occur.

## References

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Figure 1: Hospital Course

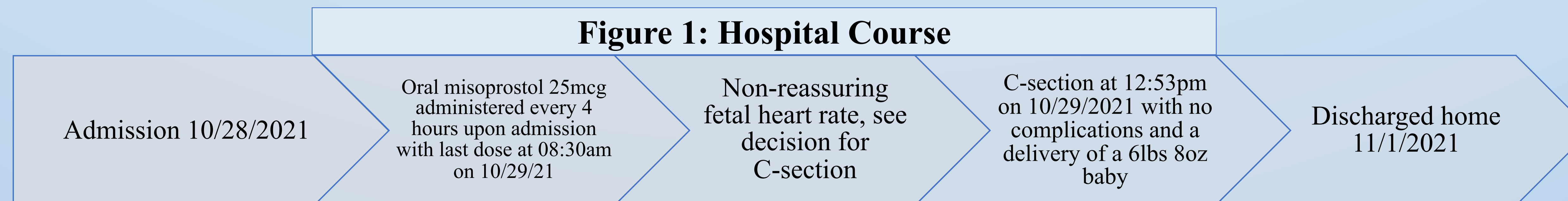
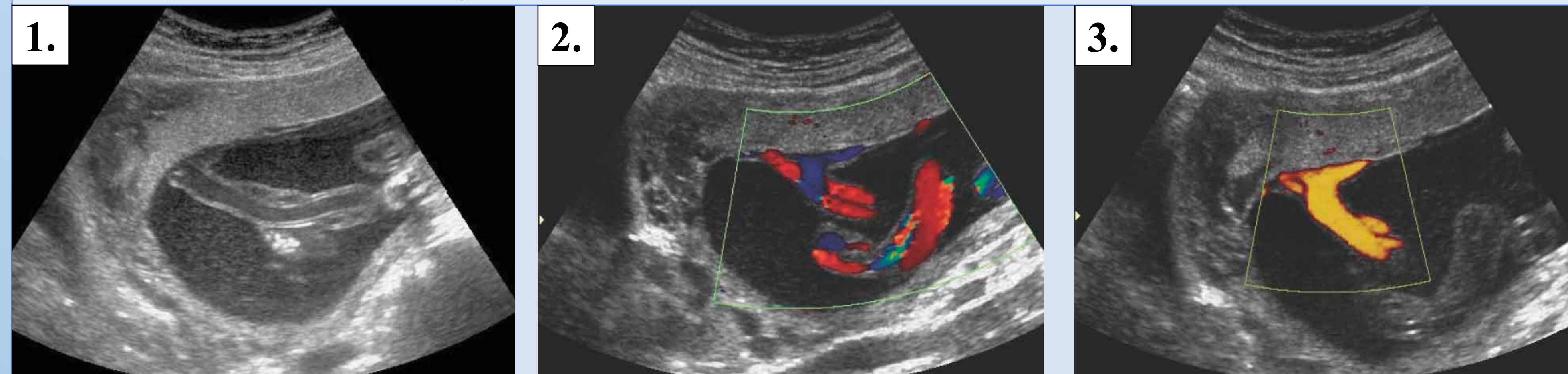


Figure 3: Ultrasound Examination of VCI<sup>7</sup>



1. Gray-scale, 2. Color Doppler and 3. Power Doppler