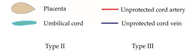
Improving safety in obstetrical ultrasound imaging: A case of Type 3 Vasa Previa diagnosed with color Doppler

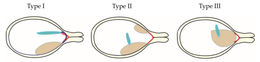
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Introduction

Vasa Previa
- **Life-threatening** obstetrical complication
  - fetus risk > mother's risk
- Vasa Previa: 0.60 per 1000 pregnancies[1]



Types of Vasa Previa[2]
- Type 1: velamentous cord
- Type 2: accessory lobe
- Type 3: no velamentous cord or accessory lobe
- This case: **Type 3 without low lying placenta**





Type 3 Vasa Previa (T3VP)
- Aberrant fetal vessels originating from the placenta, traversing the amniotic membranes near (within 2 cm) the internal cervical os, and returning to the placenta "like a boomerang", despite normal placental cord insertion[3]
- Rare form, **often missed, devastating consequences**
- **Lots of uncertainty** about Type 3 Vasa Previa diagnosis and risk factors (potentially related to advanced maternal age and IVF)

Case Presentation

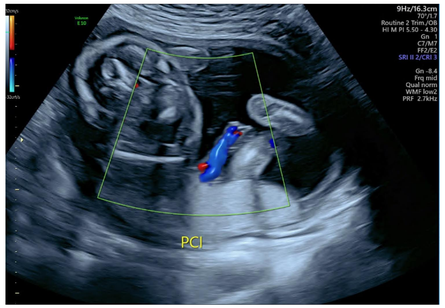
24 yo G2P0010 (dating by 11w5d ultrasound using C-R length)
2nd Trimester
- **20w0d**: Detailed Anatomy ultrasound. **Normal** placenta location and cord insertion site

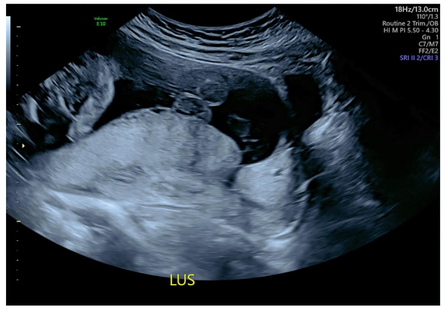
3rd Trimester
- **28w1d**: Growth Scan ultrasound: Incidental finding of **fetal vessels near internal cervical os**
  - Cannot rule-out **velamentous cord insertion** near the internal cervical os. **Plan to repeat sonogram in 1-2 weeks** to reassess
- **30w6d:** Third Trimester ultrasound (lower uterine segment)
  - **Color and Spectral Doppler** showed **fetal HR near cervical os; findings highly suggestive of Type 3 vasa previa** (central cord insertion, no accessory lobes)
  - Counseled on **exsanguination risk**, placed on **pelvic rest**, advised precautions for triage at L&D
  - Plan: **Inpatient at 32w0d**, **C-section at 34–36w** (per **ACOG/SMFM**), **avoid delayed cord clamping**; prepare for possible **neonatal transfusion**

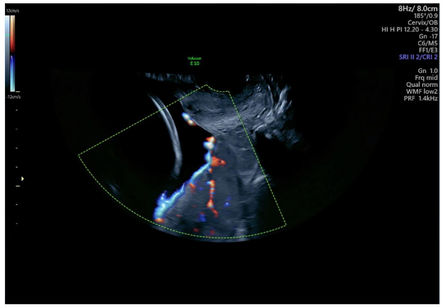
Delivery
- **34w4d:** Primary low transverse **c-section**
- **Posterior-fundal placenta** with **superior cord insertion**; **no accessory lobes**; **aberrant fetal vessels over os**
- Viable 2002 g male infant, APGARs 8/9

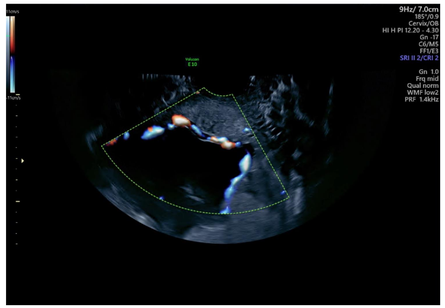
Postpartum
- Uneventful recovery; planned Depo-Provera for contraception

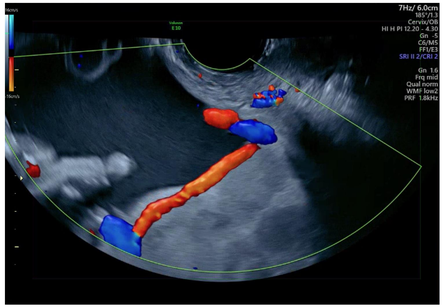
Obstetrical Ultrasound Imaging

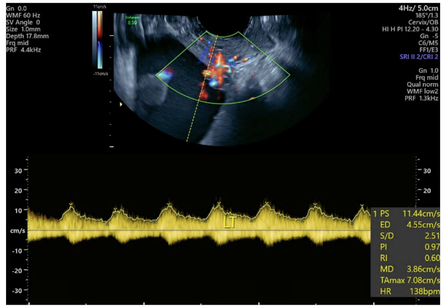












20w0d Anatomy Ultrasound
- Normal transabdominal view
- Normal placenta location and cord insertion site
- No aberrant vasculature or fetal anomalies noted
- Color Doppler showing flow direction of vessels

28w1d Growth Scan
- Abnormal transvaginal view
- Incidental findings of fetal vessels near internal cervical os
- Vascularity visible in lower uterine segment
- Cannot rule out velamentous cord insertion
- Color Doppler showing flow direction of vessels

30w6d Ultrasound
- Abnormal transvaginal view
- Aberrant fetal vessels overlying the internal cervical os
- Spectral Dopplers shows vasculature with a pulse rate of 138 bpm, likely fetal heart rate, as mother's vital signs were stable
- Color Doppler showing flow direction of vessels

References

1. Ruiter L., Kok N., Limpens J., Derks J.B., de Graaf I.M., Mol B., Pajkrt E. Incidence of and risk indicators for vasa praevia: a systematic review. BJOG. 2016;123:1278–1287. doi: 10.1111/1471-0528.13829.
2. Takemoto Y, Matsuzaki S, Matsuzaki S, Kakuda M, Lee M, Hayashida H, Maeda M, Kamiura S. Current Evidence on Vasa Previa without Velamentous Cord Insertion or Placental Morphological Anomalies (Type III Vasa Previa): Systematic Review and Meta-Analysis. Biomedicines. 2023; 11(1):152. https://doi.org/10.3390/biomedicines11010152
3. Shiro M, Kiyose M, Suzuki Y, Sano Y, Ikagawa S, Yoshida S. Type 3 vasa previa with no low-lying placenta, with central umbilical cord insertion at the upper uterine segment, and with aberrant vessels on the broad membrane: A case report. Case Rep Womens Health. 2023 Oct 28;40:e00558. doi: 10.1016/j.crwh.2023.e00558. PMID: 37946796; PMCID: PMC10630110.
4. AIUM Practice Parameter for the Performance of Detailed Second- and Third-Trimester Diagnostic Obstetric Ultrasound Examinations. Journal of Ultrasound in Medicine. 2019;38(12):3093-3100. doi:https://doi.org/10.1002/jum.15163

Discussion/Relevance

American Institute of Ultrasound In Medicine (AIUM) guidelines
- Standard of care for obstetrical ultrasound in the US

Detailed 2nd/3rd-trimester ultrasound (CPT 76811)
- Performed between 18-22 weeks
- **Not intended to be a routine ultrasound**, but rather indication-driven (**may be individualized** based on physician)
- Includes all **standard fetal ultrasound (CPT 76805)**
  - Location, relationship to internal os, appearance, **cord insertion** (Velamentous cord insertion, **Type 1 Vasa Previa** w/velamentous cord)



- Relevant additional components beyond standard ultrasound
  - **Accessory/succenturiate lobe** w/vascular supply near the internal cervical os (**Type 2 Vasa Previa**)



Table Table. Components of *CPT* Code 76811 (Standard and Detailed Examinations)[4]

Component	Standard	Detailed*
Placenta	Location	Masses70, 71
	Relationship to internal os	Accessory/succenturiate lobe with location of connecting vascular supply to primary placenta and internal cervical os72, 73
	Appearance	
	Placental cord insertion	Implantation site with evaluation for abnormal adherence25

There are no standard protocols to rule out T3VP
- "Color and/or pulsed Doppler ultrasound **may be used as warranted, based on the indication** for and findings identified during the detailed examination"[4]

Conclusion

Rethinking Ultrasound Safety: Big Takeaways

This case highlights an **under-recognized patient safety gap**
- Compromised safety when guidelines do not evolve with **emerging risks** and **changing pregnancy demographics**

Type 3 Vasa Previa is **rare, silent, and can be deadly**
- Normal placental location and cord insertion can be **falsely reassuring**
- Fetal-placental circulation evolves with gestational age, yet assessments are **mostly static**

Current ultrasound protocols are **not enough**
- Standardize **fetal-placental circulation checks**, expanding use of **color Doppler in the lower uterine segment**

Placenta is a **cross-disciplinary organ**
- Placental-related **morbidity affects neonatal and maternal outcomes**

MFM cares for **two patients** – mother and fetus
- The system must reflect that, as a missed diagnosis may result in **preventable fetal death due to exsanguination**