ULTRASOUND APPEARANCES of THE ABNORMAL PLACENTA & UMBILICAL CORD

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AIMS OF THE PRESENTATION

To discuss ultrasound appearances & clinical implications of:

- Placenta previa
- Placenta accreta spectrum (PAS)
- Vasa previa
- Marginal & velamentous cord insertions
- Single umbilical artery
- Placental chorioangioma
- Succenturiate & bilobed placenta
- Cord cysts

THE PLACENTA

- Early detection of placental abnormalities is important to ensure the correct care is provided for the safety of both mother & baby
- It is therefore important to recognise those women who are at high risk of conditions such as placenta accreta in order to ensure a careful evaluation of the placenta is made in these women

PLACENTA PREVIA

- Placenta previa - placenta overlies the cervix
  - occurs in 4-5:1000 pregnancies
- Low lying placenta – leading edge within 2cm of the internal os from 16 weeks (RCOG)
- In both cases RCOG recommends a further scan with TVS at 32 weeks, then repeated at 36 weeks if still low or covering the os
- High association with placenta accreta spectrum with previous uterine surgery e.g. C-section

PLACENTA PREVIA

- Risk factors:
  - Advanced maternal age
  - Multi-parity
  - Previous placenta previa
  - Chronic hypertension
  - Diabetes
  - Smoking in pregnancy
  - IVF pregnancies

PLACENTA ACCRETA SPECTRUM (PAS)

- Previously known as morbidly adherent placenta/abnormally invasive placenta
- Occurs when placental tissue invades into myometrium &/or into tissues/maternal bladder
- If undiagnosed, can lead to postpartum haemorrhage, peri-partum hysterectomy, ITU admission & maternal mortality
- Three grades of PAS

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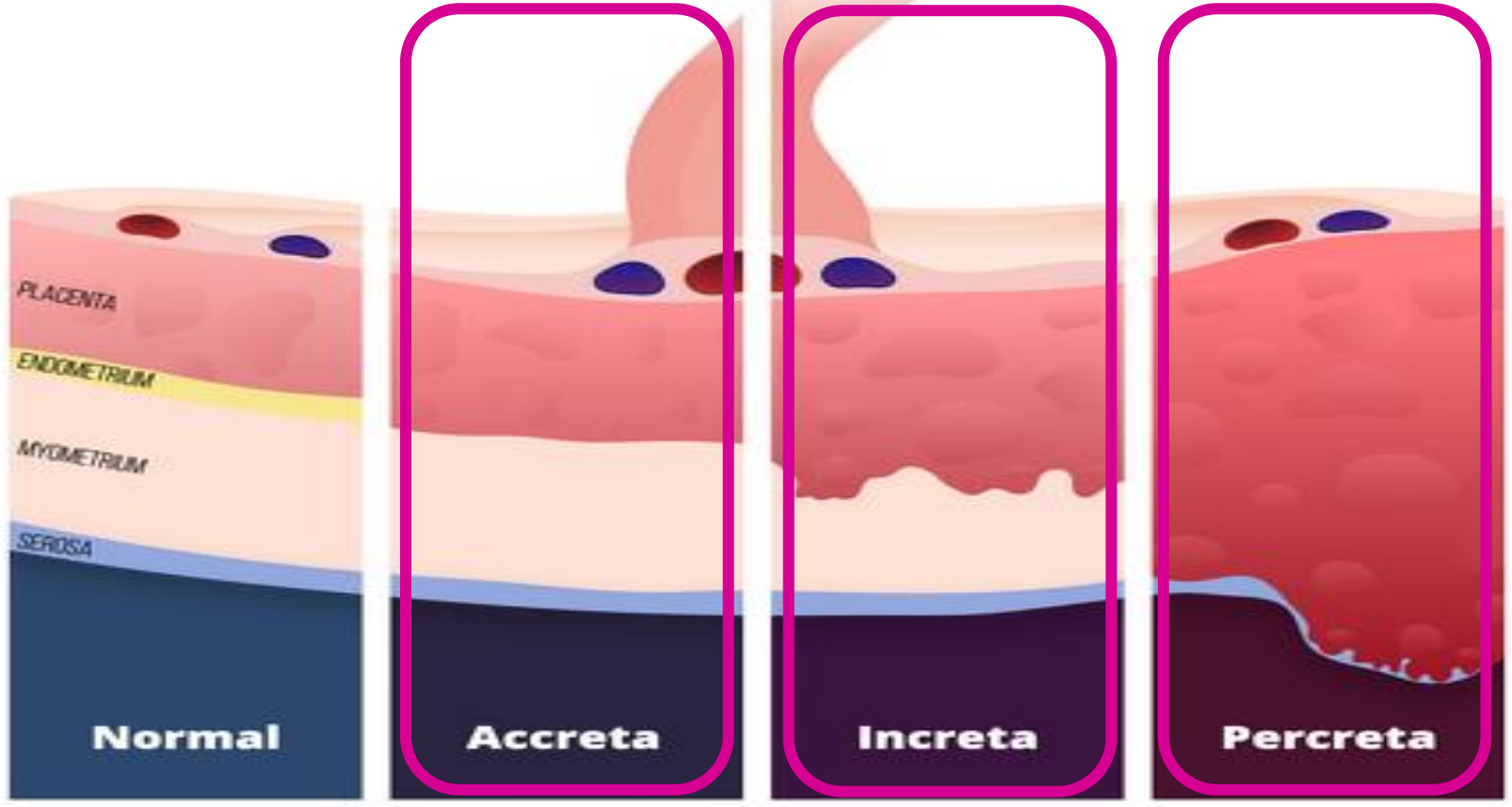
Placenta accreta spectrum



https://doi.org/10.53347/rID-167145

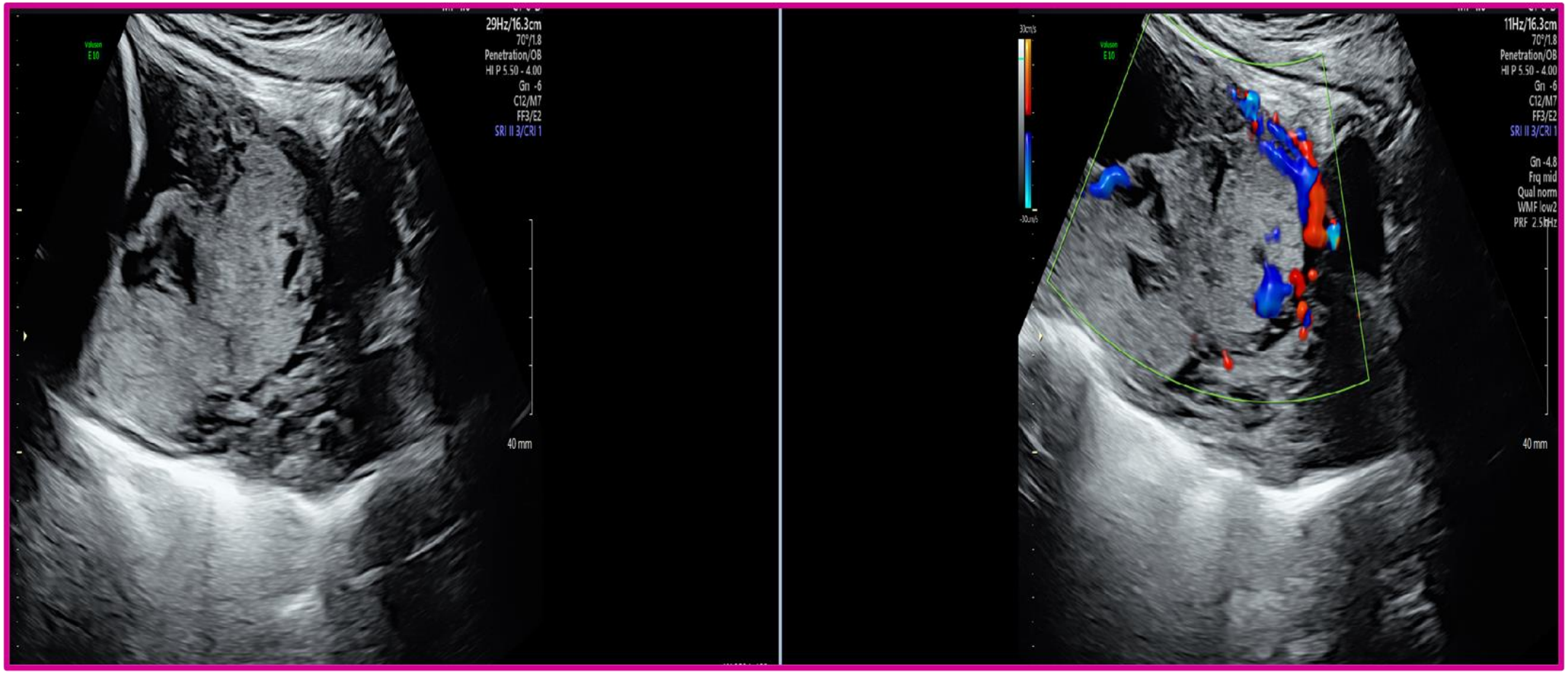
RISK FACTORS FOR PAS

- Surgery or treatment to the endometrium & myometrium
- C-section - risk increases with the number of sections
- Previous history of PAS & postpartum haemorrhage
- Asherman's syndrome
- IVF

ULTRASOUND SIGNS OF PAS

- Irregular hypoechoic spaces, with vascular flow, within the placenta
- Loss of hypoechoic zone (clear zone) between the placenta & myometrium, often at posterior wall of maternal bladder
- Less than 1mm of visible myometrial tissue at the site of the C-scar
- Bridging vessel identified penetrating through the uterine/placental margin, the uterine serosa &, in some cases, into the urinary bladder

IMAGES OF PAS



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ASSESSING FOR PAS

- Know your patient's obstetric/gynaecological history prior to scanning
- Diagnosis of PAS is dependent on experience of operator. Ask for a second opinion
- Seek advice/refer to Fetal Medicine
- Central hubs for PAS

ASSESSING FOR PAS

Previous C-section(s) or uterine surgery:

1st trimester

- look for a low implantation of the sac

or

- sac located in the scar
- perform a TV scan for further assessment of the scar

ASSESSING FOR PAS

Low lying placenta or placenta praevia + previous C-section(s) or uterine surgery

2nd &/or 3rd trimester(s)

- TV <u>not</u> TA, using both grey scale & colour

- FMU may consider MRI – as best modality at assessing depth & extension of placental tissue, especially with posterior placenta previa & high BMI

VASA PREVIA

- Occurs in 1:1275-5000 spontaneous pregnancies & 1:260 IVF pregnancies (Ranzini 2021)
- Fetal vessels cross between the internal os & fetal presenting part
- Vessels are unprotected by Wharton's jelly or placental tissue & therefore at risk of rupture
- Antenatal detection increases neonatal survival
- Ultrasound detection rate poor

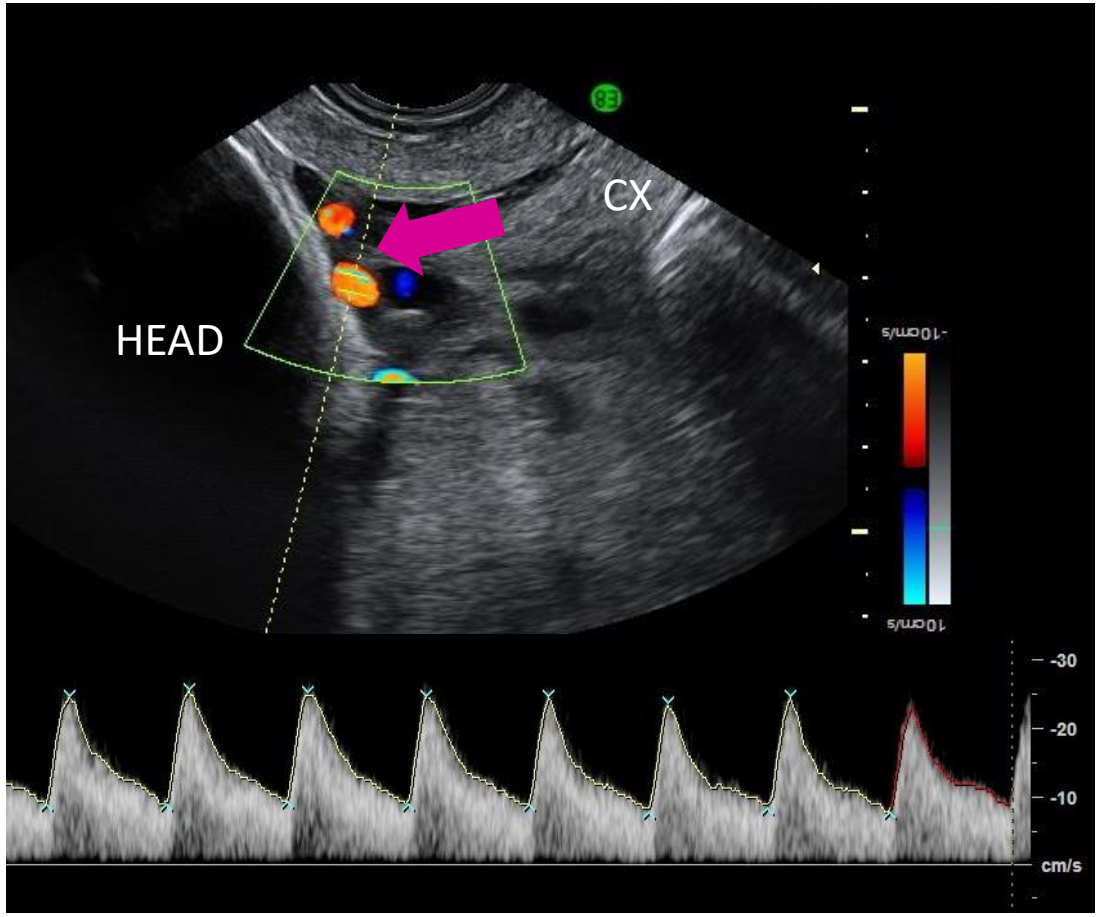
VASA PREVIA

Risk factors:

- Placenta previa
- Velamentous cord insertion
- Bilobed or succenturiate lobe
- IVF
- Multiple pregnancy
- Vaginal bleeding

VASA PREVIA

- Vessels seen as ‘bubbles’ or linear hyperechoic structures in the lower uterine segment. TVS with colour & pulsed wave Doppler required to confirm vessels are fetal
- Cord presentation can be confused with vasa previa. Ask the patient to cough or move - a free loop of cord will move. Ensure the free loop does not insert into lower segment
- An arterial vessel with a normal fetal heart rate provides a clear diagnosis of vasa previa



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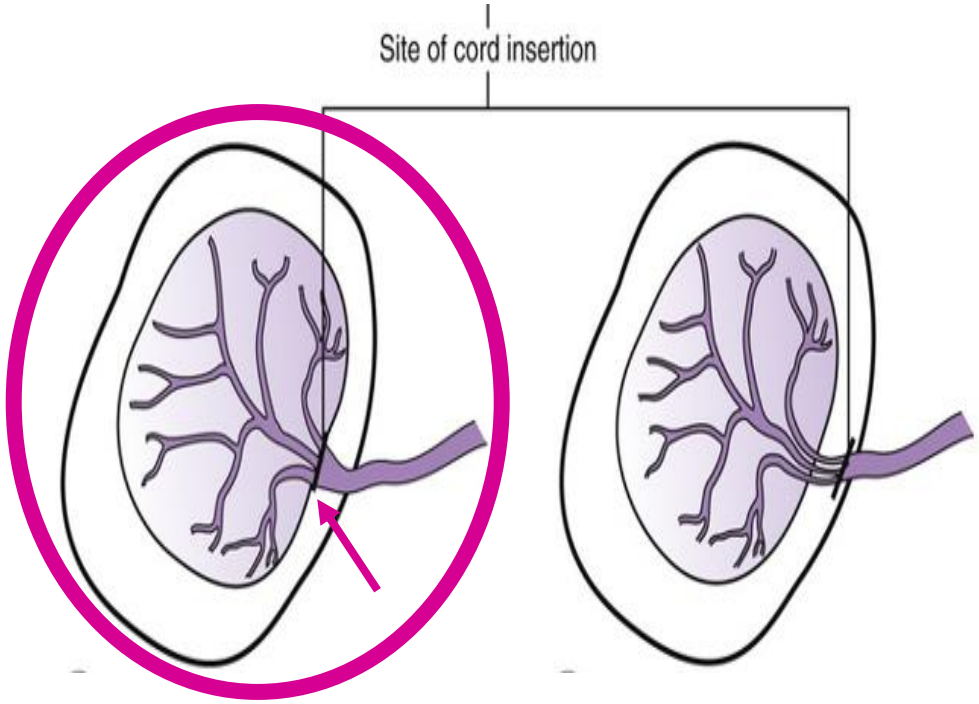
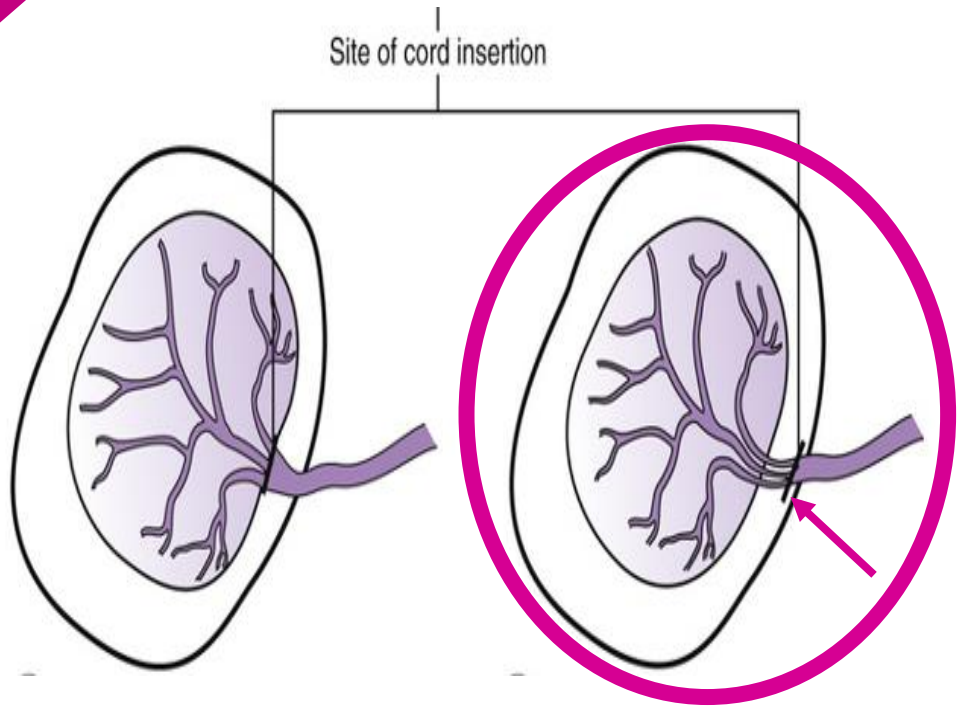
MARGINAL CORD INSERTION



- Cord inserts within 2cm of the placental margin
- Can evolve into velementous cord insertion
- Found in 6.3% of singleton pregnancies
- Lower chance of complications than velamentous
- Antenatal diagnosis useful

Skills in Midwifery Practice Edition 5, R Johnson & W Taylor pg. 210

VELAMENTOUS CORD INSERTION



Skills in Midwifery Practice Edition 5, R Johnson & W Taylor pg. 210

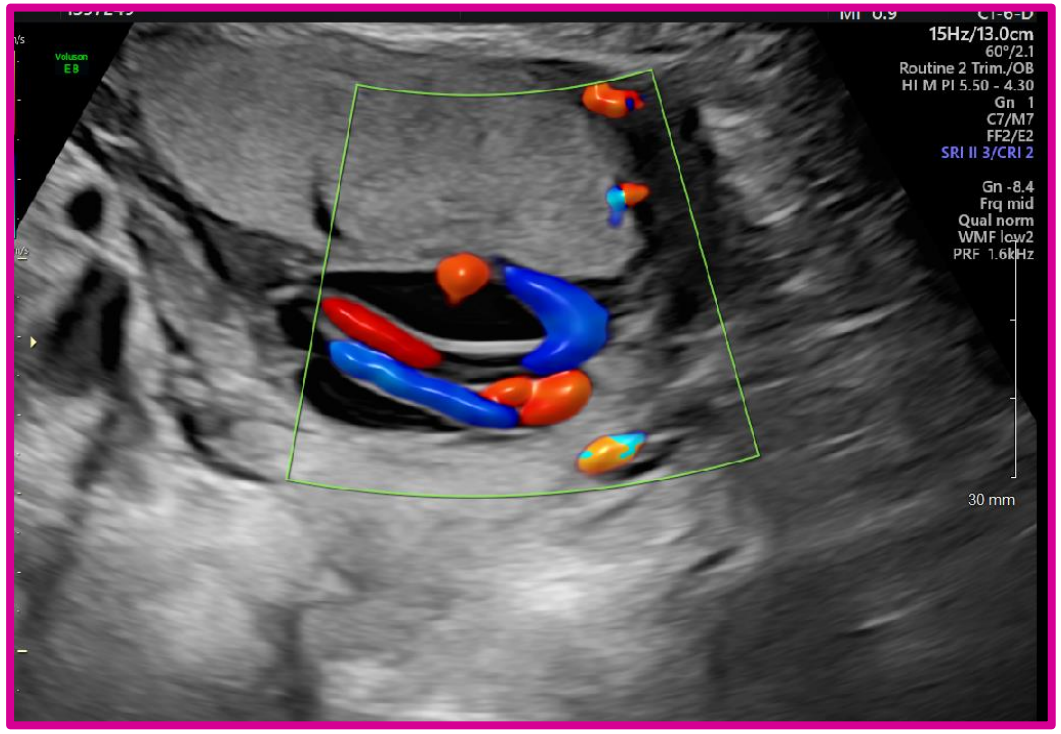
- Cord inserts into chorioamniotic membrane outside placenta margin
- Unprotected as no Whartons jelly - high risk of damage during labour/delivery
- Common with bi-lobe/succenturiate lobe placentas
- Cause of vasa previa
- More common in twins & IVF
- Found in 1.5% of singleton pregnancies
- Antenatal diagnosis important

VELAMENTOUS CORD INSERTION

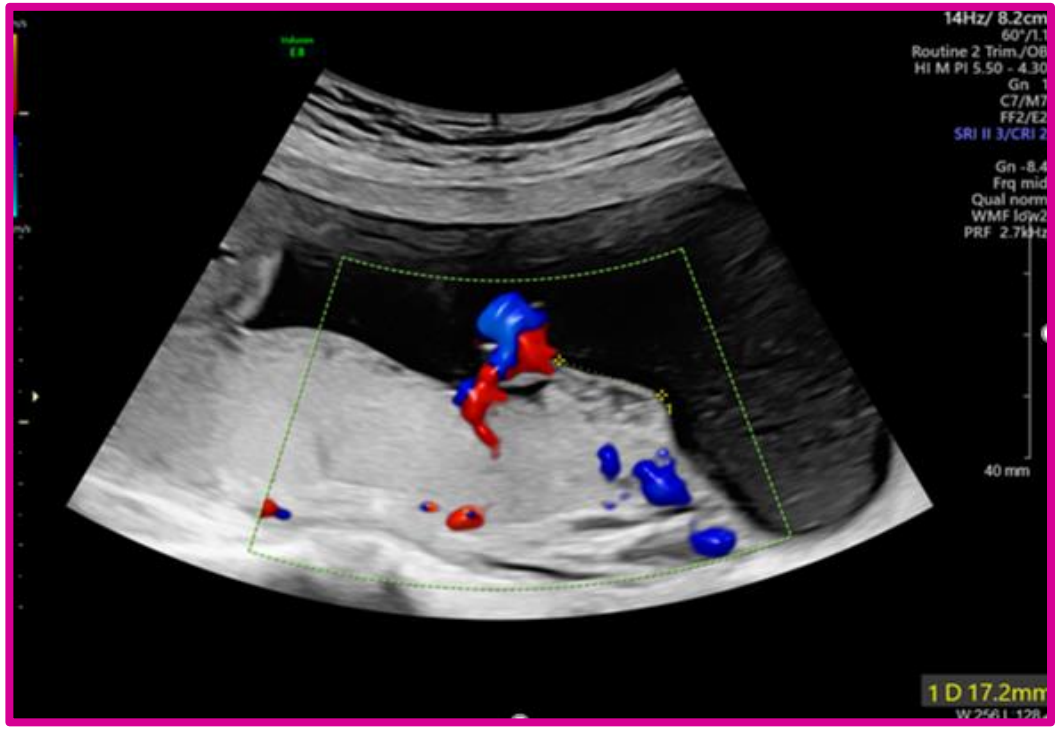
Associated with:

- Fetal growth restriction
- Placenta previa
- Placental abruption
- Increased risk of premature labour
- Increased risk of NICU admission & fetal death

VELAMENTOUS CORD INSERTION



MARGINAL CORD INSERTION



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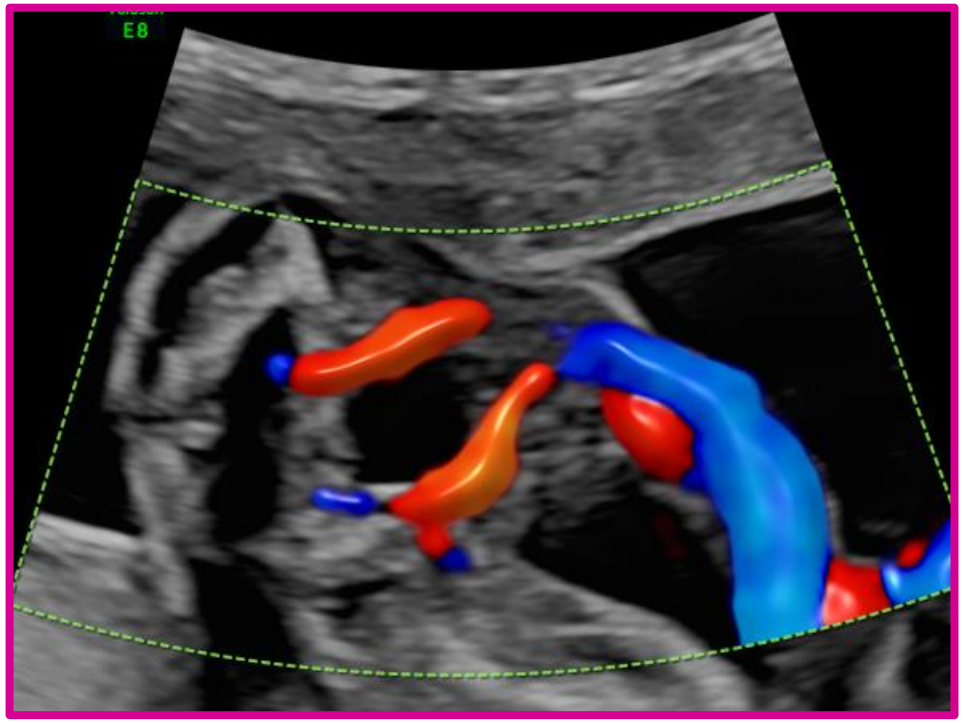
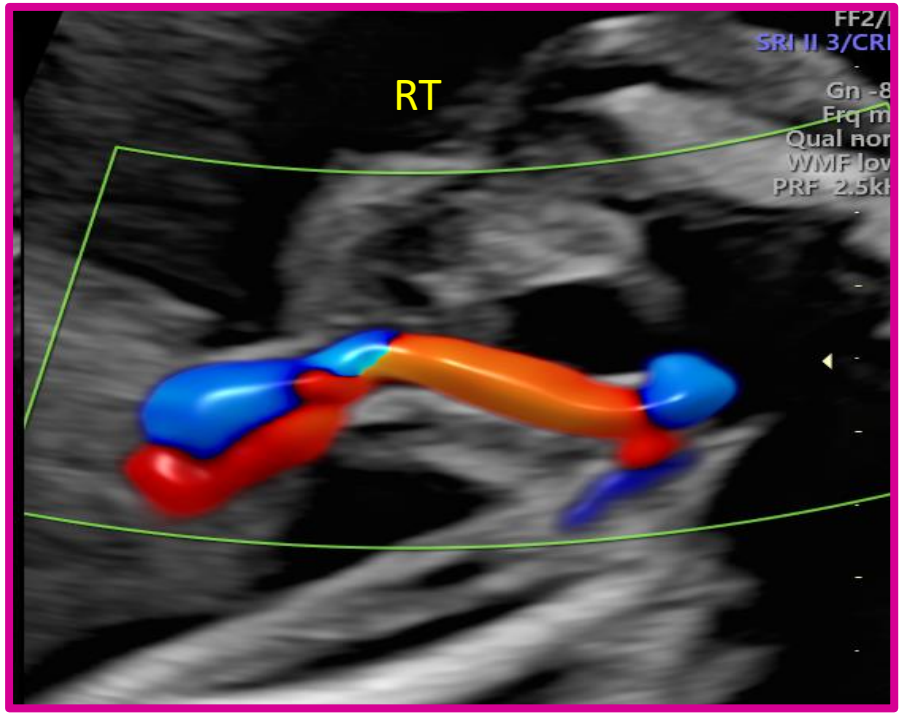
SINGLE UMBILICAL ARTERY (SUA)

- Single umbilical artery (SUA) has a prevalence of 1%, increased by 3-4x in twins (Martinez-Payo 2014)
- Cause unknown
- Absent left artery more common (61.1%) than absent right (38.9%) (Durrant 2015)
- Some studies have shown a risk of anomalies such as cardiac defects & chromosomal abnormalities. These are 9x higher where the right artery is absent compared with the left (Durrant 2015)

ASSESSING NUMBER OF CORD ARTERIES



3 vessel cord



Single Umbilical Artery

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SBLv3 recognises a SUA as high risk - recommendations based on 2nd trimester uterine artery Dopplers

SUA + 2nd trimester uterine artery Dopplers:

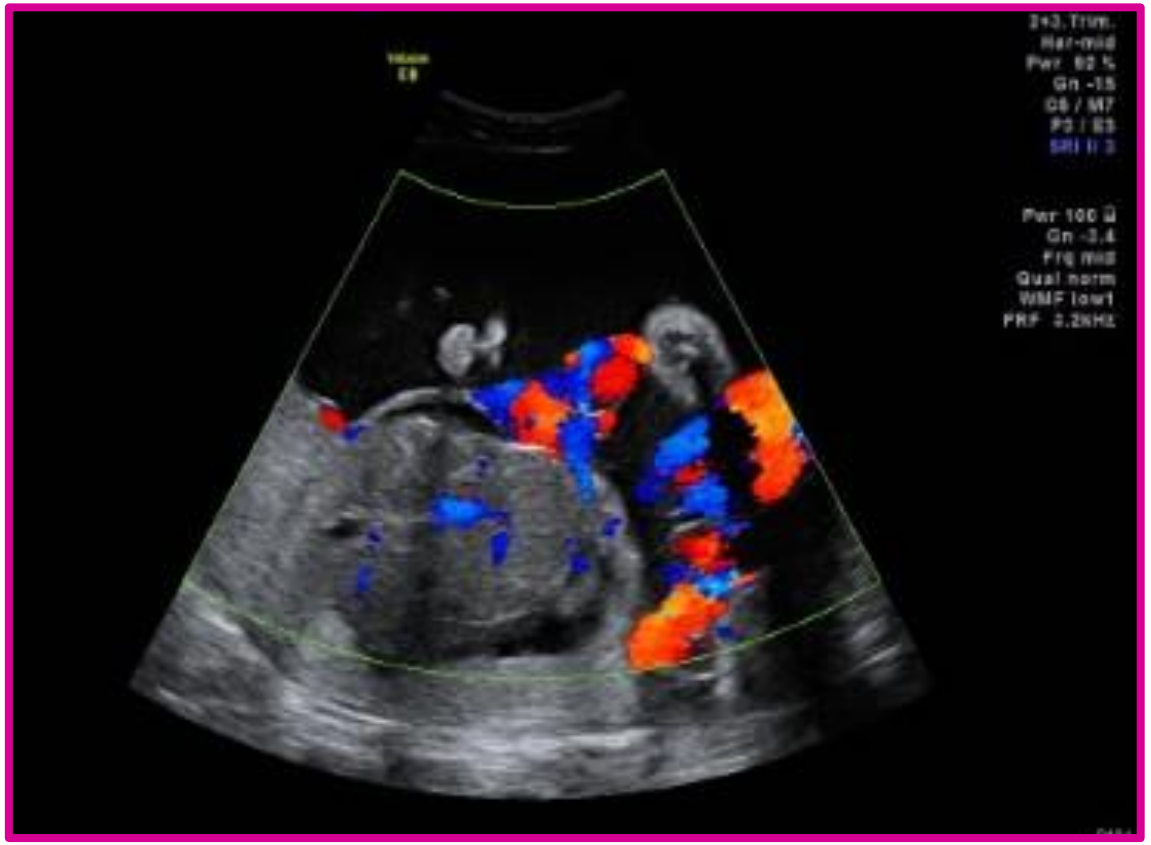
- normal - serial growth scans from 32 weeks
- abnormal with EFW≥10th centile - serial scans from 28 weeks
- abnormal with AC or EFW <10th centile – discuss with FMU

CHORIOANGIOMA

- Most common benign tumour occurring in 1% of pregnancies (Fran et al 2014)
- Formed by abnormal proliferation of vessels arising from chorionic tissue
- Cause unknown
- Located near the cord insertion of the placenta
- Often only diagnosed postnatally
- Large chorioangiomas can be identified antenatally
- There are associated complications with large tumours (>4cm)

ULTRASOUND APPEARANCES OF CHORIOANGIOMA

- Well circumscribed solid mass close to insertion of umbilical cord
- Hypoechoic rounded mass with anechoic cysts & low resistance pulsatile flow
- May bulge from the anterior portion of the placenta in the amniotic fluid
- Use colour Doppler to identify blood vessels feeding the tumour



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SUCCENTURIATE LOBE

- Accessory lobe of the placenta
- Smaller than main bulk of placenta
- Is attached to the placenta by blood vessels
- Occurs in 0.6-1% of pregnancies
- Antenatal diagnosis helpful in preventing RPOC & PPH

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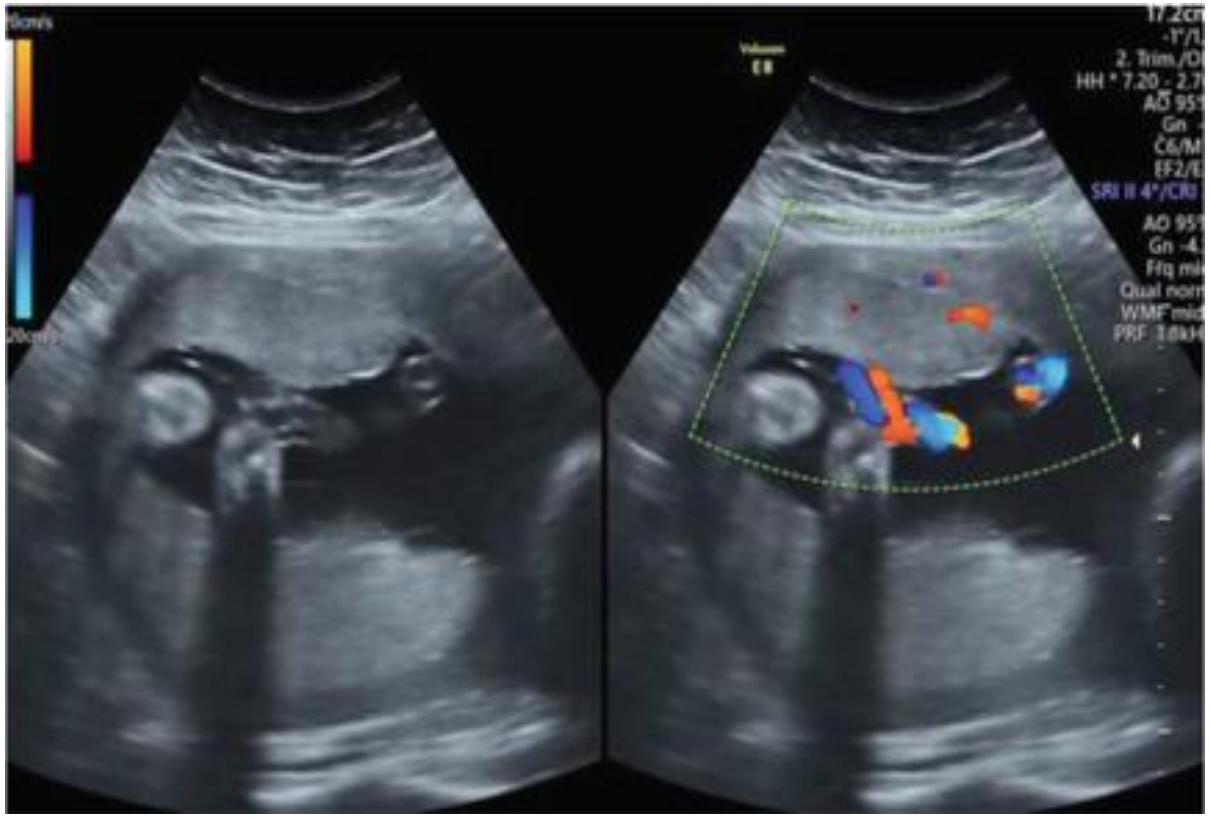
BILOBED PLACENTA

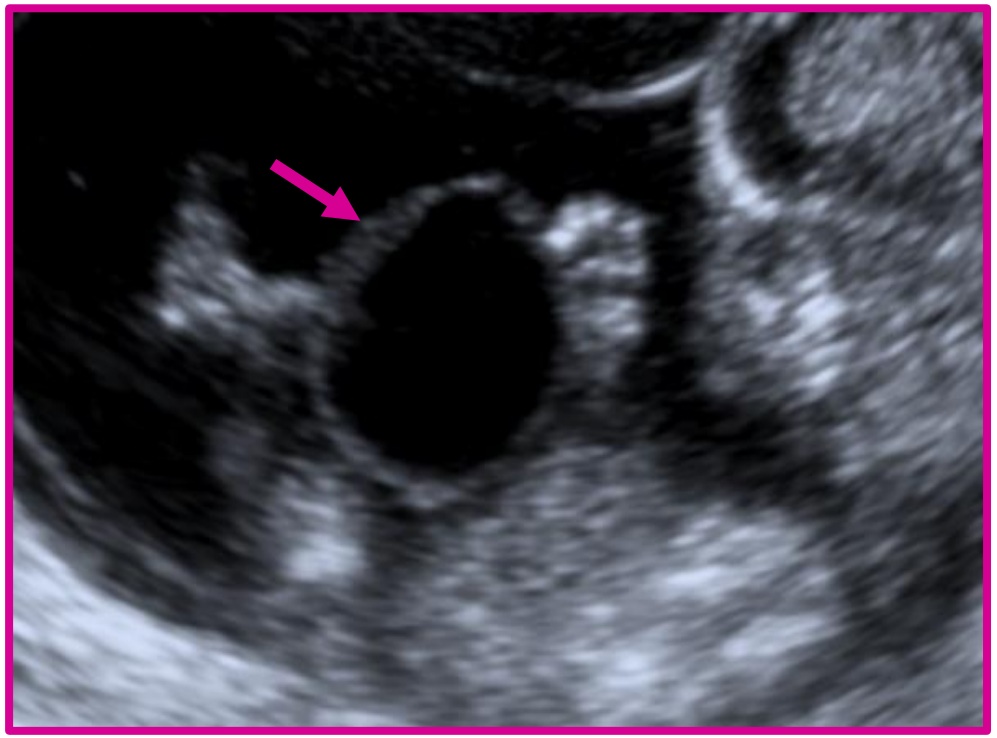
- Placenta is separated into two equal size lobes, separated by membranes
- Document where the cord insertion is to identify main placenta
- Assess where the vessels join the two lobes
- Found in 2-8% of placentas



Dragusin et al 2018. https://www.intechopen.com/chapters/60402

UMBILICAL CORD CYSTS

- Occurs 1 in 100 pregnancies
- More likely seen in 1ST trimester
- Only significant if multiple cysts
- Linked with fetal trisomy & congenital abnormalities if persist into 2nd trimester



UMBILICAL CORD CYSTS

TRUE CYSTS

- Derived from embryological remnants & located more towards the fetal cord insertion
- 20% will persist into 2nd trimester
- Typically 4-6mm in size

PSEUDO CYSTS

- Are more common & located anywhere along the cord
- Represent oedema in Wharton's jelly

SHOULD WE BE ASSESSING MORE THAN PLACENTAL SITE DURING ANOMALY SCANS?

Currently there is no national or FASP requirement to assess the placental site &/or morphology at the routine anomaly scan

So I was wondering.....

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- How many people image placental site relative to the internal os?
- How many people check for two umbilical arteries around the fetal bladder & image?
- How many people check cord insertion into placenta & image?

TAKE HOME MESSAGES

- Ensure you know the patient's obstetric & gynaecological history prior to scanning
- Assess the cord & the placenta in all trimesters
- If suspicious of PAS refer
- Use colour Doppler at the fetal bladder to identify the 2 umbilical arteries
- Follow SBLv3 for single umbilical artery
- Remember that early diagnosis of placental & cord anomalies can help reduce maternal & fetal morbidity and mortality

THANK YOU FOR LISTENING - ANY QUESTIONS?

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