



Placental findings in IUGR

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Outline

- IUGR: definition(s)
- Causes of IUGR
 - Focus on placenta
 - Implications for future pregnancies



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Intrauterine Growth Restriction: Definitions

- $<10^{\text{th}}$ percentile for gestational age
 - Consideration of sex and race/ethnicity
 - M>F
 - White>Hispanic>Black>Asian
- Vs. constitutionally-small fetus
 - Normal growth over time
 - Normal umbilical artery doppler
 - Normal amniotic volume



Intrauterine Growth Restriction: Definitions

- In the absence of that clinical data:
 - Fetal growth restriction (FGR)
 - Small for gestational age (SGA)
- **Many studies use birthweight (single measurement in time) and therefore cannot distinguish between FGR/SGA & IUGR



Intrauterine Growth Restriction: Definitions

- Symmetric
 - Entire body is small (including head and abdominal circumference)
- Asymmetric
 - Head-sparing (abdominal circumference is reduced compared to head)



IUGR: Pathologist's definition

- Birthweight
 - (vs. weight at autopsy, usually lower)
- Foot length
 - >2 week discrepancy between clinical and anatomically-determined gestational age may indicate symmetric IUGR
- Brain:liver weight ratio
 - 3:1 indicates symmetric growth
 - >3:1 indicates asymmetric growth (head-sparing)



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Causes of IUGR

- Fetal causes
 - Symmetric IUGR
 - Ex. Aneuploidy
- Placental causes
 - Asymmetric IUGR (onset in latter half of pregnancy)
 - Rarely symmetric IUGR (onset earlier in pregnancy)



Placental causes of IUGR

- Maternal vascular malperfusion
- Chronic villitis of unknown etiology
- Increased perivillous fibrin deposition
- Fetal vascular malperfusion



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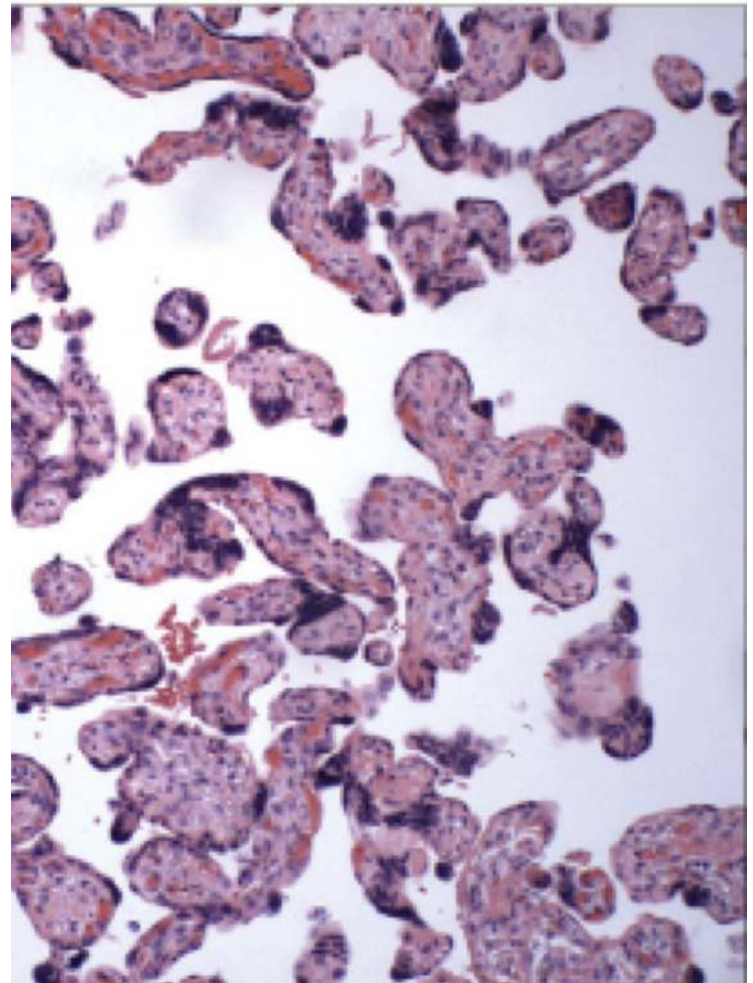


Placental causes of IUGR: maternal vascular malperfusion

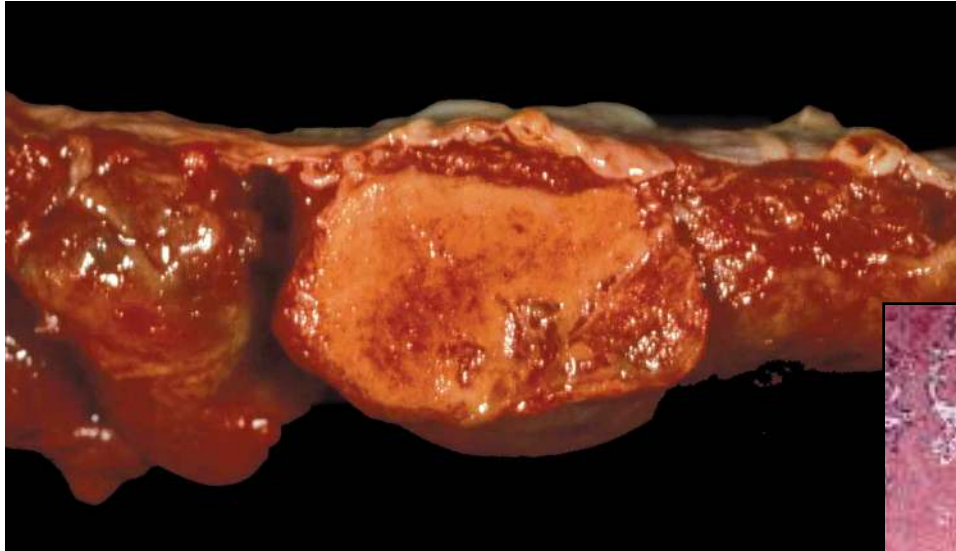
- Maternal hypertensive disorder
 - GHTN, CHTN, preeclampsia, etc.
 - Can be associated with abruption
- MVM/Placental "insufficiency"
 - Small placenta (<10th percentile)
 - Hypermaturity
 - Infarction
 - Decidual vasculopathy
 - Retroplacental hematoma (with abruption)

MVM/placental insufficiency

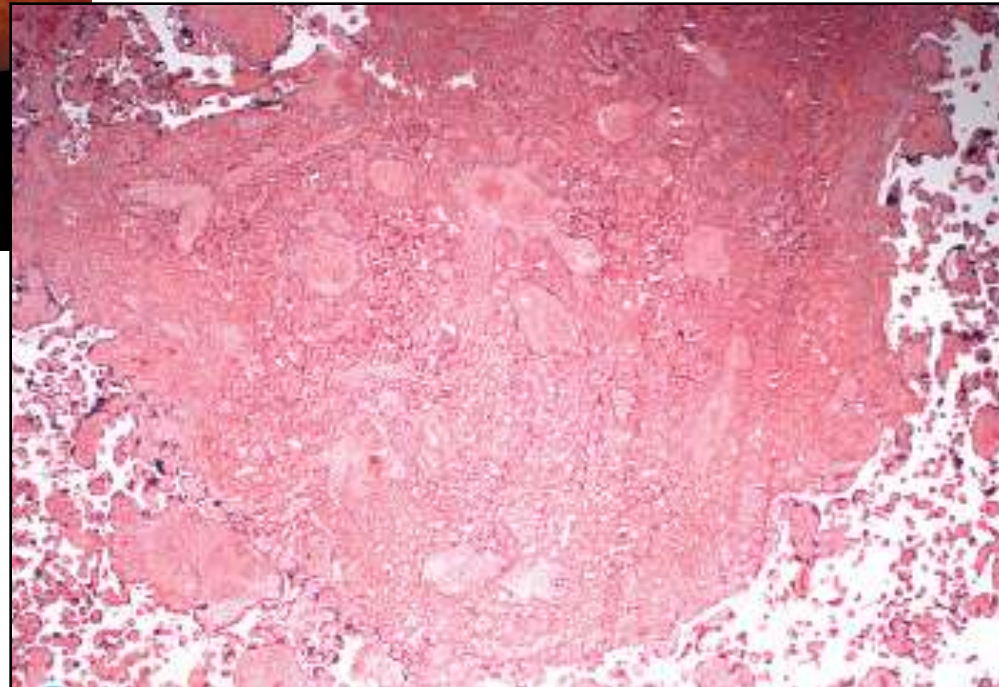
- Hypermaturity: numerous syncytial knots present throughout the placental disc (not just near the fetal surface) in a placenta <37 weeks gestation



MVM/placental insufficiency

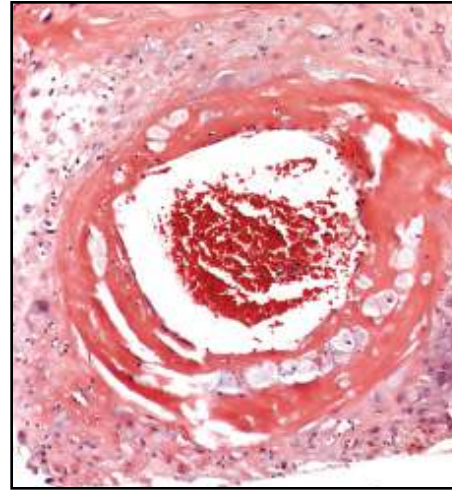
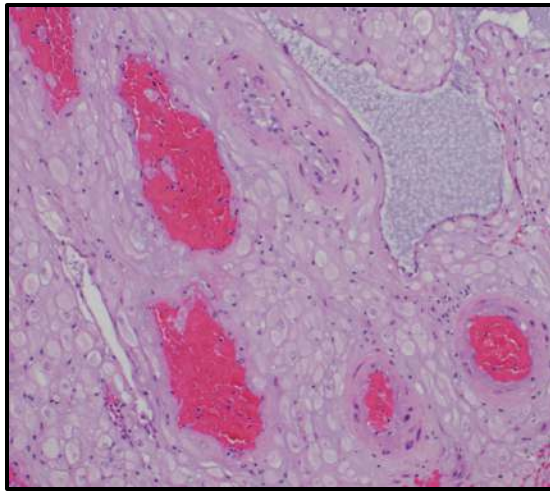


Infarct

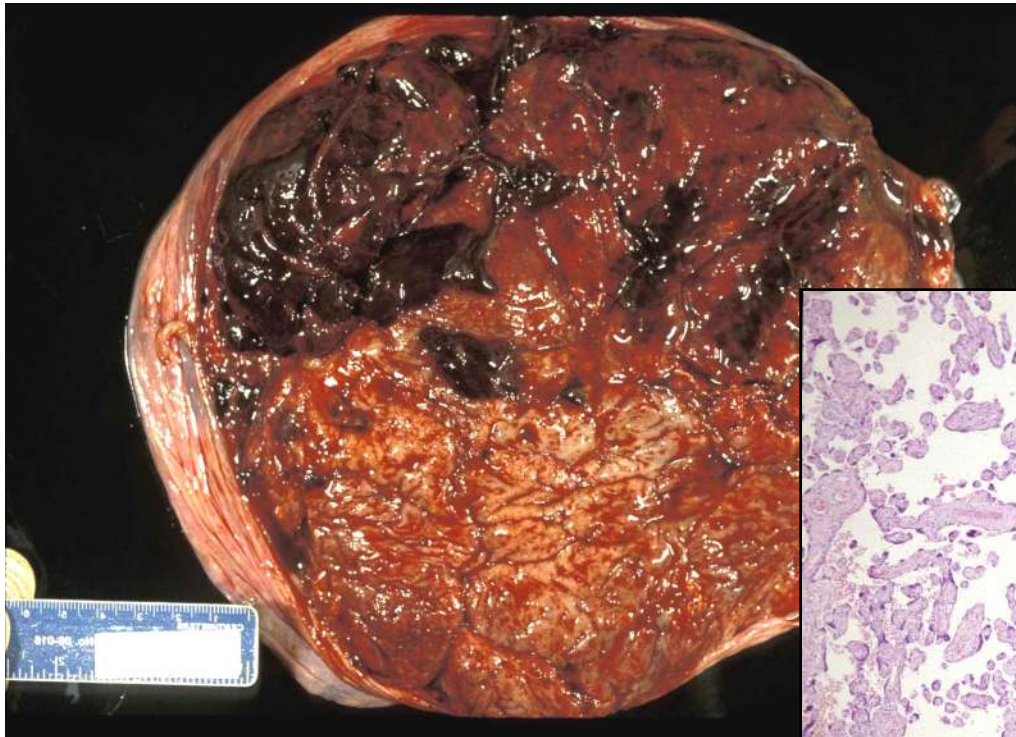


MVM/placental insufficiency

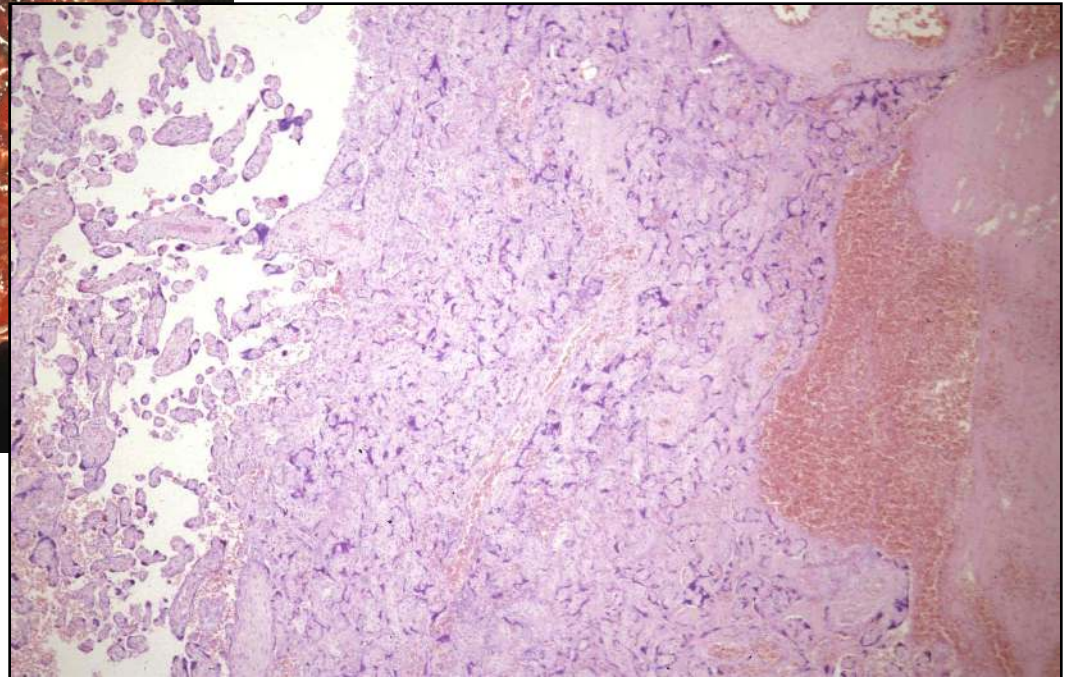
Decidual vasculopathy



MVM/placental insufficiency



Retroplacental hematoma
(abruption)





MVM/placental insufficiency

- Risk of recurrence depends on underlying disease/severity
- Preeclampsia: risk is highest in first pregnancy



Placental causes of IUGR

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- Chronic villitis of unknown etiology
- Increased perivillous fibrin deposition
- Fetal vascular malperfusion

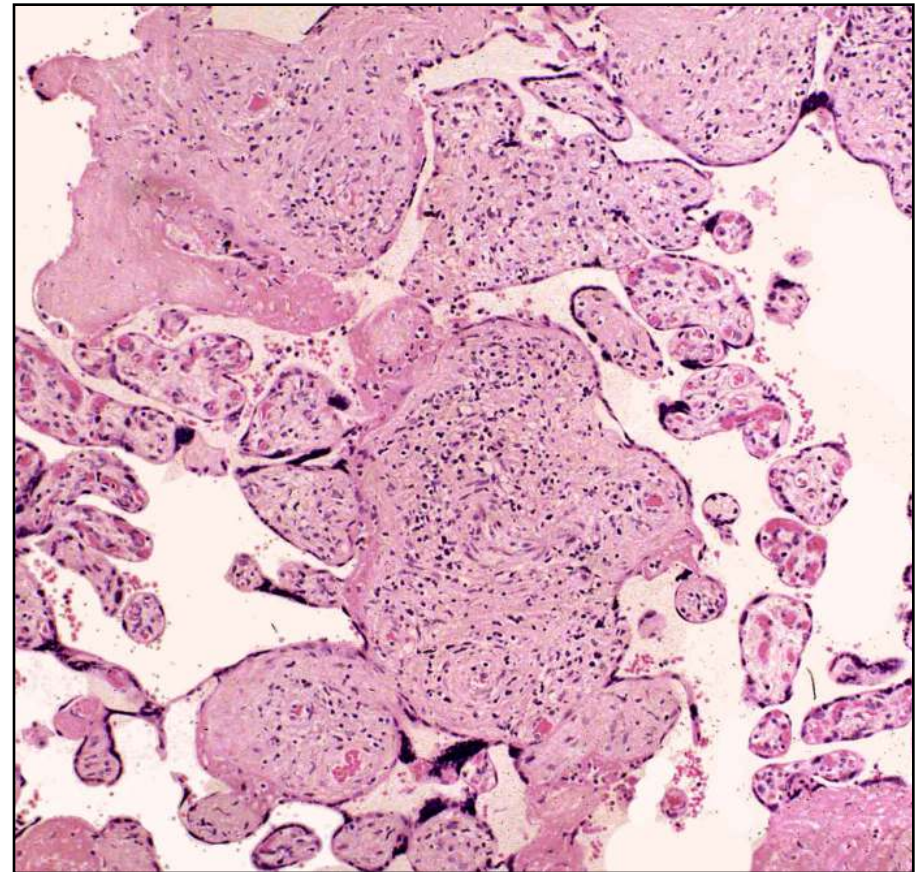


Villitis (chronic villitis of unknown etiology/CVUE)

- Unremarkable prenatal course
- Maternal hypertensive disorder
- Maternal diabetes/obesity
- Rarely: maternal sepsis/blood-borne infection
 - Including: CMV, HSV, parvovirus, streptococcal infections
 - History is not always supportive

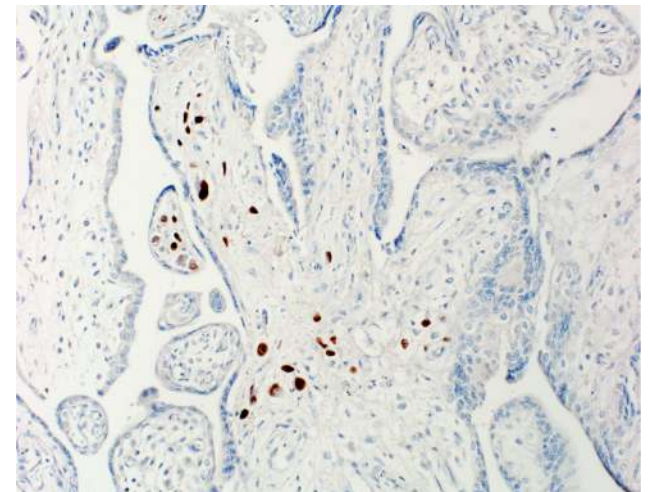
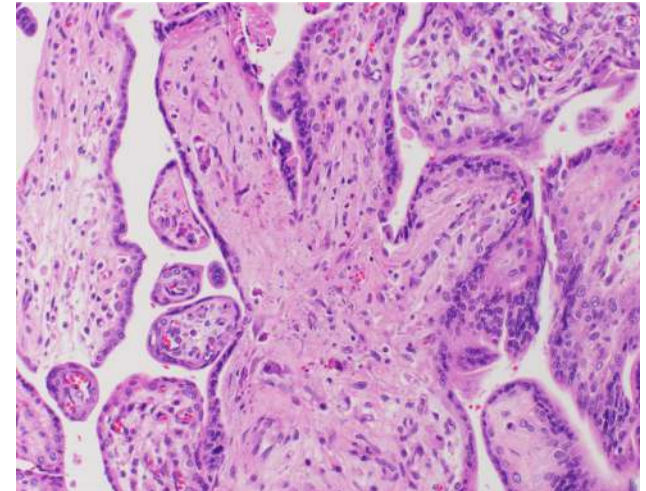
Villitis (chronic villitis of unknown etiology/CVUE)

- Majority: unknown etiology
 - Maternal response to paternal antigens?
- Can be associated with increased perivillous fibrin deposition
- **10-15% recurrence (high grade CVUE)

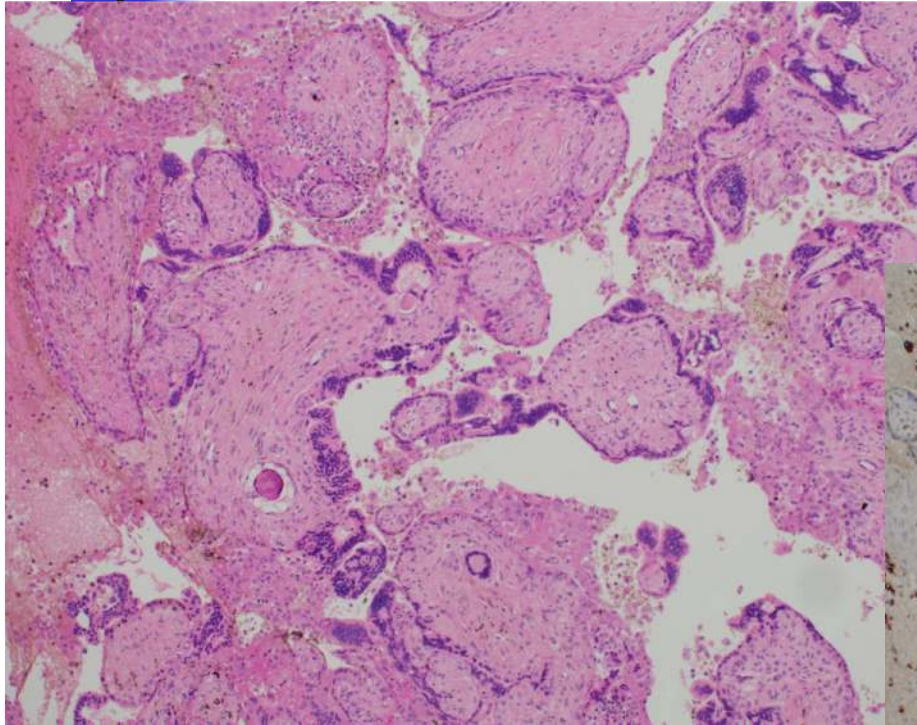


Villitis (chronic villitis of unknown etiology/CVUE)

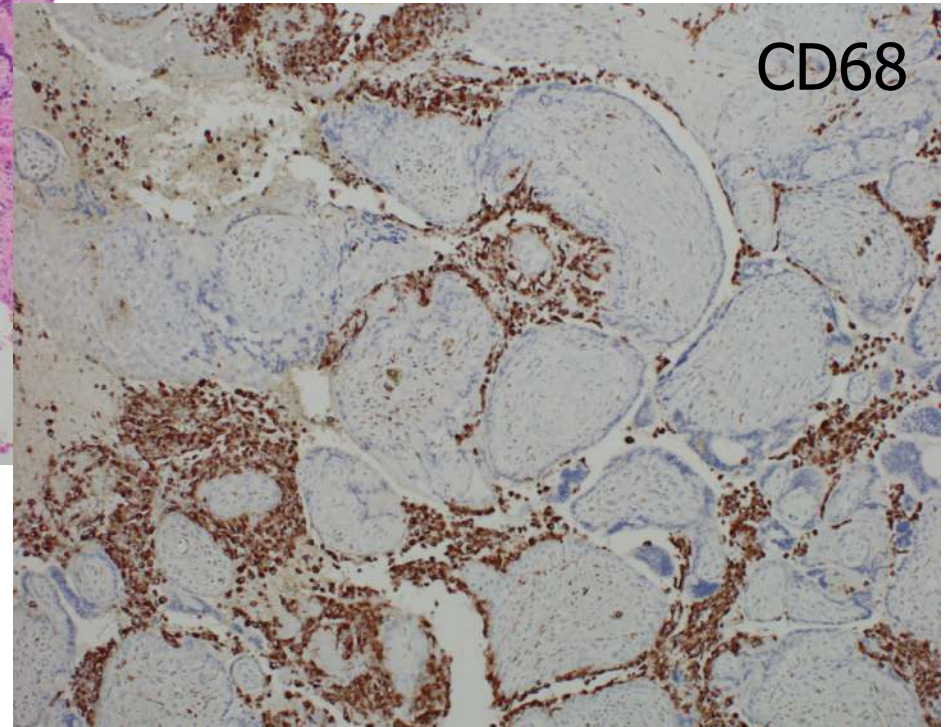
- Minority of cases: infectious villitis (TORCH)
 - CMV (inclusions)
 - Syphilis (perivascular onion skinning)
 - Toxoplasmosis (cysts in Wharton's jelly)
- **Does not recur



Rare subtype of CVUE: Massive chronic intervillitis



**>50% recurrence rate





Placental causes of IUGR

- Maternal vascular malperfusion
- Chronic villitis of unknown etiology
- **Increased perivillous fibrin deposition**
- Fetal vascular malperfusion

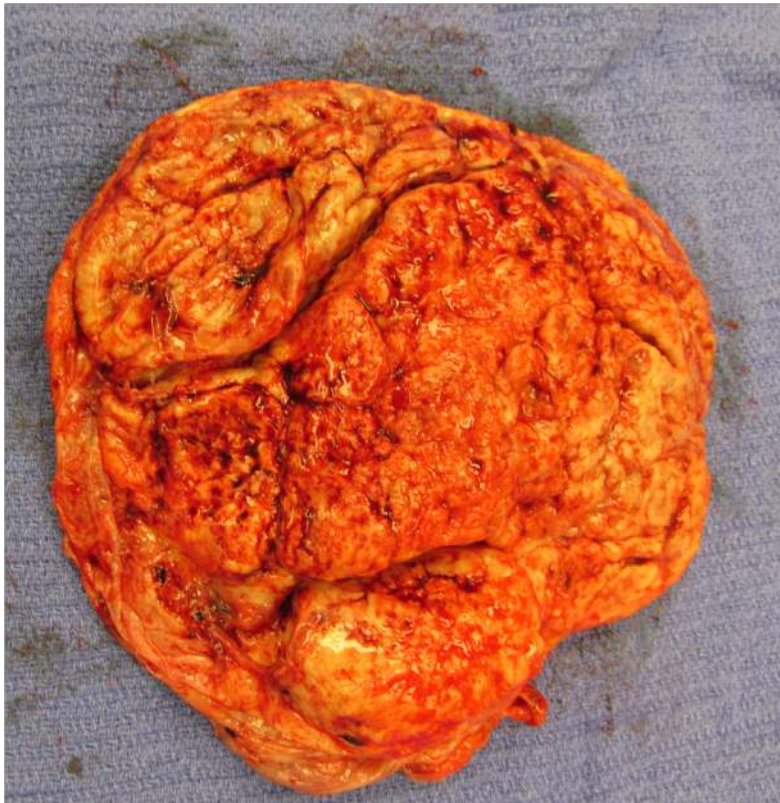


Increased perivillous fibrin deposition

- Maternal autoimmune disease
- Maternal hypertensive disorder
- Unremarkable prenatal course (particularly in first pregnancy)

Increased perivillous fibrin deposition

aka: Massive perivillous fibrin deposition, Maternal floor infarction

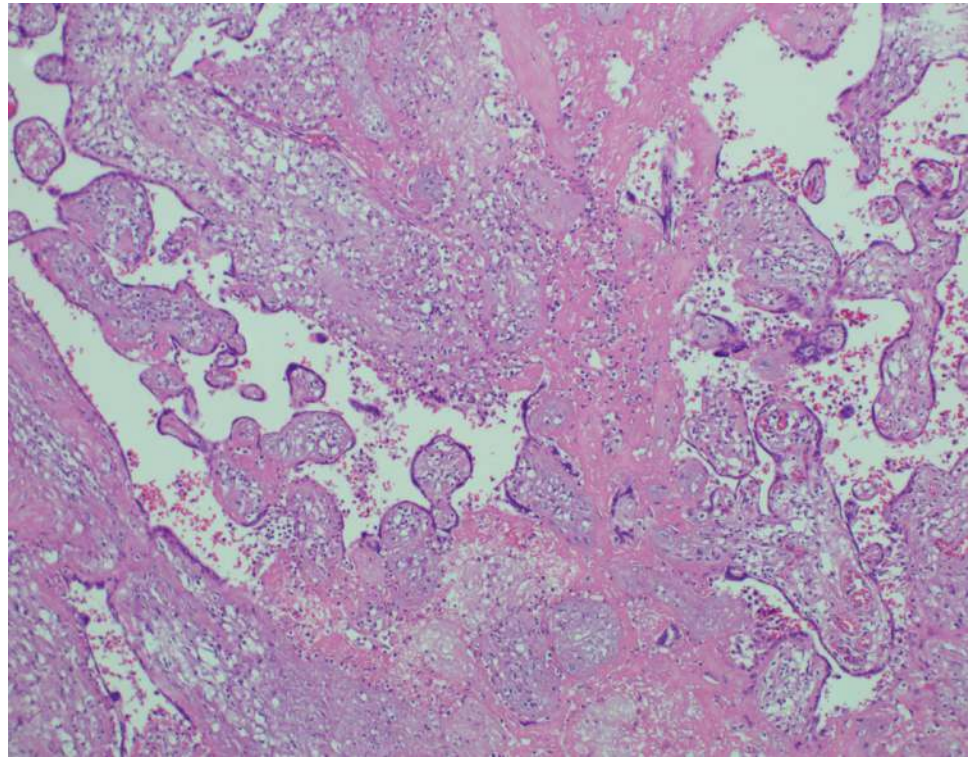


**Heavy placenta



Increased perivillous fibrin deposition

- Rule out villitis (infectious villitis, CVUE, or massive chronic intervillitis)



Increased perivillous fibrin deposition

- Can be the first manifestation of maternal autoimmune disease (i.e. lupus, APAS)
- Variable recurrence rate (depending on underlying dz)
- Recurrent IUGR can be avoided in subsequent pregnancies following treatment with aspirin/Lovenox



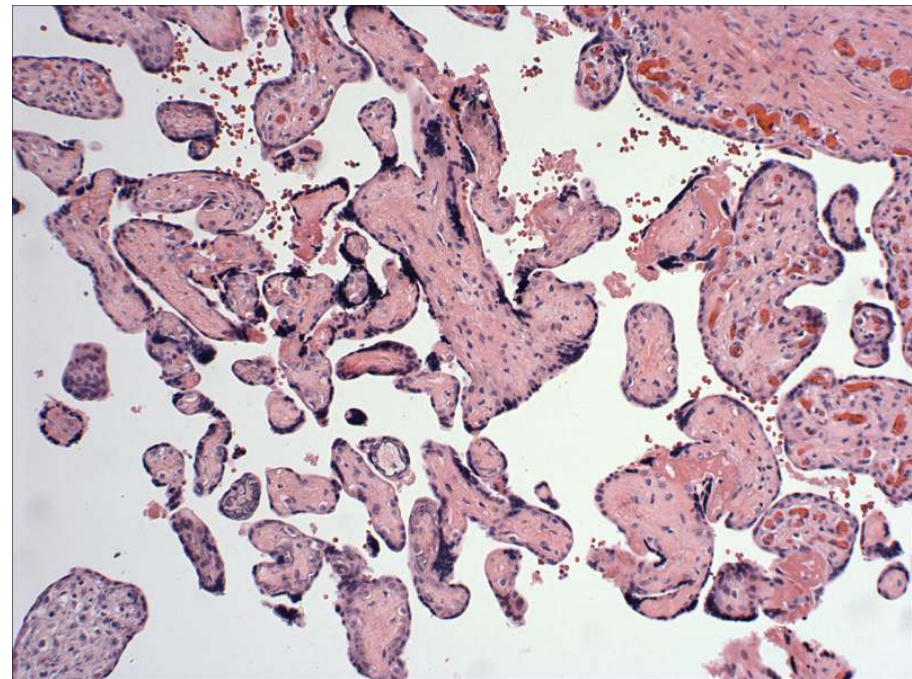


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Fetal vascular malperfusion

- Unremarkable prenatal course
- Multifocal avascular villi (involving at least 15 adjacent villi)
 - Placenta can be normal or small
- R/o maternal coagulopathy
 - Esp. extensive FVM
 - Cause of recurrent FVM

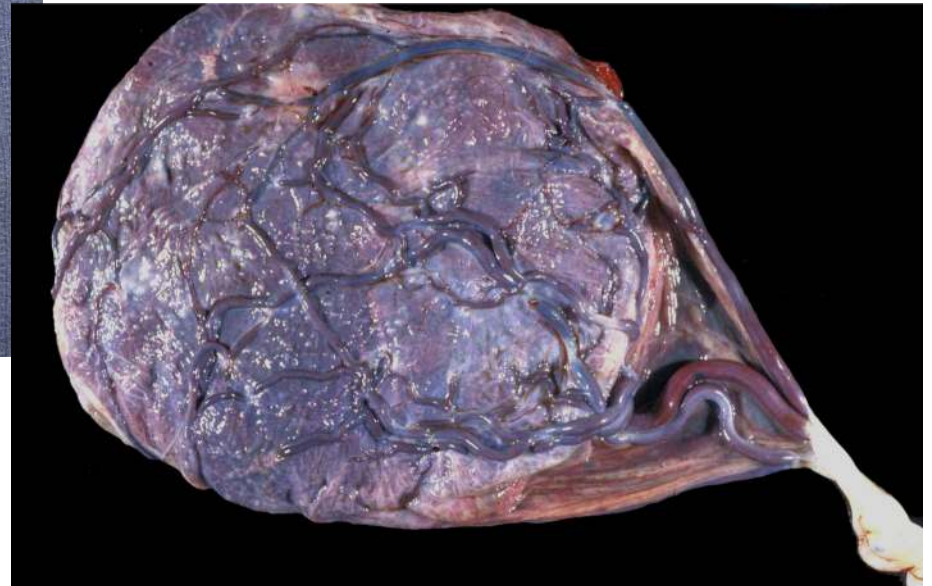


Fetal vascular malperfusion



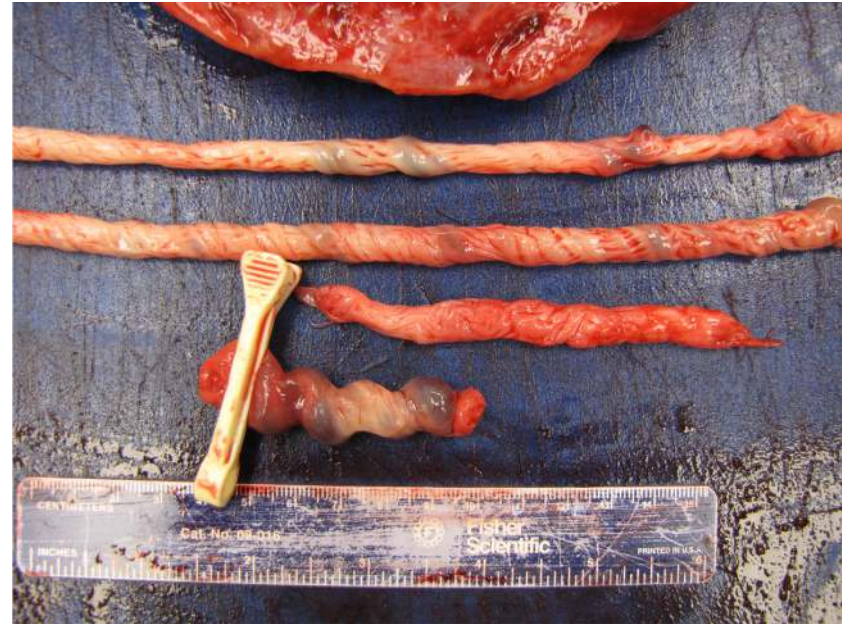
Can be associated with obstructive lesions of the umbilical cord

****Often non-recurrent**



Fetal vascular malperfusion: increased recurrence risk?

- Long cord associated with a term stillbirth
 - Deemed a “cord accident” by clinician; no autopsy was performed
 - Placental examination reveals an umbilical cord length of 117 cm (this is only noted in the gross description)





Fetal vascular malperfusion: increased recurrence risk?

- Obstetric history: prior term stillbirth with a cord length of 106 cm
- NOT a typical “cord accident”
 - “Cord accident” implies a non-recurrent lesion
 - **Long umbilical cord is associated with a slightly higher risk of recurrence in subsequent pregnancies**



Thank you!
