A Survey of Placental Pathologic Findings Observed in 122 Singleton Placentas

Scientific Workshop on Vitamin D
Medical University of South Carolina
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Disclosures

• I missed my alarm this morning!!!
(otherwise, none)
Objectives

• To summarize the gross and microscopic observations of 122 singleton placentas enrolled in the Kellogg vitamin D study
• To identify any consistent placental pathologic patterns that potentially correlate with maternal 25-hydroxyvitamin D status
Summary of Methods

• Placentas all submitted in fresh (unfixed) state
• Subsequently fixed in 10% neutral buffered formalin
• Sample extracted for ancillary studies before fixation
• Routine sections of placental disk, cord, and membranes and lesions taken for microscopic examination
PLACENTAL VITAMIN D STUDY WORKSHEET

Patient/Baby’s Name _____________________

Type of Case: Stillbirth  Livebirth/Deceased  Livebirth/Living

If Deceased: DOB ________  DOD ________  Autopsy?  Y  N

Prenatal History:

Mother's Age _____  LMP __________  EDC __________  EGA __________

Mother:  G ___  P ___  Ab ___

Previous Adverse Pregnancy Outcomes:

Underlying Maternal Disease:

Mother's Blood Type:  A  B  AB  O  Rh:  +  -

Baby's Blood Type:  A  B  AB  O  Rh:  +  -

Serologies:

TORCH titers _____________________  Other _____________________

Chromosomes:  Y  N  Results

___________________________________

Prenatal Complications:  1st  2nd  3rd  trimester

Chronic (Preexisting) HTN  Preeclampsia  Bleeding  Infection

Gestational Diabetes  Seizure Disorder  Anemia  IUGR

SLE  Antiphospholipid Ab  Other Autoimmune Condition

Alcohol Use  Smoking  Cocaine Use

Premature Labor  PROM  Placenta Previa  Breech

Other: _________________________________

Intrapartum Course:
Intrapartum Course:
Date/Time of Admission to Hospital _____________________
Name/Location of Hospital ________________________
AROM SROM Amniotic Fluid: Meconium-Stained Clear
Intrapartum Findings
____________________________________________________

Delivery/Neonatal Course:
Date/Time of Delivery _____________________
Gestational Age @ Delivery ________________
Mode of Delivery:
Vaginal Forceps-Assisted Vacuum-Assisted C-section
Birth Weight _______________ Size: AGA SGA LGA
Determined by _________________________________
Stillbirth Livebirth
Apgar Scores ____ @1 min _____@5 min _____@10 min
Delivery Findings
____________________________________________________

Narrative/Additional Notes:
Gross Placental Findings:

GENERAL
Size (Greatest Dimensions): _____ x _____ x _____ cm
Weight: _______ grams  (corrected x 95%) = _________ grams
____% ile for GA of _______ wks

CORD:
Length: ______ cm  Diameter Range: ______ cm
# of vessels: ______
Insertion:  □  central/paracentral  □  eccentric  □  marginal
           □  velamentous  □  furcate  □  interpositional
Velamentous vessels:  □  intact  □  disrupted  □  thrombus
Coiling/Twisting:  □  left-handed  □  right-handed  □  indeterminate
                □  hypercoiled  □  hypocoiled  # coils per cm _____
Lesions:
□  True Knot  □  Hematoma  □  Thrombus  □  Stricture
□  Edema  □  Plaques  □  Meconium-Staining
Discoloration __________________________
Other_________________________________________________________________

MEMBRANES:
Insertion:  □  Marginal  □  Circummarginate  □  Circumvallate
Point of Rupture: _____ cm (from margin)
Staining/Discoloration: ________________________________
Lesions:  □  Amnion Nodosum  □  Hematoma
**FETAL SURFACE:**

Color __________________________

Subchorionic Fibrin □ absent □ slight □ moderate □ marked/extensive

Marginal Hematoma □ absent □ present (dimensions: _____ x _____ x _____ cm)

□ Amnionic Band(s) □ subchorionic hematoma □ subamnionic hematoma

**MATERNAL SURFACE:**

□ intact □ disrupted/fragmented

Color __________________________

Retroplacental Blood Clot:

Greatest dimensions: _____ x _____ x _____ cm

% of maternal surface area: □ 0-10 □ 10-25 □ 25-50 □ 50-75 □ >75

**PLACENTAL PARENCHYMA:**

Color: □ Deep Red (normal) □ Pale □ Plethoric

Infarcts: □ absent □ present

Largest size: _____ x _____ x _____ cm

% of cut surface area: □ 0-10 □ 10-25 □ 25-50 □ 50-75 □ >75

Retroplacental Hematoma (dimensions): _____ x _____ x _____ cm

Lesions: □ Intervillous Thrombi □ Perivillous Fibrin □ Septal Cyst

Other _______________________________________________________________
KELLOGG VITAMIN D STUDY PLACENTAL PATHOLOGY
FIELDS FOR REDCAP

Study #

GROSS EXAMINATION

1. Corrected placental weight (in g)
2. Percentile for gestational age (small, heavy, or normal-weight placenta)
3. Cord length (in cm)
4. # of vessels if not 3
5. Type of coiling if abnormal
6. Membrane insertion if not marginal
7. Staining of membranes/fetal surface if present
8. Retroplacental blood clot if >10%
9. Accessory lobe if present
10. Amnionic bands if present
11. Maternal surface if not intact (disrupted/fragmented/lacerated)
12. Umbilical cord lesion if present (thrombus, true knot, etc.)
13. Placenta accreta
14. Subchorionic fibrin plaque/thrombus
15. Marginal hematoma
KELLOGG VITAMIN D STUDY PLACENTAL PATHOLOGY
FIELDS FOR REDCAP Study #
MICROSCOPIC EXAMINATION

1. Cord lesion if present
2. Amniotic fluid infection (AFI) if present: maternal stage (1, 2, or 3) and grade (1, 2, or 3)
3. Amniotic fluid infection (AFI) if present: fetal stage (1, 2, or 3) and grade (1, 2, or 3)
4. Decidual vasculopathy - type if present (lack of physiologic conversion vs. atherosis)
5. Pigment-laden macrophages
6. Laminar decidual necrosis
7. Infarcts (if present): solitary or multiple
8. Intervillous thrombus
9. Perivillous fibrin deposition
10. Chronic (lymphoplasmacytic) deciduitis
11. Chronic villitis
12. Accelerated villous maturation
KELLOGG VITAMIN D STUDY PLACENTAL PATHOLOGY
FIELDS FOR REDCAP Study #
MICROSCOPIC EXAMINATION

13. Increased villous vascularity
14. Increased # of nucleated red blood cells within fetal capillaries
15. Retroplacental hemorrhage if thick-layered (hematoma), laminated, or organized
16. Villous edema
17. Villous stromal hemorrhage
18. Avascular villi
19. Thrombi within stem villous vessels
20. Degenerating amnionic epithelium
21. Distal villous hypoplasia (terminal villus deficiency)
22. Subacute/chronic chorioamnionitis
23. COMMENTS
Findings

• Weight:
  - 10\textsuperscript{th}-90\textsuperscript{th} %ile: 51%
  - <10\textsuperscript{th} %ile: 42%
  - >90\textsuperscript{th} %ile: 7%

• Most common observations:
  1) laminar decidual necrosis (37%)
  2) pigment-laden macrophages (36%)
  3) delayed/irregular villous maturation: 32%
  4) amniotic fluid infection (28%)
Findings

• Most common observations:
  1) laminar decidual necrosis (37%)
  2) pigment-laden macrophages (36%)
  3) delayed/irregular villous maturation: 32%
  4) amniotic fluid infection (28%)
  5) intervillous thrombi (17%)
  6) perivillous fibrinoid deposition: 12%
Conclusions

1. Majority of placental weights (93%) either within normal (10\textsuperscript{th} - 90\textsuperscript{th} %ile) range or underweight (<10\textsuperscript{th} %ile)

2. Majority of pathologic findings not of demonstrable clinical relevance or significance

3. Villous maturation is the most subjective assessment made on microscopic examination

4. Placental histopathology probably not a sufficiently sensitive or specific reflection of vitamin D status
Gross Placental Findings Relevant to Fetal Growth: Placental Weight

- **Light placenta (<10th %ile for GA):**
  - chronic uteroplacental insufficiency
  - chromosomal abnormalities
  - maternal tobacco use
  - congenital infection

- **Heavy placenta (>90th %ile for GA):**
  - placental hydrops
  - macrosomia, infant of diabetic mother
  - Beckwith-Weidemann syndrome
  - triploidy
Additional Placental Findings Relevant to Fetal Growth

- Gross:
  - infarcts (especially when multiple, large, and >5% of placental mass)

- Microscopic:
  - decidual vasculopathy
  - accelerated villous maturation
  - villous hypoplasia
  - increased numbers of nucleated red blood cells within villous capillaries
  - villous hypervascularity (chorangiosis)
decidual vasculopathy (DV) – lack of physiologic conversion
Accelerated villous maturation
avascular villi – fetal thrombotic vasculopathy
Pigmented macrophages
Pigmented macrophage (meconium)