The Hazards of Placenta Accreta

Deirdre J. Lyell, MD
Associate Professor, Maternal-Fetal Medicine
Lucile Packard Children’s Hospital at Stanford
UCSF Antepartum & Intrapartum Management Course
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Disclosures
I have nothing to disclose

Placenta increta is
A. Placenta attached to the myometrium
B. Placenta into the myometrium
C. Placenta through the myometrium and serosa

The recommended time to deliver women with accreta is
A. 33-34 weeks
B. 34-35 weeks
C. 35-36 weeks
D. 36-37 weeks
Objectives
- Definitions, causes and demographics
- Maternal and neonatal hazards
- Antenatal diagnosis
- Best management practices

Placenta percreta with bladder invasion at cesarean delivery

Definitions, causes and demographics of accreta

Belfort et al, Am J Obstet Gynecol, Nov. 2010
Cause?

- Overly invasive trophoblast
  - Accreta reported in setting of no known prior scarring
  
  OR

- Insufficiently protective/deficient decidua
  - Lower uterine segment
  - Scarring

Risk factors

- Myometrial damage/scarring
  - Prior uterine surgery: cesarean, myomectomy, dilation and curettage, thermal ablation
  - Uterine artery embolization, radiation
  - Asherman Syndrome

- Placenta previa

- Submucous fibroids

- Multiparity

- Advanced maternal age

Risk factors

- Prior uterine surgery (cesarean) and previa:
  - After one cesarean, 0.3% (11%-25% if previa)
  - After two cesareans, 0.6% (40% if previa)
  - After three cesareans, 2.4% (61% if previa)
Accreta: increasing with cesarean delivery

![Graph showing increasing rates of accreta with cesarean delivery over time.]

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<tr>
<th>Year</th>
<th>Cesarean</th>
<th>Vaginal birth</th>
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Accreta: increasing with previa

<table>
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<tr>
<th>Risk Factor</th>
<th>Increased Risk</th>
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<tr>
<td>Prior placenta previa</td>
<td>8x</td>
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<tr>
<td>Prior cesarean delivery</td>
<td>1.5-15x</td>
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<tr>
<td>Prior suction curetage</td>
<td>1.3x</td>
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<tr>
<td>Age &gt; 35 years</td>
<td>4.7x</td>
</tr>
<tr>
<td>Age &gt; 40 years</td>
<td>9x</td>
</tr>
<tr>
<td>Multiparity</td>
<td>1.1-1.7x</td>
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<tr>
<td>Non-white (all)</td>
<td>0.3x</td>
</tr>
<tr>
<td>Asian</td>
<td>1.9x</td>
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<tr>
<td>Cigarette smoking</td>
<td>1.4-3x</td>
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Maternal and neonatal hazards of accreta

- Acute, life-threatening bleeding
  - during pregnancy: 90% previa bleed by 37 weeks
  - during attempted placental removal
  - after surgery
  - renal, cardiac damage, TRALE, death
- 66 cases of cesarean with accreta+
  - 95% received rbc transfusion
  - 39% >10 units rbc's 0 to 46 units (mean 10±9)
  - 11% >20 units rbc's
- No differences found among accreta subtypes
Maternal Morbidity
- Surgical damage to surrounding organs
- Hysterectomy
- DVT/PE
- Infectious morbidity
- Amniotic fluid embolism
- Death: 6-7%
  - Washecka et al, Hawaii Med J 2002,

Fetal and Neonatal Morbidity

Fetal Outcomes
- No reported increases in fetal anomalies or IUGR
- Perinatal mortality from maternal hemorrhage in placenta previa:
  - 25% (1960)
  - 8-13% (1980s)
  - 1% (2010 estimate)

Neonatal Outcomes
- Late preterm birth
  - 34-35 weeks, recommended delivery timing
    - NIH: Timing of Indicated Late-Preterm and Early-Term Birth, Spong et al. Obstet Gynecol 2011 August
  - National SMFM survey, 2009
    - 50% deliver at 36 weeks
    - Northwest: greatest percent of providers who deliver at 35 weeks
      - Esakoff et al. JMFNM 2012
  - Utah average GA at delivery: 35.4 weeks
    - Eiler at al., BJOG 2009
March 2011, Stanford

- Three prior cesareans
- Prior classical hysterotomy
- Prior uterine rupture
- Previa, ultrasound suggestive of accreta
- 29 week delivery due to persistent contractions

Antenatal diagnosis

Ultrasound diagnosis of accreta

- Relatively small studies
- Differences in techniques, definitions
- Important to consider:
  - High PPV to justify aggressive management
  - High NPV to justify less aggressive management
  - Cali et al., Ultrasound Obstet Gynecol 2013;41:406-12

Ultrasound diagnosis

- Ultrasound diagnosis, UCSF
  - PPV 68%
  - NPV 98%
- Placental lakes + <1 mm myometrial thickness
  - PPV 72%
    - Twickler, JMF 2000
- Numerous coherent vessels in 3D
  - 97% sensitivity, 92% specificity, PPV 76%
    - Shih Ultrasound Obstet Gynecol, 2009
Loss of clear space

Bladder line: thin or interrupted?

High flow in lacunae
Multiple lacunae

NPV 97-100% PPV 15-50%

NPV 88-92% PPV 75-100%

>6, irregular shape

Cali et al., Ultrasound Obstet Gynecol 2013;41:406-12

Clear space

- Irregular or absent “clear space” behind placenta

Doppler

- High flow
- Bridging vessels: Vessels bridging uterine-placental margin, bladder, or serosa

Normal
Absent
Cali et al., Ultrasound Obstet Gynecol 2013

- Using 5 criteria:
  - Clear space, bladder line, lacunae/flow, irregular intraplacental vascularization, hypervascular uterine serosa/bladder wall
  - At least 2 criteria were present in all accreta/percreta cases
  - All women without accreta/percreta had 0 or 1 criteria

Antenatal detection of accreta: US

- Ultrasound meta-analysis:
  - sensitivity 90.72% (95% CI, 87.2-93.6)
  - specificity 96.94% (95% CI, 96.3-97.5)
  - LR+ 11.01 (95% CI, 6.1-20.0)
  - LR- 0.16 (95% CI, 0.11-0.23)
  - Color doppler had the best predictive accuracy


Antenatal detection of accreta: MRI

- MRI: meta-analysis:
  - sensitivity 94.4% (95% CI 86.0-97.9)
  - specificity 84.0% (95% CI 76.0-89.8)
  - +LR: 5.91 (95% CI 3.73-9.39)
  - -LR: 0.07 (95% CI 0.02-0.18)
  - MRI may be useful for depth and location of invasion

  - Helpful if ultrasound is inconclusive

Stanford accreta evaluation protocol: US

- Lacunae? Presence and number?
- Turbulent flow?
  - Peak systolic velocity
- Retroplacental clear space
- Uterine-serosa bladder wall interface: hypervascular?
- Irregular placental vessels crossing tissue planes?
- Placental location: previa: lateral, posterior?
Serum analytes?

- MS-AFP: associated with increased accreta
  - Kuperminc MJ et al Obstet Gynecol 1993

- >2.5 MoM, OR 8.3 (95% CI 1.8-39.3)
- free beta hCG >2.5 MoM OR 3.9 (95% CI 1.9-9.9)
  - Hung et al, Obstet Gynecol, 1999

First trimester: PAPP-A?

- Cleaves IGF from IGF-BP4
- Low PAPP-A implicated in poorly invasive placentation
- Elevated PAPP-A seen with overly invasive placentation?

PAPP-A and accreta

- Retrospective study of 16 accretas, 82 previa controls
  - Median PAPP-A 1.68 MoM accreta vs. 0.98 previa
    - Desai N. et al., Prenat Diagn Feb 2014

- CA GDSP and OSHPD linked databases
  - 37 accretas, 699 previa controls
  - PAPP-A ≥ 95th%ile (2.63 MoM)
    - aOR 8.71, 95% CI 2.77 – 27.42
    - Lyell et al., SMFM February 2014

Best management practices
When to deliver? Why 34-35 weeks?
- Decision analysis
- Estimated maternal hemorrhage, perinatal mortality, ICU admission risks
- Weighted outcomes: maternal ICU admission, neonatal RDS, cerebral palsy, mental retardation, infant death
- Compared 9 delivery strategies, 34-39 weeks
  - +/- betamethosone
  - +/- lung maturity amniocentesis
- Robinson and Grobman, *Obstetrics and Gynecology*, 2010

Who should deliver and where?
- Multidisciplinary team
  - in-house Obstetrics and Anesthesia
  - immediately available Gynecologist Oncologist
  - and Interventional Radiology team
  - fully stocked blood bank
  - NICU/ICU

Table 5. Ranked Quality-Adjusted Life Years
Outcomes of Different Strategies

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<thead>
<tr>
<th>Rank</th>
<th>Strategy</th>
<th>QALY</th>
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<tbody>
<tr>
<td>1st</td>
<td>Scheduled delivery at 34 wk</td>
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<tr>
<td>2nd</td>
<td>Scheduled delivery at 35 wk</td>
<td>119.17</td>
</tr>
<tr>
<td>3rd</td>
<td>Scheduled delivery at 36 wk</td>
<td>119.05</td>
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<tr>
<td>4th</td>
<td>Scheduled delivery at 36 wk pending amniocentesis</td>
<td>119.02</td>
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<tr>
<td>5th</td>
<td>Scheduled delivery at 37 wk</td>
<td>118.99</td>
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<td>6th</td>
<td>Scheduled delivery at 37 wk pending amniocentesis</td>
<td>118.96</td>
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<tr>
<td>7th</td>
<td>Scheduled delivery at 38 wk</td>
<td>118.86</td>
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<td>8th</td>
<td>Scheduled delivery at 38 wk pending amniocentesis</td>
<td>118.84</td>
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<tr>
<td>9th</td>
<td>Scheduled delivery at 39 wk</td>
<td>118.74</td>
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QALY, quality-adjusted life year.

Who should deliver and where?
- Multidisciplinary team vs. standard care
  - 5-fold reduced composite early maternal morbidity
    - OR 0.22 (95% CI, 0.07–0.70)
  - Less transfusion >4 units prbcs
    - 43% vs. 61%, *P* = .031
  - Less reoperation w/in 7 days for bleeding
    - 3% vs. 36%, *P* < .001
- Eller, Obstet Gynecol, Feb. 2011
Delivery: it takes a village

Management: pre-op
- Large bore I.V. access, availability of high-flow infusion device
- 1-2 MTG equivalents in the room
- DVT prophylaxis
- Avoidance of hypothermia
- Antibiotics one hour prior to delivery
  - Repeat >1500cc EBL or >3 hours surgery
- I.R.?

Elective hysterectomy?
- Create fundal hysterotomy, deliver
- If future childbearing is planned and feasible:
  - Can await spontaneous placental separation (do NOT attempt manual separation)
- If proceeding with hysterectomy:
  - Do not attempt placental removal
  - Close hysterotomy

Persistent bleeding: temporizing measures
- Diffuse, nonarterial bleeding
  - Pelvic pressure packing with laparotomy sponges
  - Infrarenal aortic compression
  - Balloon occlusion or clamping of aorta reported in extreme cases
  - Risks: distal thrombosis and ischemia
  - “Know when to walk away”
Interval staged surgery

August, 2012, Stanford

Postoperative care

- ICU admission, observation
  - Correction of coagulopathy, anemia, ongoing evaluation for bleeding, renal tract injury
  - Low threshold for re-exploration

Postoperative risks

- Prolonged surgery, massive transfusion, hypotension
  - Renal, cardiac and other organ dysfunction
  - Sheehan syndrome
    - Hyponatremia is an early sign
  - Pulmonary edema, TRALE
  - PE
  - Infection

Program in Placental Disorders, Stanford

Streamlining Complex Maternal Care for a Safe Delivery for Mothers and Newborns
Program Goals

- Minimize morbidity and mortality for mother and newborn
- Maximize coordination of care
- Research the problem of abnormal placentation
  - Data and tissue banks

Coordination for a Safe Delivery

- Maternal-Fetal Medicine
- Obstetric Anesthesia
- Gynecologic Oncology
- Trauma Surgery
- Vascular Surgery
- Pediatric Radiology
- Interventional Radiology
- Adult Critical Care
- Neonatal Intensive Care
- Transfusion Services
- Perinatal Nursing
- Pathology

Placenta increta is

A. Placenta attached to the myometrium
B. Placenta into the myometrium
C. Placenta through the myometrium and serosa

The recommended time to deliver women with accreta is

A. 33-34 weeks
B. 34-35 weeks
C. 35-36 weeks
D. 36-37 weeks
Referrals

- Center for Maternal and Fetal Health
  - Diagnosis
  - Consultation
  - Management

650-724-2221

Prevention

- Avoid first cesarean when possible

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