Placenta Previa: Accreta, Increta and Percreta

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Objectives

• The learner will be able to describe the epidemiology of placenta accreta.
• The learner will be able to compare and contrast the three types of placenta accreta.
• The learner will be able to identify the risk factors of placenta accreta.
Placenta Previa

- Placental tissue covers the cervix occurring in approximately 1 in 200 pregnancies
Placenta Previa

- Normal placenta
- Umbilical cord
- Uterine wall
- Cervix
- Placenta previa
Placenta Previa
# Frequency of Placenta Previa

<table>
<thead>
<tr>
<th>Cesarean Delivery</th>
<th>Placenta Previa</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>3.3%</td>
</tr>
<tr>
<td>Second</td>
<td>11%</td>
</tr>
<tr>
<td>Third</td>
<td>40%</td>
</tr>
<tr>
<td>Fourth</td>
<td>61%</td>
</tr>
<tr>
<td>≥Fifth</td>
<td>67%</td>
</tr>
</tbody>
</table>
Risk Factors for Placenta Previa

- Previous cesarean section*
- Smoking
- Cocaine use
- Previous uterine surgery
- Previous placenta previa
- Grand multiparous
- Advanced maternal age
## Incidence of Cesarean Delivery in US

<table>
<thead>
<tr>
<th>Year</th>
<th>CD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>31.8%</td>
</tr>
<tr>
<td>2006</td>
<td>30.5%</td>
</tr>
<tr>
<td>1996</td>
<td>20.7%</td>
</tr>
<tr>
<td>1988</td>
<td>24.7%</td>
</tr>
<tr>
<td>1970</td>
<td>5.5%</td>
</tr>
</tbody>
</table>
Unexpected Consequences of CD

- Cesarean section scar pregnancy
- Morbidly adherent placenta
- Uterine rupture
- Placenta previa
- Ectopic pregnancy
- Infertility
C/S Scar Pregnancy
C/S Scar Pregnancy
Morbidly Adherent Placenta

- Iatrogenic disease
- First described in the 20th century (1937)
- Incidence increases with number of CD
Accreta

• An abnormal placental implantation in which all or some of the anchoring placental villi attach to the myometrium, rather than being contained due to a loss of the decidua basalis
Decidua Basalis
## Incidence of Placenta Accreta

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>1:30,000 deliveries</td>
</tr>
<tr>
<td>1960</td>
<td>1:19,000 deliveries</td>
</tr>
<tr>
<td>1980</td>
<td>1:7,000 deliveries</td>
</tr>
<tr>
<td>1990</td>
<td>1:2,500 deliveries</td>
</tr>
<tr>
<td>2002</td>
<td>1:533 deliveries</td>
</tr>
<tr>
<td>2012</td>
<td>As high as 1:333 deliveries</td>
</tr>
</tbody>
</table>

Belfort, 2010
Grading

- Three grades are used, based on pathologic assessment of myometrial invasion by the chorionic villi:
  - Placenta Accreta - chorionic villi in contact with myometrium (80% of cases)
  - Placenta Increta - chorionic villi invade into myometrium (15% of cases)
  - Placenta Percreta - chorionic villi invade into serosa (5% of cases)
**Placenta accreta:**

1) Usually occurs in previous CS scar (low and above bladder)

2) Placenta invades deeply within scar (becomes “accreta”)

3) Placenta starts low (growing over cervical os, becoming “previa”)

4) Placenta previa + (multiple) previous CS → high likelihood of accreta

5) Commonest organ for invasion by the placenta accreta is the bladder

6) Diagnosis by US or MRI
Accreta Risk Factors

- Placenta previa risk is markedly increased when placenta overlies a previous uterine scar
- Prior cesarean section, uterine surgery, curettage, anomalies or irradiation, endometrial ablation, Asherman’s syndrome and leiomyomata
- Advanced maternal age
- Multiparity
- Hypertensive disorders of pregnancy
- Smoking
Placenta accreta
Placenta Increta

• Deep myometrial invasion of trophoblast villi
Placenta Percreta

- Placental villi perforating through the full thickness of the myometrium and uterine serosa with possible involvement of adjacent organs (intestine, bladder, abdominal wall)
Placenta Percreta

• Blood requirements associated with percreta
  – 90% require transfusion
  – 40% require greater than 10 units of PRBC’s
  – Median requirement 8 units
Normal (Decidua)

Increta (17%)

Stratum basalis of endometrium

Myometrium

Accreta (75-78%)

Percreta (5%)
Placenta Percreta
Percreta
Placenta Increta and Percreta Incidence

- Less than 20% of the cases of placenta accreta
Placenta Accreta Complications

- Hysterectomy
- Profuse hemorrhage
  - 700-900mL of blood flow through uterus @ term
- Sepsis
- Uterine rupture
- Abnormal fetal growth/oligohydramnios
- Maternal and/or fetal death

Belfort, 2010
Placenta Accreta – Clinical Outcomes

- Maternal ICU admissions
- Coagulopathy
- Ureteral injury
- Infections
- Return to the OR

Eller, 2009
Placenta Accreta – Clinical Outcomes

• Blood loss: > 3,000mL
• Blood transfusion (average): 90%
  – 40% require 10 units
• Ureteral injury: 10-15%
• ICU admission: 25-50%
• Maternal death: up to 7%
• Fetal risks secondary to prematurity/ bleeding

Bauer & Bonanno, 2009
Mortality

- One report suggested maternal mortality associated with placenta accreta may be as high as 5 - 6%
  - Washecka & Behling (2000)
- Amniotic fluid embolism has also been reported in association with placenta accreta
Diagnosis

• Improves maternal outcome
• Opportunity for counseling
  – Risks of adverse outcome
  – Potential loss of fertility
  – Prolonged hospitalization
• Frequent maternal and fetal evaluation
• Planning delivery
Diagnosis

• High quality ultrasound
• MRI
• Maternal AFP
Maternal Serum AFP

- Elevated serum AFP is associated with the presence of placenta accreta
Ultrasound Diagnosis

• A normal placental attachment site is characterized by a hypoechoic boundary between the placenta and the bladder

• Sensitivity has been reported between 77% and 87%, and the specificity 96% to 98%, positive predictive value 65% to 93% and the negative predictive value is 98%
Ultrasound Diagnosis

• The presence and increasing number of lacunae within the placenta at 15–20 weeks of gestation have been shown to be the most predictive sign of placenta accreta, with a sensitivity of 79% and a positive predictive value of 92%.

• These lacunae may result in the placenta having a “Swiss cheese” appearance.
MRI

• Not superior to ultrasound
• High rate of false positives
• Specific benefit
  – Parametrial invasion
  – Ureteral involvement
  – Posterior placenta
Diagnosis

• When the diagnosis of placenta accreta is made, the need for hysterectomy should be anticipated and arrangements made for delivery in a center with adequate resources, including those for embolization and massive transfusion
Management

- Antenatal steroids
- Mag sulfate for neuro protection
- Antepartum monitoring
- Scheduled delivery
- Transfer to tertiary care facility
- Blood baking and other support services
- Staged embolization

Belfort, 2012
Goals of Management

• Avoid chaos!
• Controlled procedure
  – Delivery @ 34-35 weeks gestation
  – Availability of personnel
  – Availability of blood
Management by Interdisciplinary Team

- Less likely to require large volume transfusion
- Less return to OR
- Less admissions to ICU
- Less coagulopathies
- Less ureteral injury

Belfort, 2010
Outpatient Goals

• Complete transfer of care in a timely fashion.
• Contact all primary team members upon TOC.
• Develop plan of care for outpatient with placenta accreta.
• Integrate outpatient care with multi-disciplinary team to maximize maternal and fetal outcomes.
• Perform all appropriate imaging studies.
• Initiate hemoglobin enhancing medications based on H&H.
• Provide updates as needed to primary team members.
• Arrange for admission to Antepartum at approximately 33 weeks gestation
Workflows

• Workflows were developed with the goal of providing the optimal quality patient experience for both the outpatient and inpatient services

• Job related not person related

• To develop a “recipe” for providing care to these patients regardless of who was providing the care
Optimal Timing of Delivery

• 44% rate of emergency delivery at <36 weeks gestation for maternal hemorrhage who were scheduled for C-Hyst at 36 weeks gestation

• Another study noted that 65% of accreta cases delivered due to antepartum bleeding
  • 93% of those beyond 35 weeks had antepartum bleeding
  • Warshak et al. (2010)
Hospitalization

• Antepartum hospitalization between 33 and 34 weeks gestation
• Contraction monitoring for “occult cervical dilatation through unperceived contractions”
• Daily non-stress test
  • Belfort (2011)
Antepartum Management

• Appropriate surgical facilities and personnel
  – MFM, Urology, GYN/ONC, Interventional Radiology, Anesthesia and Nursing

• Blood bank capable of large scale transfusion of a full range of blood products
Antepartum Order Set

Nursing
- Assess vital signs every 4 hours while awake
- Apply Sequential Compression Devices (SCDs) while in bed
- Non-stress test daily and prn
- Venofer 300mg IV every other day x 2 doses
- Epogen 40,000 units IV
- Betamethasone 12mg IM every 24 hours x 2 doses
- Type & screen available at all times
- CBC on admission
Iron Replacement

• Hgb <13mg/dL
• Epoetin – (Epogen®)(Eprex®)(Procrit®)
  – A hormone for erythrocyte precursors stimulates peripheral stem cells in the bone marrow to produce red blood cells
  – 40,000 units IV x 1 dose/per week
Iron Replacement

• Venofer®
  – Hgb <13mg/dL
  – IV Iron Sucrose Injection
  – 300mg IV every other day x 2 doses
  – Rise in hemoglobin of approximately 1.5g/week during the second week and thereafter
  – Oral iron must not be administered concomitantly with a course of IV iron. Allow a period of 5 days before resumption of oral iron
# Venofer® Administration

<table>
<thead>
<tr>
<th>300mg Venofer® in 300mL Sodium Chloride 0.9%</th>
<th>25mg in 25mL over 15 mins. (IV pump set 100mL/hr, VTBI 25mL)</th>
<th>175mg in 175mL to be infused. Max infusion rate 200mL/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>300mg Venofer® in 300mL Sodium Chloride 0.9%</td>
<td>Administer over at least 60 minutes 600mL/hr for 300mL bag</td>
<td></td>
</tr>
</tbody>
</table>
Multi-disciplinary Consults

- GYN-ONC
- Neonatology
- Anesthesia
- Blood Bank
- Urology
- Interventional Radiology
Inpatient Goals

• Notify all primary team members of inpatient admission.
• Integrate inpatient care with multi-disciplinary team to maximize maternal and fetal outcomes.
• Initiate hemoglobin enhancing medications based on H&H.
• Complete course of antenatal steroids.
• Maintain preoperative hemoglobin above 13gm/dL.
• Distribute summary documentation (SBAR).
• Verify instrument, equipment and supplies with surgeons.
• Conduct all consults and obtain consents prior to day of surgery.
Optimal Timing of Delivery

- Decision Analysis Model
  - Used 9 delivery timing strategies
    - 34,35,36,37,38,39,FLM @ 36,37,38,
  - Maternal ICU admission
  - Perinatal mortality
  - Infant mortality
  - Infant RDS
  - Mental retardation
  - Cerebral palsy

Robinson & Grobman (2010)
Preferred Delivery Time

• Issues to consider
  – Increased risk of emergent delivery as EGA increases – maternal and neonatal effects
  – 90% with placenta previa will have symptomatic bleeding before 37 weeks
  – 50% of mortality is associated with delivery after 35 weeks

Belfort, 2012
Intraoperatively

- Intraoperatively, attention should be paid to abdominal and vaginal blood loss.
- All sponges, laps, etc. must be weighed and a running total calculated
  - Total for C/S
  - Total for Hyst
  - Total for after Hyst and ongoing
Cystoscopy

- Performed by a urologist under fluoroscopy, places stents to assist with ureteral identification during pelvic surgery.
Selective Arterial Embolization

- Selective arterial embolization (SAE) has been used in a variety of clinical settings to control hemorrhage.
- Interventional radiologist (IR) under fluoroscopic guidance introduces a catheter via the femoral artery to the uterine artery, gelfoam pledgets or coils are used to occlude the uterine artery.
Selective Arterial Embolization

• Prophylactically placed catheters reduce the total blood loss and incidence of coagulopathy, compared with catheterization performed in an emergent setting
  • Alvarez et al. (1992)

• Both sides of the pelvis may be accessed through a single puncture
Selective Arterial Embolization
Intraoperative Cell Salvage

- Intraoperative blood salvage (IBS) – 1984
- The cell saver device washes and filters the suctioned fluid and collected red red cells can be re-infused.
- Once the infant is delivered, remove all fetal products and amniotic fluid from the operative field.
- Blood collected with a large-bore suction device.
- Cell salvage depletes platelets and coagulation factors
# Massive Transfusion Protocol

<table>
<thead>
<tr>
<th>Cycle #</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC</td>
<td>6 units</td>
<td>6 units</td>
<td>6 units</td>
</tr>
<tr>
<td>FFP</td>
<td>4 units</td>
<td>4 units</td>
<td>4 units</td>
</tr>
<tr>
<td>Platelets</td>
<td>5 units pooled</td>
<td>5 units pooled</td>
<td>5 units pooled</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>-</td>
<td>10 units pooled</td>
<td>10 units pooled</td>
</tr>
<tr>
<td>R FVIIa</td>
<td>-</td>
<td>Consider</td>
<td>Administer</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>-</td>
<td>5 grams</td>
<td>4 grams</td>
</tr>
</tbody>
</table>

Should also include laboratory studies
Complications of Massive Transfusion

- DIC – dilutional
- Hypothermia – blood stored at 1° - 6°
- Acidosis – pH of PRBC’s 6.8 – 7.0
- Hypocalcemia (citrate binds to Ca++)
- Hyperkalemia
  - K+ leaches from RBC in stored blood
- ARDS antibody-antigen mediated
Thank You