Morbidly adherent Placenta

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"PPH: Predict, Prepare, Handle!" HOSHAS
PPH: Predict, Prepare, Handle!

**INTRODUCTION**
- Low → High INCIDENCE
- Intrapartum → Prenatal DIAGNOSIS
- Reducing Mortalities → reducing Morbidities

**PREDICT**
- History
- Ultrasound
- MRI

**PREVENT**
- Caesarean
  - primary
  - Repeat / VBAC
- Techniques
  - MRP
  - D&C
  - Caesarean

**PREPARE**
- Safe confinement admission
- Counseling and consent
- Blood and blood products
- Anaesthetic referrals
  - ICU back up
  - Gynaecologist / Paediatricians

**HANDLE**
- Multidisciplinary
  - Surgeon
  - MFM / Gynaecologist
    - Urologist
    - Vascular surgeon
  - Perfusionist
  - Interventionist Radiologist
- Emergency → Plan surgery
  - Caesarean hysterectomy
    - in reducing morbidities
  - Conservatives

Content: \( PP_{x_{2}}H \) or \( PP^{2}H \)

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Introduction - incidence

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### Maternal Mortality

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1934</td>
<td>37.2%</td>
</tr>
<tr>
<td>1945 – 1955</td>
<td>10.1%</td>
</tr>
<tr>
<td>1955 – 1969</td>
<td>9.4%</td>
</tr>
<tr>
<td>&gt; 1970s</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

- Bleeding
- Uterine rupture

### Morbidities

#### Maternal
- DIVC
- Blood transfusion related
- Ureteral damage / Bladder injury
- Infections – esp conservative Mx
- Longer hospital stay

#### Fetal
- Prematurity
- Antepartum/Intrapartum fetal distress

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**Introduction – Reducing mortality and morbidities**

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Introduction: Diagnosis

- Intrapartum surprises – vaginal deliveries / caesarean – worst if it was emergency.

- Antenatal or prenatal diagnosis
  - Any gestation
  - Even at first trimester

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Diagnosis: surprise at an early gestation

G5P2A3 at 15 wks
- (1 caesarean and two D&C))
- Referred for epigastric pain / anaemia / asystole
- Autopsy: ruptured uterus / placenta increta

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- Previous uterine surgery
- Caesarean

### Table 2. Link between number of previous caesarean sections and risk of placenta accreta, placenta praevia and hysterectomy

<table>
<thead>
<tr>
<th>Number of previous caesarean section(s)</th>
<th>Number of women</th>
<th>Number of women with placenta accreta</th>
<th>Chance of placenta accreta if placenta praevia</th>
<th>Number of hysterectomies</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6201</td>
<td>15 (0.24%)</td>
<td>3%</td>
<td>40 (0.65%)</td>
</tr>
<tr>
<td>1</td>
<td>15 808</td>
<td>49 (0.31%)</td>
<td>11%</td>
<td>67 (0.42%)</td>
</tr>
<tr>
<td>2</td>
<td>6324</td>
<td>36 (0.57%)</td>
<td>40%</td>
<td>57 (0.9%)</td>
</tr>
<tr>
<td>3</td>
<td>1452</td>
<td>31 (2.13%)</td>
<td>61%</td>
<td>35 (2.4%)</td>
</tr>
<tr>
<td>4</td>
<td>258</td>
<td>6 (2.33%)</td>
<td>67%</td>
<td>9 (3.49%)</td>
</tr>
<tr>
<td>5</td>
<td>89</td>
<td>6 (6.74%)</td>
<td>67%</td>
<td>8 (8.99%)</td>
</tr>
</tbody>
</table>

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### Table 1. Diagnostic performance of different ultrasound modalities

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Positive predictive value (%)</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greyscale</td>
<td>95</td>
<td>76</td>
<td>82</td>
<td>93</td>
</tr>
<tr>
<td>Colour Doppler</td>
<td>92</td>
<td>68</td>
<td>76</td>
<td>89</td>
</tr>
<tr>
<td>Three-dimensional power Doppler</td>
<td>100</td>
<td>85</td>
<td>88</td>
<td>100</td>
</tr>
</tbody>
</table>
Greyscale:
- loss of the retroplacental sonolucent zone
- irregular retroplacental sonolucent zone
- thinning or disruption of the hyperechoic serosa-bladder interface
- presence of focal exophytic masses invading the urinary bladder
- abnormal placental lacunae.

Predict: Ultrasound
Colour Doppler:
- diffuse or focal lacunar flow
- vascular lakes with turbulent flow (peak systolic velocity over 15 cm/s)
- hypervascularity of serosa–bladder interface
- markedly dilated vessels over peripheral subplacental zone.

Predict : Ultrasound

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Three-dimensional power Doppler:
- numerous coherent vessels involving the whole uterine serosa-bladder junction (basal view)
- hypervascularity (lateral view)
- inseparable cotyledonal and intervillous circulations, chaotic branching, detour vessels (lateral view).
3D ULTRASOUND

Placenta Praevia

Placenta percreta without bladder invasion

Placenta percreta with bladder invasion

Predict : Ultrasound

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Percreta with Bladder invasion

Greyscale  Color Doppler  Power Doppler  3D ultrasound  At surgery

Predict : Ultrasound

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G3P2A at 14 wks
(2 D&C/ no caesarean)

Predict : US at early gestation

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The main MRI features of placenta accreta include:

- uterine bulging
- heterogeneous signal intensity within the placenta
- dark intraplacental bands on T2-weighted imaging.
MRI: Invasion to other

Bladder Invasion

Parametrial Invasion

Cervico-trigonal vascular hyperplasia (CTVH)

Vessels crossing the interface disruption site

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Safe confinement

- Admit at 32 weeks
  - 93% bleeding after 35 weeks
  - Caesarean at 34 – 35 weeks
  - No increase neonatal morbidity

Counseling and consent

- Understand the severity
- Blood loss
  - Blood flow to uterus
    - 60 ml/min non pregnant
    - 500-700 ml/min pregnant
- Massive transfusion and complications
  - Caesarean Hysterectomy
  - May need 2nd or 3rd relaparotomy
  - Ureteric stenting
  - Intervention Radiology Techniques
  - Conservative and its morbidities

Major obstetrical emergency, not treated promptly may result in rapid exsanguination and demise of the mother

Prepare: Admission

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Anaesthetic and ICU

- Experienced anaesthetic team
  - Adequate lines including central line
  - Manage massive blood transfusion reaction
  - Patient should not die of bleeding!!

- ICU
  - Prolonged general anaesthesia
  - Ventilate
  - Manage fluid / blood transfusion

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Neonatologist / Paediatricians

- Morbidities
  - Shock: maternal-fetal haemorrhage
  - Fetal distress

Prepare: Neonatologist

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Blood & Blood Products

• 90 % require blood transfusions
• 40 % ≥ 10 unit packed RBC
• Have in OT
  • 10 units of PC
  • 2 DIVC
• Blood bank for more blood and blood products
• Porter service

Prepare:

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Interventional Radiology
Technique

- Angiogram room
- Balloon catheter inserted into the artery – premeasured the size and volume to inflate the catheter
  - Internal iliac artery
  - Common Iliac artery
  - Aorta

Handle : Multidisciplinary team

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Handle: Interventional Radiology Technique

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<table>
<thead>
<tr>
<th>Procedure</th>
<th>S1 invasion (uterine body)</th>
<th>S2 invasion (lower segment, cervix, vagina)</th>
<th>Parametrial Invasion</th>
<th>CTVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>OSCS-SAH</td>
<td>OSCS-TAH</td>
<td>OSCS-TAH</td>
<td>OSCS-SAH</td>
</tr>
<tr>
<td>Proximal vascular Control</td>
<td>Uterine or anterior iliac artery</td>
<td>Aortic or bilateral common iliac</td>
<td>Aortic OR bilateral common iliac</td>
<td>Aortic or bilateral common iliac</td>
</tr>
<tr>
<td>Uterine vascular control</td>
<td>UAE-UAL-compression Sutures</td>
<td>IIAE-CHO square suture</td>
<td>IIAE-CHO square and simple suture</td>
<td>Avoid dissection or Embolization</td>
</tr>
<tr>
<td>Ureteral catheterization</td>
<td>Not necessary</td>
<td>Recommendable</td>
<td>Mandatory</td>
<td>Recommendable but usually very difficult</td>
</tr>
</tbody>
</table>

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**Urologist**

- Cystoscopy
- Ureteric stenting
- Remove after 14 days – 2 months

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**Handle : Multidisciplinary team**

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### MFM / Gynae Oncologist
- Pre plan surgical technique
  - Midline incision
  - Classical Caesarean
  - Deliver baby and clamped cord
  - Leave placenta in situ / no attempt of removal
  - Inflate balloon catheter
  - Caesarean hysterectomy
    - Matsubara technique
    - Palaqios one step surgery
  - Deflate balloon catheter

### Surgical technique
- Abdominal incision
  - Widely expose retro-vesical space
  - Median infraumbilical with cephalad
- Uterine incision
  - Vertical / transverse / fundal
- Vesico-uterine area
- Bladder invasion

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**Handle : Multidisciplinary team**

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Vascular surgeon

Handle: Multidisciplinary team

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Handle: Surgical Vascular Control Technique

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Vesico- Uterine Area – Type 1

Lax dividing plane – placenta is detachable and appears as non percreta rebleed again closely observed the posterior bladder wall-circular dehiscence

• No newly formed vessels at placental-vesical or vesico-uterine

• Lax dividing plane between posterior bladder wall and anterior surface of uterine segment

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Palacios Jaraquemada, 2012
Both lower uterine segment and posterior bladder are noticeably thinner.

No lax plane between both organs and a fibrous scar connects them.

No newly formed vessels at placental-vesical or vesicouterine.

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Vesico Uterine Area Type 3

Thinner uterine segment, vesical wall of variable thickness

Neovascular circulation
Placental-vesical
Vesicouterine

Vesicouterine plane with or without fibrous adherence
Pelosi’s maneuver

“Retrovesical Lower Uterine segment bypass hysterectomy”

• Stepwise vascular ligatures and vascular section.

• Open anterior side of parametrium and disect medially the cervico-vesical space (rarely invaded plane)

• Once inside the space both fingers introduced laterally (Pelosi’s maneuver) through vesico-cervical plane

• Dissection and ligature towards cephalad

Vesico-Uterine Area – Fibrous adhesions / Neovasculars

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Vesico Uterine Area - Open Bladder Technique (for bladder invasion)

"PPH: Predict, Prepare, Handle!" HOSHAS

Matsubara 2012
<table>
<thead>
<tr>
<th>G4P3A1, 1 caesarean</th>
<th>10 L loss</th>
<th>14 unit PC</th>
<th>3 DIVC cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5P4 1 caesarean</td>
<td>4.5 L loss</td>
<td>6 unit PC</td>
<td>2 DIVC cycle</td>
</tr>
<tr>
<td>G3 P2, 2 caesarean,</td>
<td>2 L loss</td>
<td>2 unit PC</td>
<td>2 DIVC cycle</td>
</tr>
</tbody>
</table>

Placenta Percreta with bladder invasion

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G4 P3A1 – one previous caesarean / bleeding at 34 weeks
MRI / Ultrasound – lateral placenta percreta
Ureteric stenting
Blood loss 10 liters
Received 14 litres + 3 DIVC cycles
Cell salvage & Perfusionist

Handle: Multidisciplinary team

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Prevention: Reducing Caesarean rate

Reduce primary caesarean
- Reduce induction of labour
- Methods of induction
- Define failed induction
- ECV
- Define established labour
- Delayed ARM
- Vigilance in CTG interpretation
- Define second stage
- Use of Forceps / Vacuum
- Proper management of Hypertension / Diabetes

Reduce Repeat Caesarean
- VBAC

National Obstetric Registry 2010

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• Techniques at caesarean
  • Remove placenta – CC
  • Gently ensure uterine cavity is emptied
  • Uterine closure

Prevention: Improve caesarean technique

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Complete reapproximation of incised decidua → restrict extent of trophoblast invasiveness.

Weak scar → Uterine rupture / abnormal placentation
- Single layer closure → double layer closure
- Locked single layer → unlocked single closure
- Inclusion of endometrial/decidua into the scar

Prevention: Techniques of uterine closure
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Tantbirojn P. et al Placenta, 2008
Story and Paterson Brown, Best Practice in Labour and Delivery, 2009
Bujold et al, Obstet Gynecol, 2010
Garmi S. Obset Gynecol, 2011
Roberge et al, Int j Gynaecol Obstet 2011
At 6 months: no observable thinning of scar by TVS/MRI: 1.5-3.5 cm

Prevention: Techniques of uterine closure

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Detach the placenta from the implantation site by keeping your fingers tightly together and using the edge of your hand to gradually make a space between the placenta and the uterine wall.

Prevention: techniques at MRP

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Prevention: techniques at D & C / ERPC

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Dilatation and Curettage Effect on the Endometrial Thickness

Robab Davar¹, Razieh Dehghani Firouzabadi¹, Kefayat Chaman Ara¹

¹ Department of Obstetrics and Gynecology, Shahid Sadoughi University of Medical Sciences, Yazd, IR Iran

<table>
<thead>
<tr>
<th>D&amp;C Number</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Significant¹</th>
<th>Spearman’s Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st measurement</td>
<td></td>
<td>10.00 ± 0.58</td>
<td>9.83 ± 0.47</td>
<td>8.90 ± 0.92</td>
<td>7.42 ± 0.18</td>
<td>7.40 ± 0.07</td>
<td>0.000</td>
</tr>
<tr>
<td>2nd measurement</td>
<td></td>
<td>10.62 ± 0.68</td>
<td>9.64 ± 0.49</td>
<td>8.48 ± 0.96</td>
<td>6.32 ± 0.15</td>
<td>6.90 ± 0.04</td>
<td>0.000</td>
</tr>
</tbody>
</table>

¹ Sig. at P < 0.01
b Correlation is significant at the 0.01 level (2-tailed)

Prevention : Medical vs Surgical evacuation

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Morbidly adherent Placenta

Each of us are equally responsible:

- Reduce incidence
- Reduce mortalities
- Reduce morbidities

Conclusion

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Thank you

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"PPH: Predict, Prepare, Handle!" HOSHAS
**ACCRETA PATIENT CHECKLIST**

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Type of abdominal incision planned:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Record Number:</td>
<td>Type of uterine incision planned:</td>
</tr>
<tr>
<td>Date of Planned Delivery:</td>
<td>Placenta Plan (remove yes/no):</td>
</tr>
<tr>
<td>GA at Planned Delivery:</td>
<td>Uterus Plan (planned C Hyst yes/no):</td>
</tr>
<tr>
<td>EDC:</td>
<td>Additional equipment needed:</td>
</tr>
<tr>
<td>Primary Obstetrician:</td>
<td>Additional imaging needed?</td>
</tr>
<tr>
<td>GYN Oncologist:</td>
<td>If so, type of imaging:</td>
</tr>
<tr>
<td>Anesthesiologist for C/S:</td>
<td></td>
</tr>
<tr>
<td>MFM Physician:</td>
<td>L&amp;D/MFCU Nurse Manager aware?</td>
</tr>
</tbody>
</table>

**Indication:**

- □ Anesthesiology Consult
  - □ Date of consult:
  - □ Consulting anesthesiologist:
  - □ Type of anesthesia planned:
  - □ Monitoring planned:
  - □ Number of PRBC units to be ready in OR:
  - □ Special equipment needed:
- □ Gynecology Oncology Consult
  - □ Date of consult:
  - □ Consulting physician:

Source: Paola Aghajanian, MD, and the Accreta Team at Cedars-Sinai Medical Center, Los Angeles, California
Table 2  Dose reducing techniques

Exclude the foetus from the direct beam whenever possible  
Keep fluoroscopy time to an absolute minimum  
Keep the tube current as low as possible by keeping the tube potential (kVp) as high as possible to achieve the appropriate compromise between image quality and low patient and foetal dose  
Keep the X-ray tube at maximal distance from the patient  
Keep the image receptor (image intensifier or flat-panel detector) as close to the patient as possible  
Use geometric magnification as little as possible  
Always collimate as tightly as possible to the area of interest  
Allow for posterior–anterior beam projection whenever possible  
Use low dose rate fluoroscopy  
Use last image hold (LIH) instead of spot fluorographic images to record the study and to plan the technique  
Avoid digital subtraction angiography (DSA)
• Foetal radiation dose
  • <100 mGy (diagnostic range dose) no increased in congenital malformation, still birth, miscarriage, growth or mental disability
  • >50 mGY an approximate doubling of natural baseline risk of childhood cancer
  • 20mGy (2 rad) –
    • 1-2 cases of childhood cancer occurring per 3000 children exposed to 10 mGy (1 rad)
    • Risk of childhood cancer increases incrementally above the 1- mGy dose level

• During POBC is low
  • Reducing fluoroscopy pulse rate
  • Dose reducing techniques (6.25 to 3.05 mGy)

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