Proactive Approaches For Patients at High Risk for Hemorrhage

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● NEBRASKA, WHERE A GREAT LIFE STARTS WITH HEALTHY MOMS AND HEALTHY BABIES. ●

Objectives

- Review the risk factors for obstetric hemorrhage
- Identify tools to recognize and predict risk for obstetric hemorrhage
- Explore planning measures to improve management and safety of patients at risk for hemorrhage

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- No financial disclosures
- I use AI to generate some images

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Terminology/Definitions

- PPH- postpartum hemorrhage
  - >1000ml at cesarean, >500ml at vaginal delivery
- CD- cesarean delivery
- SVD- normal vaginal delivery
- OVD- operative vaginal delivery (forceps, vacuum)
- PAS- Placenta Accreta Spectrum Disorder
- Pree- Pre-eclampsia
- HELLP- Hemolysis, Elevated Liver Enzymes, Low Platelets
- eQBL- Quantitative blood loss (weighed/measured)
- pRBC- packed red blood cells
- Crystalloid- normal saline or lactated ringer's solution
- Colloid- starch or albumin containing IV fluid

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Quality improvement requires a safe space.

We are here because everyone is trying their best to improve maternal care and outcomes.

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70–97%

of hemorrhage deaths are preventable

Primarily due to delay in treatment

Delays due to recognition and communication

California Department of Public Health, Maternal, Child and Adolescent Health Division. The California Pregnancy-Associated Mortality Review. Report from 2002-2007 maternal death reviews . Sacramento (CA): California Department of Public Health; 2018. Available at: https://www.cmqcc.org/resource/california-pregnancy-associated-mortality-review-ca-pamr-report-2002-and-2007-maternal.

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ARM YOUR TEAM

Simulation

Work with Partners to find proper level of care

Organization

Response Team

Debrief

Screen for Risk

Hemorrhage Protocols

Identify Hemorrhage Early

EQBL

Locate Source

Definitive Management

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Benefits of Simulation in Obstetric Emergencies

Improved Clinical Skills and Decision-Making
Practice high-stakes scenarios

Increased Confidence and Preparedness
Reduced anxiety

Teamwork and Communication
Interprofessional collaboration

Standardization of Care
Protocol reinforcement

Error Identification and System Improvement
Safe failure

Better Patient Outcomes
Reduced morbidity and mortality

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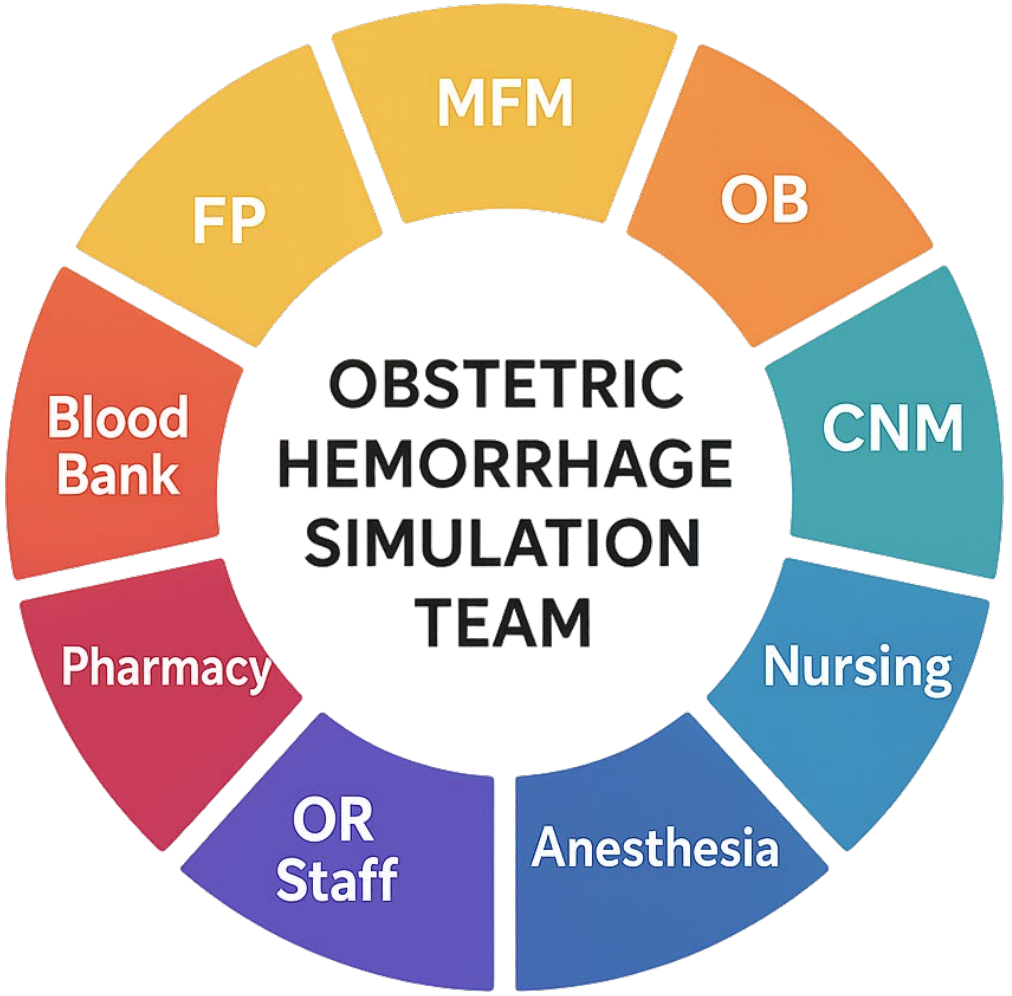
Multidisciplinary



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Share the Simulation

- Don’t limit them to your Obstetric Unit
- Redesign simulation for specific parts of the team
  - Perform in areas that have specific limitations or differences in resources

- EMS
- Emergency Department (with and without OB services)
- Postpartum Unit
- Intensive Care Unit

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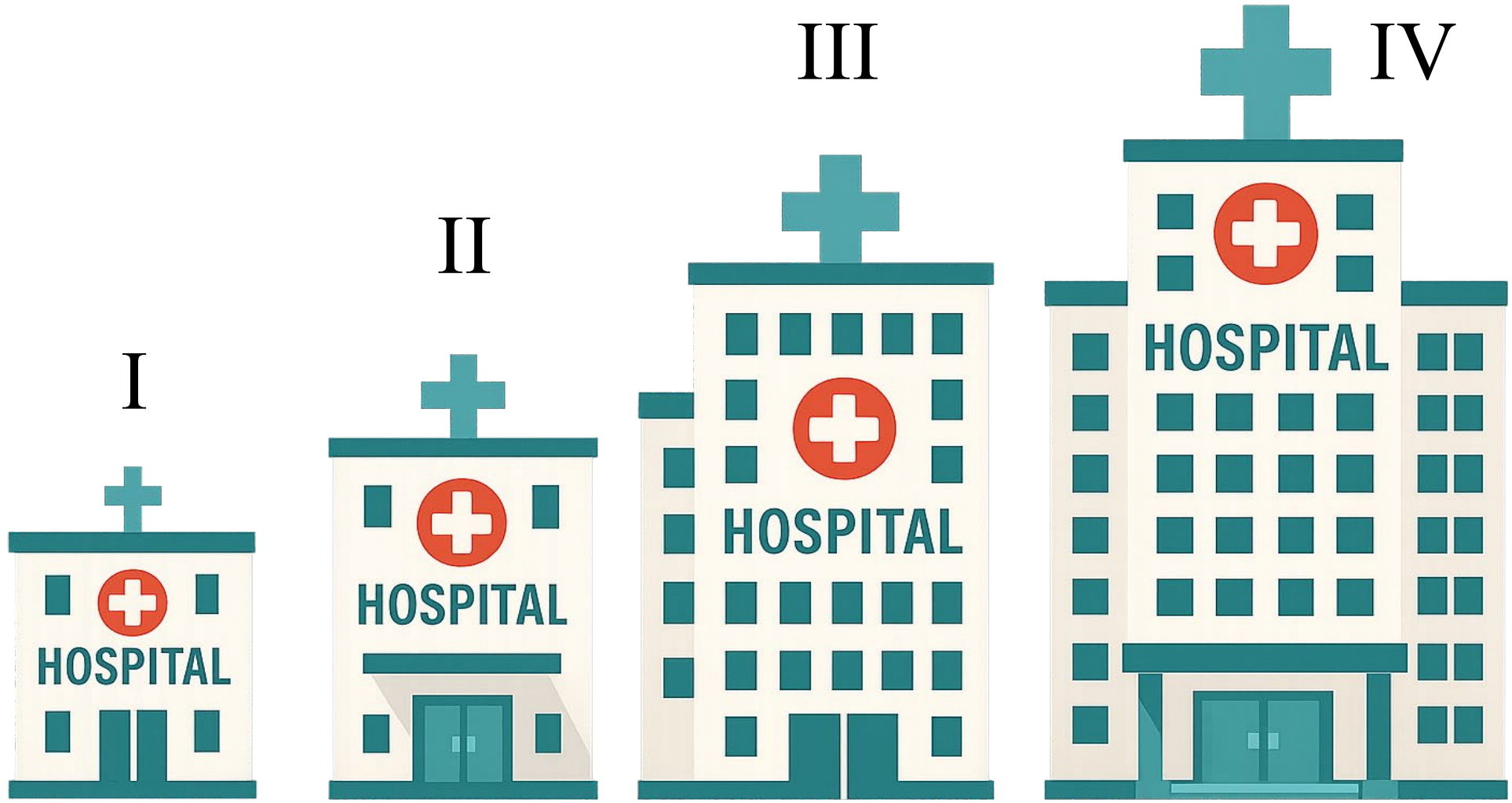
Work to Identify Your Level of Obstetric Care



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Levels of Obstetric Care

- Birth Center
  - Per American Association of Birth Centers
- Level I
  - OB or CNM available, low risk deliveries, ability to perform primary CD at all times, basic blood bank
- Level II
  - OB available at all times, MFM available for consult (in-person or via technology), moderate risk, multiple prior CD, MTP capability
- Level III
  - OB and Anesthesia in-house, MFM always available, high risk, complex surgery, complex neonatal care (Level III), adult ICU, IR services
- Level IV
  - All specialties available 24/7, Ob Anesthesia or significant OB anesthesia experience present at all times, diseases with predicted mortality, transplant level care, ECMO, level IV NICU care.

https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2019/08/levels-of-maternal-care

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Major Determinants for Level of Care

- Highest level of training for Obstetric Provider
- Availability of MFM
- In house presence of Ob and Anesthesia providers
- Blood bank
- Level of NICU Care

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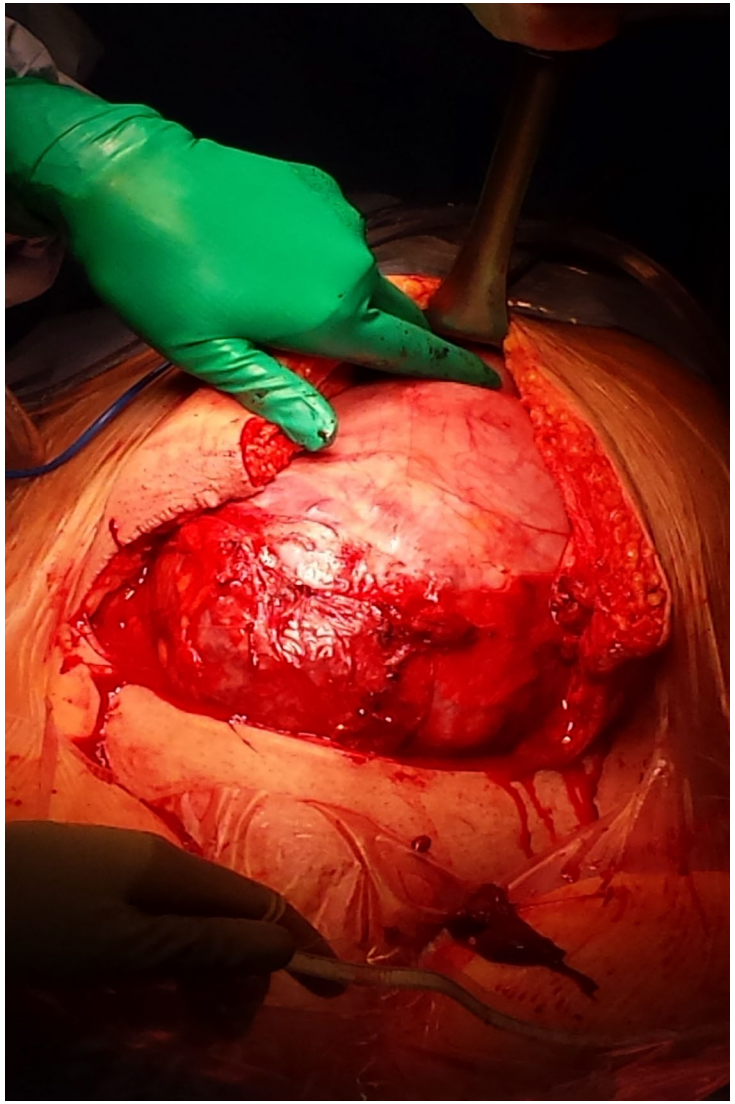

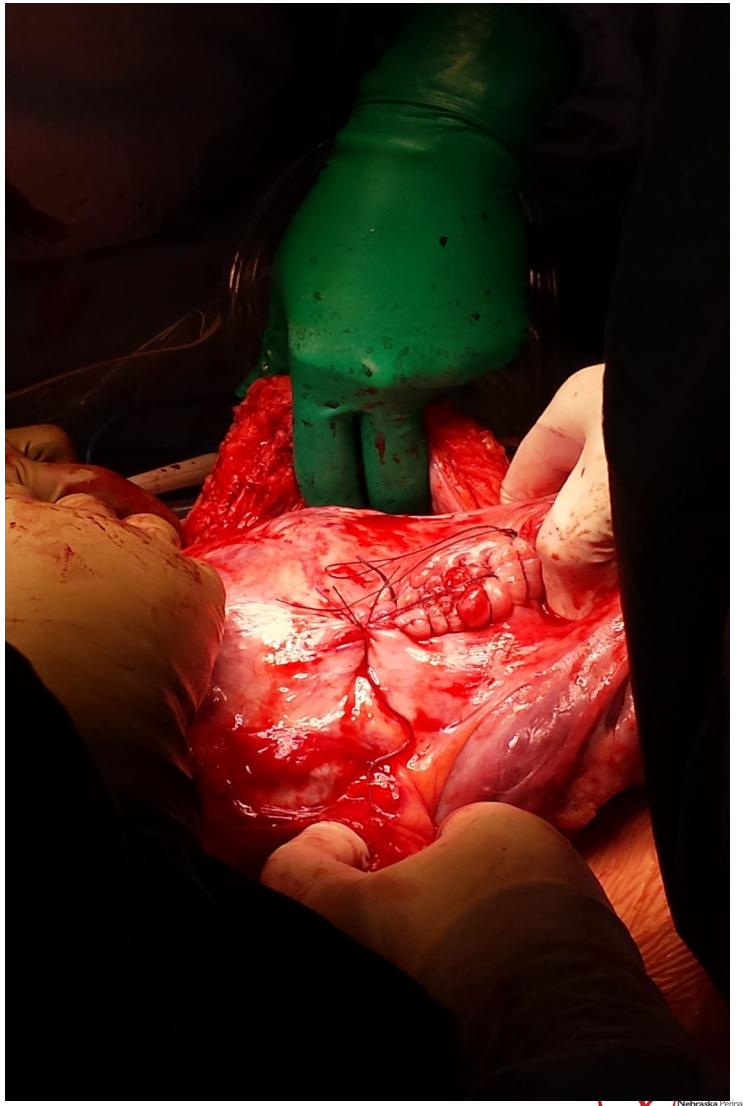

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Organization

- Communicate within the institution about high-risk patients
- Establish guidelines and place referrals early in pregnancy
  - Use level of care to place early referrals based on Maternal and Fetal risks
- Establish guidelines and policies for Labor and Delivery
  - eQBL
  - Hemorrhage stages
  - Management of hemorrhage
  - Calling trees
  - Criteria for transfer
- Education- didactic, simulation, drills, all departments, referring services if possible (EMS), other local/regional hospitals

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Response Team

- Who gets called for an obstetric hemorrhage?
- What roles do they have and how are roles assigned?
- How are those people contacted?
- Do you need a backup plan/what is the backup plan?

  i.e. you can't reach a member of the team or they are occupied in another case
- When to transport?
- To Whom do you transport?
- Who will provide the transport?

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Debrief

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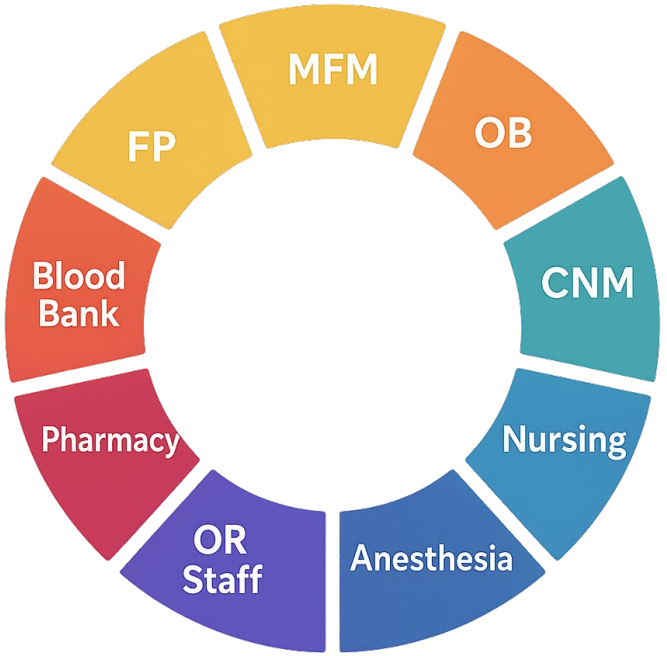
What and When to Debrief

- May vary based on institution
- Timing requires balance
- Include same stakeholders as simulation



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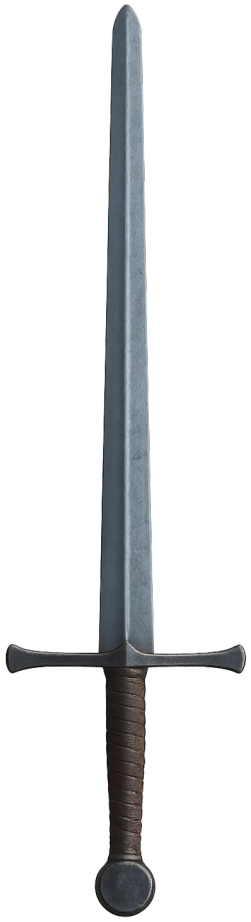
Prepare the Unit



Simulation

Work with stakeholders to identify your level of care

Organization

Response Team

Debrief

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Screen for Risk

Hemorrhage Protocols

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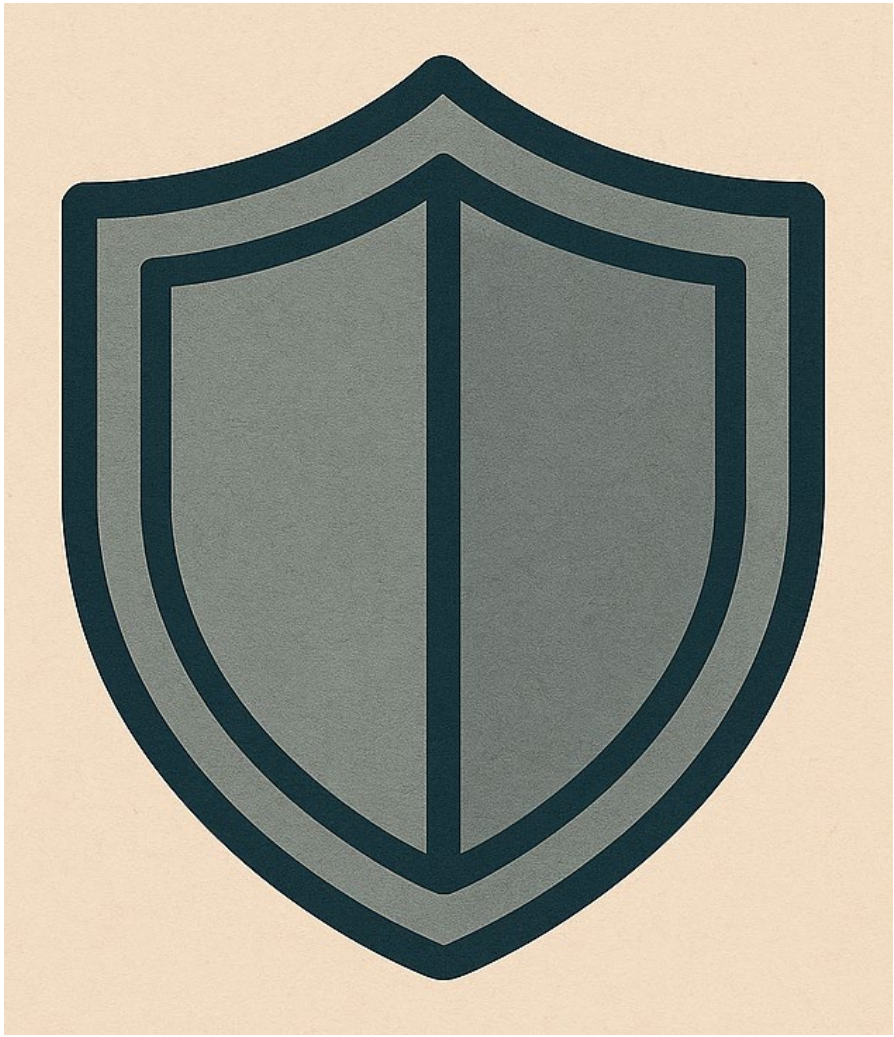

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POSTPARTUM HEMORRHAGE

Delays in:

- RECOGNITION
- COMMUNICATION
- TREATMENT
- TRANSPORT

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Red Flags

Particularly with unexplained instability

- She can't be bleeding, everything was fine when we closed
- If she isn't having any vaginal bleeding, let's just keep an eye on it.
- She's not bleeding just give her some extra fluid. We must have underestimated
- It's an exaggerated response to the anesthesia/pain meds/etc, give some fluids.

Risk Factors are Different than Types/Causes of Hemorrhage

Causes of Hemorrhage

- Uterine Atony
- Trauma (genital tract injury during delivery, incision, tear)
- Abnormal Placentation (Previa, accreta, retained products)
- Coagulopathy (predisposition or secondary to blood loss)

Screen for Risk Factors

HIP Red Flags

Historical/Antepartum

Intrapartum

Postpartum

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Historical

- Prior CD with LUS placentation, previa or just anterior placenta (Risk of PAS)
- History of PPH requiring……

  Transfusion

  Bakri balloon/JADA

  Multiple uterotonics

  ICU admission
- History of Uterine Surgery (Risk of PAS)
- History of Retained Placenta or Accreta
- Multiple Gestation
- Placenta Previa
- Diabetes
- CHTN
- Polyhydramnios

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Historical

- Preeclampsia/HELLP Syndrome

  Magnesium is not associated with hemorrhage so do not stop this in a bleeding patient

- Induction of Labor
- Fetal Macrosomia
- Anticoagulation
- Obesity
- IVF
- Mullerian Anomaly
- Myomas/Fibroids

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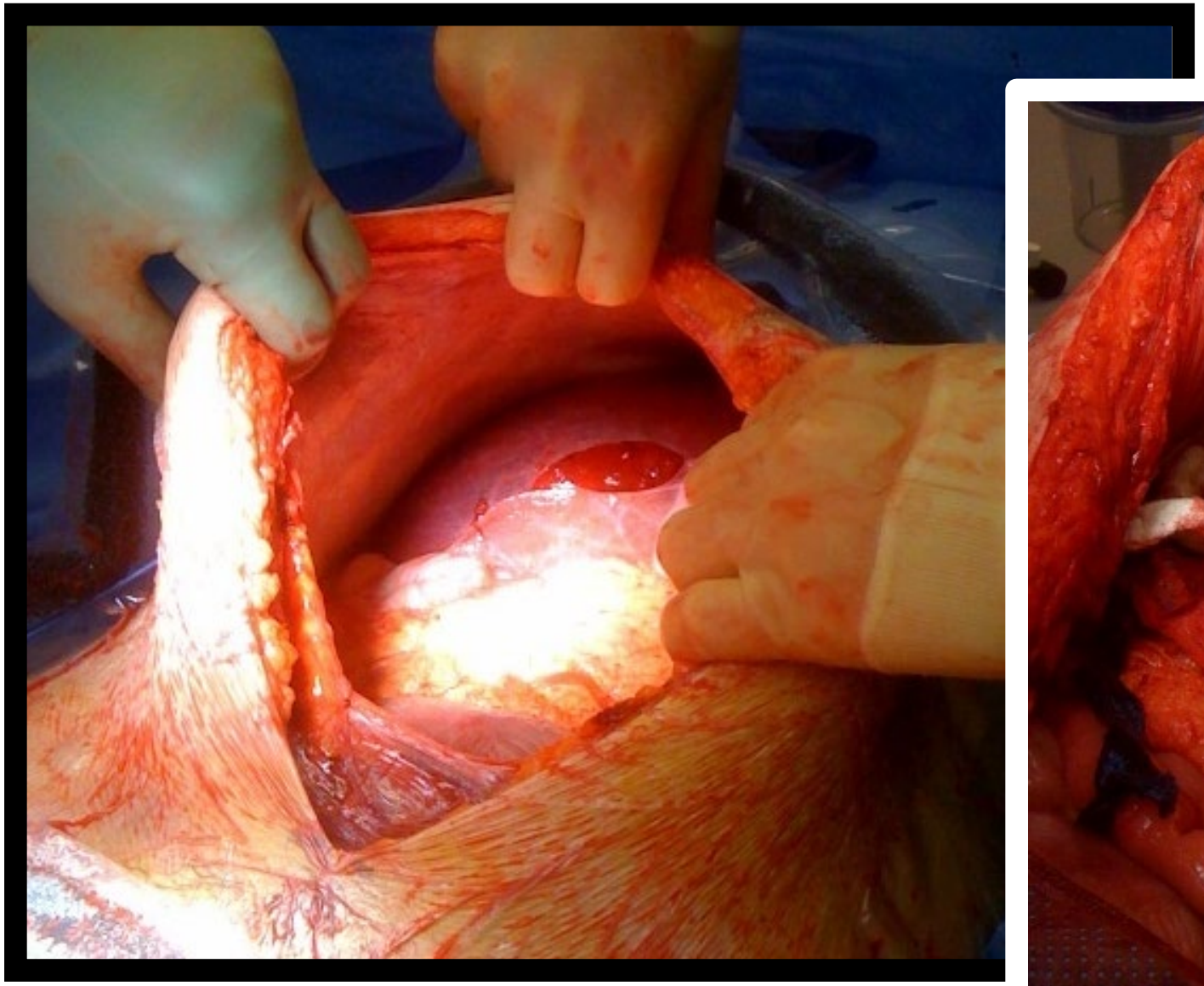

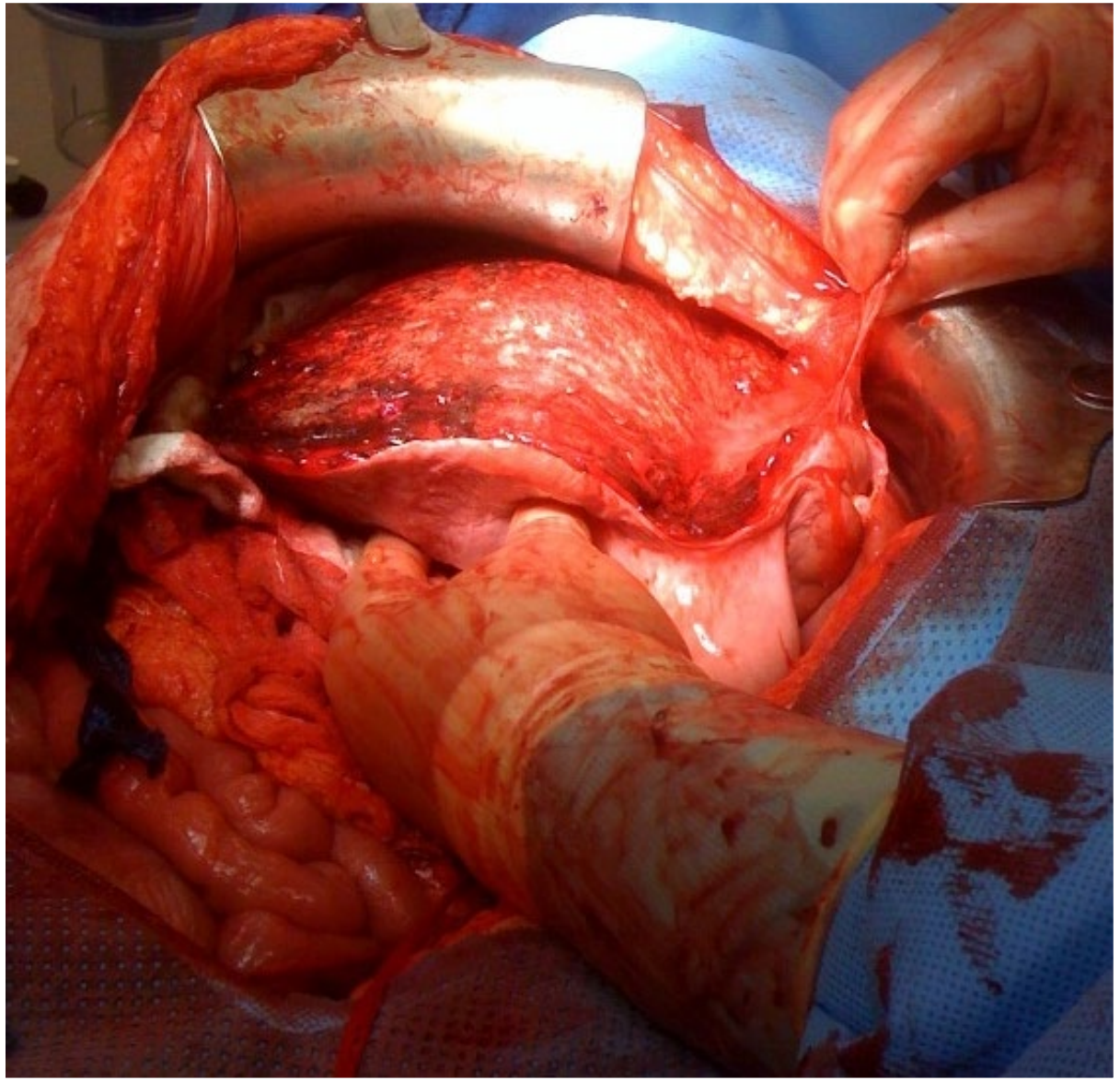

Intrapartum

- Prolonged Induction/Labor
- Use of oxytocin
- Abruption
- Precipitous Delivery
- Chorioamnionitis
- ***Arrest of descent/Need for CD at complete cervical dilation (highest risk CD)***
- Any Labored CD
- Classical CD or T uterine incision
- Operative vaginal delivery (Forceps > Vacuum)

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Postpartum

- Retained placenta (unrecognized at delivery)
- Prolonged labor/oxytocin use (delayed PPH or unresponsive atony)
- Operative delivery (unrecognized laceration, hematoma)
- Unscheduled/Labored CD (unrecognized laceration, hematoma)
- Polyhydramnios (delayed atony)
- Multiple Gestation (delayed atony)
- Mullerian Anomaly (unrecognized injury, delayed atony)
- VBAC (occult uterine rupture)

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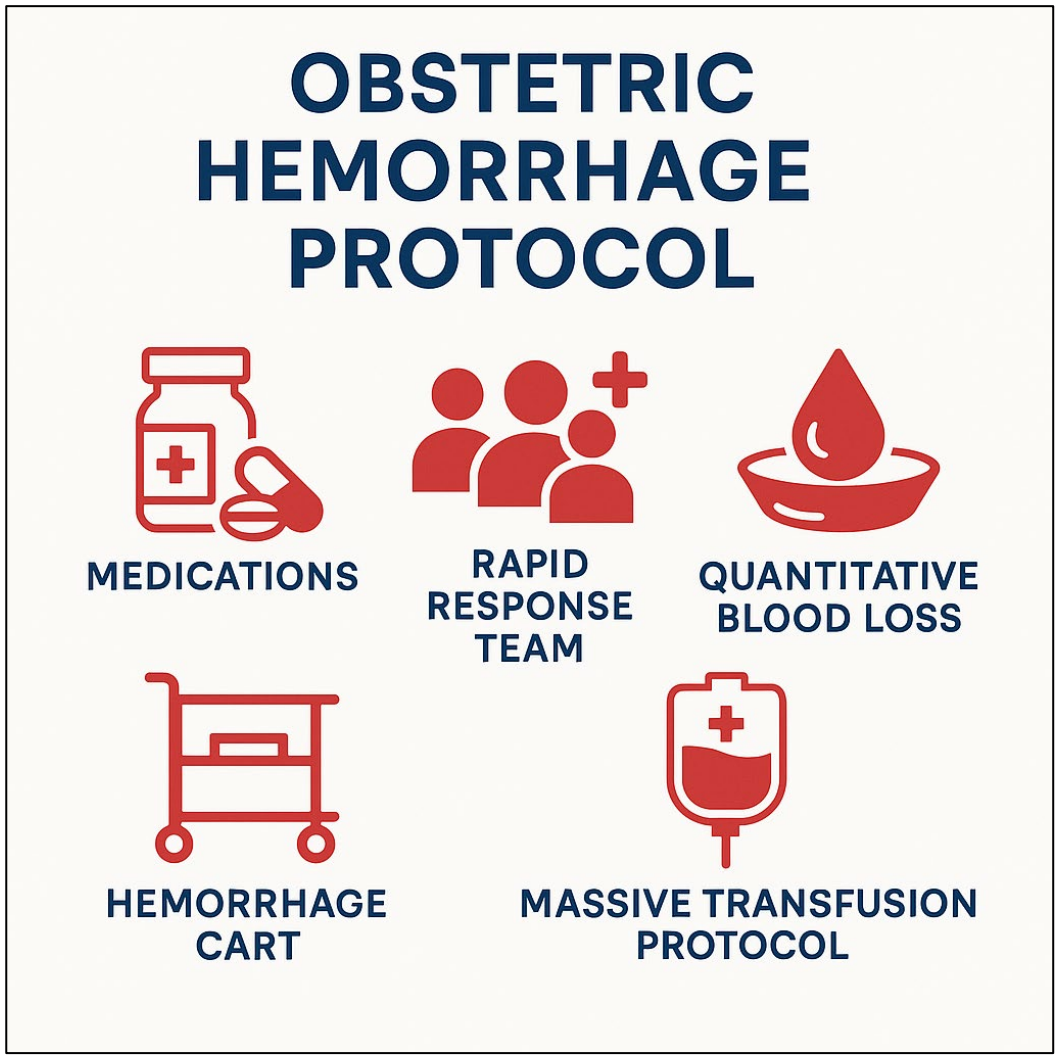
Hemorrhage Protocol (Readiness Lifestyle?)



STAGE 1
QBL >500ml or >1000ml CS, or increased bleeding in recovery with ongoing bleeding

STAGE 1

- ❑ **Fundal** Massage
- ❑ **Notify** Charge Nurse
- ❑ **Apply** Pulse Oximeter. **O2** to keep SpO2 >95%
- ❑ Vital Signs, QBL & O2 Sat Q5-15min
- ❑ **Verify** IV Access
- ❑ **Empty** bladder
- ❑ **Weigh** bloody items
- ❑ Notify OB and anesthesia
- ❑ **Hemorrhage** Cart and **Scale** to Room
- ❑ Oxytocin infusion
- ❑ **Methergine** 0.2mg IM if *not hypertensive*
- ❑ **Type and Screen, Consider T&C for 2 units pRBC**
- ❑ **Apply** warm blankets

STAGE 2
Continued bleeding or VS instability With QBL <1500ml

STAGE 2

- ❑ **OB TO BEDSIDE**
- ❑ **Announce** VS, O2 Sat and QBL Q5-10min, weigh blood items
- ❑ **Bimanual uterine massage**
- ❑ **MISOPROSTOL 1000mcg PR or HEMABATE 250mcg IM**
- ❑ **2nd IV** access (16 gauge preferred)
- ❑ **LABS**: CBC, PT, PTT, Fibrinogen, ABG prn O2sat <95% **(DIC Panel)**
- ❑ **Foley w/ urimeter in place**
- ❑ **Reevaluate** vagina and cervix for laceration or hematoma
- ❑ **Ultrasound** to bedside
- ❑ 2 Units pRBC to bedside
- ❑ **TRANSFUSE pRBCs per clinical signs** – Do NOT wait for lab results
- ❑ **Consider** moving to **OR**
- ❑ **Consider** Bakri balloon/Jada
- ❑ **Consider** Activating Stage 3

STAGE 3
QBL >1500ml, unstable VS or suspicion of DIC

STAGE 3

"Stage 3 Hemorrhage"

- ❑ **MOBILIZE TEAM**- MFM, additional anesthesia provider, OB/GYN Backup
- ❑ **Activate MTP**
- ❑ **Apply** Bair Hugger
- ❑ **Meds as indicated**
- ❑ **Blood/Fluid Warmer and Rapid Infuser**
- ❑ **D&C, Bakri Balloon, Jada or Laparotomy**
- ❑ **TRANSFUSE AGGRESSIVELY (1pRBC:1FFP)**
- ❑ **Announce** VS, O2 Sat and QBL Q5-10min
- ❑ **LABS**: CBC, PT, PTT, Fibrinogen, ABG prn O2sat <95%, Lactate, ionized Calcium every 8 units of pRBC
- ❑ **Apply SCDs**
- ❑ **Assign** staff to family support- Call Social Worker, Chaplain.
- ❑ Notify ICU staff

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Identify early and use EQBL

- Communication
- Reassess risk and continue to assess loss at each stage

Admission Delivery Postpartum

- **E**QBL
  - More accurate than visual estimation
  - 21% reduction in severe maternal morbidity
  - 2/3^{rds} of reduction due to fewer transfusions

Main EK et al. Am J Obstet Gynecol 2017;216:298.e1-11.
Shields LE et al. Am J Obstet Gynecol. 2011 Oct;205(4):368.e1-8.
Blosser C et al. Cureus 2021; 13(2), e13591.

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Why eQBL for Every Delivery?

- Visual estimation of blood loss may result in approximately 30-60% inaccuracy
  - Underestimation of blood loss may result in delay of treatment for post-partum hemorrhage
  - Standardization of procedures key component in improving safety and quality within obstetric practice

- CMQCC (2022) AWHONN (2021)

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A Pictorial Reference Guide to Aid Visual Estimation of Blood Loss at Obstetric Haemorrhage: Accurate Visual Assessment is Associated with Fewer Blood Transfusions

Dr Patrick Bose, Dr Fiona Regan, Miss Sara-Paterson Brown

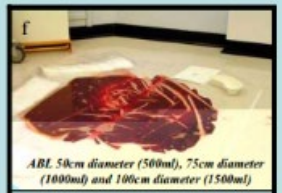
Soiled Sanitary Towel
30ml

Soaked Sanitary Towel
100ml

Small Soaked Swab 10x10cm
60ml

Incontinence Pad
250ml

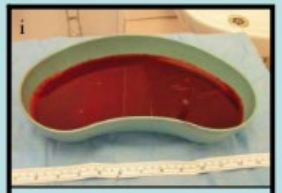
Large Soaked Swab 45x45cm
350ml*



100cm Diameter Floor Spill
1500ml*

PPH on Bed only
1000ml

PPH Spilling to Floor
2000ml



Full Kidney Dish
500ml

***Multidisciplinary observations of estimated blood loss revealed that scenarios (e-f) are grossly underestimated (> 30%)**

For Further Information please contact Miss Sara Paterson-Brown
Delivery suite, Queen Charlottes Hospital, London

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Math should Math

- Assume 5L blood volume
- Determine starting Hgb
- Determine eQBL
- Estimate patient Hgb once equilibrated
  - May take 48 hours for complete normalization
- Add back 1g for every unit pRBC

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Vignette

Example 1:

24 year old undergoes a forceps assisted delivery. She has a 500ml EBL but 4 hours after delivery has signs of shock (hypotension, tachycardia). She has now received 2L of IVF to assist in her resuscitation.

- Her hgb prior to delivery was 10g/dL
- Her hgb is 6g/dL when you order a stat CBC

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The Math

500ml is 10% blood loss based on presumed 5L blood volume.

Starting Hgb is 10g*.9 = 9g/dL

Her Hgb is 6g, this would estimate a 2000ml EBL.

You need to explain the difference.

Example #2

Patient had a labored cesarean after reaching complete dilation and pushing for 2 hours. She had an extension on the left side that was secured and hemostatic. EBL during the 2 hour procedure was 2000ml and anesthesia gave her 2 units of pRBC, 2L crystalloid and 500ml of colloid intraoperatively. Postop she has had 30ml of UOP over 4 hours and her heart rate has steadily increased to the 120's. BP is appropriate.

Starting Hgb 10g/dL, estimated Hgb 8g/dL (10-4=6 add 2 for pRBC)

Stat Hgb 5.5g/dl

Concerning if 1.5g/dL or greater below the expected Hgb.

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Delays

Recognition, Treatment, Communication, Transport

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Most Significant Delays occur in unexpected and concealed hemorrhages.

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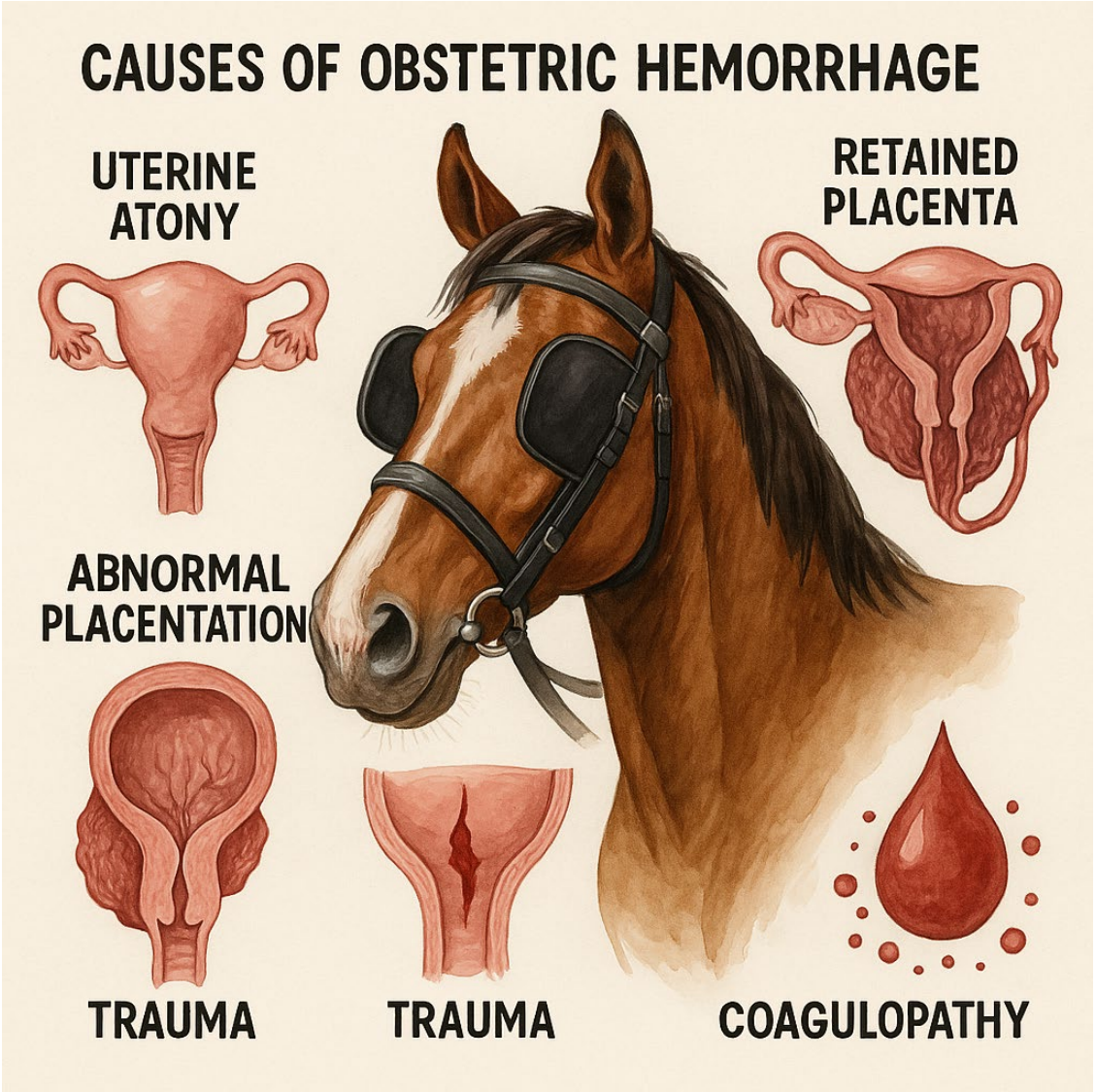
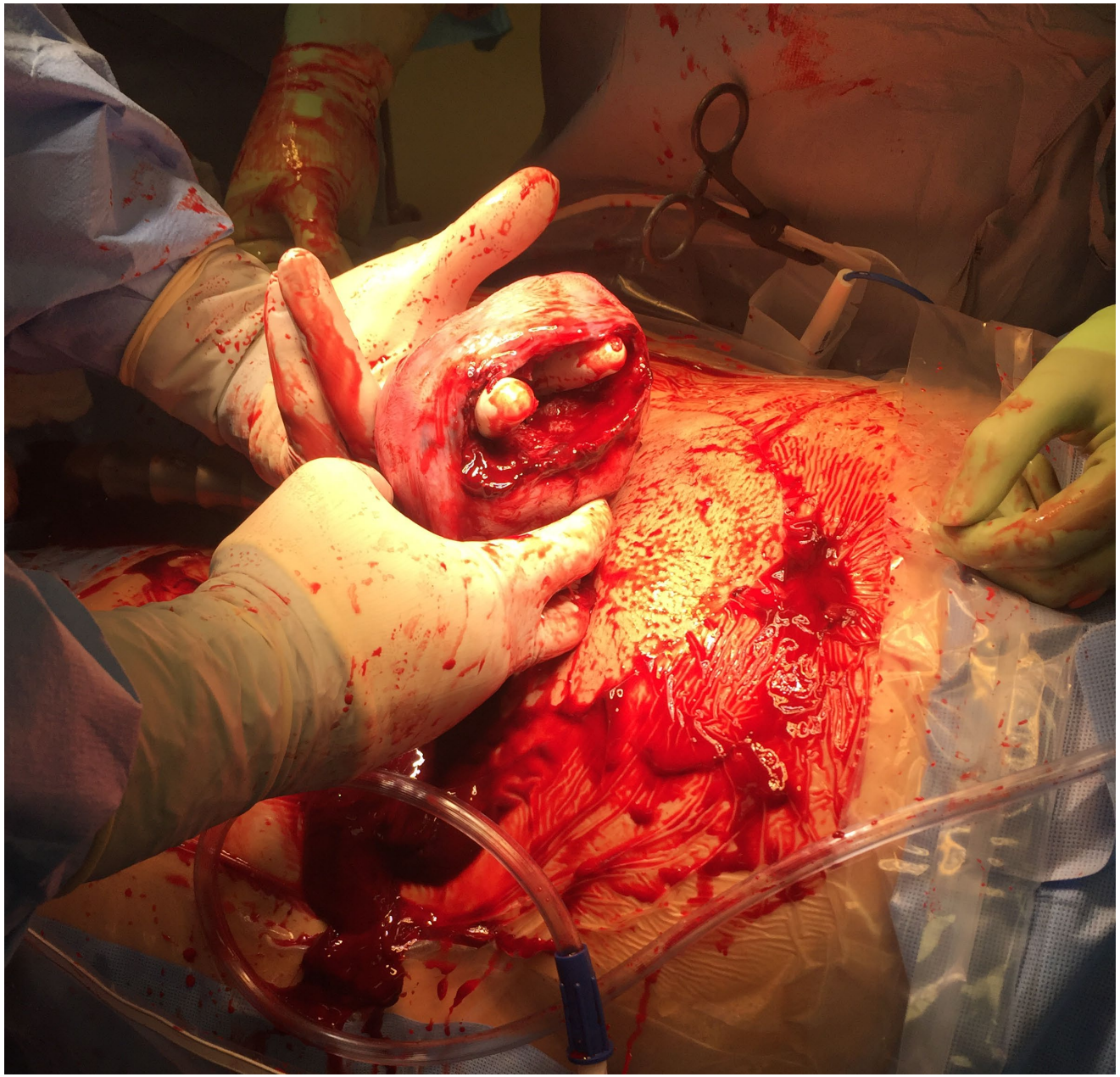
Locate Source





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Ask for Help

- Visual Exam- don't be afraid to repeat multiple times
  - Use ring forceps to walk the cervix after a vaginal delivery
  - Palpate for lacerations on the roof of the vagina/arch of the symphysis

- Bedside US
  - Evaluate for intraabdominal bleeding
  - Evaluate uterus for intrauterine clots and bleeding

- Manual exam/exploration
  - Sometimes you can feel retained products that are otherwise difficult to see
  - Especially in VBAC- scar can dehisce and bleed
  - May be able to palpate a hematoma in the upper vagina or broad ligament that's not visible

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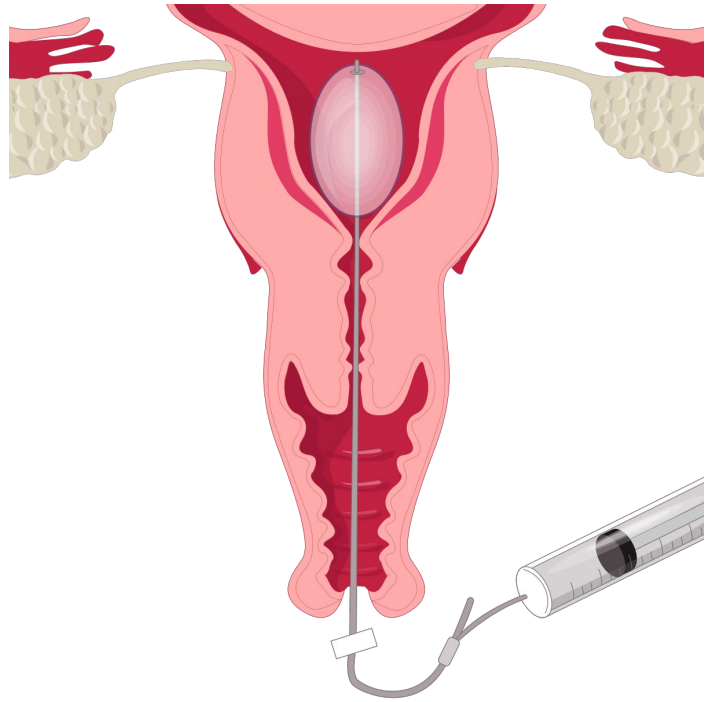
Definitive Management



- Devices for atony
  - ❖ Jada or Bakri
- Surgical hemostasis
  - ❖ repair lacerations, extensions
  - ❖ uterine compression sutures
  - ❖ interventional radiology (hematomas or retroperitoneal bleeding)
- Suction curettage or sharp curettage
  - ❖ For retained products
  - ❖ Placental site subinvolution
- Exploratory Laparotomy
  - ❖ Compression sutures
  - ❖ Hysterectomy

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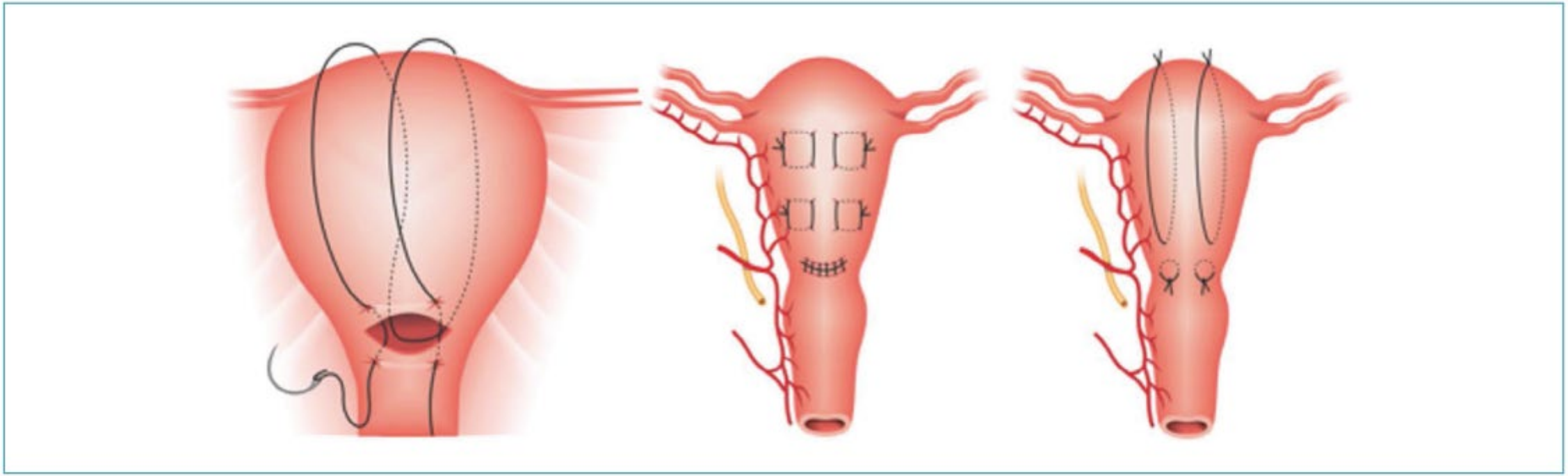
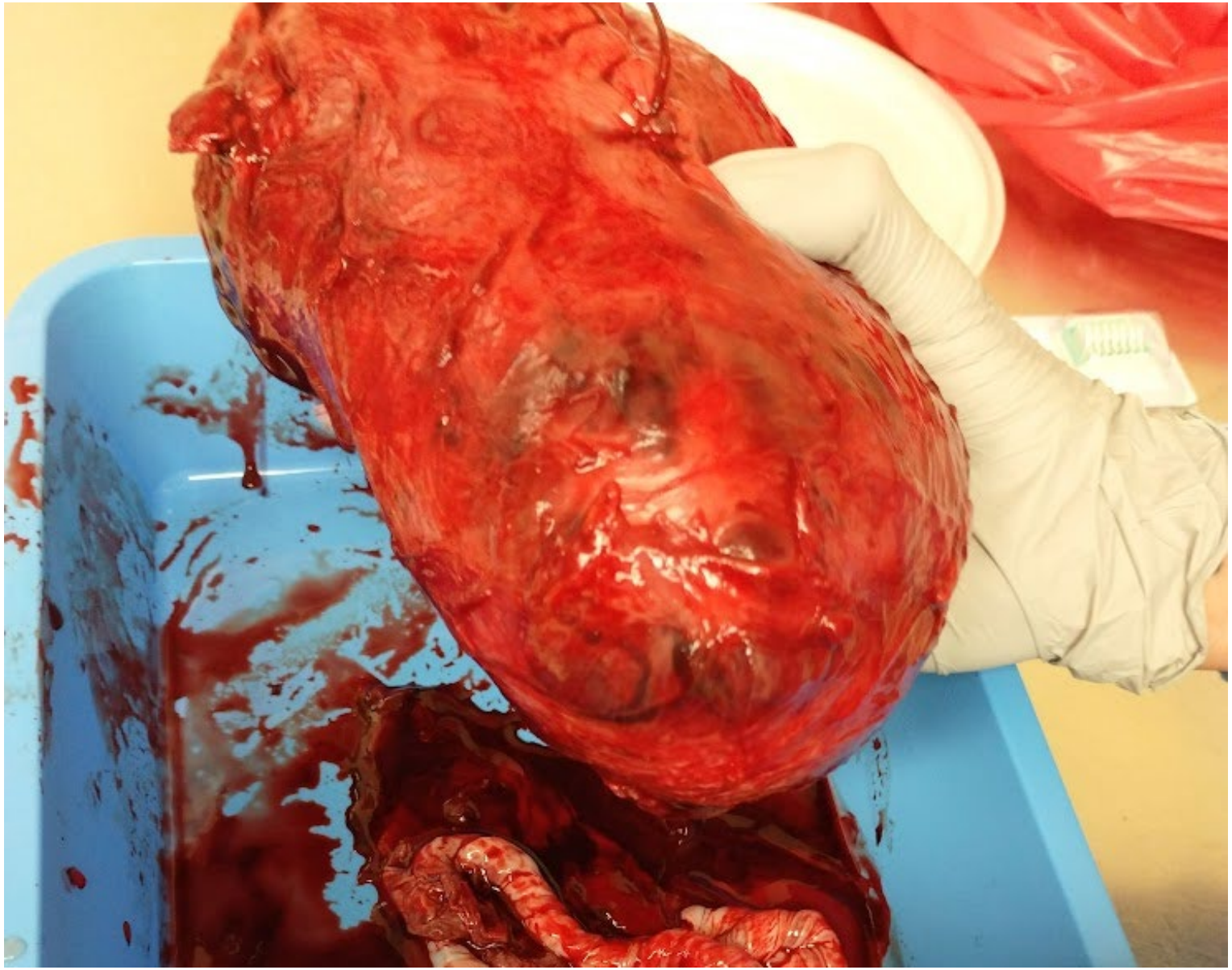


Source: Illustrations by Felipe Lage Starling (authorized).

Figure 3. B-Lynch, Cho and Hayman uterine compression sutures

October 2020 Revista brasileira de ginecologia e obstetrićia: revista da Federação Brasileira das Sociedades de Ginecologia e Obstetrícia 42(10):679-686



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Protect the Patient

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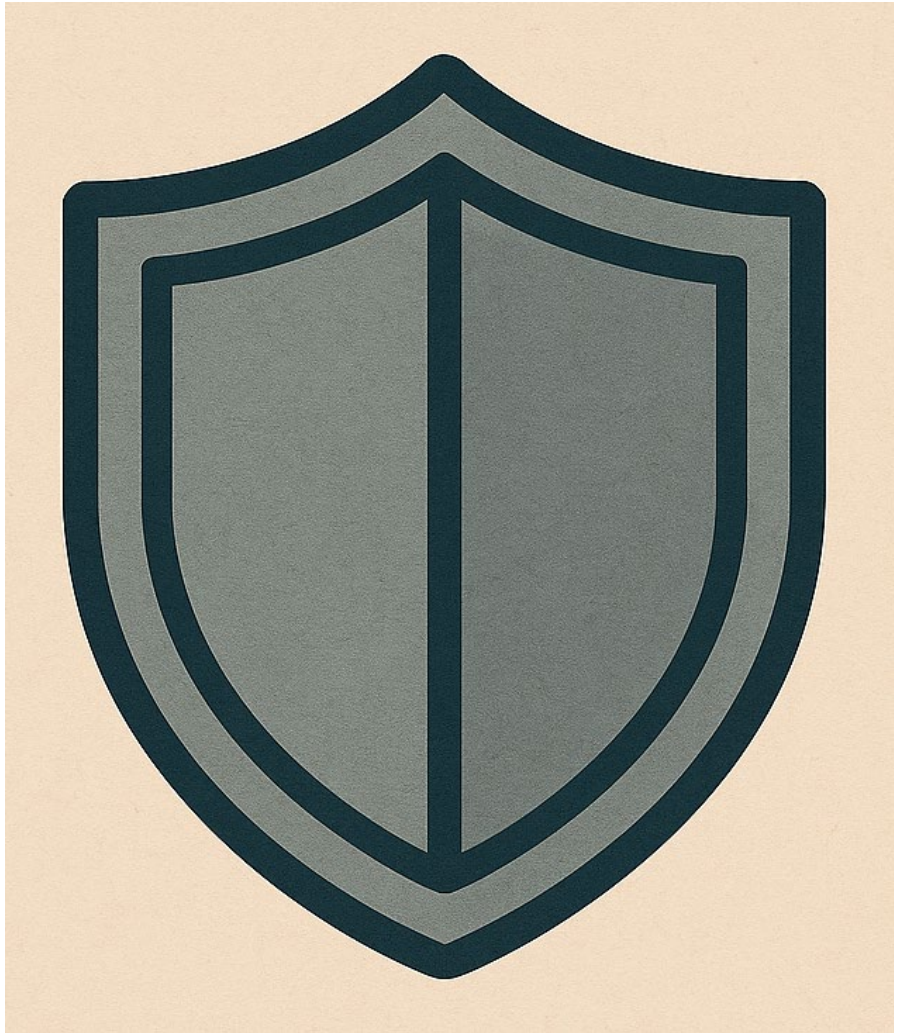

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Thank You

We appreciate the time it takes to complete your duties as participants in NPQIC and your dedication to improving maternal care.

Thank you to Mary Seger-Barker and Kayla Brickell for their eQBL slides.

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