

Prenatal Assessment & Planning

- Identify and prepare for patients with special considerations: Placenta Previa/Accreta, Bleeding Disorder, or those who Decline Blood Products
- Screen and aggressively treat severe anemia: if oral iron fails, initiate IV Iron Sucrose Protocol to reach desired Hgb/Hct, especially for at risk mothers.

Admission Assessment & Planning

- Verify Type & Antibody Screen** from prenatal record
If not available,
- Order Type & Screen (lab will notify if 2nd clot needed for confirmation)
- If prenatal or current antibody screen positive (if not low level anti-D from Rho-GAM),**
- Type & Crossmatch 2 units PRBCs
- All other patients,**
- Send Clot to blood bank

- Evaluate for **Risk Factors** (see below)
- If medium risk:**
- Order Type & Screen
 - Review Hemorrhage Protocol
- If high risk:**
- Order Type & Crossmatch 2 units PRBCs
 - Review Hemorrhage Protocol
 - Notify OB Anesthesia
- Identify** women who may decline transfusion
- Notify OB provider for plan of care
 - Early consult with OB anesthesia
 - Review Consent Form

Ongoing Risk Assessment

- Evaluate for development of additional risk factors in labor:
 - Prolonged 2nd Stage labor
 - Prolonged oxytocin use
 - Active bleeding
 - Chorioamnionitis
 - Magnesium sulfate treatment
- Increase Risk level (see below) and convert to Type & Screen or Type & Crossmatch
- Treat multiple risk factors as High Risk

Admission Hemorrhage Risk Factor Evaluation

Low (Clot only)	Medium (Type and Screen)	High (Type and Crossmatch)
No previous uterine incision	Prior cesarean birth(s) or uterine surgery	Placenta previa, low lying placenta
Singleton pregnancy	Multiple gestation	Suspected Placenta accreta or percreta
≤4 previous vaginal births	>4 previous vaginal births	Hematocrit <30 AND other risk factors
No known bleeding disorder	Chorioamnionitis	Platelets <100,000
No history of PPH	History of previous PPH	Active bleeding (greater than show) on admit
	Large uterine fibroids	Known coagulopathy
	Estimated fetal weight greater than 4 kg	
	Morbid obesity (BMI >35)	

STAGE 0: All Births: Prevention & Recognition of OB Hemorrhage

Active Management of Third Stage

- Oxytocin infusion: 10-20 units oxytocin/1000ml solution titrate infusion rate to uterine tone; or 10 units IM; do not give oxytocin as IV push
- Vigorous fundal massage for at least 15 seconds

Ongoing Quantitative Evaluation of Blood Loss

- Using formal methods, such as graduated containers, visual comparisons and weight of blood soaked materials (1gm = 1ml)

Ongoing Evaluation of Vital Signs

If: Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S -OR- Vital signs >15% change or HR ≥110, BP ≤85/45, O2 sat <95% -OR- Increased bleeding during recovery or postpartum, proceed to STAGE 1

STAGE 1: OB Hemorrhage

**Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S -OR-
Vital signs >15% change or HR ≥110, BP ≤85/45, O2 sat <95% -OR-
Increased bleeding during recovery or postpartum**

MOBILIZE	ACT	THINK
<p>Primary nurse, Physician or Midwife to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Activate OB Hemorrhage Protocol and Checklist <p>Primary nurse to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Notify obstetrician (in-house and attending) <input type="checkbox"/> Notify charge nurse <input type="checkbox"/> Notify anesthesiologist 	<p>Primary nurse:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish IV access if not present, at least 18 gauge Increase IV fluids rates (Lactated Ringers preferred) and increase Oxytocin rate (500 mL/hour of 10-40 units/1000mL solution); Titrate Oxytocin infusion rate to uterine tone <input type="checkbox"/> Continue vigorous fundal massage <input type="checkbox"/> Administer Methergine 0.2 mg IM per protocol (if not hypertensive); give once, if no response, move to alternate agent; if good response, may give additional doses q 2 hr <input type="checkbox"/> Vital Signs, including O2 sat & level of consciousness (LOC) q 5 minutes <input type="checkbox"/> Weigh materials, calculate and record cumulative blood loss q 5-15 minutes <input type="checkbox"/> Administer oxygen to maintain O2 sats at >95% <input type="checkbox"/> Empty bladder: straight cath or place Foley with urimeter <input type="checkbox"/> Type and Crossmatch for 2 units Red Blood Cells STAT (if not already done) <input type="checkbox"/> Keep patient warm <p>Physician or midwife:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Rule out retained Products of Conception, laceration, hematoma <p>Surgeon (if cesarean birth and still open)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta 	<p>Consider potential etiology:</p> <ul style="list-style-type: none"> • Uterine atony • Trauma/Laceration • Retained placenta • Amniotic Fluid Embolism • Uterine Inversion • Coagulopathy • Placenta Accreta • Uterine Rupture <p>Once stabilized: Modified Postpartum management with increased surveillance</p>

If: Continued bleeding or Continued Vital Sign instability, and <1500 mL cumulative blood loss proceed to STAGE 2

UTEROTONIC AGENTS for POSTPARTUM HEMORRHAGE

Drug	Dose	Route	Frequency	Side Effects	Contraindications	Storage
Pitocin® (Oxytocin) 10 units/ml	10-40 units per 1000 ml, rate titrated to uterine tone	IV infusion	Continuous	Usually none Nausea, vomiting, hyponatremia ("water intoxication") with prolonged IV admin. ↓ BP and ↑ HR with high doses, esp IV push	Hypersensitivity to drug	Room temp
Methergine® (Methylergonivine) 0.2mg/ml	0.2 mg	IM (<u>not</u> given IV)	-Q 2-4 hours -If no response after first dose, it is unlikely that additional doses will be of benefit	Nausea, vomiting Severe hypertension, esp. with rapid administration or in patients with HTN or PIH	Hypertension, PIH, Heart disease Hypersensitivity to drug Caution if multiple doses of ephedrine have been used, may exaggerate hypertensive response w/possible cerebral hemorrhage	Refrigerate Protect from light
Hemabate® (15-methyl PG F2a) 250mcg/ml	250 mcg	IM or intra-myometrial (<u>not</u> given IV)	-Q 15-90 min -Not to exceed 8 doses/24 hrs -If no response after 3 doses, it is unlikely that additional doses will be of benefit.	Nausea, vomiting, Diarrhea Fever (transient), Headache Chills, shivering Hypertension Bronchospasm	Caution in women with hepatic disease, asthma, hypertension, active cardiac or pulmonary disease Hypersensitivity to drug	Refrigerate
Cytotec® (Misoprostol) 100 or 200mcg tablets	800-1000mcg	Per rectum (PR)	One time	Nausea, vomiting, diarrhea Shivering, Fever (transient) Headache	Rare Known allergy to prostaglandin Hypersensitivity to drug	Room temp

STAGE 2: OB Hemorrhage

Continued bleeding or Vital Sign instability, and <1500 mL cumulative blood loss

MOBILIZE	ACT	THINK
<p>Primary nurse (or charge nurse):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Call obstetrician to bedside <input type="checkbox"/> Call Anesthesiologist <input type="checkbox"/> Activate Response Team: PHONE #: _____ <input type="checkbox"/> Notify Blood bank of hemorrhage; order products as directed <p>Charge nurse:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Notify Perinatologist or 2nd OB <input type="checkbox"/> Initiate OB Hemorrhage Record <input type="checkbox"/> If selective embolization, call-in Interventional Radiology Team and second anesthesiologist <input type="checkbox"/> Notify nursing supervisor <input type="checkbox"/> Assign single person to communicate with blood bank <input type="checkbox"/> Call medical social worker or assign other family support person 	<p>Team leader (OB physician):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Additional uterotonic medication: Hemabate 250 mcg IM [if not contraindicated] OR Misoprostol 800-1000 mcg PR <ul style="list-style-type: none"> o Can repeat Hemabate up to 3 times every 20 min; (note-75% respond to first dose) <p>Do not delay other interventions (see right column) while waiting for response to medications</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bimanual uterine massage <input type="checkbox"/> Move to OR (if on postpartum unit, move to L&D or OR) <input type="checkbox"/> Order 2 units PRBCs and bring to the bedside <input type="checkbox"/> Order labs STAT (CBC/Plts, Chem 12, PT/aPTT, Fibrinogen, ABG) <input type="checkbox"/> Transfuse PRBCs based on clinical signs and response, do not wait for lab results <p>Primary nurse:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish 2nd large bore IV, at least 18 gauge. Maintain adequate fluid volume with Lactated Ringers and adequate uterine tone with oxytocin infusion <input type="checkbox"/> Assess and announce Vital Signs and cumulative blood loss q 5-10 minutes <input type="checkbox"/> Set up blood administration set and blood warmer for transfusion <input type="checkbox"/> Administer meds, blood products and draw labs, as ordered <input type="checkbox"/> Keep patient warm <p>Second nurse (or charge nurse):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Place Foley with urimeter (if not already done) <input type="checkbox"/> Obtain portable light and OB procedure tray or Hemorrhage cart <input type="checkbox"/> Obtain blood products from the Blood Bank <input type="checkbox"/> Assist with move to OR (if indicated) <p>Blood Bank:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Determine availability of thawed plasma, fresh frozen plasma, and platelets; initiate delivery of platelets if not present on-site <input type="checkbox"/> Consider thawing 2 FFP (takes 30 min), use if transfusing >2 units PRBCs <input type="checkbox"/> Prepare for possibility of massive hemorrhage 	<p>Sequentially advance through procedures and other interventions based on etiology:</p> <p>Vaginal birth</p> <p>If trauma (vaginal, cervical or uterine):</p> <ul style="list-style-type: none"> • Visualize and repair <p>If retained placenta:</p> <ul style="list-style-type: none"> • D&C <p>If uterine atony or lower uterine segment bleeding:</p> <ul style="list-style-type: none"> • Intrauterine Balloon <p>If above measures unproductive:</p> <ul style="list-style-type: none"> • Selective embolization (Interventional Radiology if available & adequate experience) <p>C-section:</p> <ul style="list-style-type: none"> • Uterine hemostatic suture, e.g., B-Lynch Suture, O'Leary, Multiple Squares • Intrauterine Balloon <p>If Uterine Inversion:</p> <ul style="list-style-type: none"> • Anesthesia and uterine relaxation drugs for manual reduction <p>If Amniotic Fluid Embolism:</p> <ul style="list-style-type: none"> • Maximally aggressive respiratory, vasopressor and blood product support <p>If vital signs are worse than estimated or measured blood loss: possible uterine rupture or broad ligament tear with internal bleeding; move to laparotomy</p> <p>Once stabilized: Modified Postpartum management with increased surveillance</p>

Re-Evaluate Bleeding and Vital Signs
If cumulative blood loss >1500ml, >2 units PRBCs given, VS unstable or suspicion for DIC,
proceed to STAGE 3

STAGE 3: OB Hemorrhage

Cumulative blood loss >1500ml, >2 units PRBCs given, VS unstable or suspicion for DIC

MOBILIZE	ACT	THINK
<p>Nurse or Physician:</p> <input type="checkbox"/> Activate Massive Hemorrhage Protocol	<p>Establish team leadership and assign roles</p> <p>Team leader (OB physician + OB anesthesiologist, anesthesiologist and/or perinatologist and/or intensivist):</p> <input type="checkbox"/> Order Massive Hemorrhage Pack (RBCs + FFP + 1 pheresis pack PLTS—see note in right column)	<ul style="list-style-type: none"> • Selective Embolization (IR) • Interventions based on etiology not yet completed • Prevent hypothermia, Acidemia
<p>PHONE #: _____</p> <p>Charge Nurse or designee:</p> <input type="checkbox"/> Notify advanced Gyn surgeon (e.g. Gyn Oncologist)	<input type="checkbox"/> Move to OR if not already there	<p>Conservative or Definitive Surgery:</p> <ul style="list-style-type: none"> • Uterine Artery Ligation • Hysterectomy
<input type="checkbox"/> Notify adult intensivist	<input type="checkbox"/> Repeat CBC/PLTS, Chem 12, PT/aPTT, Fibrinogen, ABG STAT q 30-60 min	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>For Resuscitation:</p> <p>Aggressively Transfuse</p> <p>Based on Vital Signs, Blood Loss</p> <p>KEY: HIGH RATIO of FFP to RBC</p> <p>Either: 6:4:1 PRBCs: FFP: Platelets</p> <p>Or: 4:4:1 PRBCs: FFP: Platelets</p> </div>
<input type="checkbox"/> Call-in second anesthesiologist	<p>Anesthesiologist (as indicated):</p> <input type="checkbox"/> Arterial blood gases	<p>Unresponsive Coagulopathy:</p> <ul style="list-style-type: none"> • After 8-10 units PRBCs and coagulation factor replacement may consider risk/benefit of rFactor VIIa
<input type="checkbox"/> Call-in OR staff	<input type="checkbox"/> Central hemodynamic monitoring	<p>Once Stabilized: Modified Postpartum Management; consider ICU</p>
<input type="checkbox"/> Reassign staff as needed	<input type="checkbox"/> CVP or PA line	
<input type="checkbox"/> Call-in supervisor, CNS, or manager	<input type="checkbox"/> Arterial line	
<input type="checkbox"/> Continue OB Hemorrhage Record (In OR, anesthesiologist will assess and document VS)	<input type="checkbox"/> Vasopressor support	
<input type="checkbox"/> If transfer considered, notify ICU	<input type="checkbox"/> Intubation	
<p>Blood Bank:</p> <input type="checkbox"/> Prepare to issue additional blood products as needed – stay ahead	<p>Primary nurse:</p> <input type="checkbox"/> Announce VS and cumulative measured blood loss q 5-10 minutes	
	<input type="checkbox"/> Apply upper body warming blanket if feasible	
	<input type="checkbox"/> Use fluid warmer and/or rapid infuser for fluid & blood product administration	
	<input type="checkbox"/> Apply sequential compression stockings to lower extremities	
	<input type="checkbox"/> Circulate in OR	
	<p>Second nurse and/or anesthesiologist:</p> <input type="checkbox"/> Continue to administer meds, blood products and draw labs, as ordered	
	<p>Third Nurse (or charge nurse):</p> <input type="checkbox"/> Recorder	

BLOOD PRODUCTS

<p>Packed Red Blood Cells (PRBC) <i>(approx. 35-40 min. for crossmatch—assuming no sample is in the lab and assuming no antibodies are present)</i> Transfuse O Negative blood if you cannot wait</p>	<p>Best first-line product for blood loss 1 unit = 450ml volume If antibody positive, may take 1-24 hrs. for crossmatch 1 unit=450 ml volume and typically increases Hct by 3%</p>
<p>Fresh Frozen Plasma (FFP) <i>(approx. 35-45 min. to thaw for release)</i></p>	<p>Highly desired if >2 units PRBCs given, or for prolonged PT, aPTT >1.5x control 1 unit = 180ml volume and typically increases Fibrinogen by 10mg/dL</p>
<p>Platelets (PLTS) <i>Local variation in time to release (may need to come from regional blood bank)</i></p>	<p>Priority for women with Platelets <50,000 Single-donor Apheresis unit (= 6 units of platelet concentrates) provides 40-50k transient increase in platelets</p>
<p>Cryoprecipitate (CRYO) <i>(approx. 35-45 min. to thaw for release)</i></p>	<p>Priority for women with Fibrinogen levels <80 10 unit pack typically raises Fibrinogen 80-100mg/dL Best for DIC with low fibrinogen and don't need volume replacement Caution: 10 units come from 10 different donors, so infection risk is proportionate.</p>