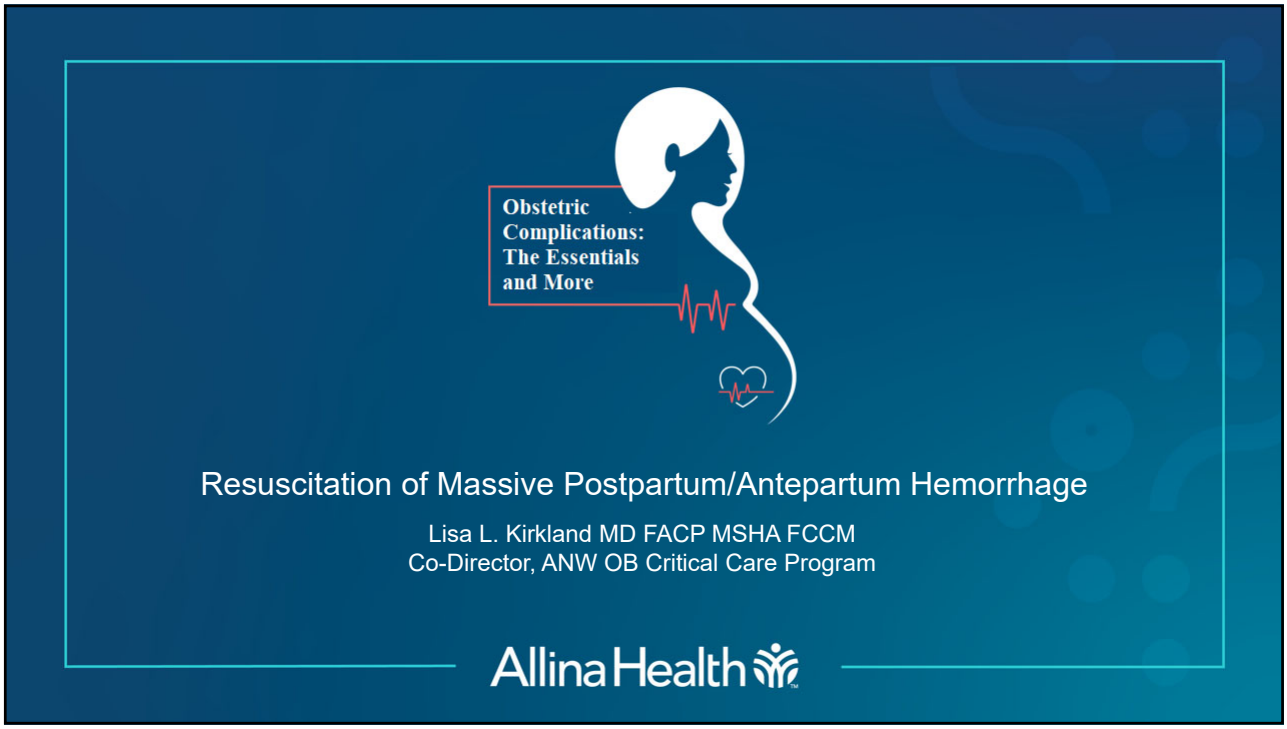
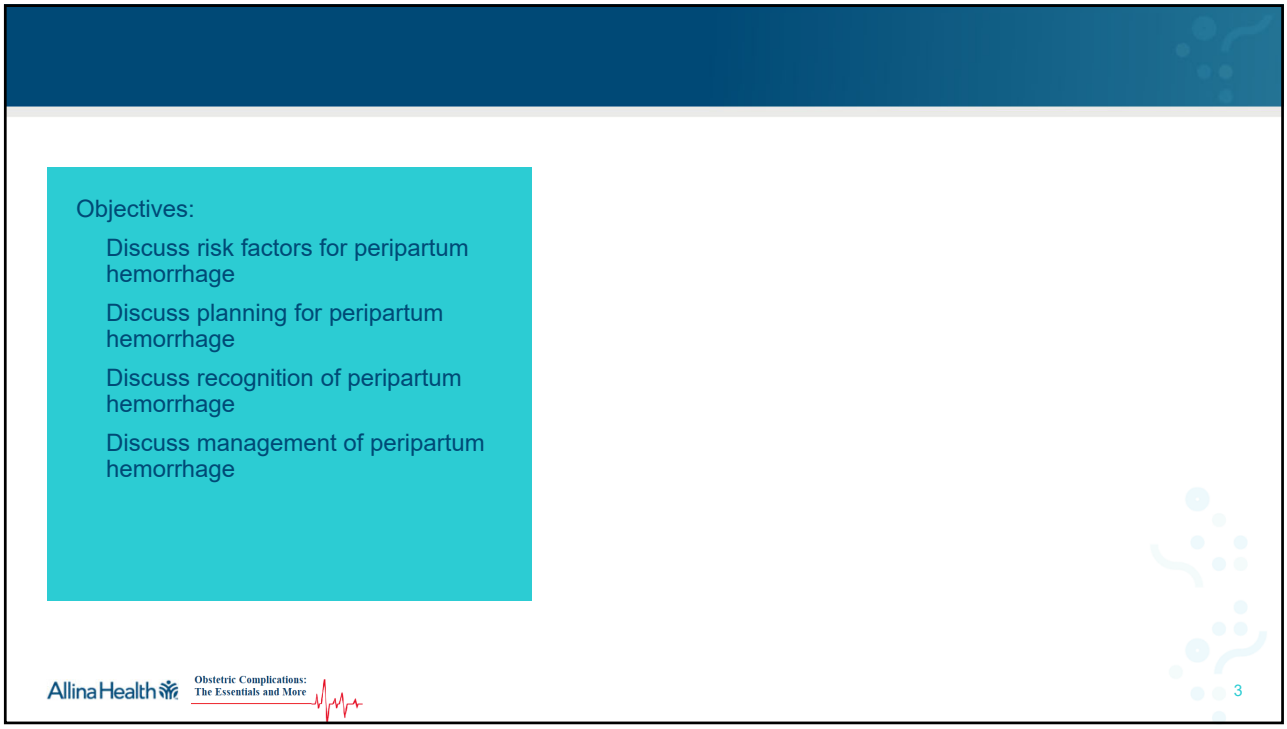


2



3

- PPH is a common obstetrical event and a major source of maternal morbidity and mortality
- Early recognition of PPH is critical
- BLEEDING will guide effective PPH management
- Don't forget the 4 T's!

Allina Health | Obstetric Complications: The Essentials and More

4

CASE PRESENTATION

22 year old G3P0020 with EDD 11/13/2023, presented at 34w6d with severe abdominal pain.

- Relevant PMH: mWHO I repaired congenital heart disease
- Planned vaginal delivery in Mother Baby Center
- PPH prevention: use IM pitocin if need for reduced IVF volume. TXA and Cytotec OK. Cautious use of methergine/hemabate (OK to use in emergency). Avoid Terbutaline due to arrhythmia risk
- Awakened at 0600 with pain, went back to sleep but awakened at noon with very severe abdominal, back, rectal pain
- Triage found no fetal heart tones
- Admitted for IUFD with labor

Obstetric Complications: The Essentials and More

Allina Health

5

5

Obstetric Complications: The Essentials and More

6

Admission:
Cervix:
(IA) Dilation (cm): 2
Effacement: 60%
Station: -2
Consistency: Medium

Labs:
WBC: 15.2
Hemoglobin: 9.7
Plts: 146
APTT: 45
INR: 1.7
Fibrinogen: <60

ASSESSMENT: 22 y.o. G3P0020 at 34w6d with IUFD, Maternal Cardiac Disease, Likely Placental Abruption with abnl coagulation factors

Allina Health

6

- Massive transfusion protocol activated
- Received 2 u FFP, 2 u cryo
- Transferred to ICU for duration of labor and delivery
- There, cared for by ICU nurse and L&D nurse, with intensivist in attendance and OB hospitalist immediately available.
- Started Pitocin, received fentanyl, received 1 u PRBC for Hg 7.1 and cryo for fibrinogen < 60
- Bleeding from mouth, blood in urine
- Dilation complete, delivered stillborn and placenta with large blood and clots
- Received TXA, methergine, hemabate – QBL 1800 cc and still bleeding

7

7

PERIPARTUM HEMORRHAGE DIFFERENTIAL

- Tone – uterine atony is #1 cause – her uterus too contracted for JADA
- Tissue – retained placenta? – possible but appeared intact
- Trauma - Evaluation of the perineum and labia notable for laceration of the right labium majus with arterial vessel bleeding briskly; repaired with good hemostasis
- Thrombin – received additional FFP, cryo, platelets, and PRBC
- Final QBL 3212
- Total blood products 5 units pRBC, 4 units FFP, 4 units Cryo, and 2 units platelets
- Labs: Hg 8.6, fibrinogen 132, INR 1.4, plts 53K

8

8

SAMPLE CHECKLIST

Obstetric Hemorrhage Checklist

- Complete all steps in prior stages plus current stage regardless of stage in which the patient presents.
- Postpartum hemorrhage is defined as cumulative blood loss of >/= 1000 mL or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours.
- Blood loss > 500 mL in a vaginal delivery is abnormal, and should be investigated and managed as noted in Stage 1

Recognition

- ☐ Call for assistance (Obstetric Hemorrhage Team)
- ☐ Designate:
  - ☐ Team Leader_____
  - ☐ Checklist reader/recorder
  - ☐ Primary RN
- ☐ Announce:
  - ☐ Cumulative blood loss
  - ☐ Vital signs _____
  - ☐ Determine stage

Stage 1: Blood loss > 1000 mL after delivery with normal vital signs and lab values (or vaginal delivery 500-999 mL)

Initial steps
- ☐ Ensure 16G or 18G IV Access
- ☐ Increase IV fluid (crystalloid without oxytocin)
- ☐ Insert indwelling urinary catheter
- ☐ Fundal massage

Medications
- ☐ Ensure appropriate medications given patient history
- ☐ Increase oxytocin, additional uterotonics

Blood Bank
- ☐ Confirm active type & screen; consider cross match of 2 units pRBCs

Action
- ☐ Determine etiology and treat
- ☐ Prepare OR, if clinically indicated (optimize visualization/examination)

Stage 2: Continued bleeding (EBL up to 1500 mL or >/= 2 uterotonics) with normal vital signs and lab values (>/= 2 uterotonics in addition to oxytocin administration; or >/= 2 administrations of the same uterotonic)

Initial steps
- ☐ Mobilize additional help
- ☐ Place 2nd IV (16-18G)
- ☐ Draw STAT labs (CBC, Coags, Fibrinogen)
- ☐ Prepare OR

Medications
- ☐ Continue Stage 1 medications; consider TXA

Blood Bank
- ☐ Obtain 2 units PRBCs (DO NOT wait for labs. Transfuse per clinical signs/symptoms)
- ☐ Thaw 2 units FFP

Action
- ☐ For uterine atony --> consider uterine balloon or packing, possible surgical interventions
- ☐ Consider moving patient to OR
- ☐ Escalate therapy with goal of hemostasis

Stage 3: Continued bleeding (EBL > 1500 mL or > 2 units pRBCs given or risk for occult bleeding/coagulopathy or any patient with abnormal vital signs/labs/oliguria)

Initial steps
- ☐ Mobilize additional help
- ☐ Move to OR
- ☐ Announce clinical status (vital signs, cumulative blood loss, etiology)
- ☐ Outline and communicate plan

Medications
- ☐ Continue Stage 1 medications; consider TXA

Blood Bank
- ☐ Initiate Massive Transfusion Protocol (If clinical coagulopathy: add cryoprecipitate, consult for additional agents)

Action
- ☐ Achieve hemostasis
- ☐ Intervention based on etiology
- ☐ Escalate interventions

Stage 4: Cardiovascular Collapse (massive hemorrhage, profound hypovolemic shock, or amniotic fluid embolism)

Initial step
- ☐ Mobilize additional resources

Medications
- ☐ ACLS

Blood Bank
- ☐ Simultaneous aggressive massive transfusion

Action
- ☐ Immediate surgical intervention to ensure hemostasis (hysterectomy)

Adapted and used with permission from ACOG Safe Motherhood Initiative: Obstetric Hemorrhage [8]

Schneider, Patrick

Clinical Obstetrics and Gynecology66(2):415-424, June 2023.

doi: 10.1097/GRF.0000000000000786

Obstetric hemorrhage checklist example. Adapted and used with permission from ACOG Safe Motherhood Initiative: Obstetric Hemorrhage.8 Adaptations are themselves works protected by copyright. So in order to publish this adaptation, authorization must be obtained both from the owner of the copyright in the original work and from the owner of copyright in the translation or adaptation.

9

9

SRVWSDUWXP#KHPRUUKDJH#) #PDVVLYH#WUDQVIXVLRQ

Oruddlh#O1#Wkruqexuj/#P1G1
Surihvvru#ri#Re2J|q
Gluhfwru#PdwhuqdoOIhwdo#Phglflqh
Xqlyhuvlw|#ri#Urfkhvwhu/#Q\

Society for Maternal • Fetal Medicine

10

E Be Ready

- O **L**oss Estimation & **L**evel
- H **E**tiologies of bleeding
- H **E**stimate blood & Fluid Replacement
- G **D**rugs
- L **I**ntraoperative management
- Q **N**on-Obstetrical Services
- J **G**et support during & afterwards

Allina Health

Obstetric Complications: The Essentials and More

11

EH#JHDG\

Postpartum Hemorrhage with Maternal Hemodynamic Instability

Primary RN	•Initate emergency call light and report to key responders •Assess vital signs and blood loss every 5 minutes •Provide fundal massage, oxygen, IVF bolus •Increase Pitocin rate; provide second-line uterotonic as ordered •Document •Support family
First Responder	•Call OB Emergency Respose Team: MD, OB Hopsitalist, MFM, Anesthesiologist •Notify RN supervisor •Place second IV, hang blood tubing for both IV sites, and draw labs •Type and crossmatch 2u pRBC; transfuse if clinically unstable •Assist with uterotonic therapy
Second Responder	•Obtain PPH emergency cart •Provide Foley catheter •Maintain normothermia and place pneumatic compression hose •Obtain tamponade balloon and assist with placement if desired
RN Supervisor	•Call blood bank and lab •Direct additional personnel •Move patient to OR as indicated and assist with OR set-up (count, surgical field lighting, etc)
MD	•Assess PPH etiology and treat accordingly •Provide additional uterotonic therapy if atony (Pitocin, Cyotec, Methergine, Hemabate) •Initiate massive transfsion protocol (6u pRBC, 4u FFP, 10u cyroprecipitate, 1u platelet concentrate) •Consider tamponade balloon, uterine artery embolization, or surgery

Allina Health Obstetric Complications: The Essentials and More

12

BE READY

- Universal active management 3rd stage
- Have a Massive Transfusion protocol
- Have a hemorrhage cart

Allina Health Obstetric Complications: The Essentials and More

13

J hw#l#fduw

Equipment - OB Hemorrhage Cart

Allina Health | Obstetric Complications: The Essentials and More

14

BE READY: DURING ADMISSION

6

RISK ASSESSMENT: LABOR & DELIVERY ADMISSION

Medium Risk

- [ ] Prior cesarean, uterine surgery, or multiple laparotomies
- [ ] Multiple gestation
- [ ] >4 prior births
- [ ] Prior obstetric hemorrhage
- [ ] Large myomas
- [ ] EFW >4000 g
- [ ] Obesity (BMI >40)
- [ ] Hematocrit <30% & other risk

→ **Type & SCREEN, review protocol**

High Risk

- [ ] Placenta previa/low lying
- [ ] Suspected accreta/percreta
- [ ] Platelet count <70,000
- [ ] Active bleeding
- [ ] Known coagulopathy
- [ ] 2 or more medium risk factors

→ **Type & CROSS, review protocol**

Allina Health

15

BE READY: DURING LABOR

RISK ASSESSMENT: INTRAPARTUM

Medium Risk	High Risk
] Chorioamnionitis] Prolonged oxytocin >24 hours] Prolonged 2nd stage] Magnesium sulfate	[ ] New active bleeding [ ] 2 or more medium risk factors (admission &/or intrapartum)
→ Type & SCREEN, review protocol	→ Type & CROSS, review protocol

Allina Health | Obstetric Complications: The Essentials and More

16

E: ETIOLOGIES OF PPH

- Primary (<24hrs)
  - Uterine atony
  - Genital tract lacerations
  - Retained or invasive placentation
  - Uterine rupture
  - Uterine inversion
  - Coagulopathy
- Secondary (>24hrs-12wks)
  - Infection
  - Retained placenta
  - Placental site subinvolution
  - Coagulopathy

Allina Health | Obstetric Complications: The Essentials and More

17

PPH CLASSIFICATION

Class	Acute Blood Loss	% Lost	Clinical Changes
1	1000cc	10-15	Dizziness, palpitations, minimal BP change
2	1,500cc	15-25	Tachycardia, tachypnea, sweating, weakness, arrowed pulse pressure
3	2,000cc	25-35	Significant tachycardia and tachypnea, restlessness, pallor, cool extremities, hypotension
4	≥2,500cc	35-45	Shock, air hunger, oliguria or anuria

Allina Health — Obstetric Complications: The Essentials and More

Modified from Bonnar, J Baillieres Best Pract Res Clin Obstet Gynaecol 2000

18

COMPARING HEMODYNAMICS OF PREGNANCY AND SHOCK STATES

Hemodynamics of pregnancy

	1st Trimester	2nd Trimester	3rd Trimester	During Labor	Early Postpartum (<3 Months)	Late Postpartum (3-6 Months)
Cardiac Output	↑	↑	↑	↑	↔	↔
Blood Pressure	↓	↓	↑	↑	↓	↔
Heart Rate	↑	↑	↑	↑	↓	↔
Systemic Vascular Resistance	↓	↓	↓	↓	↑	↔

Hemodynamic profile

Mechanism of Shock	Parameter Measurement Exam	Preload CVP / PCWP JVD, edema	Pump function CO Cardiac exam	Afterload SVR Pulses	Extraction (CvO2)
	Hypovolemic	↓	↓	↑	↑
	Cardiogenic	↑	↓	↑	↑
	Distributive	↓	↑	↓	↓
	Obstructive	Variable	↓	↑	↑

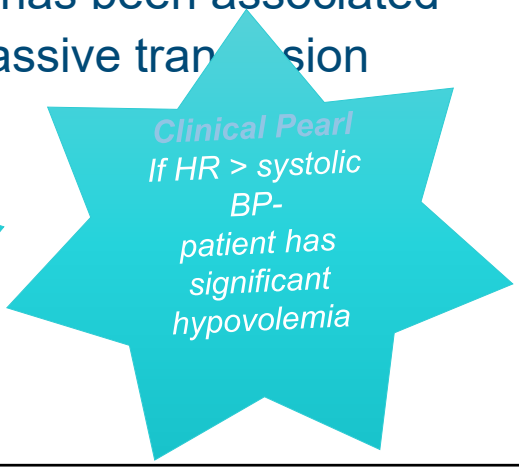
Allina Health — Obstetric Complications: The Essentials and More

19

19

LOSS ESTIMATION: SHOCK INDEX

- Heart rate divided by systolic BP
- Shock index >0.9 has been associated with a need for massive tran sion



Allina Health Obstetric Complications: The Essentials and More

20

E: BLOOD PRODUCT REPLACEMENT NEEDS

Component	*Primary Contents*	*Volume*	*Anticipated Effect*
Packed rbc	Red blood cells	300mL	Increase Hgb 1g/dL per unit
Platelets (pooled)	Platelets	300mL (6 units)	Increase platelet count 30-60,000/mm^3 per pack
FFP	All clotting factors	250mL	Increase fibrinogen 10mg/dL per unit
Cryoprecipitate	Fibrinogen, vWF, factors VIII, XIII	10mL	Increase fibrinogen 10mg/dL per unit

Allina Health Obstetric Complications: The Essentials and More

21