OB Hypertension and Postpartum Hemorrhage

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OB Hypertension

Elevated BP
Systolic ≥ 140 and or Diastolic ≥ 90

Severe Range BP
Systolic ≥ 160 and or Diastolic ≥ 110

GESTATIONAL HYPERTENSIVE DISORDERS

- Gestational Hypertension
- Preeclampsia (with or without severe features)
  - Early onset – < 34 weeks gestation
  - Late onset – > 34 weeks gestation
  - Postpartum – up to 6 weeks postpartum
- Eclampsia

CHRONIC HYPERTENSIVE DISORDERS

- Chronic Hypertension
- Superimposed Preeclampsia

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Diagnostic Criteria

	Preeclampsia	Preeclampsia with Severe Features
Hypertension	BP ≥ 140/90 mmHg x2, at least 4 hours apart after 20wks gestation in a normotensive woman	BP ≥ 160/110 mmHg x2, at least 4 hours apart while on bedrest (unless antihypertensive therapy has already been initiated)
Proteinuria	➢ 300mg in 24 hour specimen ➢ Protein/creatinine ratio ≥ 0.3 (with each measured as mg/dl)	No longer used as a diagnostic criteria: Massive proteinuria (> 5g in 24 hour specimen)
Thrombocytopenia	Platelets <100,000/uL	Platelets <100,000/uL
Impaired Liver Function	↑ Blood level of liver enzymes to twice the upper level of normal concentration or higher	↑ Blood level of liver transaminases to twice the normal concentration, severe persistent epigastric pain or RUQ pain unresponsive to medication and not accounted for by alternative diagnosis, or both
Renal Insufficiency	New development of serum creatinine >1.1mg/dl or doubling of serum creatinine concentration in the absence of other renal disease	Progressive renal insufficiency (serum creatinine >1.1mg/dl or doubling of serum creatinine concentration) in the absence of other renal disease
Pulmonary Edema	Absent	Present
Cerebral/Visual Disturbances	Absent	New Onset

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Complications of hypertension in pregnancy

MATERNAL

- Placental abruption
- DIC
- Cerebral hemorrhage
- Cerebral vascular accident
- Pulmonary edema
- Acute renal failure
- Seizure
- Stroke

NEONATAL

- Uteroplacental insufficiency
- Chronic fetal hypoxemia
- Intrauterine growth restriction
- Prematurity
- Low Apgar scores
- Seizures
- Neonatal encephalopathy
- Fetal and neonatal death

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Signs and symptoms of preeclampsia

Hypertension	Proteinuria	Visible edema in face, hands, abdomen; pitting edema	Rapid weight gain
Unusual, frequent or severe headache	Cerebral or visual disturbances	Epigastric pain (heartburn)	Stomach or RUQ pain
Nausea or vomiting	Dyspnea	Renal insufficiency	Hyperreflexia

(ACOG, 2020a; Lowdermilk et al., 2020; Simpson et al., 2021)

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OB Acute HTN Management

- **1st Alert** - after documented severe range BP
  - Repeat BP in 15 minutes
- **2nd Alert** – second documented severe range BP after 15min
  - Document from 2nd alert
- Initiate Protocol and call Provider
  - Protocol includes order for Nifedipine 10mg to start acutely treating the patient
    - Other acceptable Acute HTN Treatment
      - Hydralazine IV
      - Labetalol IV

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Protocol Orders

- Nifedipine 10mg
- Vitals
  - After treatment q15min until 4 consecutive non-severe BPs
    - If serve range BP in the middle q15mins starts over
  - Q2hr x4
  - Q4hr until discharge
- I&O q 4hrs
- Obtain IV access
- Fetal Monitoring for 60min after treatment
- Continuous Pulse oximetry

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Nifedipine

- 1st line for acute HTN treatment

ACTION:	A calcium channel blocker that relaxes smooth muscles including the uterus by blocking calcium entry
INDICATIONS:	• Pre-term labor • Gestational hypertension disorders • MEWS (Maternal Early Warning Signs) Protocol
DOSAGE AND ROUTE:	• 10mg or 20mg PO – Systolic BP ≥160 or Diastolic BP ≥110 x2, 15 minutes apart (OB Acute HTN Management protocol) • 10-20mg PO q6hrs (hypertension or preterm labor management) • 30-60mg PO QD or BID for HTN management
ADVERSE EFFECTS:	Maternal • Hypotension, HA, flushing dizziness, Nausea Fetal • Rare • Hypotension (questionable)
NURSING CONSIDERATIONS:	• Assess BP prior to administration; hold dose if BP <90/50 • Avoid concurrent use during magnesium sulfate bolus • Should not be given simultaneous with terbutaline because of effects on BP, HR

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Labetalol

ACTION:	Combined alpha and beta blocking agent causing vasodilation without significant change in cardiac output
INDICATIONS:	●Used to treat hypertension when systolic BP exceeds 155, or diastolic BP exceeds 105
DOSAGE AND ROUTE:	●Given PO 2-4 times daily for long term treatment of hypertension ●100mg initial dose ●Max dosing: 800mg q 8hours (2,400mg/24hrs) ●Can be given intermittent or continuous IV for acute treatment of severe hypertension ●20-40 mg IVP once ●20 mg IVP q1hr ●Do not exceed 300mg in 24 hours ●Push over 2 minutes
ADVERSE EFFECTS:	●Flushing, tremulousness, orthostatic hypotension, minimal change in pulse rate ●Minimal, if any, fetal effects
NURSING CONSIDERATIONS:	●Assess BP frequently because precipitous drop can lead to shock and placental abruption ●Assess maternal and fetal heart rate ●Assess urinary output ●Use with caution in presence of maternal tachycardia ●Should not be administered if patient has asthma

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Hydralazine

ACTION:	Vasodilators – which relaxes the blood vessels so blood can flow more easily
INDICATIONS:	● Serve Range blood pressure
DOSAGE AND ROUTE:	●5mg -10mg IV
ADVERSE EFFECTS:	●Dizziness ●Nausea ●Hypotension
NURSING CONSIDERATIONS:	●Assess BP frequently ●Push medication of 2 minutes ●Assess maternal and fetal heart rate ●Assess urinary output ●If serve range BPs continue may need to escalate dose from 5mg to 10mg.

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Eclampsia and Post Convulsion Intervention

Do not leave unattended **Call Medical Emergency**	Observe for post-convulsion confusion, coma and incontinence	Assess airway, breathing, pulse	Suction as needed
O2 10L/min via nonrebreather face mask	Insert IV if not already in place	Start IV fluids & monitor for potential fluid overload	Magnesium sulfate as ordered IV or IM
Administer additional anticonvulsants if seizure reoccurs	Vital signs until stable	Monitor fetal, cervical, & uterine status	Insert foley and accurate intake and output
Expedite labs work – kidney function, liver function, coagulation studies, drug levels	Provide hygiene and quiet environment	Provide support to patient and family	Prepare to assist with birth when woman is in stable condition

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Magnesium Sulfate

- High alert medication
- First line therapy for seizure prophylaxis
- Should be used in all patients with preeclampsia with severe features or with HELLP syndrome during labor and or postpartum

ACTION:	CNS depressant; relaxes smooth muscles including the uterus
INDICATIONS:	•Used to prevent seizures in patients with gestational hypertensive disorders •Used for neuroprotection in pregnancy's <32wks
DOSAGE AND ROUTE:	•Loading dose •IV - 4-6g bolus over 20-30 minutes •IM - 10 g (two separate injections of 5g in each buttocks) •IV - Maintenance dose 1-4 g/hr
ADVERSE EFFECTS:	Maternal: •Common effects: Hot flushes, sweating, burning at IV site, N/V, dry mouth, drowsiness, blurred vision, diplopia, HA, ileus, generalized muscle weakness, lethargy, dizziness, SOB, hypocalcemia •Intolerable effects: respiratory rate <12, pulmonary edema, absent DTRs, chest pain, severe hypotension, altered LOC, Urine output <25-30ml/hr, Serum magnesium level of 10mEq/L (9mg/dl) or greater Fetal (uncommon): •Decreased breathing movement, reduced FHR variability, Nonreactive NST
NURSING CONSIDERATIONS:	•Assess woman and fetus to obtain baseline before beginning therapy and then before and after each increment; follow frequency of hospital protocol •Notify MD if respiratory rate <12, Urinary output <25-30 ml/or, absent DTRs, and discontinue infusion if magnesium blood level >8 •Ensure Calcium Gluconate is available to reverse magnesium toxicity •Total IV intake should be limited to 125 ml/hr •Policy link – Medication Administration: Magnesium Sulfate

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HELLP Syndrome

- **H**emolysis – Breakdown of red blood cells
- **E**levate **L**iver Enzymes – AST and ALT abnormalities
- **L**ow **P**latelets - >100,000

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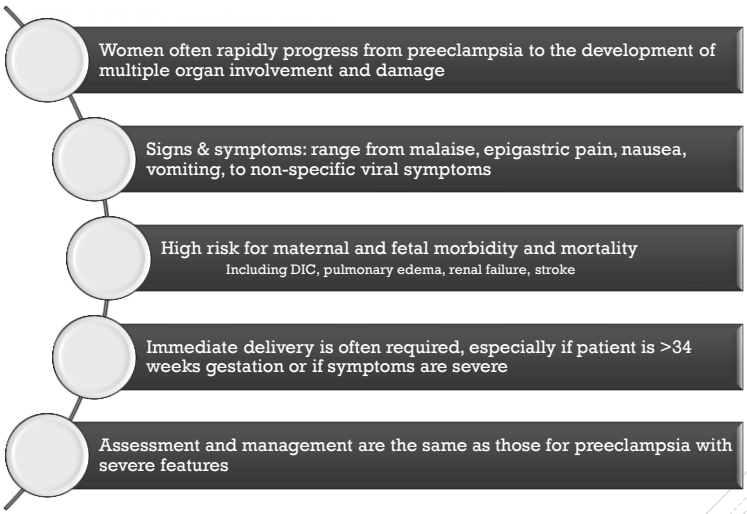
HELLP Syndrome



(Simpson et al., 2021)

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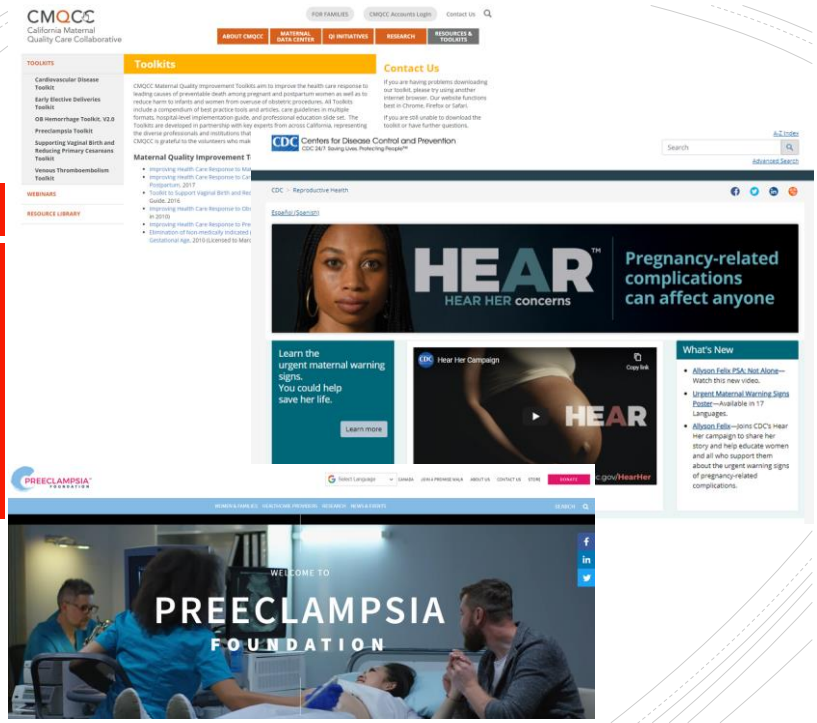
Resources

- CMQCC
- AWHONN
- Preeclampsia Foundation
- CDC Hear Her
- Council on Patient Safety In Women's Health Care



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Postpartum Hemorrhage

ACOG Standards

(American College of Obstetrics and Gynecology)

- Blood Loss ≥ 1000mL
- Any blood loss associated with s/s hypovolemia within 24hrs of delivery
- Blood loss of 500-999ml = abnormal finding and should be monitored closely

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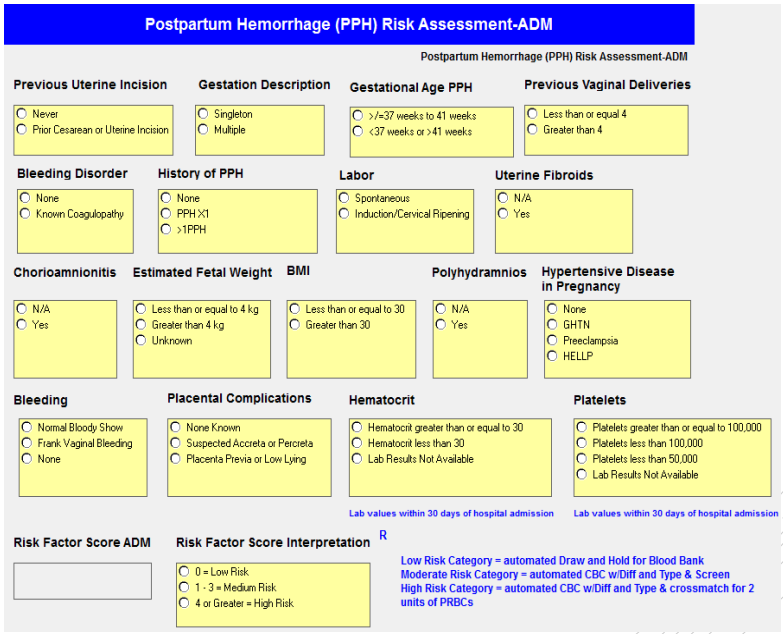
PPH Risk Assessment

- PPH risk assessments can identify 60-85% of birthing people that will experience PPH
- Completing PPH risk assessments prior to delivery allows facilities readiness for PPH



Postpartum Hemorrhage (PPH) Risk Assessment-ADM

Postpartum Hemorrhage (PPH) Risk Assessment-ADM

Previous Uterine Incision
- Never
- Prior Cesarean or Uterine Incision

Gestation Description
- Singleton
- Multiple

Gestational Age PPH
- >/=37 weeks to 41 weeks
- <37 weeks or >41 weeks

Previous Vaginal Deliveries
- Less than or equal 4
- Greater than 4

Bleeding Disorder
- None
- Known Coagulopathy

History of PPH
- None
- PPH X1
- >1PPH

Labor
- Spontaneous
- Induction/Cervical Ripening

Uterine Fibroids
- N/A
- Yes

Chorioamnionitis
- N/A
- Yes

Estimated Fetal Weight
- Less than or equal to 4 kg
- Greater than 4 kg
- Unknown

BMI
- Less than or equal to 30
- Greater than 30

Polyhydramnios
- N/A
- Yes

Hypertensive Disease in Pregnancy
- None
- GHTN
- Preeclampsia
- HELLP

Bleeding
- Normal Bloody Show
- Frank Vaginal Bleeding
- None

Placental Complications
- None Known
- Suspected Accreta or Percreta
- Placenta Previa or Low Lying

Hematocrit
- Hematocrit greater than or equal to 30
- Hematocrit less than 30
- Lab Results Not Available

Lab values within 30 days of hospital admission

Platelets
- Platelets greater than or equal to 100,000
- Platelets less than 100,000
- Platelets less than 50,000
- Lab Results Not Available

Lab values within 30 days of hospital admission

Risk Factor Score ADM

Risk Factor Score Interpretation R
- 0 = Low Risk
- 1 - 3 = Medium Risk
- 4 or Greater = High Risk

Low Risk Category = automated Draw and Hold for Blood Bank
Moderate Risk Category = automated CBC w/Diff and Type & Screen
High Risk Category = automated CBC w/Diff and Type & crossmatch for 2 units of PRBCs

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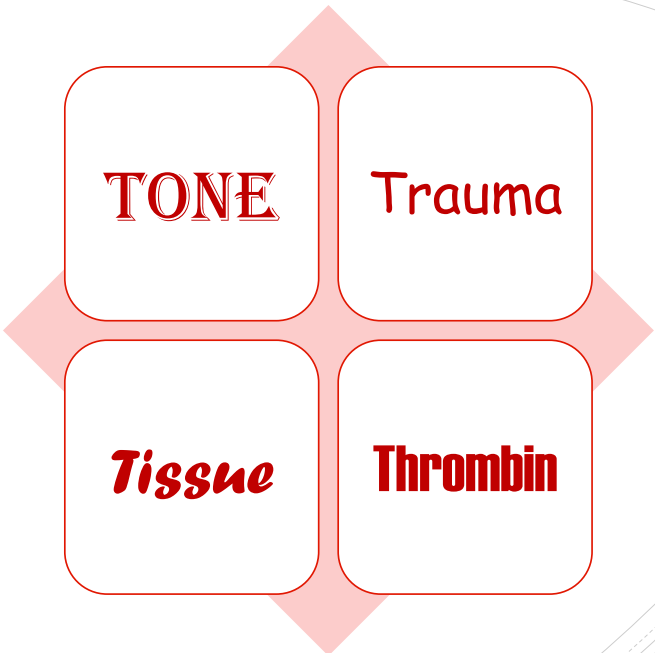
The 4 T's

possible causes of PPH



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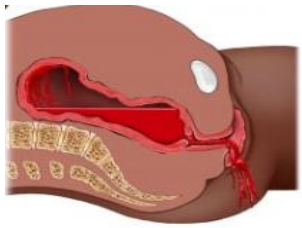
Poor Uterine **TONE**

leading cause of PPH

- Over distention of the uterus related to multiple gestation, polyhydramnios, macrosomia
- Prolonged (>24hrs) or precipitous(>3hrs) labor
- Prolonged delivery of placenta
- Oxytocin augmentation or induction of labor
- Grandmultiparity (>5 babies)
- Use of anesthesia, magnesium sulfate, calcium channel blockers (Nifedipine), tocolytics (terbutaline)



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Trauma

- Genital Trauma
  - Tears
  - Lacerations

Pressure or Repair Needed

- Risk for genital trauma increases with
  - LGA
  - Operative delivery

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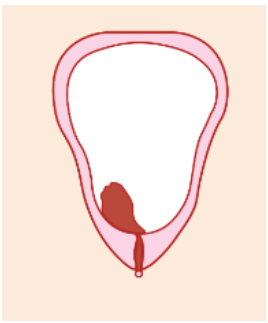
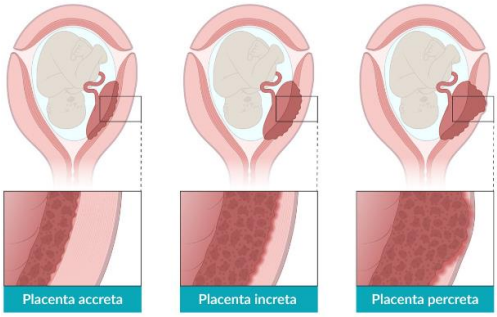
Tissue

- Retained Placenta
  - Incomplete delivery of placenta
  - Placenta Accreta spectrum
- Clots





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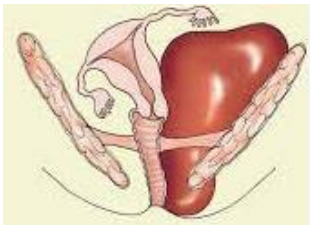
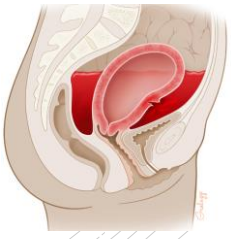
Thrombin

- Inherited clotting factor deficiencies (von Willebrand disease, [Disorder of platelet adhesion & protein coagulation. There are 3 Types- with the 3rd Type most severe] thrombocytopenia)
- Current anticoagulation therapy
- DIC
  - may be a cause or a result of postpartum hemorrhage

Vaginal Hematoma



Internal bleeding



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Stage Based OB Hemorrhage Management

STAGE 1 QBL >500ml or >1000ml CS, or increased bleeding in recovery with ongoing bleeding	STAGE 2 Continued bleeding or VS instability With QBL <1500ml	STAGE 3 QBL >1500ml, unstable VS or suspicion of DIC
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 ❑**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 ❑**Consider** Activating Stage 3	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 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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OB Hemorrhage Treatment

Medication

- Uterotonics
  - Oxytocin
  - Methergine
  - Hemabate
  - Misoprostol
- Non-Uterotonic
  - Tranexamic Acid (TXA)

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Oxytocin

ACTION:	Hormone produced in the posterior pituitary gland; acts directly on the myometrium to stimulate uterine contractions; aids in milk let down. Pitocin is a synthetic form of this hormone.
INDICATIONS:	●Used for labor induction and augmentation ●First line agent for postpartum hemorrhage
DOSAGE AND ROUTE:	●IV solution containing oxytocin should be mixed in a standard concentration ●30 units / 500mL ●Administered IV through a secondary line connected to the main line at the proximal port ●ALWAYS administered by pump ●Administer according to protocol (see policy) ●IM comes in 10 units vials
ADVERSE EFFECTS:	●Maternal: tachysystole, placental abruption, uterine rupture, unnecessary cesarean birth caused by abnormal FHR and patterns, PP hemorrhage, water intoxication. ●Fetal: hypoxemia and acidosis, eventually resulting in abnormal FHR and patterns
NURSING CONSIDERATIONS:	●Patient and family education- reason for use, effects, monitoring to anticipate ●Keep patient and family informed regarding progress ●Remember women vary greatly in response to this medication ● Intensive Assessment- follow protocols (see policy) ●The rate of Oxytocin infusion should be continually titrated to the lowest dose that achieves acceptable labor progress ●Documentation- follow protocols (see policy)

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Methergine

ACTION:	Vasoconstrictor; Causes strong contractions of the uterus which will decrease the amount of bleeding that occurs from the site where the placenta is attached.
INDICATIONS:	Postpartum hemorrhage
DOSAGE AND ROUTE:	●0.2 mg q2-6 hours up to six doses ●Routes: ●IM ●PO ●IV (rare)
ADVERSE EFFECTS:	**Hypertension**, nausea, vomiting, headache, strong cramping
NURSING CONSIDERATIONS:	●Contraindicated in patients with hypertension and cardiac disease ●Check blood pressure before giving, and do not give if .140/90 ●Continue to monitor vaginal bleeding and uterine tone ●Must be refrigerated

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Hemabate (Carboprost)

ACTION:	Prostoglandin that acts directly on the myometrium and other smooth muscle; Causes contractions of uterus.
INDICATIONS:	Postpartum hemorrhage
DOSAGE AND ROUTE:	250 mcg IM or intrauterine q15-90 min up to eight doses (2mg max dose)
ADVERSE EFFECTS:	•Diarrhea, nausea/vomiting, fever, tachycardia, hypertension, headache •Side effects are dose dependent
NURSING CONSIDERATIONS:	•Avoid with asthma •Continue to monitor vaginal bleeding and uterine tone •Must be refrigerated

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Misoprostol

ACTION:	•Cytotec is a prostaglandin that stimulates uterine contractions.
INDICATIONS:	•Used for pre-induction cervical ripening (ripen cervix before oxytocin induction of labor when Bishop score <4), labor induction, or abortion; also used for postpartum hemorrhage.
DOSAGE AND ROUTE:	•Available in 100 or 200 mcg tablets. Pharmacy prepares tablets to correct dose. •Recommended initial vaginal dose is 25 mcg, buccal dose is 50mcg •Intravaginally inserted into the posterior vaginal fornix. •Repeat q 3-6 hrs up to 6 doses in a 24-hour period or until an effective contraction pattern is established., the cervix ripens, or significant adverse effects occur. •Can be used up to 1000mcg rectally for postpartum hemorrhage.
ADVERSE EFFECTS:	•Higher doses are more likely to result in adverse effects such as nausea and vomiting, diarrhea, fever, uterine tachysystole with or without an abnormal FHR and pattern, or fetal passage of meconium. •The risk for adverse reactions is reduced with lower dosages and longer intervals between doses.
NURSING CONSIDERATIONS:	•Explain procedure to the woman and her family. •Assess maternal-fetal unit, before each insertion and during treatment following protocol. •Use caution in women with history of asthma, glaucoma, or renal, hepatic or cardiovascular disorders. •Documentation- follow protocols. •MAY NOT BE USED IN PATIENTS WITH A PRIOR UTERINE INCISION

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Tranexamic Acid

ACTION:	Inhibits the enzymatic breakdown of fibrin blood clots to prevent or reduce hemorrhage episodes
INDICATIONS:	Heavy bleeding
DOSAGE AND ROUTE:	•1000mg (1gm) IVP •10mL vial •Can repeat in 15 minutes
ADVERSE EFFECTS:	• Hypotension • Headache • Nausea / vomiting / diarrhea • DVT / PE
NURSING CONSIDERATIONS:	•SLOW PUSH over 10 minutes

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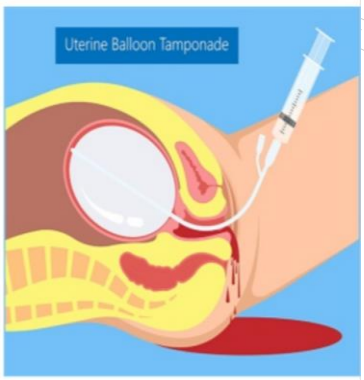
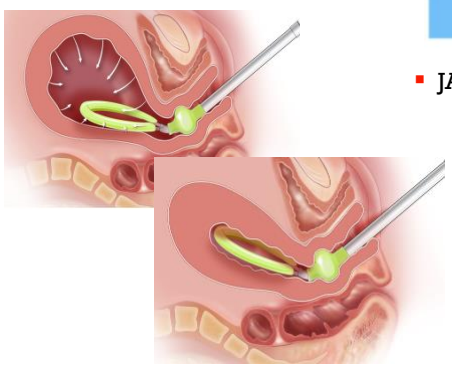
Devices

- Bakri – Uterine Balloon Tamponade
  - Manually placed inside the uterus and filled with normal saline
  - Helps to tamponade the uterus to reduce bleeding
  - Reduces the need for more invasive procedures
  - Doesn't require an operating room for placement
    - Most are placed with U/S





- JADA – Uterine Suction Device
  - Low-level suction that induces physiologic contraction of the uterus
  - Doesn't require an operating room for placement

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Surgical Interventions

- D&C
- B-Lynch Suture
- O'Leary
- Hysterectomy
- IR (Interventional Radiology)
- Laparotomy