Uterine Atony

Uterine atony is failure of the uterus to fully contract post-partum potentially resulting in massive hemorrhage & emergent hysterectomy requiring simultaneous assessment & management; it is the MOST COMMON cause of PPH

ANESTHETIC CONSIDERATIONS:

1. Considerations of the pregnant patient (except 2nd patient):
    - potentially difficult airway
    - rapid desaturation due to decreased FRC
    - aspiration risk and rapid sequence induction
    - physiologic changes of pregnancy
2. Risk of maternal morbidity & mortality

ANESTHETIC GOALS:

1. Maintain adequate circulating blood volume and coagulation factors
2. Clear lines of communication with surgical team regarding ongoing HD & coagulation status

HISTORY

- Diagnosis supported by soft post-partum uterus and vaginal bleeding (however, significant engorged uterus can contain ~1 L of blood w/out vaginal bleeding)
- History / physical may be limited d/t emergent conditions and should be directed to evaluating urgency of intervention:
    - On-going blood loss
    - Maternal hypotension
    - **Any of these 2 = urgent / emergency and may r/o RA**
- AMPLE at minimum, if time permits, standard obstetrical anesthetic history as well as::
    - Assessment for placenta accreta:
        - 5% of pts w/ previa have accreta
        - 25% of pts w/ previa and 1 prior C/S have accreta
        - 50% of pts w/ previa and 2 prior C/S have accreta
        - 67% of pts w/ previa and > 3 prior C/S have accreta
    - Assessment for other causes of PPH = "T's":
        - Tissue
        - Trauma
        - Thrombosis
        - Turn out of the uterus

PHYSICAL

- **HEENT**
    - Mallampati class, ease of intubation
- **CVS**
    - Tachycardia, hypotension

INVESTIGATIONS

- **Labs**
    - CBC for Hb
    - X-match
    - DIC investigation: PLT, INR, PTT, fibrinogen, FDP
- **Imaging**
    - U/S can be useful in detecting retained placental products

OPTIMIZATION

- Maternal resuscitation:
    - Supplemental O_2
    - IV Fluid Bolus
    - Ephedrine / phenylephrine for hypotension (in addition to volume)
    - **Uterine Massage**
    - **Uterotonics**:
        - Oxytocin:
            - Neurohypophyseal hormone
            - Boluses up to 20 IU
            - Infusions up to 80 IU/L
            - S/E:
                - CVS:
                    - Hypotension (decreased SVR w/ increased HR)
                    - Pulmonary HTN
                    - Cardiac arrest w/ boluses
                - IV site pain
                - Hyponatremia (very similar in structure to ADH) thus do not administer w/ hypotonic agents
        - Methylergonovine:
            - Ergot alkaloid
            - 0.2 mg IM - may repeat once
            - Alternatively, diluted in NS and given slowly IV over 10 min

        - S/E:
            - CVS:
                - HTN & coronary artery vasoconstriction
                - Pulmonary HTN
                - Pulmonary edema
            - CVA
    - Carboprost (Hemabate):
        - Prostaglandin F_2-alpha analog
        - 0.25 mg IM or intramyometrial - repeat up to 1.0 mg
        - S/E:
            - CVS:
                - HTN
                - Pulmonary HTN
            - Bronchospasm
        - Misoprostol (PGE_1 Analogue)
            - Can be used in patients w/ pulmonary HTN or asthma
            - Dose: 200 mcg orally plus 400 mcg rectally
- OR prep:
    - Mobilization of resources - RNs, surgeon, prep & drape
    - Aspiration prophylaxis
    - Topicalization of A/W if AFOI likely

ANESTHETIC OPTIONS

- Options will be limited by:
    - Hypovolemia
    - Hemorrhage
- GETA vs. RA vs. MAC depending on stability of patient & A/W

ANESTHETIC SETUP

- **Drugs**
    - Standard emergency drugs & inotrope / pressor infusions + NTG in case uterine relaxation required
- **Equipment**
    - CAS monitors + 5-lead ECG
    - 2nd set of skilled hands if hemorrhage
    - Multiple large bore IVs
    - Warmers & rapid infusion device
    - Art-line for HD instability

MANAGEMENT OF ANESTHESIA

- **Induction**
    - Be prepared for hemorrhage resulting in hypotension post induction - consider ketamine 1-1.5 mg/kg instead of STP for induction
- **Maintenance**
    - Always keep possibility of placenta accreta as possible diagnosis
    - Evaluate urgency and prepare for:
        - Massive blood loss w/:
            - At least 2 large-bore IVs
            - PRBCs
            - Coagulopathy: FFP, PLT, Cryoprecipitate or Factor replacement
        - Requirement for:
            - Clamp uterine arteries
            - Emergent hysterectomy
            - X-clamp aorta
- **Emergence**
    - Awake

DISPOSITION & MONITORING

- Depends on transfusion

COMPLICATIONS

- Massive blood loss & need for hysterectomy

PATHOPHYSIOLOGY

- 1 in 20 deliveries
- Uterus receives 20% of the CO, so the atonic uterus can loose 2000 cc in 5 minutes
- RF:
    - Uterine overdistention:
        - Multiparity
        - Polyhydramnios
        - Gestational DM
        - Multiple gestations

    - Excessive oxytocin use
    - Retained placenta
    - Operative delivery
- Recognize that degree of hemorrhage is often underestimated by RN and MD
- Blood loss in studies is conflicting, but one study reported average for SVD is 600 cc and C/S is 1000 cc
- Primary PPH occurs w/in first 24 hours and secondary PPH occurs between 24 hours and 6 weeks
- May be associated w/ myocardial ischemia