

Automated alert system of second-line uterotonic drug administration

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■ **Situation**

- Lucile Packard Children's Hospital, Stanford, is a tertiary referral center with 4,500-5,000 deliveries/year (70% high-risk deliveries)
- Incidences occurred when the OB Anesthesiology team were alerted late, or not at all during PPHs

■ **Background**

- A significant proportion of maternal morbidity and mortality are preventable¹

■ **Assessment**

- Suboptimal situational awareness or task saturation by the OB provider(s) and L&D nurses

■ **Recommendation**

- A novel **automated alert system** based on **2nd-line uterotonic drug administration** was introduced to improve the reliability of alerting the anesthesia team



Methods

- An alert system based on **EBL** and **education** of nurses/OBs was introduced (Figure 1)
 - To alert the anesthesia team early in the case of PPH
 - Thresholds based on EBL and/or vital signs were unreliable
- An **automated process** was introduced
 - Alert sent by text message (using clinical communication software) to the obstetric anesthesiology team when a 2nd-line uterotonic drug was documented in the EMR
- Trigger criteria included administration of a **2nd-line uterotonic drug**
 - *Methylergonovine 200 mcg (IM), or*
 - *Carboprost 250 mcg (IM), or*
 - *Misoprostol 800 mcg (any route)*

Got PPH?



Call the Anesthesia Team if:

- EBL >500 mL after vaginal delivery
- Heart rate >110 bpm
- Systolic blood <85 mm Hg
- SpO₂ <95%
- Altered mental status
- Secondary uterotonic agent needed
- Patient bleeding and OB unavailable or delayed
- You are concerned about bleeding or the clinical situation

The Anesthesia Team will:

- Reassess EBL
- Determine cardiovascular stability
- Obtain additional large-gauge IV access
- Administer fluids and vasopressors
- Draw labs
- Help activate MTG
- Administer blood, if needed

We are always ready to help - don't hesitate to call!

- OB Anesthesia Attending xxxxx
- OB Anesthesia Fellow xxxxx
- OB Anesthesia Resident xxxxx

Figure 1: 'Got PPH?' poster



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ANNUAL MEETING

- Introduction of the automated alert process:
 - Resulted in **1.06 alerts/day** (Jan-Dec 2021)
 - Ensures **prompt bedside evaluation** by an obstetric anesthesiology team member to:
 - Assess hemodynamic stability
 - Obtain additional IV access
 - Initiate resuscitation actions
 - Ensure utilization of the PPH checklist (Figure 2)
 - Escalate care when indicated

Conclusion

- Utilization of this **automated 2nd-line uterotonic drug alert system** has:
 - Improved communication
 - Dramatically reduced failure to inform the obstetric anesthesiology team
 - Increased the presence of an anesthesiologist at the bedside
- Future studies are required to determine if this novel automated alert system improves patient outcomes and decreases preventable maternal morbidity and mortality



PPH Checklist

Recognize
Call for Help
Treat
Transfuse early

STEP 1: CALL FOR HELP!

☐ OB Rapid Response (xxx)

☐ Primary OB

☐ OB Chief Resident (xxx-xxx-xxxx)

☐ OB Anesthesia (Attending: xxx-xxx-xxxx Fellow: xxx-xxx-xxxx Resident: xxx-xxx-xxxx)

☐ Assign nursing roles

STEP 2: IDENTIFY & TREAT CAUSE ~ Atony, Laceration, Retained Placenta, Coagulopathy

☐ Vitals q1-2 min

☐ PPH kit + PPH cart

☐ 100% oxygen
 ☐ Fundal massage

☐ IV fluids - high rate
 ☐ Urinary catheter

☐ 2 wide-bore IVs
 ☐ Uterotonics
 ➡

Pitocin 1-2 u IV bolus (anesthesiologists only)
 Max 30 u/500 mL (max rate 500 mL/hr)

Always inform an anesthesiologist if administering 2nd-line uterotonics:

Methergine 0.2 mg IM q2-4 hr Time given: _____

Hemabate 0.25 mg IM q15 min _____

Repeat dose @ _____

Misoprostol 600-800 mcg SL _____

STEP 3: ASSESS MAGNITUDE

Phase 1 (first 5 - 10 min)

☐ Consider doing a RECAP now

☐ Send STAT labs (ABG, CBC, PT/PTT, INR, Fibrinogen, iCa, TEG)

☐ Activate MTG
 ☐ Resuscitate using Belmont

☐ Assess QBL
 ☐ Bakri balloon

Phase 2 (10 - 15 min)

☐ Early transfer to OR (if bleeding is ongoing) or IR (if bleeding ongoing + stable)

☐ Consider fibrinogen concentrate (RiaSTAP), or cryoprecipitate

☐ Consider tranexamic acid 1 g IV

☐ Treat hypocalcemia
 ☐ Maintain normothermia

Figure 2: PPH checklist