Simulations and Drills: Educational Tools
Sample Scenario #3: Hemorrhage, Hypotension after Delivery
Simulations and Drills
Used with permission of Paul Preston, MD, Kaiser Permanente, San Francisco Medical Center

*This scenario employs NOELLE Maternal & Neonatal Birthing Simulators*

**BRIEF SYNOPSIS:** Progressive fetal distress, suggestive of abruption. Profound atony, bleeding and hypotension after delivery, coincidental with administration of antibiotic. Maternal antibodies, unable to crossmatch blood. Profound neonatal hypovolemia, requiring UA fluids and pressors.

**Teaching Objectives**
Recognition of abruption. Decision not to activate epidural with hypotension. Differential, bleeding vs. allergy. Management of massive bleeding, including other resources (IR, tamponade balloons). Communication with neonatology, and neonatal team management of severe abruption with meconium. Need to give type specific or O- blood in certain situations.

**Potential System Issues Explored**
Communication, especially when things aren't clear-cut. Overall preparation of unit, hospital for massive bleeding and c/hyst. Preparation of neonatal team for really sick kid, needing drugs/CPR/volume. Relations with blood blank in demanding and unusual situations.

**Equipment, Settings, Rooms:**

a) Noelle: Single IV, pitocin and Magnesium running at usual rates. Epidural catheter, infusing at usual rate.
b) Fetalsim: Abruption pattern, PPSP 2, programmed and allowed to run for a while.
c) Baby: Loaded on sim-man* in uterus. Mouth and body covered in pea soup and blood. Blood loaded in UA reservoir, fake umbilicus in place. If using device driver, set to HR of 60 and 50% saturation. (*Note: Noelle is used in a labor room, then transported to the OR and left outside of the OR; then sim-man becomes the patient as he is already in the OR and set up as Noelle would coming from the room).
d) Sim-Man: Single IV, pitocin and Magnesium running (unless these would be discontinued for transport. Epidural catheter, infusing at usual rate. Program HR to 138, BP to 85/40, O2 sat to 97%. Breath sounds, airway all normal.
e) Other: Prepare suction full of fake blood, multiple bloody pads, and hide under towel in OR. Take off towel right after delivery, call attention to this finding.

**Confederates and Briefings:**

a) Patient voice: having pain, worse than before. Feeling exhausted, sick of mag. Legs still very heavy, at least T8 level to testing (if performed). In OR, still pain and now feeling weak, nauseated. If epidural dosed, profound weakness (along with LOW BP) and eventual unresponsiveness.
b) Partner: (optional) Nervous, wants to accompany patient, but reasonable—will stay behind if given good explanation.

**Briefing for team**

Mrs. Jones is a wonderful lady—it's painful to see her having such an awful labor. 38YO, G2P1, induced for moderate pre-eclampsia. On mag and pit. Prior section for breech, really wants vag delivery. Slow labor all night, minimal sleep. CBC, labs—compatible with moderate pre-eclampsia, not HELLP. Finally got epidural 2 hours ago, now calling RN for something. If asked, no other major illness or known allergy, normal height and weight, last BP was 150/82, last HR 110, last cervical check 4 cm.

**How Scenario Runs**

a) RN arrives, patient feels pain. Strip looks progressively more ominous, but without catastrophic decel. Maternal BP starts at 110/50, HR of 122, progressive deterioration. Good sensory level to epidural. On cervical exam, still 4 cm, thick mec with blood. Advance the Fetalsim appropriately to make sure we go to OR.
**b) In OR,** low BP noted and strip keeps looking worse. Class 2 airway if examined. If epidural activated, profound hypotension/near cardiac arrest. If GA induced, reward light doses of anesthetic. Airway not a problem. Does discussion of probably shock, uterine rupture, choice of anesthetic, advance planning for bleeding occur?
c) Baby delivered---does peds get briefed about blood and mec and probable abruption? How well are they able to do this resuscitation? NALS instructor—don't let them get baby back until they actually cannulate cord and give volume.
d) After delivery, while Kefzol being given, really drop the BP—70/30, add some PVCs. Show bloody suction, rags to team. Uterus is totally boggy, tone is terrible. Give some credit for pressors and lighter anesthesia, but not enough to feel safe—push them to order blood--her color looks very pale. Stat crit---14, if ordered. How well prepared is OR team to do a C/hyst? Start more IV access and give blood? Blood bank is reluctant to release blood ("Can you just give us another 30 minutes to work on this antibody?") Requires clear communication to release uncrossmatched blood.

**Key Times to be Alert**

a) Recognition of rupture, communication, decision to go to CS.
b) Briefings in OR-situation, shock, baby, choice of anesthesia?
c) Management of bleeding
d) Management of baby

**Why This Scenario?**

Bleeding is commonly seen. Many of our facilities report systems issues in handling this problem, often related to blood bank. Overall, a good discussion of system strengths and weaknesses results. New information on uterine tamponade balloons, best practices for blood storage (coolers work if no fridge), clear planning for requesting emergency blood will often result.