

Instructor Guide

Resources

- Instructor Guide
- Human Simulation Template
- Pre/Post Evaluations
 - Participants complete before and after workshop to assess changes in knowledge, comfort, and self-assessed confidence managing hemorrhage (including cervical bleeding assessment, cannula test, and uterine tamponade), as well as session usefulness.
- PowerPoint Presentation
 - Review of indications for uterine aspiration, safety, risks and potential complications.
 - Introduction to “6Ts” mnemonic for causes¹, management steps, and hemorrhage case for fishbowl procedural demonstration.
- Provider Evaluation Form
 - Checklist for hands-on practice by Evaluator to track progress of the Provider.
 - Successful performance is to name and simulate 75% of management steps.
- Equipment list of basic and optional items for simulation lab
- Clinic Simulation Exercise and Teaching Points
 - A supplementary group exercise to practice delegation, coordinated teamwork, and transfer of a patient with hemorrhage in the clinic setting.

Purpose

More than half of pregnancies experienced by US women are unintended, one in five end in miscarriage, and one in four end in abortion. Uterine aspiration is a procedure used for miscarriage management, incomplete abortion, or therapeutic abortion. Because complications of uterine aspiration are rare,²⁻⁴, trainees may benefit from supplementary training on complication management. We developed this simulation lab of a relatively common complication (hemorrhage) including cases, management steps, and a helpful mnemonic.

Integrating the workshop into clinical training may help trainees in gynecology, primary care and emergency medicine to be more comfortable and competent future providers. Practicing the simulation in women’s health clinical settings can further prepare teams on appropriate delegation, closed-loop communication, and emergency management.

Basic Structure:

The Workshop presents a low cost simulation model, complication cases, a mnemonic to guide learning, a pre- and post-session participant evaluation of knowledge and perceived competence, a participant observed performance checklist (completed at the time of simulation), as well as an additional role play for clinical teams,

Fruit models have been used to practice uterine aspiration⁵ and now management steps of hemorrhage.⁶ In addition to uterine dilation and aspiration, learners have the opportunity to practice new skills including the cannula test, walking the cervix with forceps, and uterine tamponade with foley catheter.



Educational Objectives

A. Primary Learning Objectives

- Review indications, safety and risks of uterine aspiration
- Practice mnemonic for hemorrhage causes and management steps, including common uterotonic medications
- Learn and practice cervical assessment with forceps and “cannula test”
- Practice uterine tamponade with foley catheter

B. Secondary Learning / Assessment Objectives

- Review manual vacuum aspiration and equipment
- Review risk factors for post-aspiration hemorrhage
- Review algorithm for triaging patients based on resource availability
- Recognize significant ultrasound findings in hemorrhage

Conceptual Background

A growing literature supports the use of simulations in procedural training and medical education.⁶⁻¹⁴ Limited patient encounters, heightened focus on patient safety, and demands on training hours have led to a new paradigm of medical education that increasingly involves innovative ways to provide standardized curriculum, including use of models and simulated complication scenarios. Simulations have led to improvements in medical knowledge, comfort in procedures, and improvements in performance during complications, and have also been shown to be a reliable tool to teach topics such as teamwork, delegation, and stress-readiness during a crisis. While different models have been evaluated for second trimester¹² or post-partum hemorrhage,¹³⁻¹⁵ none have been evaluated for hemorrhage after uterine aspiration in early pregnancy.

Practical Implementation Advice

Materials Needed

(n is based on groups of 3; if using groups of 1-2, multiply by n, or n = ½ trainees)

- Dragon fruit (pitaya) or papaya (n=⅓ trainees + 1 demonstration)
- Manual vacuum aspirators (n=⅓ trainees + 1 for demonstration)
- Cannulae #9 (n=⅓ trainees + 1 for demonstration)
- Dilators (up to size 9 Denniston or 27 Pratt) (n=⅓ trainees)
- Foley catheters (n=⅓ trainees + 1 for demonstration)
- Saline bags (0.5-1 L) and IV tubing (n=⅓ trainees)
- Ring forceps (n=2)

Optional:

- Red food dye, Chux/paper towels/sani-wipes (n=# of trainees)
- Uterine aspiration instrument pack (n=1 for demonstration)
- Printed images of ultrasounds:
 - Empty uterus
 - Fluid in cul-de sac

The workshop takes 90-120 minutes and requires one trained instructor. An additional instructor or assistant should be used for groups over 15 participants.

Consider local seasonal availability of fruit models ahead of time. Although this workshop is designed to use dragon fruit (pitaya), papaya can easily suffice, and may be



more widely available. Choose fruit size to mimic uterine size, and ripeness to avoid unplanned perforation. It is helpful to divide and arrange all materials ahead of time, for groups of 1-3 learners plus one demonstration area.

Equipment can be borrowed from a local clinic to minimize the cost of purchasing new equipment, but then requires staff time to properly sterilize borrowed equipment. If only used for training purposes, the equipment does not need to be sterile, and can be washed and used multiple times. Additionally, old or expired equipment, such as cannulas, or sounds, which would otherwise be thrown away, can be used rather than purchasing new equipment.

The Powerpoint presentation is used to review indications, safety, risk stratification for uterine aspiration,¹⁶ and a mnemonic for hemorrhage management. Cases are presented for fishbowl demonstration and individual simulation exercise.

How Successfully Deployed (common pitfalls, tips for success)

We initially developed the Clinic Simulation for Hemorrhage as an emergency preparedness drill for women's health clinics (2004–2012). We were asked to pilot the Simulation Lab with dragonfruit for a national conference⁵ which was well-received but most useful among learners with previous uterine aspiration experience.

Subsequently we evaluated the Classroom Simulation among a group of medical and nursing professionals with varied uterine aspiration experience, and as a supplementary training session for Family Medicine residents after a basic rotation including uterine aspiration. In session evaluations, learners (n=27) rated the helpfulness of the workshop as 4.8 on a 5 point Likert scale (with 5 being "very helpful") in preparing them to manage aspiration-related hemorrhage. Participant knowledge was assessed using pre- and post- evaluations, showing improved identification of medications to avoid in patients with hypertension (23%), common perforation sites (21%), and common etiology of post-aspiration hemorrhage (8%). Learner's self-assessed competency to manage hemorrhage during uterine aspiration rose by 1.1 (on 5 point scale) following the workshop. Learners' self-perceived readiness to take a leadership role and delegate improved by 1.2. We have subsequently added additional self-assessment of skills including cervical bleeding assessment, cannula test, and uterine tamponade.

Limitations and Lessons Learned

Compared to high tech models, this simulation is inexpensive and materials are easily attainable in most parts of the world. Dragon fruit simulates both the grittiness of the uterus after aspiration, pliability of uterine involution, and those varieties with red pulp nicely simulate bleeding (although red food dye can also be added to saline). If dragon fruit (pitaya) is seasonally unavailable, papaya can also be substituted.

A limitation is that fruit models may not mimic all anatomical features such as the tone of the cervical os, which may limit teaching of anatomy and cervical dilation. (Removing the woody stems is helpful ahead of time, but avoid creating too large an opening, so dilation can still be practiced.)

References: (See Simulation Template)