Simulation for Laparoscopic Salpingostomy and Salpingectomy for Ectopic Pregnancy

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Preparation:
Each station has two residents and one faculty member

Simulators to be used:
1. Standard Laparoscopic Box Trainers will be used
2. Laparoscopic Maryland Graspers, Laparoscopic Endoshears
3. Laparoscopic ectopic model (materials and assembly described below)

Materials:
1. Laparoscopic box trainer
2. Maryland grasper and endoshears
3. Plastic 5-inch long maraca
4. Assorted size balloons
   a. 5-inch white balloon (used for ovaries)
   b. Squiggly balloons (used for tube with ectopic)
   c. Assorted 5 inch colored balloons (to be used as ectopic)
   d. Twist and shape balloons optional (used as normal fallopian tube if desired)
5. Wooly balls
6. Glad Press-n-seal
7. Plastic cord/string (to be used as vessels)
8. Scotch tape
9. Drill with 1/4 inch bit
10. Optional: Laparoscopic needle with water filled syringe to simulate injection of pitressin

Model Construction:
1. Ectopic (calculate how many needed total and prepare all in advance)
   a. Place wooly ball inside colored 5-inch balloon (Fold opening to balloon backwards for ease of insertion; may use forceps to stretch balloon opening. Once wooly ball is inside, tie top of balloon and fold excess backwards over balloon.

   ![Image of balloon setup]

2. Fallopian tubes (calculate how many needed total and prepare all in advance)
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a. Cut off closed tip of squiggly balloon
b. Place prepared ectopic inside desired location of squiggly balloon (folding balloon backwards from the cut end, and inserting the “ectopic” from this end will facilitate placing the “ectopic” inside; you can again use forceps to stretch opening and aid placement. “Ectopic” can be placed anywhere along tube to simulate different locations of ectopic pregnancy; Note, we found it easier when using the model to have an “ectopic” that was a different color than the “fallopian tube”)
c. Tie opposite (uncut) end of balloon
d. Cut distal end of balloon to simulate fimbriae
e. Fold the balloon in half, length ways, and glue together (this decreases overall caliber of the tube)

3. Uterus
   a. Drill ¼-inch hole in the desired “cornual” locations in the rounded part of the maraca (you will need to drill 2 total, one for each fallopian tube).
   b. Place tied end of one prepared fallopian tube into drilled hole in maraca
c. Tape tube in place
d. For the opposite tube, you can place an additional prepared fallopian tube in the drilled hole and secure in place with tape. (this will make a model with 2 ectopic pregnancies, and will allow 2 simulations on one model. If only one ectopic is desired, you can place a single twist and shape balloon in the same manner. You will need to tie the end of this balloon and then cut slits for fimbriae at the distal end)

4. Ovaries
   a. Take two white 5 inch balloons and inflate to desired size
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b. Tie the end to secure

5. Final Model Assembly
   a. Measure out a piece of Glad press n seal that will cover the entire length of the maraca and then fold back over that length (will want to “sandwich the maraca”)
   b. Lay press and seal with sticky side up on flat surface
   c. Place maraca with tubes on lower 1/2 of press and seal. Tip of maraca should be slightly off end of press and seal
   d. Place “ovaries” in desired location (we placed tied end of “ovary” adjacent to maraca, and under fallopian tube to simulate uterine-ovarian attachment and attach with tape)
      i. Place single piece of red plastic string adjacent to ovary to simulate IP ligament)
   e. Fold press n seal over model and press to secure
   f. For added mobility of tubes (if desired), can cut a vertical slit, 1-2 cm, along distal tip of maraca

Completed Model with bilateral ectopic within trainer
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Lab Sequence:

1. The laparoscopic box trainers will be set up with one Maryland and one endoshear at each station. The ectopic model will be placed in the trainer with the base of the maraca facing away from the operator (opposite of what is shown in the picture above). This will be manipulated by the surgical assistant.
2. The learner will describe the process of a time out
3. The learner will describe the proper positioning of a patient
4. The learner will describe the proper set up of the camera equipment, tubing, and energy sources
5. The learner will call for and properly identify the instruments used in the simulation: Maryland graspers and endoshears. (Optional items include laparoscopic needle with water filled syringe if simulation of pitressin injection is desired). The learner should also call for additional instruments she/he would use in the actual operating room (uterine manipulator, endocatch bag)
6. The learner will describe the method upon he/she would gain access to the abdominal cavity and obtain pneumoperitoneum
7. The learner will identify and describe key surgical anatomy
8. The learner will describe safe secondary trocar placement and call for appropriate port sizes
9. The learner will identify the ectopic pregnancy site and evaluate the opposite fallopian tube
10. The learner will grasp, position, and orient the fallopian tube; surgical assist with aid with uterine manipulation and access to the ectopic pregnancy
11. The learner will perform a linear salpingostomy opposite the mesosalpinx using Maryland graspers and endoshears. (Injection of “pitressin” is optional at the beginning of this step)
12. The learner will remove the ectopic pregnancy and leave the fallopian tube intact; they will describe how to adequately obtain hemostasis
13. The learner will describe need to follow beta-HCG post-operatively
14. Optional Step: The learner may then proceed with salpingectomy using endoshears and Maryland grasper if desired (as previously described in salpingectomy module)
15. The learner will describe proper specimen removal
16. The learner will describe intra-abdominal confirmation of hemostasis
17. The learner will describe proper removal of trocars under direct visualization
18. If applicable, the learner will describe the proper closure of the fascial defect after trocar removal
19. The learner will describe the proper closure of the skin incisions