Sonohysterogram Protocol

I. **Patient Preparation**
   a. Performed with an empty urinary bladder on the last day of bleeding or during the first few days after, the early proliferative stage of the menstrual cycle.
   b. Indications
      i. >4mm endometrial thickness in perimenopausal/postmenopausal patients with abnormal uterine bleeding
      ii. >15mm endometrial thickness in proliferative phase in premenopausal patients
      iii. Endometrial cavity/endometrium not discernible during endovaginal ultrasound
      iv. Filling defect/endometrial lesion identified during endovaginal ultrasound
   c. Pelvic organ tenderness should be assessed during the preliminary endovaginal sonogram. If adnexal tenderness or pain suspicious for active pelvic infection is found prior to fluid infusion, the examination should be deferred until after an appropriate course of treatment. In the presence of nontender hydrosalpinges, consideration may be given to administering antibiotics at the time of the examination; in this case it is prudent to discuss the antibiotic regimen with the referring physician. A pregnancy test is advised when clinically indicated. Patients should be questioned about latex allergy prior to use of a latex sheath. The optimal time to perform this test in a menstruating woman is after the bleeding ends but prior to ovulation.
   d. Automatically need an order for pelvic ultrasound if 90 days/ 3 months since prior pelvic ultrasound.
   e. If pelvic ultrasound was performed within the 90 days/3 months of scheduled sonohysterogram, then a transvaginal ONLY will be performed (at no additional charge) the day of the procedure.
   f. **Contraindications**
      i. Sonohysterography should not be performed in a woman who is pregnant or who could be pregnant. This is usually avoided by scheduling the examination in the follicular phase of the menstrual cycle, after menstrual flow has essentially ceased, but before the patient has ovulated.
      ii. In a patient with regular cycles, sonohysterography should be performed no later than the tenth day of the menstral cycle. The patient can be scheduled one to seven days after the **last** day of active bleeding, as long as it doesn't exceed the 10^{th} day of the current cycle.
      iii. In a patient with abnormal cycles (metrorrhagia) the procedure can be scheduled at any time since the patient is unsure of start/stop of the cycle. Active vaginal bleeding is not a contraindication to the procedure but may make the interpretation more challenging.
      iv. Sonohysterography should not be performed in patients with a pelvic infection or unexplained pelvic tenderness, which could be due to pelvic inflammatory disease (PID). Pre-medicate patient with antibiotics if patient has a history of PID.
      v. Cannot be performed in a patient with cervical stenosis.

II. **Equipment**
   a. Transvaginal: All exams are to be performed with a real-time scanner using a curved array transducer with a frequency range 4-8 MHz or higher.

b. Matrix X-plane and volumetric gray scale and/or power/color 3D evaluation can be employed. 3D image(s) of the endometrium should be obtained using 3D sweep with reconstruction, if equipment available.
c. Supplies
    i. Package sterile 4x4's
    ii. Three (3) 20 ml syringes
    iii. Bag of saline
    iv. IV tubing with 3-way stopcock
    v. 7fr Sonohystero catheter
    vi. Plastic denture cup
    vii. Bottle of Betadine (or if patient allergic use Hibiclense)
    viii. Tube sterile gel
    ix. Alcohol wipe
    x. Sterile gloves for doctor and technologist
    xi. Speculum (have small, medium, and large available)
    xii. Sterile sponge forceps
    xiii. 20g or 19g needle (to fill 20ml syringes with)
    xiv. Blue pads ("chucks") for table, floor, and doctor's lap
    xv. Transvaginal transducer cover
    xvi. Headlamp for doctor
    xvii. Metal Procedure tray
    xviii. Heating Pad
    xix. Sanitary napkin available for patient after procedure
d. Initial Setup
    i. Put blue pad (chuck) on procedure tray keeping a long side hanging to cover supplies with until ready to use.
    ii. Put denture cup onto tray and fill ½ way with Betadine or Hibiclense
    iii. Open 4x4 sponges and fold 3 of them into quarters.
    iv. Open the forceps and clamp one folded 4x4 into end and lay on tray
    v. Open the 20g or 19g needle and attach to one of the 20ml syringes
    vi. Use alcohol wipe to clean needle port on bag of saline
    vii. Insert the needle into port on saline bag and fill all 3 of the 20 ml syringes, lay on tray
    viii. Open end of sono catheter (leaving it in the sterile package and unattach the syringe
    ix. Using the 19g or 20g needle, fill this syringe with saline and reattach to the sono catheter making sure that you put it back on the correct port. Take the attached syringe and fill the line until the balloon at end of catheter fills (to check the balloon for proper inflation). Turn the stopcock to close this line.
    x. Attach one of the 20 ml syringes to the IV tubing and attach to the other open port of the sono catheter. Using this syringe, flush the catheter line until a small amount of saline comes out end of catheter to remove any excess air. Turn stopcock to close this line after flushing.
    xi. Plug in heating pad and lay one of each size speculum (still in package) on pad and fold to cover them.
    xii. Put headlamp together and have ready to plug in just prior to doctor coming in room.
    xiii. Have the transvaginal transducer covered and ready to scan.

III. **Procedure Protocol**
    a. **Pre-saline infusion scan**

1. The patient is instructed to empty bladder fully prior to performing transvaginal imaging. If there is uncertainty of the bladder emptying completely, the technologist should look again transabdominally to see if patient should void again. *For best imaging, the bladder should be as empty as possible!
2. Preliminary endovaginal sonography with measurements of endometrium and evaluation of the uterus, ovaries, and pelvic free fluid should be performed prior to sonohysterography.
3. Sagittal imaging of the uterus starting ML and imaging through the right and left sides (labeled accordingly) with length and AP measurements at the ML level of uterus.
4. Sagittal endometrium with and without maximum AP thickness measurement (thickest bi-layer endometrial measurement on a sagittal image when possible).
5. Perform 3 dimensional scan of the endometrium prior to saline infusion.
6. Evaluate and measure any discernible endometrial mass/lesion in 3 dimensions with appropriate labeling. Power Doppler to assess for blood flow.
7. Record the following images:
    a. Longitudinal midline endometrium
    b. Longitudinal left endometrium
    c. Longitudinal right endometrium
    d. Transverse lower uterine segment with endometrium
    e. Transverse uterine body with endometrium
    f. Transverse uterine fundus with endometrium
8. Sagittal and transverse imaging of both right and left adnexa with and without color Doppler showing the iliac arteries as the lateral boundary of the adnexa.
9. Transverse imaging of the uterus from inferior (vaginal canal) to superior (fundus) (labeled accordingly) with a width measurement at mid body of uterus at widest plane.
10. Sagittal and transverse imaging of the right and left ovaries. The length and AP measurements at plane of longest sagittal portion of the ovary and width measurement at the widest transverse plane of the ovary.
11. Color and/or power Doppler AND pulsed Doppler including spectral tracing of one each intraovarion vein and artery for each ovary. The ovary cannot be labeled as "normal" without the proper documentation of pulsed doppler flow within the cortex of each ovary.
12. Remove endovaginal transducer.

b. <u>Patient preparation</u>

i. A speculum is used to allow visualization of the cervix. The presence of unusual pain, lesions, or purulent vaginal or cervical discharge may require rescheduling the procedure pending further evaluation.
ii. Insert speculum by holding blades in a vertical position, insert with gradual downward motion with blades directed towards the rectum.
iii. Gradually turn speculum 90 degrees until blades are oriented horizontally, and then insert the full length of the speculum.
iv. Open the blades of the speculum by depressing lever with the left thumb
v. Turn screw in clockwise rotation to lock blades in open position
vi. Cervix should appear in center of open blades; if not, adjust speculum posteriorly or anteriorly to view cervix

vii. Cleanse the cervix using ring forceps with cotton ball soaked in Betadine or other cleansing agent
viii. Prior to insertion, the catheter should be flushed with sterile fluid to avoid introducing air during the study.
ix. Thread the catheter into the cervix through the external cervical os
x. With stopcock in open position, inject a small amount of saline into the balloon to hold the catheter in place
xi. Place stopcock in closed position
xii. Turn screw in counterclockwise rotation and gradually remove speculum with the blades in the open position
xiii. Reinsert vaginal transducer posterior to the catheter. Check the position of the catheter on the monitor. The tip of the catheter should be placed in the lower uterine segment, or ideally in the endocervical canal so as not to obscure pathology. Deflate the balloon slightly before moving the catheter if its position needs adjusting.

c. Post-saline infusion scan

i. Slowly instill sterile saline fluid into the endometrial cavity by means of manual injection under real- time sonographic imaging. Imaging should include real- time scanning of the endometrial and cervical canal.
ii. Perform 3 dimensional scan of the endometrium and save the sweep. Measure and record single layer of endometrial thickness (measure both the anterior and posterior portions of the endometrium separately). Image any areas of focal endometrial thickening.
iii. Evaluate and measure any discernible endometrial mass/lesion in 3 dimensions with appropriate labeling. Power Doppler to assess for blood flow.
iv. Once the uterine cavity is filled with fluid, a complete survey of the uterine cavity should be performed and representative images obtained to document normal and abnormal findings. If a balloon catheter is used for the examination, images should be obtained at the end of the procedure with the balloon deflated to fully evaluate the endometrial cavity, particularly the cervical canal and lower portion of the endometrial cavity.
v. Record the following images following saline infusion
    1. Longitudinal midline endometrium
    2. Longitudinal left endometrium
    3. Longitudinal right endometrium
    4. Transverse lower uterine segment with endometrium
    5. Transverse uterine body with endometrium
    6. Transverse uterine fundus with endometrium

d. Disinfection protocol

i. Wearing gloves and protective eye wear, remove condom/probe cover slowly so as not to splatter any gel from the probe
ii. If condom/probe cover is saturated with blood, place in receptacle for contaminated articles.
iii. Soak endocavity transducer in 14 day Cidex for a period of 10 minutes.
iv. Remove transducer, thoroughly rinse and towel dry.

IV. Policies

a. **Transvaginal Exam:** The patient must be properly informed of the transvaginal procedure before beginning, with a clear verbal authorization.

i. Non-sexually active patient:

1. **Under 18:** Transvaginal imaging should not be utilized. If it is deemed necessary by the ordering physician and indicated so on the order, the legal custodian must be informed of the procedure and give a verbal consent prior to the onset of the exam. This should be well documented by the technologist and radiologist in the report. If needed, consider translabial sonographic evaluation.
2. **Over 18:** Transvaginal imaging should only be utilized if Transabdominal imaging cannot definitively delineate anatomy or an abnormality is seen. The patient should be informed of the procedure and give a verbal consent prior to the onset of the exam. If needed, consider translabial sonographic evaluation.
3. **Helpful Questions:**
    a. Have you had an internal exam and/or PAP smear by your gynecologist?
    b. Do you use tampons?
    c. Would you like to see the transducer before deciding?

ii. Sexually active patient:

1. **Under 18:** Transvaginal imaging should only be utilized if Transabdominal imaging cannot definitively delineate anatomy or an abnormality is seen. The patient and legal custodian must be informed of the procedure and give a verbal consent prior to the onset of the exam.
2. **Over 18**: Transvaginal imaging should be utilized if all of the pelvic anatomy is not clearly defined. The patient should be informed of the procedure and give a verbal consent prior to the onset of the exam.

iii. **Non-consenting patient:** Any patient who is over 18 with a guardian who is a medical power of attorney should be addressed in the same manner as a patient under the age of 18.