MRAD 254: Fluoroscopic Imaging

Outcomes: 5 and 6

Hysterosalpingogram

Objectives

Outcome 5

- Outline the different procedures performed for visualizing the genitourinary system.

Outcome 6

- Distinguish the elements required for producing radiographic images of the genitourinary system

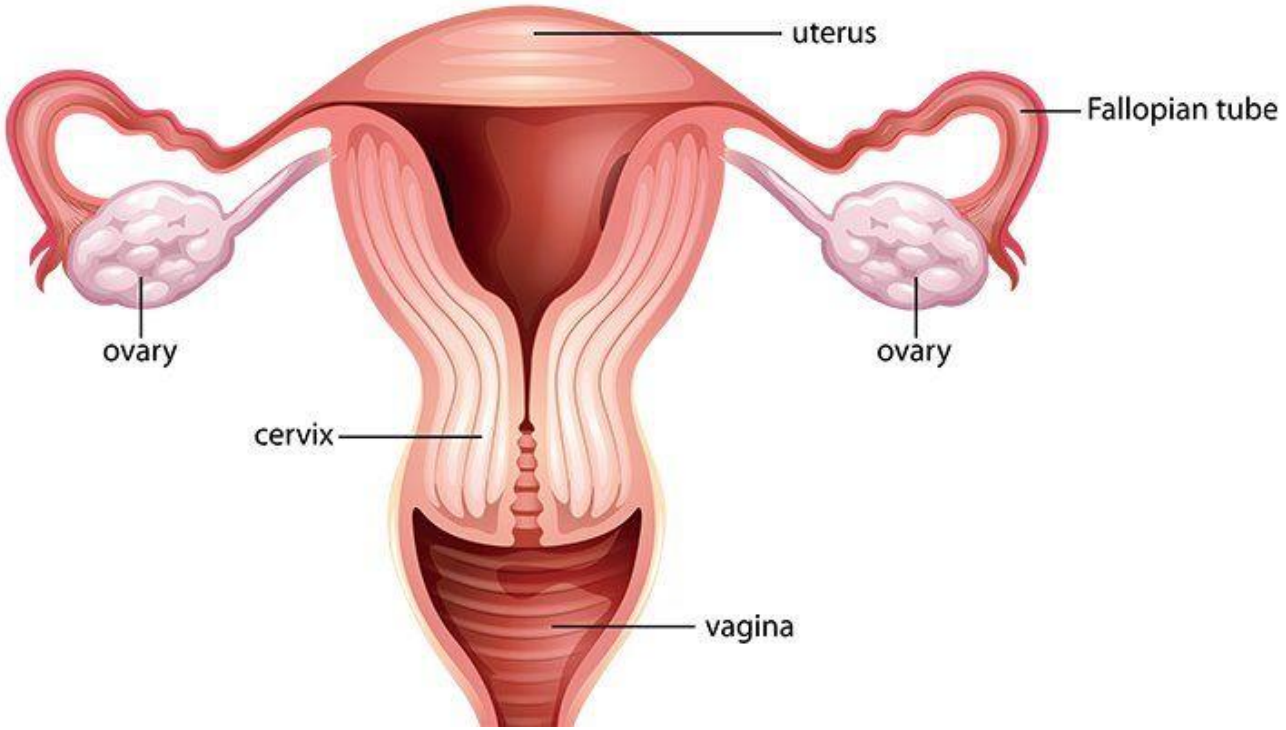
**Please refer to your course outline for more detail*

Hysterosalpingography

- Hystero = uterus
- Salpinges = fallopian tubes
- Only exam of the female reproductive tract that uses fluoroscopy

Anatomy

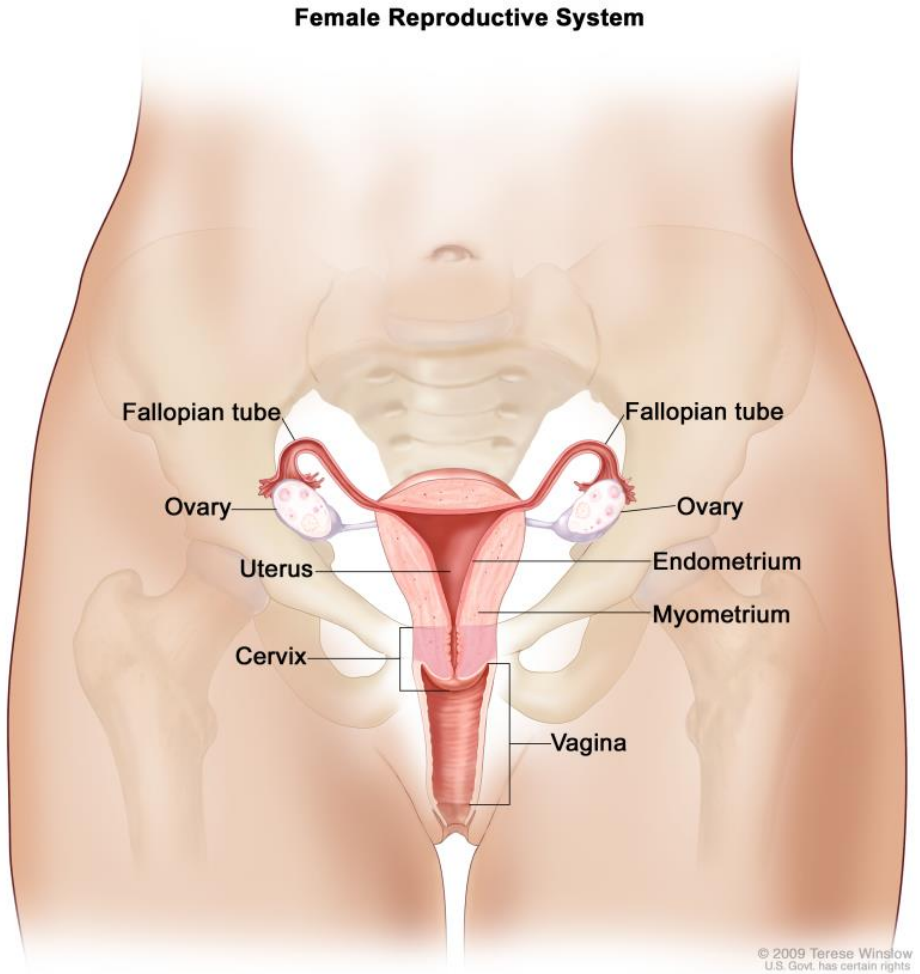
- Uterus
- 2 fallopian tubes
- 2 ovaries



https://www.everydayhealth.com/sexual-health/female-reproductive-organs.aspx

Anatomy - Uterus

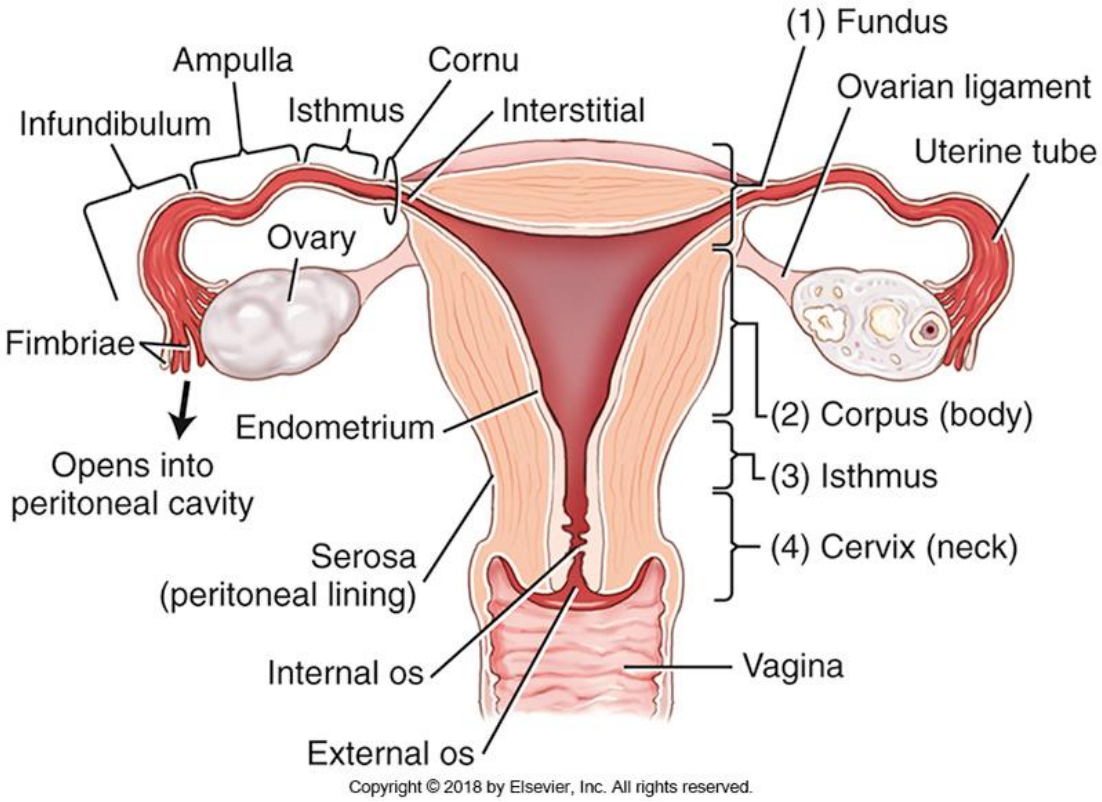
- Triangular organ
  - Sits low within the pelvis
- Bordered anteriorly by the urinary bladde
- Bordered posteriorly by the rectum



https://www.ncbi.nlm.nih.gov/books/NBK65829/figure/CDR0000062903__286/

Anatomy – Uterus cont.

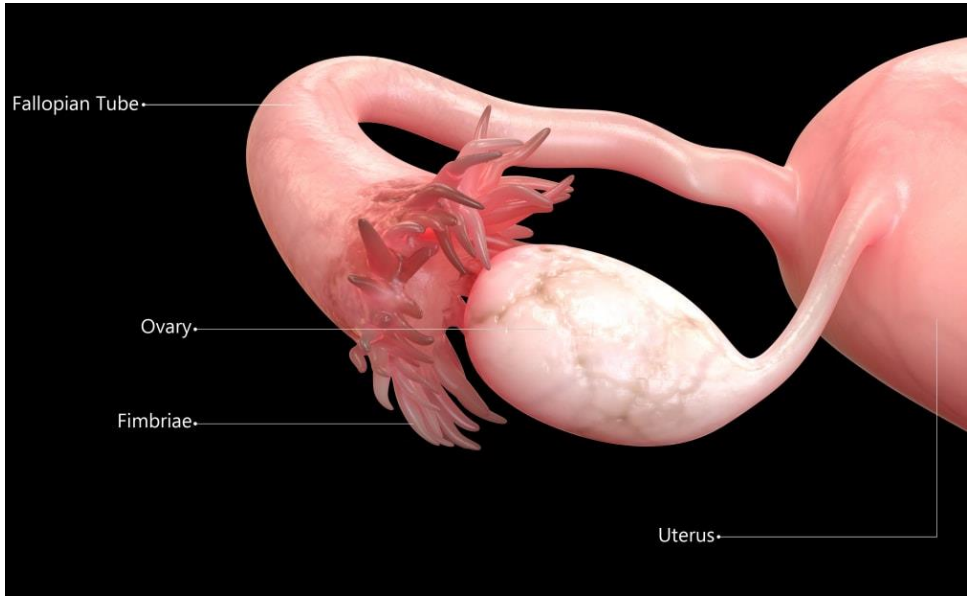
- Widest, most superior point is the fundus
- Below fundus is the corpus (body)
- Narrow neck is the isthmus
- Cervix opens into the vaginal canal
- 3 layers
  - Outer serosa forms a capsule around the uterus
  - Myometrium is the muscular layer
    - Makes up the majority of the uterus
  - Endometrium
    - Innermost layer is grown and shed with the menstrual cycle



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Anatomy – Fallopian Tubes

- Also called oviducts or uterine tubes
- Join to the uterus on superolateral aspect
- 10-12cm long
- 1-4mm in diameter
  - Extremely narrow
  - Doesn’t take much scar tissue or other debris to block the tube and prevent fertilization of the egg
- Distal ends widen and split into finger-like projections called fimbriae
- Fimbriae cup each ovary
  - No physical connection to ovary
  - Opens into peritoneal cavity



Anatomy - Ovaries

- On the end of each fallopian tube
- Approximately 2-4cm in diameter
  - Size of a large grape
- Mature and release ovum (eggs)

Hysterosalpingogram

- Contrast fluoroscopy exam
- Performed by a gynecologist in a fluoroscopy suite
- Exam is retrograde and non-functional
- We fill the uterine cavity and fallopian tubes with contrast

Hysterosalpingogram cont.

- Demonstrates the patency (openness) of the fallopian tubes
- Usually done when a woman is failing to conceive
- Can also be done after a tubal ligation or ligation reversal
  - Tubal ligation: sterilization surgery. “tubes tied”
- Occasionally done to diagnose intrauterine pathology
  - Fibroids, polyps, fistulas, congenital defects
  - Rare now that ultrasound is readily available

Contrast

- Non-ionic, iodinated, water soluble
  - Used to be an oil based contrast, but this is not used in North America anymore due to complications it caused

- We expect the contrast to spill out of the fallopian tubes into the peritoneal cavity
  - Must be reabsorbed by the body

- 5-10ml injected
  - Uterus is very small (despite what it looks like on anatomy diagrams!)
  - Doesn’t take much to fill

Contraindications

- MUST NOT be pregnant
  - Book this exam 7-10 days after starting menstruation
- Known contrast allergy
- Active uterine infection
  - Do not want to push infection into the peritoneal cavity along with the contrast

Patient Preparation

- Your text book says they must do bowel prep
  - No longer done!

- No formal preparation

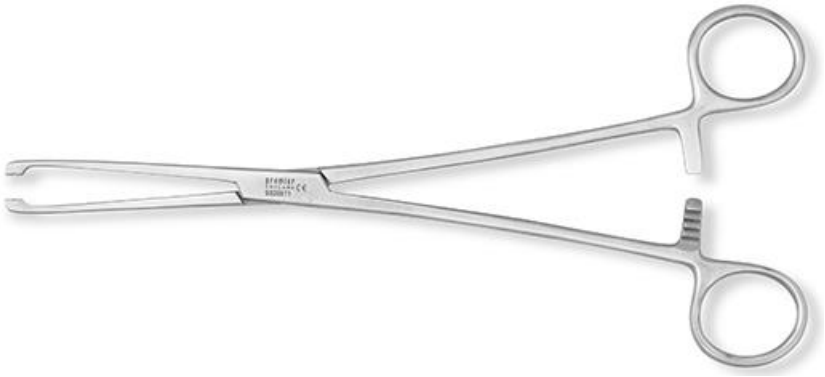
- Patient may take over-the-counter pain medication the morning of the procedure if they wish to reduce discomfort

HSG Specific Equipment

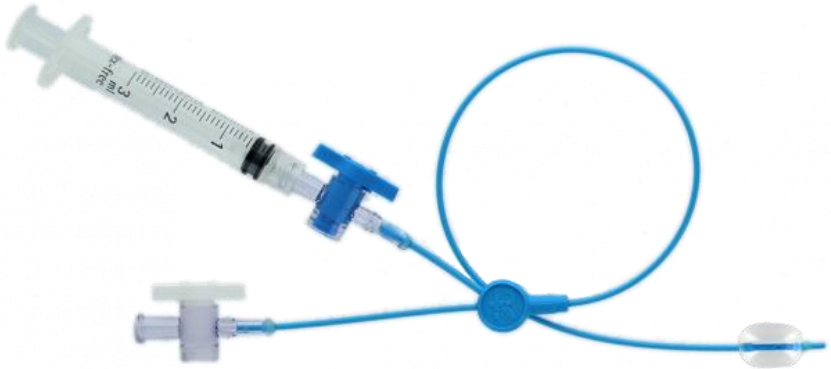


https://www.mpmmedicalsupply.com/products/graves-vaginal-speculum

Speculum
- Allows visualization of the cervix



Tenaculum
- Used to manipulate the cervix



https://sales.rocketmedical.com/rocket-hsg-sonography-catheters-procedure-packs

Balloon catheter
- Double lumen
- One lumen fills balloon with air
- One lumen administers contrast

Exam Procedure

- Performed using sterile technique
- Patient will lay on the fluoro table in the lithotomy position
  - Feet on table if no stirrups available
- Dr will insert speculum
- Use antiseptic solution to clean vaginal walls and cervix
  - Avoid introducing bacteria into uterus

Exam cont.

- A cannula or balloon catheter is inserted through the cervix and into uterine cavity
  - Balloon on the catheter helps prevent contrast from spilling back out the cervix
- Dr will remove speculum
  - May ask the patient to move up the bed if the fluoro tube won't go to the bottom of the bed
- Take one exposure with catheter in place, but BEFORE any contrast is injected
- Slowly inject contrast into uterus while using fluoroscopy to visualize
  - Injecting slowly can reduce the pain for the patient

Exam cont.

- Dr. will keep injecting contrast until they see the uterus fill with contrast

- Want the fallopian tubes to fill with contrast
  - Will see it spill out into the peritoneal cavity

What if the Contrast Doesn’t Spill?

- Tube may be blocked
  - Could be scar tissue, adhesions from trauma or surgery
  - Could be a kink or tight twist (like a hose)

- Dr may try to push through the blockage (VERY gently!)
  - If it is a small adhesion or a kink they may be able to open up the tube
  - Makes pregnancy more likely
  - Makes the exam therapeutic as well as diagnostic

Once the Contrast is in Place

- Exposures will be taken demonstrating the contrast filled (or not) structures
- AP (with possible cephalad or caudad angle if needed to see the uterus face on)
- Possibly LPO/RPO to demonstrate the fallopian tubes and fimbriae more clearly
  - Up to the performing physician

After the Images are Taken

- Balloon will be deflated and the catheter withdrawn
- Pt can go to the bathroom or changing room if they are feeling well
- Pt may leave the facility
- A full report will be sent to the referring physician

Post Procedure

- Patient can expect some cramping and possibly bloody spotting for 1-2 days

- May have discharge of sticky contrast for the same amount of time

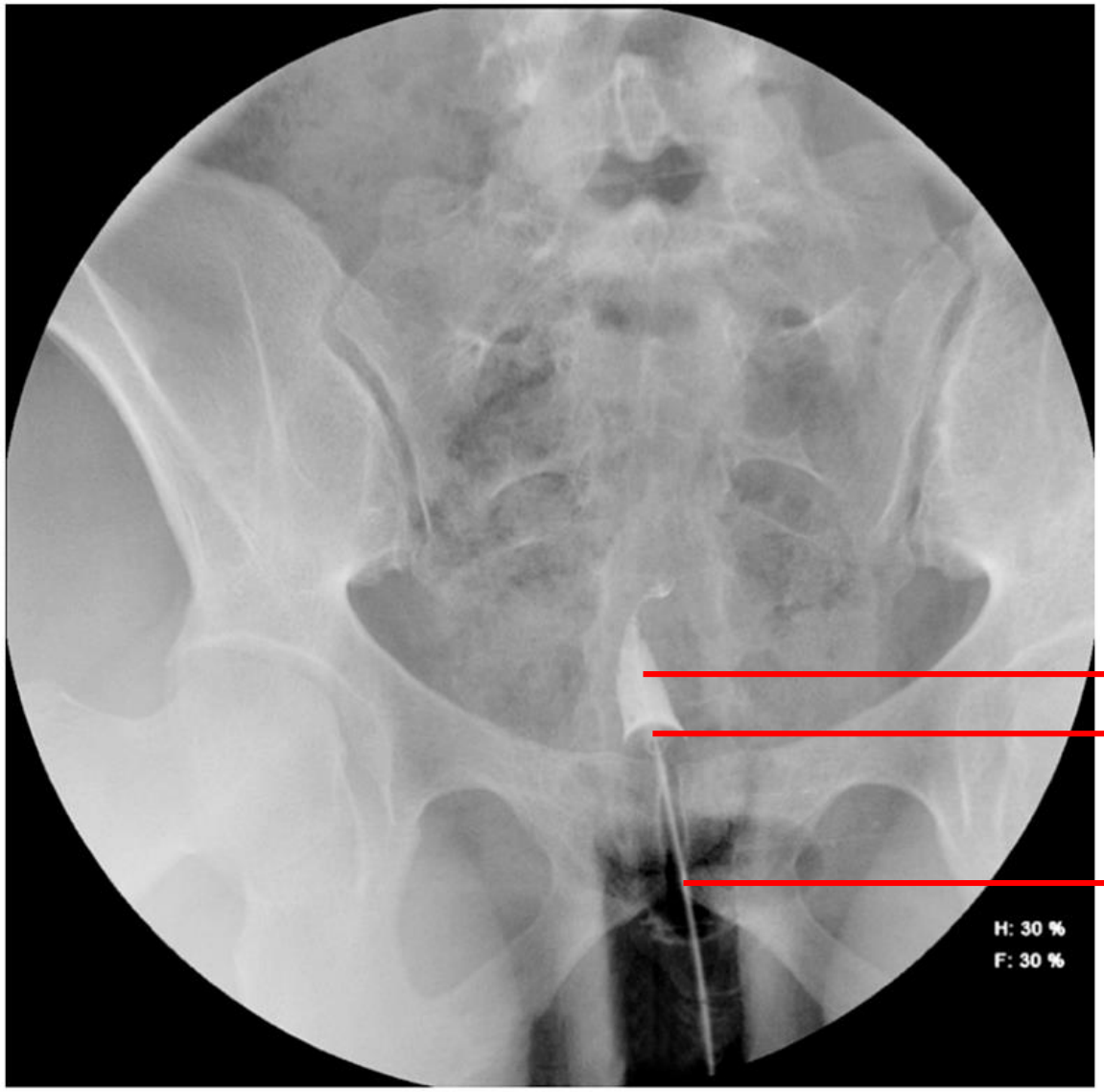
- Follow up with Dr if the pain persists or is accompanied by excessive bleeding, pus, or foul smells coming from the vagina
  - An infection may have been introduced during procedure

Technologist’s Role

- Depends greatly on what site you work at
  - Some sites the tech is involved in every aspect
  - Some sites the tech’s role is almost entirely technical
- Set up and monitor fluoro
- Obtain informed consent from the patient
- Open and assemble sterile tray
  - Gather all supplies and contrast
- Assist patient onto and off of exam table
  - Ensure privacy throughout

Tech’s Role cont.

- Assist the gynecologist in taking exposures
  - Make sure there is a R/L marker on the image
  - Help the patient shift into oblique positions if necessary
- Give post procedure instructions to the patient
- Clean room and prepare for the next patient
- Document
  - Contrast type and amount
  - Fluoro time/images
  - Supportive care given
  - Patient or procedure notes from Dr.



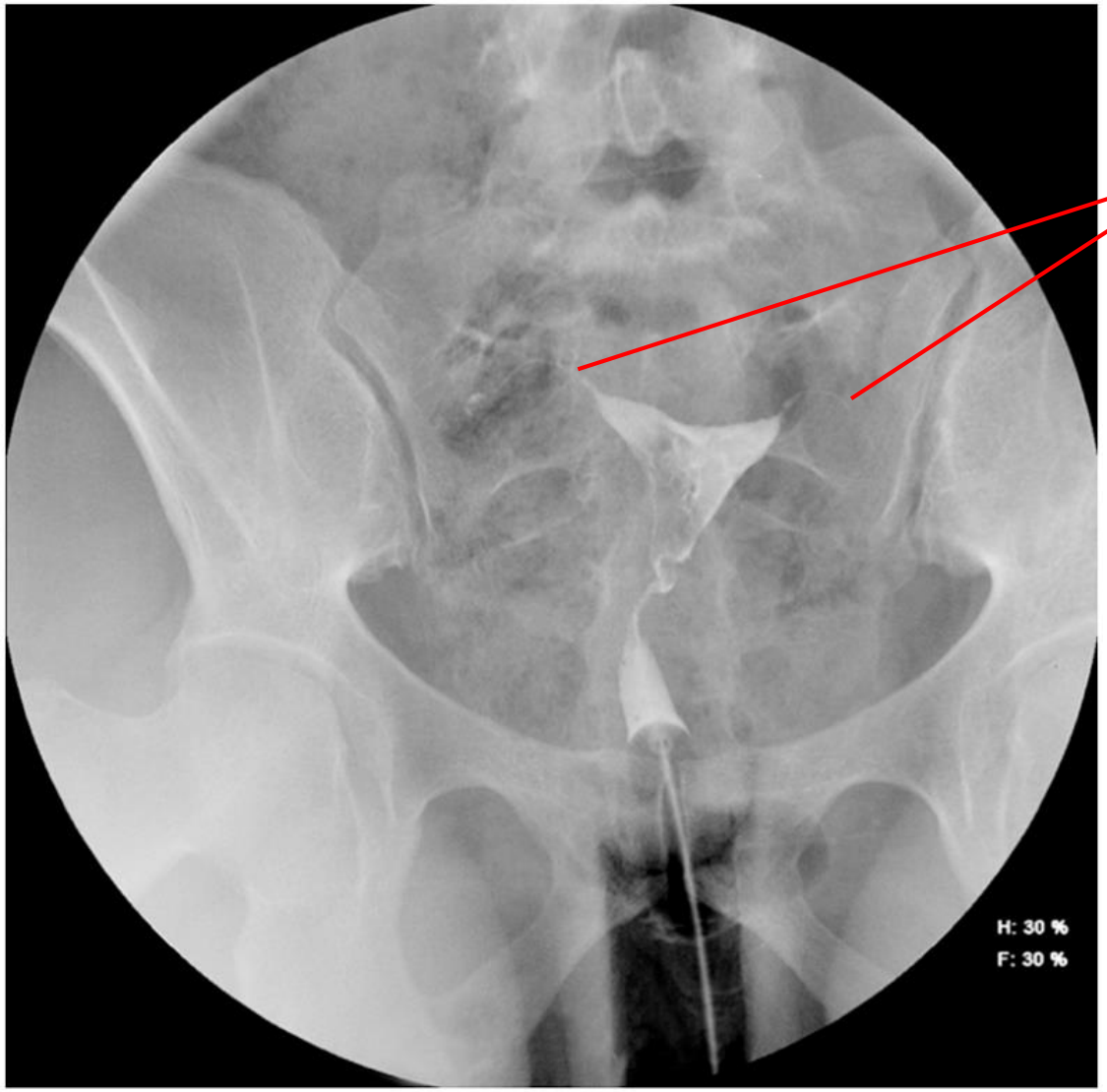
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Contrast beginning to fill uterus

Contrast in uterus

Inflated balloon on catheter

Contrast filled catheter



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Tiny fallopian tubes filling with contrast

Uterine cavity filled with contrast, beginning to spill into fallopian tubes



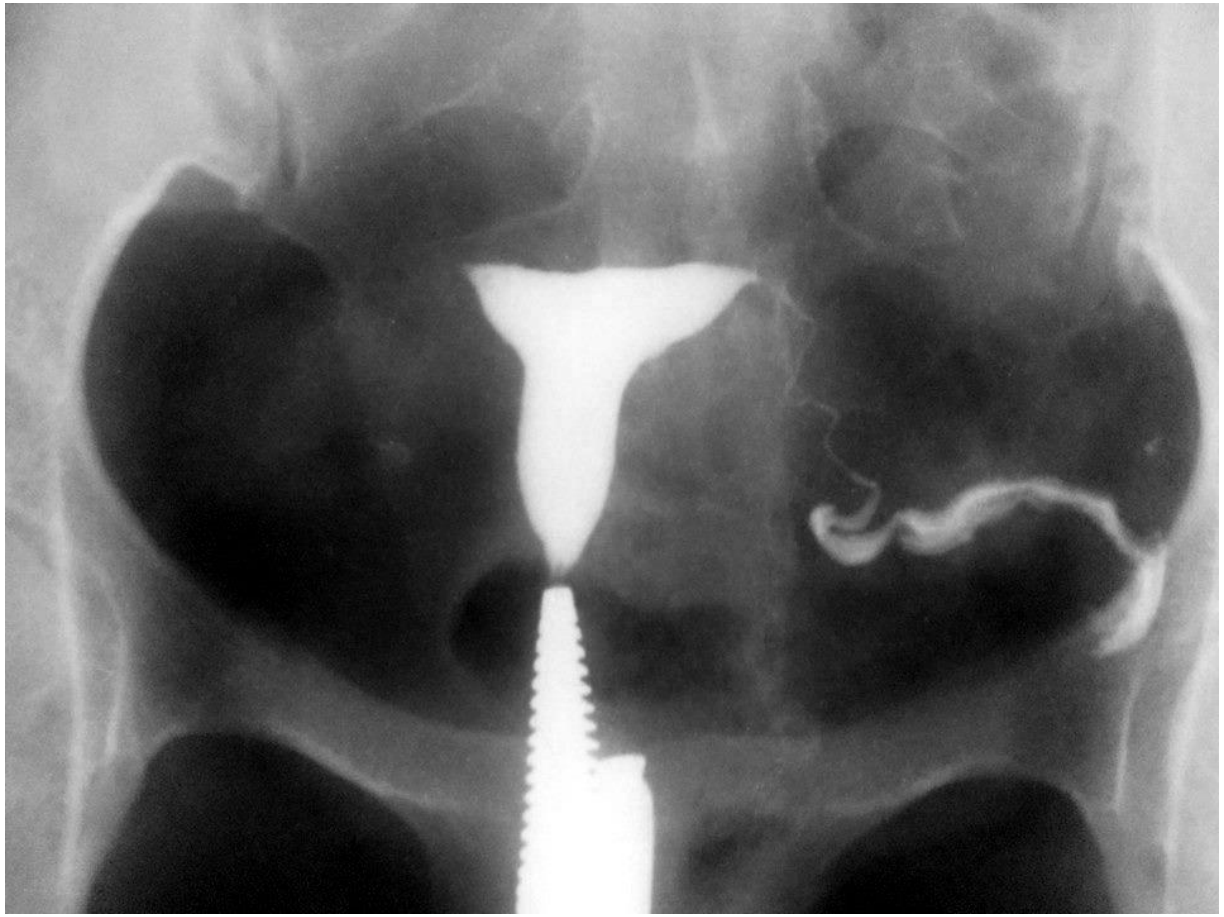
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LPO. Contrast filled tubes.



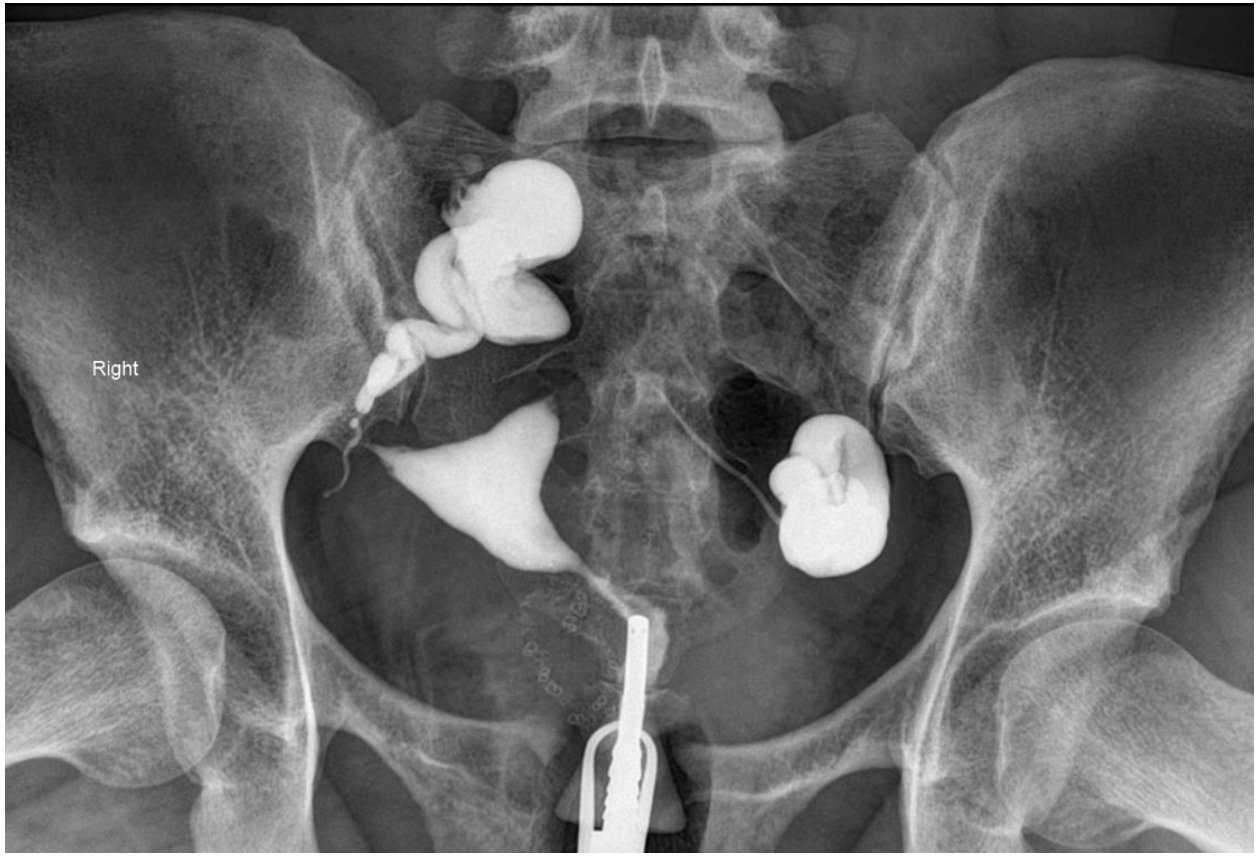
Good bilateral spill of contrast

Case courtesy of Dr. Matt A. Morgan, Radiopaedia.org, rID: 41788



Case courtesy of Dr. Kewal Arunkumar Mistry, Radiopaedia.org, rID: 35635

Right tube blocked



Hydrosalpinx

- Fluid filled/distended fallopian tubes

HSG Video #1

- https://www.youtube.com/watch?v=G43KyfeOvJA

- 5:53

- This is a great video. If you only watch one of the three I include here, let it be this one. It shows you the equipment, how it works, and what it looks like in use.

HSG Video #2

- https://www.youtube.com/watch?v=1tsHHFBmgmw
- 0:50
- This one is very short, but has great live fluoro of contrast infusion.
- I don’t know what he was going to say in the sentence that gets cut off at the end, but I think you’ll get the picture….

HSG Video #3

- https://www.youtube.com/watch?v=d5CSAHUGk5g
- 3:25
- Pretty boring for the first minute, but good after.
- Shows oblique imaging
- Also a good demonstration of the cooperation between the tech and Dr, if you turn the sound way up.