



CONNECTICUT ACADEMY OF  
FAMILY PHYSICIANS

CARING FOR CONNECTICUT'S FAMILIES

JEFFERSON RADIOLOGY  
DIAGNOSTIC & INTERVENTIONAL SPECIALISTS

# What a Family Practitioner Should Know About Interventional Radiology

Pat Duffy, M.D.  
Jack Foster, M.D.

2014 Scientific Symposium  
October 8, 2014

# Overview

- What is Interventional Radiology (IR)?
- History of IR
- Common procedures
- IR as a clinical practice
- How can IR help you and your patients?
- The future of IR

**Interventional  
Radiology**



**Better.  
Faster.  
Safer.**

# Background

- Pat Duffy-
  - Resident in Diagnostic Radiology- Yale, 2009-2013
  - Fellowship in Vascular and Interventional Radiology- Beth Israel Deaconess Medical Center, 2013-2014
  - Joined Jefferson Radiology in July 2014
- Jack Foster-
  - Resident in Diagnostic Radiology- Boston University, 1984-1988
  - Fellowship in Vascular and Interventional Radiology- Massachusetts General Hospital, 1988-1989
  - 11 years experience in New Hampshire practice, followed by 5 years as an Interventional Radiologist for the Connecticut Vascular Institute
  - Joined Jefferson Radiology in 2005

# Jefferson Radiology

- Established in 1963
- Largest Radiology Private Practice Group in Connecticut
- 8 Hospital Partnerships-
  - Hartford Hospital
  - CCMC
  - Griffin Hospital
  - Day Kimball Hospital
  - Johnson Memorial Medical Center
  - Windham Hospital
  - Holyoke Medical Center
  - Noble Hospital
- 12 Outpatient offices
- 11 IR Physicians



# What is Interventional Radiology?

- Interventional Radiology is a recognized medical specialty by the American Board of Medical Specialties.
- Interventional Radiologists are board-certified physicians with additional advanced training in minimally invasive, targeted treatments, performed using imaging for guidance.
- Initial training in diagnostic radiology allows IR physicians to understand different imaging modalities, diagnose a disease's pathology and map out the procedure tailored to the individual patient.





# What is Interventional Radiology?

- According to a national survey, only 3% of Americans are aware of Interventional Radiologists (Riley Research Associates, 2001).
- Historically, interventional radiologists have been the “specialist’s specialist”, and patients didn’t have direct contact with our specialty.
- Modern, minimally invasive treatments are available for many diseases, but few patients know how to ask about them.



# History of Interventional Radiology

- On January 16, 1964, Charles Dotter performed the first recorded angioplasty in the world when he used progressively larger catheters to dilate a distal superficial femoral artery stenosis.
- 1969- Development of catheter-delivered stenting techniques and prototype stent.
- 1972- Selective arterial embolization for GI bleeding.
- 1977- Bland and chemo-embolization for treatment of hepatocellular cancer.

# History of Interventional Radiology

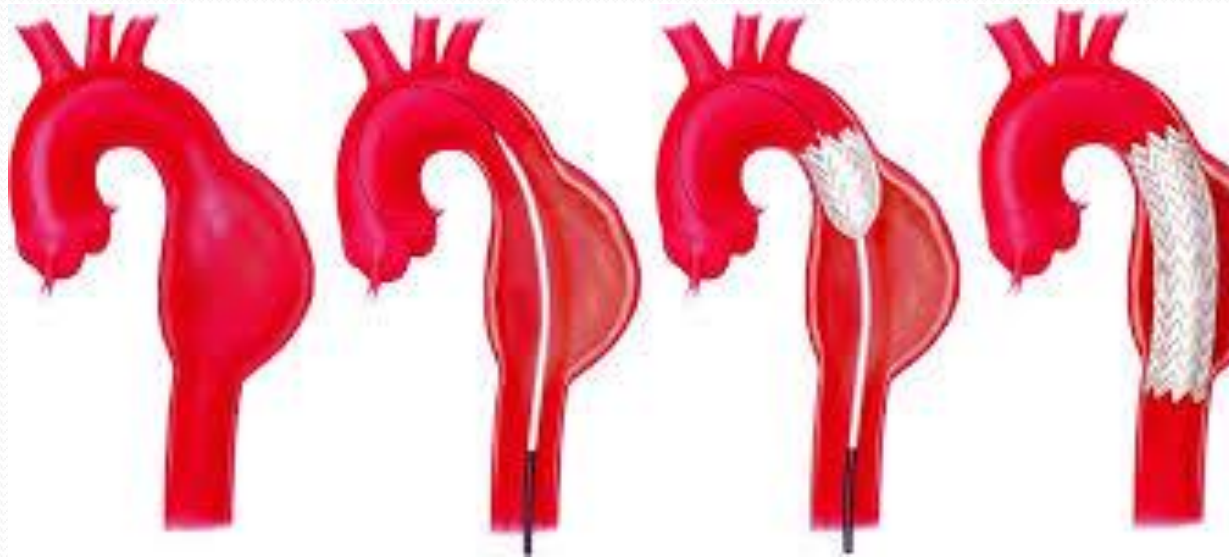
- 1980- Biliary stent development
- 1982- TIPS (transjugular intrahepatic portosystemic shunt)
- 1984- Vertebroplasty
- 1985- Self-expanding stents





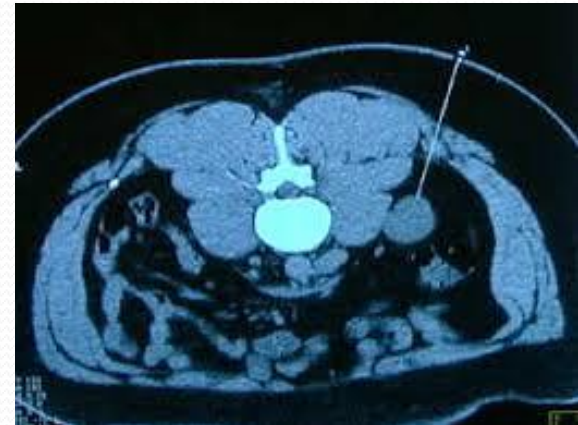
# History of Interventional Radiology

- 1990- Radiofrequency ablation technique for liver tumors
- 1991- Abdominal aortic stent grafts
- 1999- Endovenous laser ablation for varicose veins



# Common IR Procedures

- Image Guided Biopsies:
  - Use U/S, CT and fluoroscopic guidance
  - Thyroid, lung, liver, kidney, lymph node, bone, breast
  - Transjugular liver biopsies
- Image Guided Drainages/Aspirations:
  - Abscess, pseudocyst
  - Paracentesis, thoracentesis
  - Chest tube placement



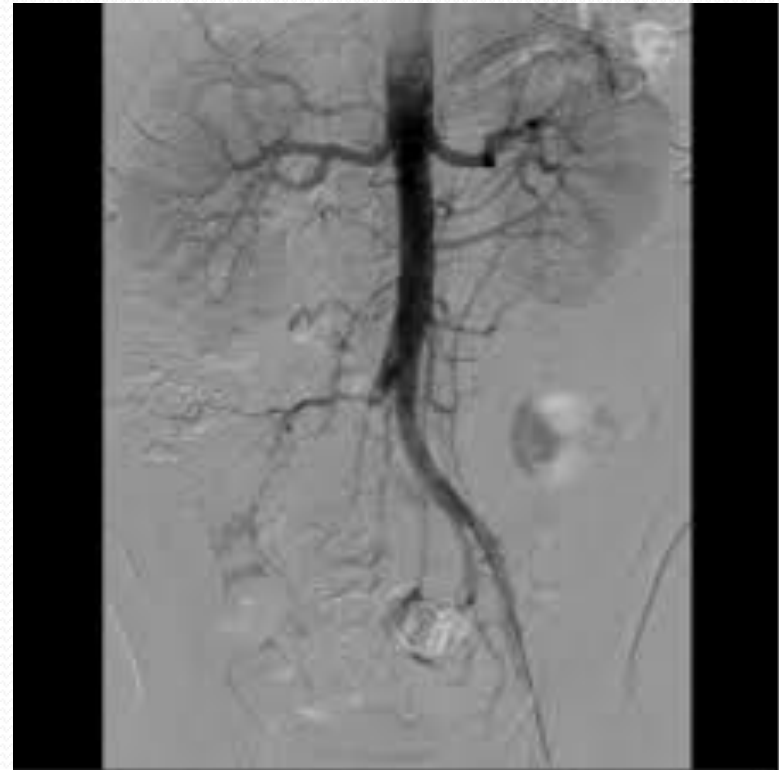
# Common IR Procedures

- Central Venous Access:
  - Ports
  - Tunneled lines
  - PICC lines
  - Prolines



# Common IR Procedures

- Diagnostic Angiography (including CO<sub>2</sub> and Gadolinium):
  - Arteries- cerebral, visceral, peripheral
  - Venous
  - Pulmonary
- Balloon Angioplasty/Stents:
  - Peripheral vascular disease (PVD)
  - Cerebral and carotid
  - Aortic stent-grafts
  - Venous outflow in dialysis grafts
  - Mesenteric (ischemia)
  - Renal (HTN)
  - Biliary



# Common IR Procedures

- IVC Filter Placement
- IVC Filter Removal
- Gastrostomy tube placement
- Gastrojejunostomy tube placement
- Renal Interventions
  - Nephrostomy tubes
  - Nephroureteral stents
  - Renal stone removal



# Common IR Procedures

- Hemodialysis Access Maintenance:
  - Angioplasty, thrombolysis, stenting
- Thrombolysis
  - Chemical and mechanical
    - Stroke
    - DVT (EKOS)
    - Peripheral artery
    - Dialysis fistula/graft
    - Pulmonary





# Common IR Procedures

- Embolization
  - Use coils, gelfoam, plastic particles, NBCA
  - Upper and lower GI bleeding
  - Iatrogenic hemorrhage
  - Pelvic and visceral trauma (renal, splenic)
  - Bronchial artery hemorrhage
  - AVM, varicoceles, parathyroid
  - Uterine fibroid embolization
  - Pelvic Congestion Syndrome



# Common IR Procedures

- Chemoembolization (doxyrubicin)
- Radioembolization (Y-90)
- Radiofrequency Ablation:
  - Lung, liver, kidney, bone
- Cryoablation
- Microwave Ablation
- Alcohol Ablation
- Laser Ablation:
  - Varicose Vein treatment



# Common IR Procedures

- Hepatobiliary Procedures:
  - Cholangiography
  - External and Internal/External biliary drains
  - CBD stricture dilatation/stent placement
  - Transjugular liver biopsy
  - Percutaneous cholecystostomy tube
  - TIPS (transjugular intrahepatic portosystemic shunt)



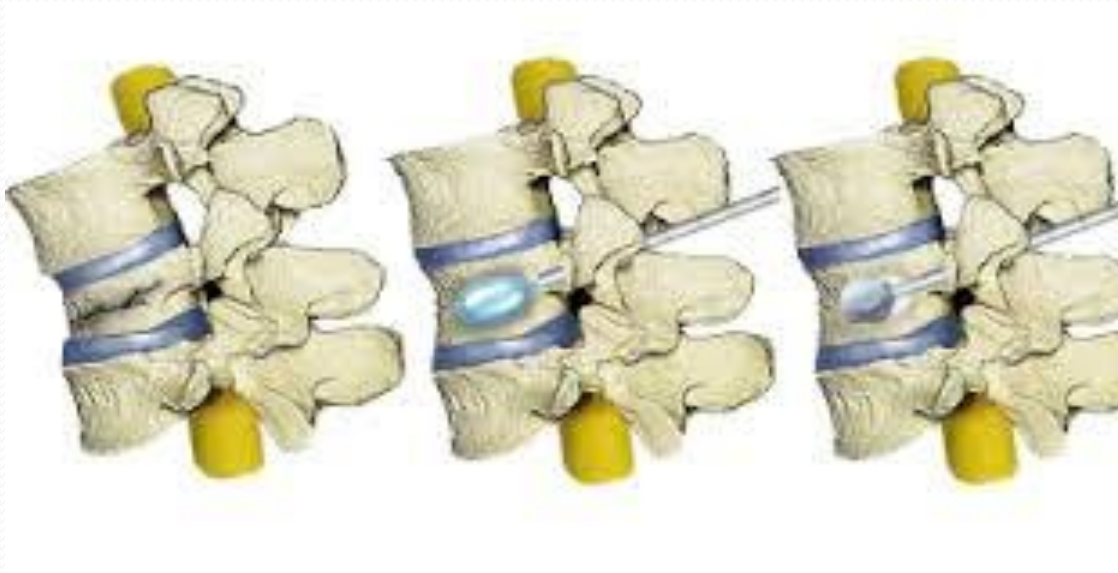
# Common IR Procedures

- Pain Management:
  - Epidural steroid injections (cervical, thoracic, lumbar)
  - Selective nerve root blocks/ablations
  - Celiac plexus/sympathetic blocks (Complex Regional Pain Syndrome)
  - Steroid Joint Injections- facet, shoulder, hip, sacroiliac



# Common IR Procedures

- Vertebral Augmentation



# Common IR Procedures

- Arthrography
- Discography
- Myelography
- Direct thrombin injection of pseudoaneurysms
- Fallopian tube catheterization and recanalization
- Intrathecal chemotherapy administration
- Foreign body retrieval
  - Fractured central lines, pacemaker wires, etc.





# Why Choose IR?

- Multiple different specialties perform similar/identical procedures.
  - Gastrostomy tubes (surgery, GI, IR)
  - IVC filter (vascular surgery, cardiology)
  - Vertebral Augmentation (ortho)
  - Ports (surgery)



# Why Choose IR?

- What sets Interventional Radiology apart from other specialties is our ability to maintain our devices and to treat any complications.
  - When a G-tube clogs or needs routine changing, those patients are referred to IR.
  - When a port is malfunctioning, those patients come to IR for a flow study and possible fibrin sheath stripping.
- IRs manage many surgical complications for surgeons



# IR as a Clinical Practice

- Evolved from providing “special procedures” to providing both pre- and post-procedure care.
- We will set up a consultation visit with your patient, perform a complete H and P and get any necessary diagnostic testing completed.
- Before treatment begins, you will receive a referral acknowledgement letter outlining the treatment plan.

# IR as a Clinical Practice

- We have admitting privileges, so we will be responsible for your patient's complete care if an overnight hospital stay is required for their procedure.
- When our care is complete, we will send you a summary letter of care regarding your patient.
- We will arrange any necessary follow-up office visits or tests.

# How Can IR Help You?

- 46 y/o female c/o heavy menstrual bleeding and pelvic pain.
  - PMH: unremarkable except for known fibroids discovered during an OB u/s 15 years ago.
  - Most recent u/s demonstrated multiple uterine fibroids, the largest measuring 9cm.
  - Work-up for this patient is otherwise negative.



# Fibroid Treatment Options

- Medications:

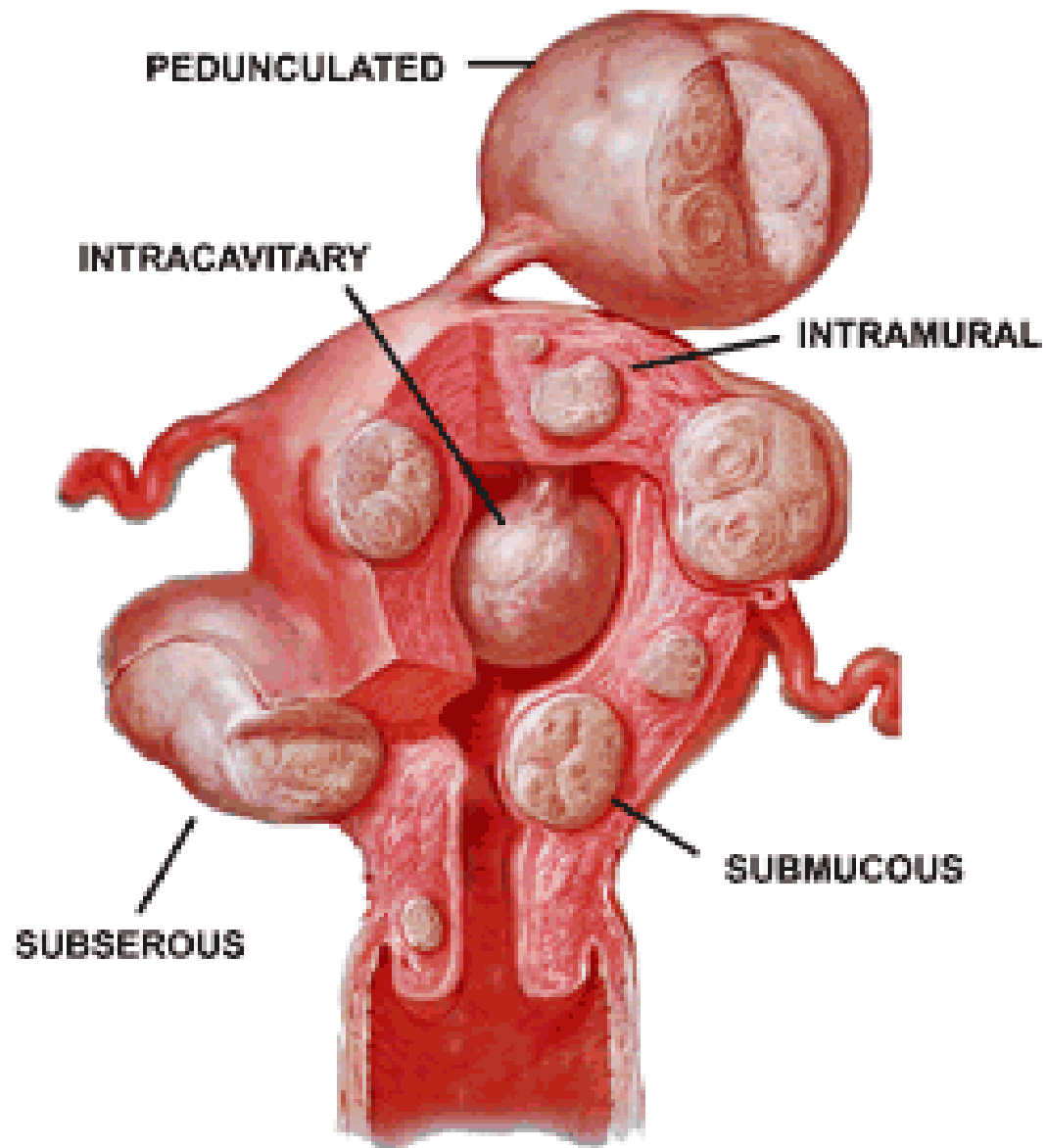
- May improve symptoms but will not “cure” the fibroids.
- If primary complaint is secondary to pressure symptoms from large fibroids, medications are of little benefit.
  - OCPs- may reduce bleeding by better regulating the menstrual cycle.
  - Lupron (GnRH Agonist)- blocks production of estrogen potentially stopping heavy bleeding and temporarily shrinking fibroids.
    - Can cause menopausal symptoms and long term can cause osteopenia/perosis.
  - IUDs- hormone release can decrease bleeding caused by fibroids.





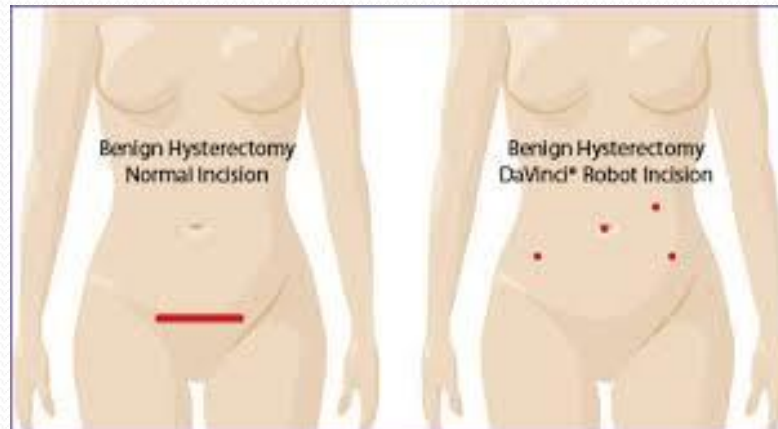
# Fibroid Treatment Options

- Myomectomy-
  - Abdominal Myomectomy:
    - Apx. 2-3 night hospital stay and 4-6 week recovery time.
  - Laparoscopic Myomectomy:
    - Apx. 1-2 night hospital stay and 2-4 week recovery time.
  - Hysteroscopic Myomectomy:
    - Potentially an out-patient procedure.
    - Only for submucosal fibroids.
- Effective but fibroids can regrow.
  - About a 30% recurrence rate in 5 years
- Also, general anesthesia is usually always used.



# Fibroid Treatment Options

- Hysterectomy:
  - Abdominal, vaginal or laparoscopic hysterectomy.
  - All require general anesthesia
  - Typical recovery time:
    - 1-3 night hospital stay and 2-6 week recovery time
  - This is often times a major surgical procedure, however, it is definitive treatment.



# Fibroid Treatment Options

- Uterine Artery Embolization (UAE)
  - Often referred to as Uterine Fibroid Embolization (UFE).
  - Alternative treatment to open surgery.
  - Performed through a tiny incision in the groin that doesn't require any stitches.
  - Small particles used to block the tiniest blood vessels supplying the fibroids.
  - Creates controlled death (and shrinking) of the fibroids.

# Uterine Fibroid Embolization

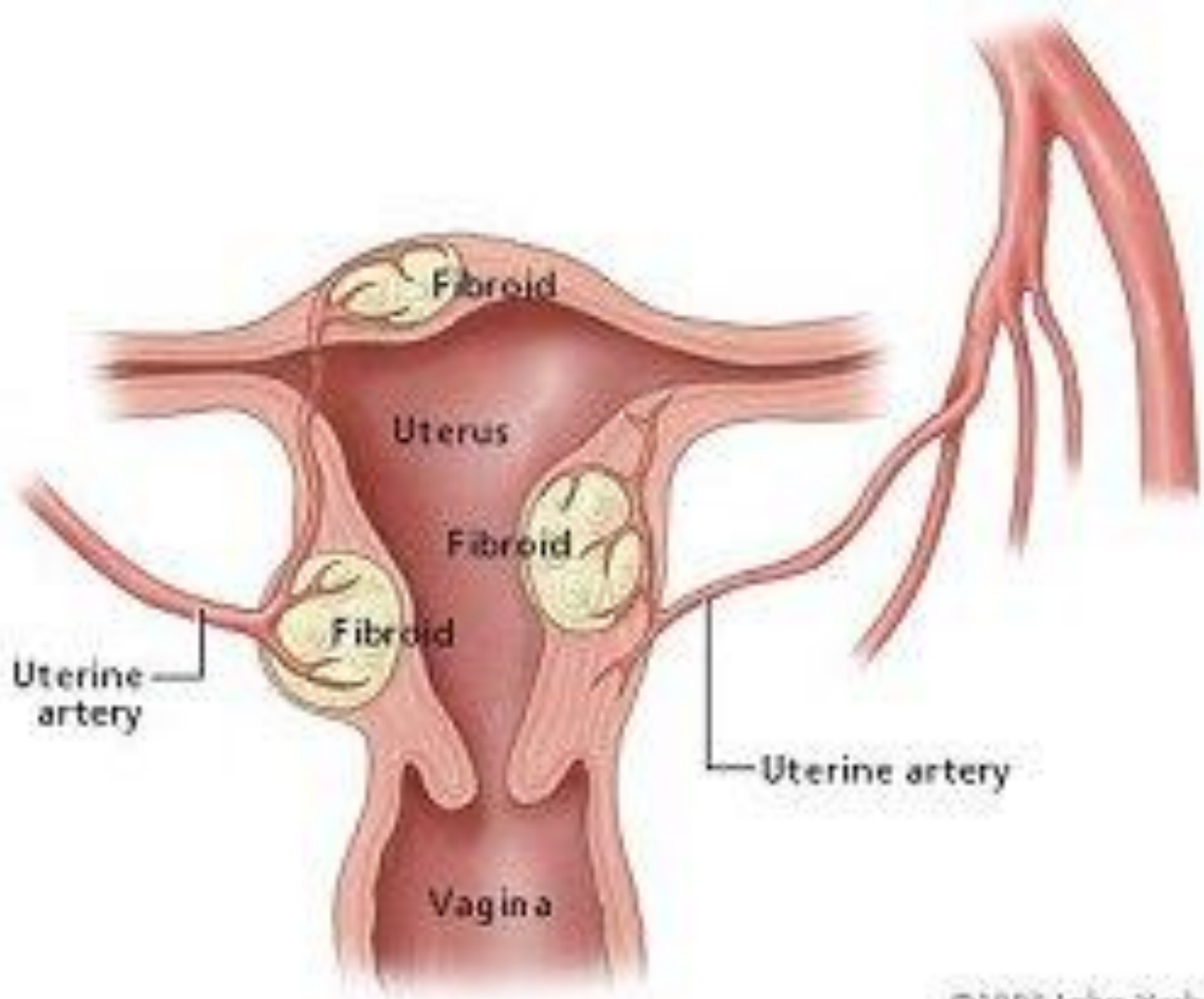
- Procedure is done under moderate sedation (fentanyl and/or versed).
  - Procedure usually lasts < 1 hour
  - Can be an out-patient procedure, however, many patients will stay one night in the hospital for pain control.
  - Most women return to full activity in 5-7 days.
- 
- Ideal Candidate:
    - Symptomatic fibroid(s)
    - Would like to avoid surgery, desire to keep uterus
    - Would like faster, easier recovery

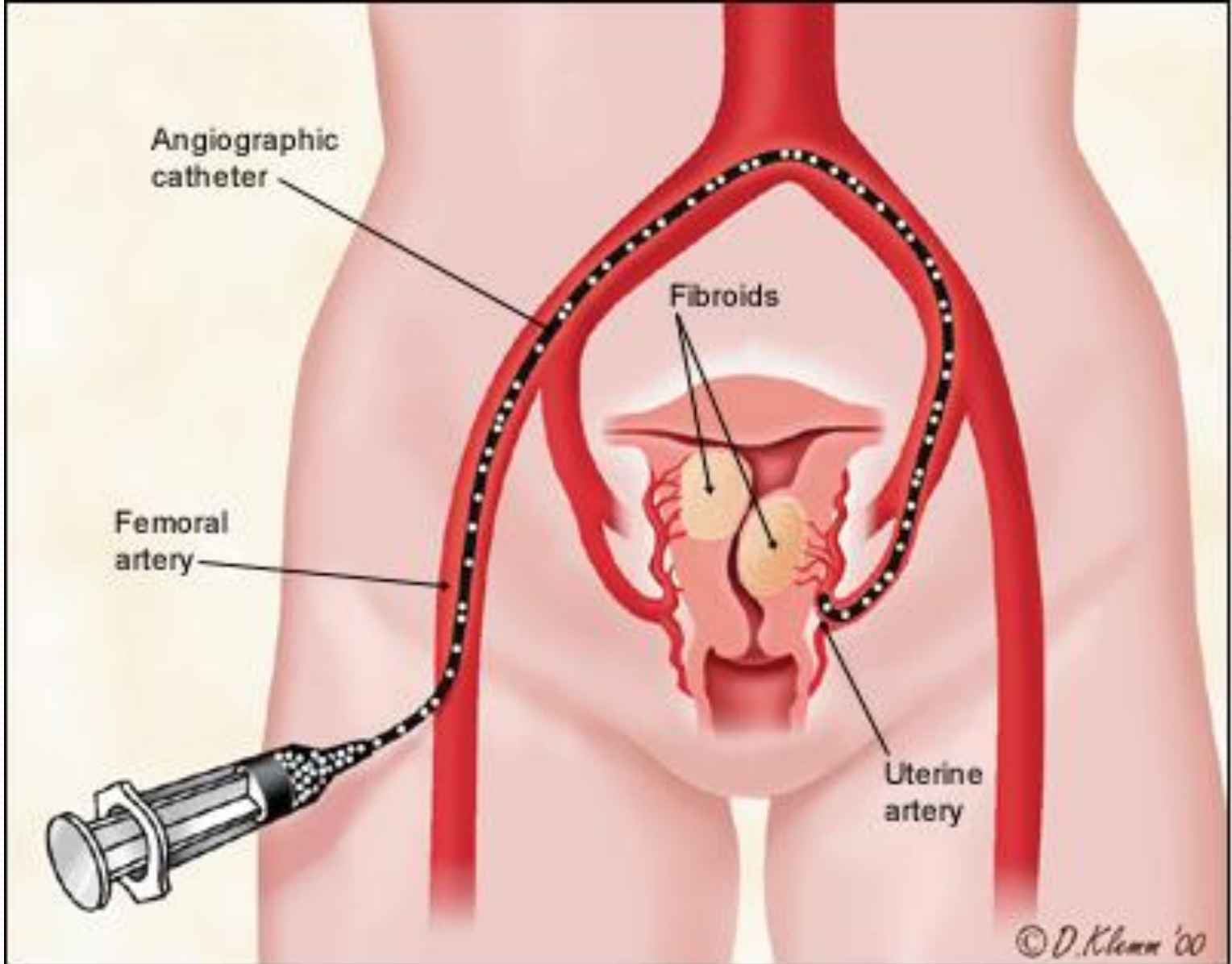
# Pelvic Embolization

- Three Decades of Experience
  - Post-partum hemorrhage
  - Trauma
  - Post pelvic surgery hemorrhage
  - Cancer
  - 86-100% overall success rate
- First U.S. experience for fibroid treatment was in 1997.

Am J Obstet Gynecol, 1997; 176:938-948  
Am J Obstet Gynecol, 1998; 10:475-479  
JVIR 1997; 8:517-526





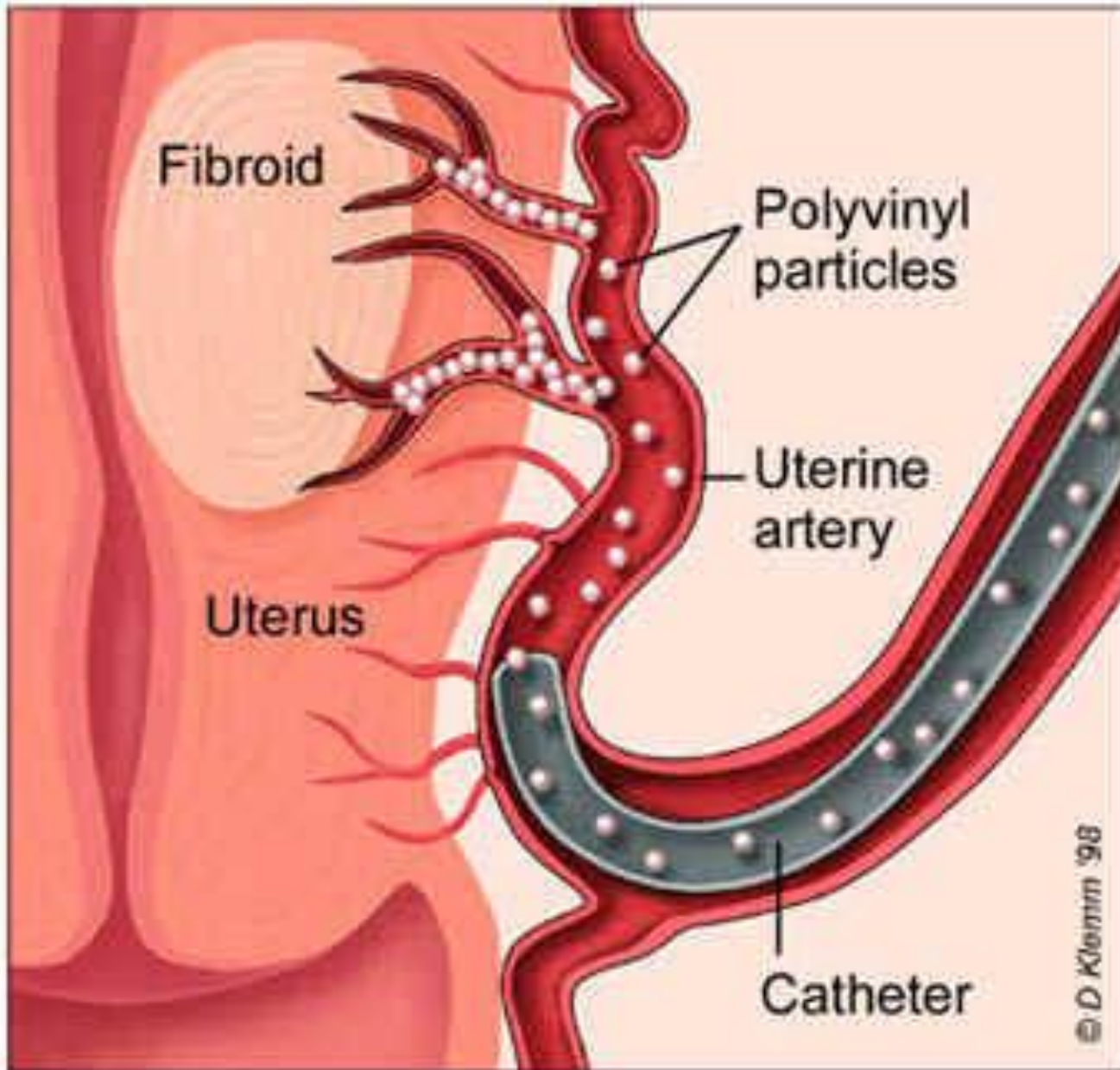


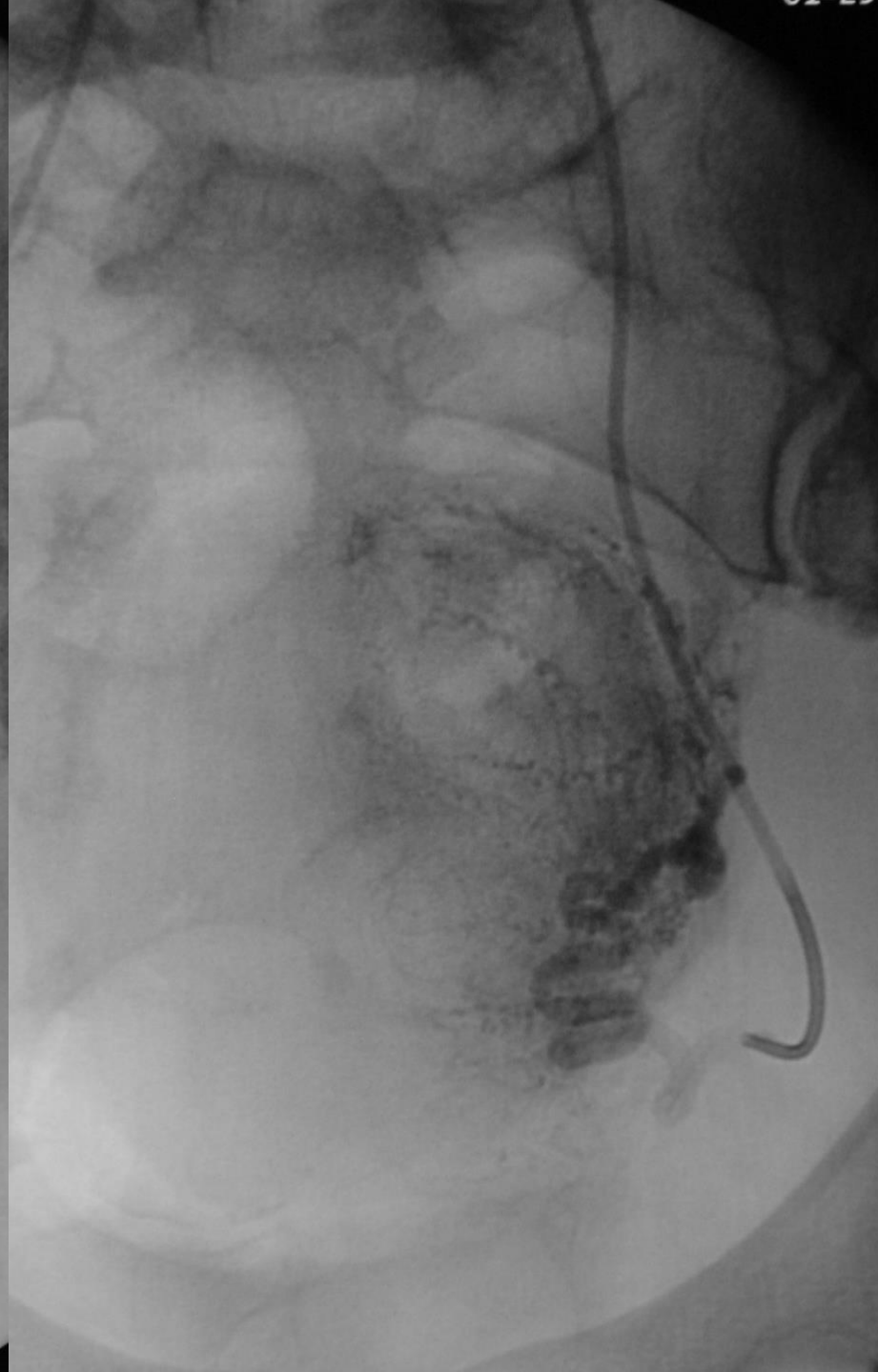
Angiographic catheter

Femoral artery

Fibroids

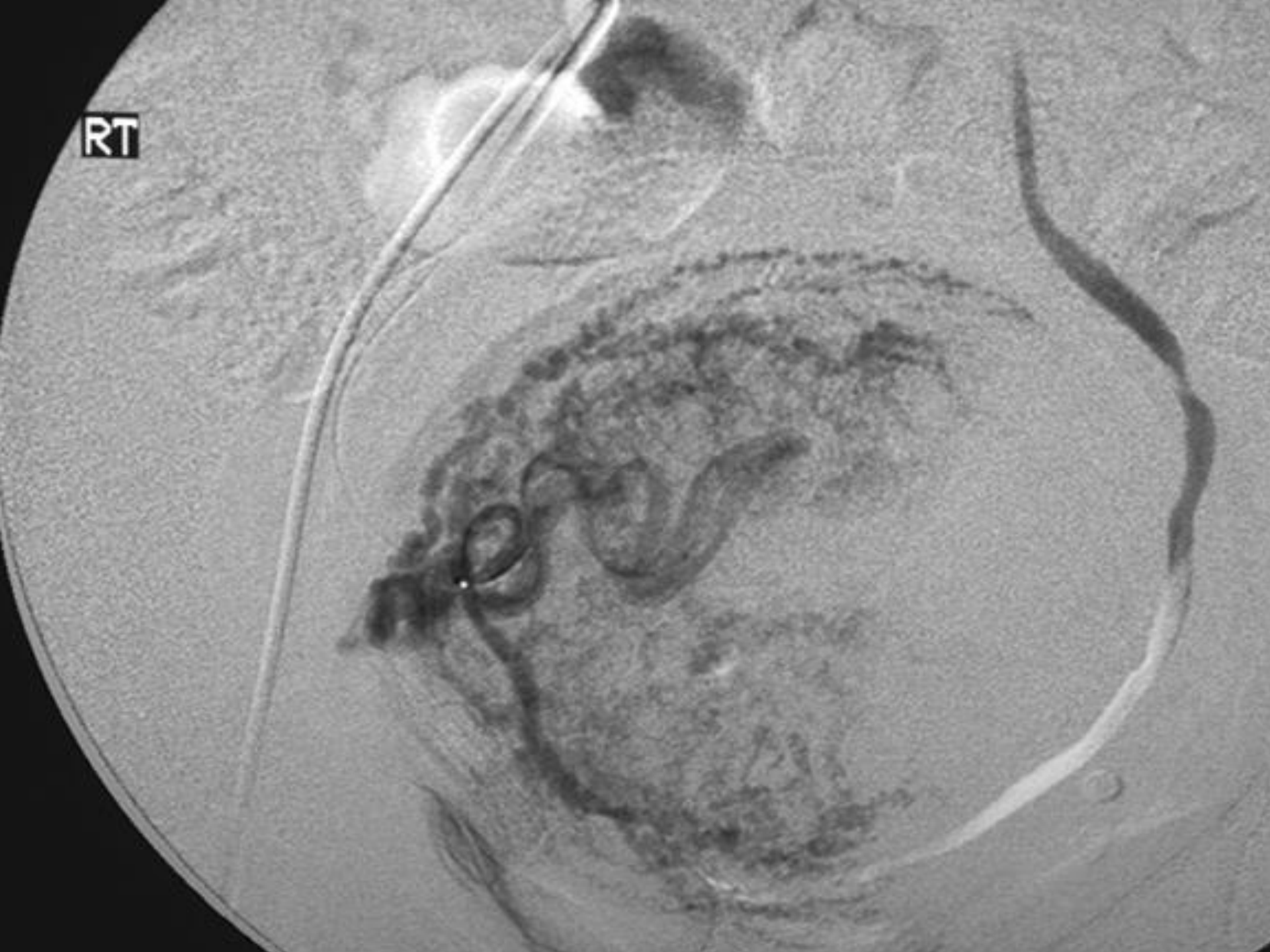
Uterine artery







RT



# Sequence of Events

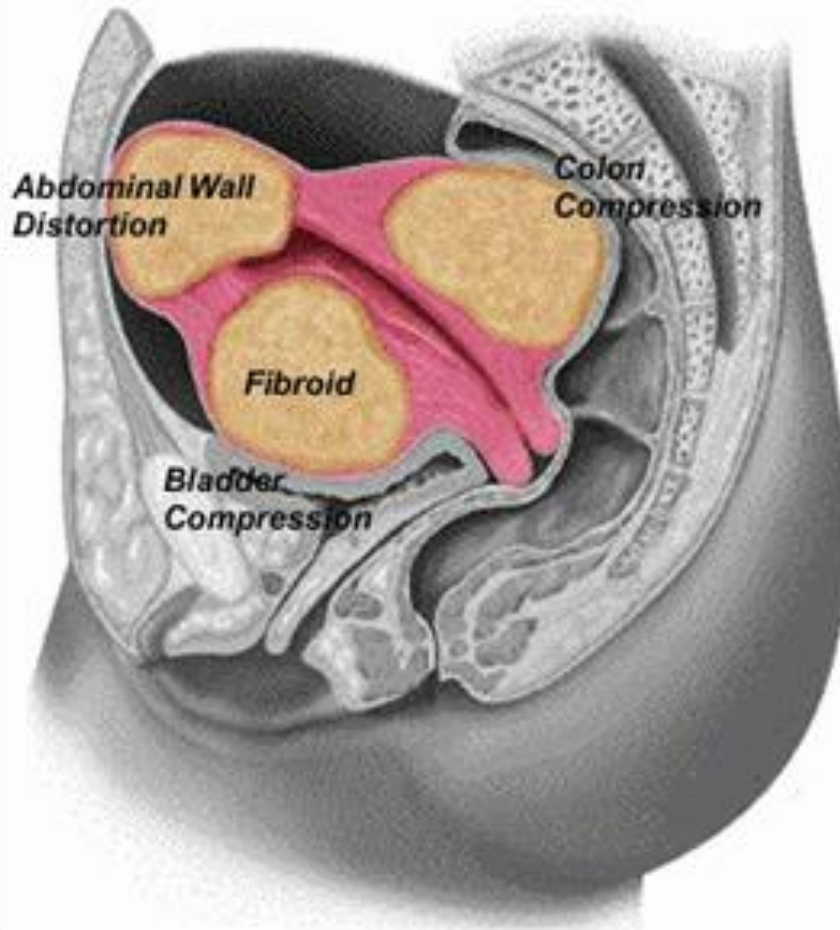
- After we get your call, we will schedule a consultation visit at one of our outpatient or hospital locations.
  - Detailed H/P
  - Physical examination
  - Review of imaging
  - Ordering of any additional necessary imaging (MRI of Pelvis)
  - Endometrial biopsy
  - Exclude pregnancy

# Sequence of Events

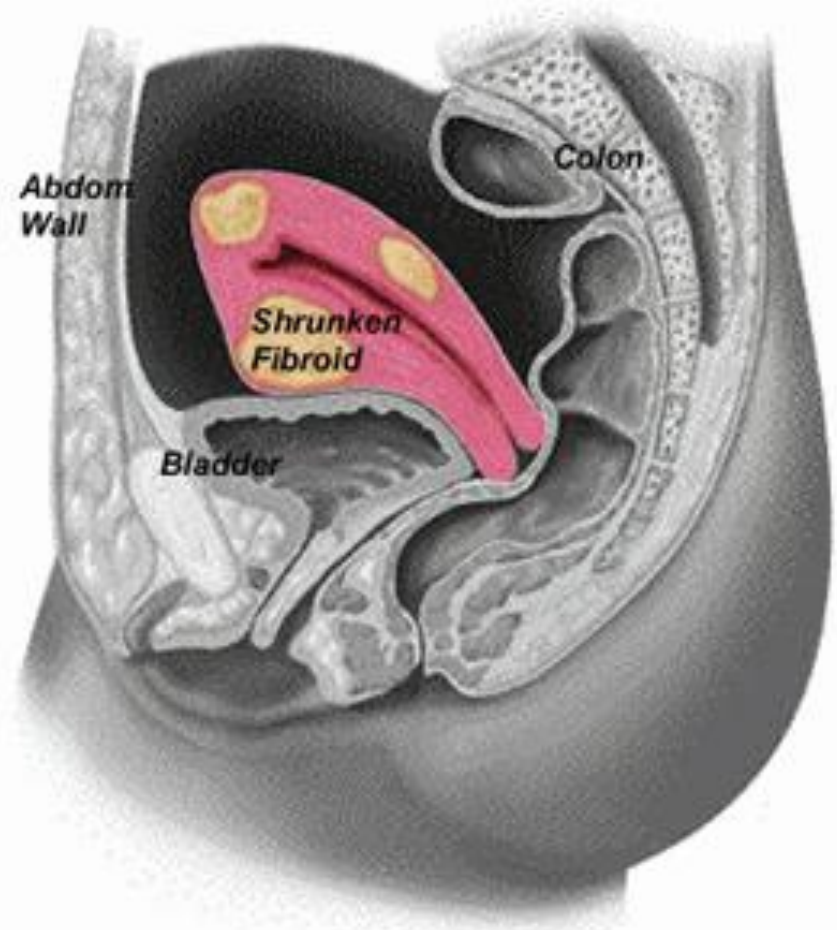
- We will send you a referral acknowledgement letter outlining the treatment plan.
- We will book the procedure for a date that works for your patient.
- If your patient needs a post-procedure admission we will coordinate this and admit under our service.
- After discharge, we will be responsible for pain management, scheduling f/u office visits and f/u imaging and send you a summary letter of care.
  - Typically a f/u office visit at 1 week
  - Typically a f/u MRI at 3 and 12 months



# Results

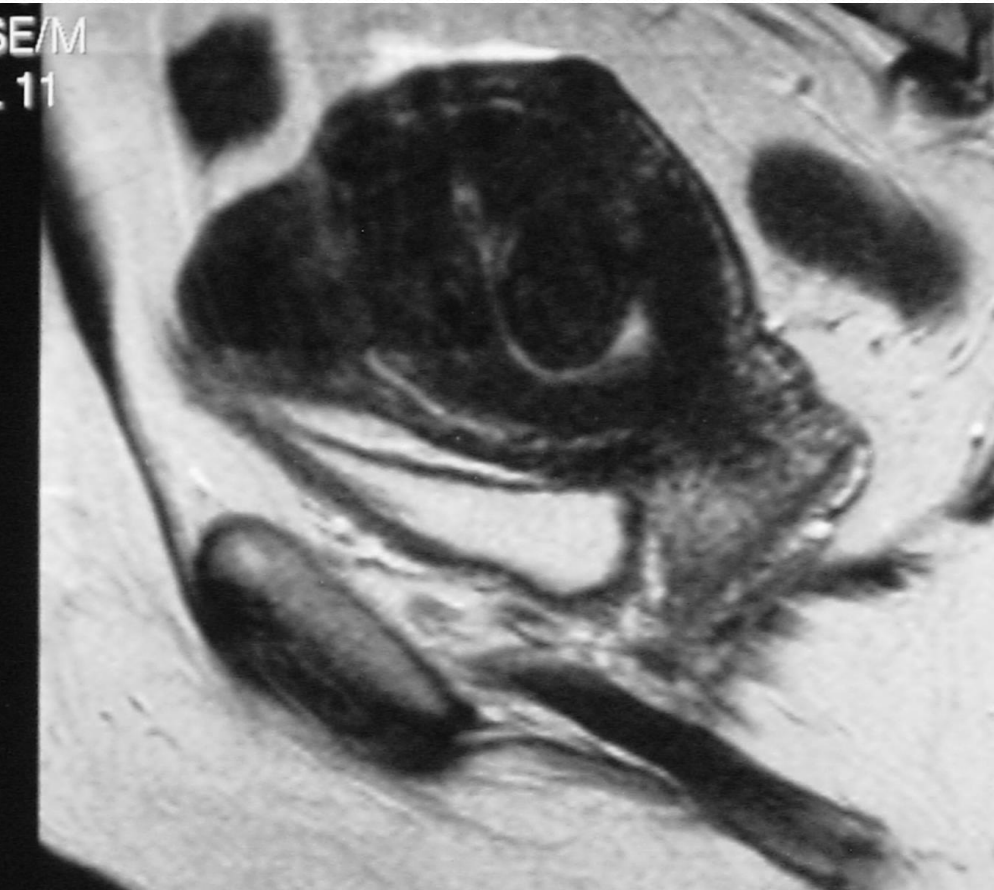


**Before UFE**

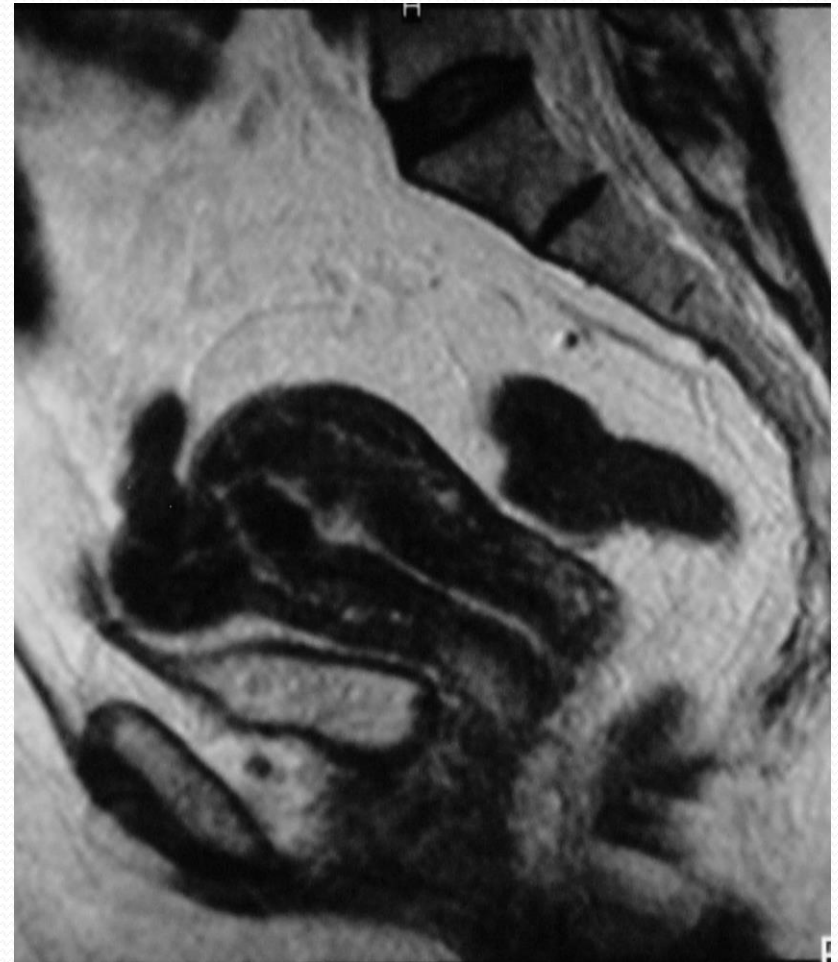


**After UFE**

# Results



Pre-embolization



3 Months Post Embolization

# Results



# Results

## *CASE 3*



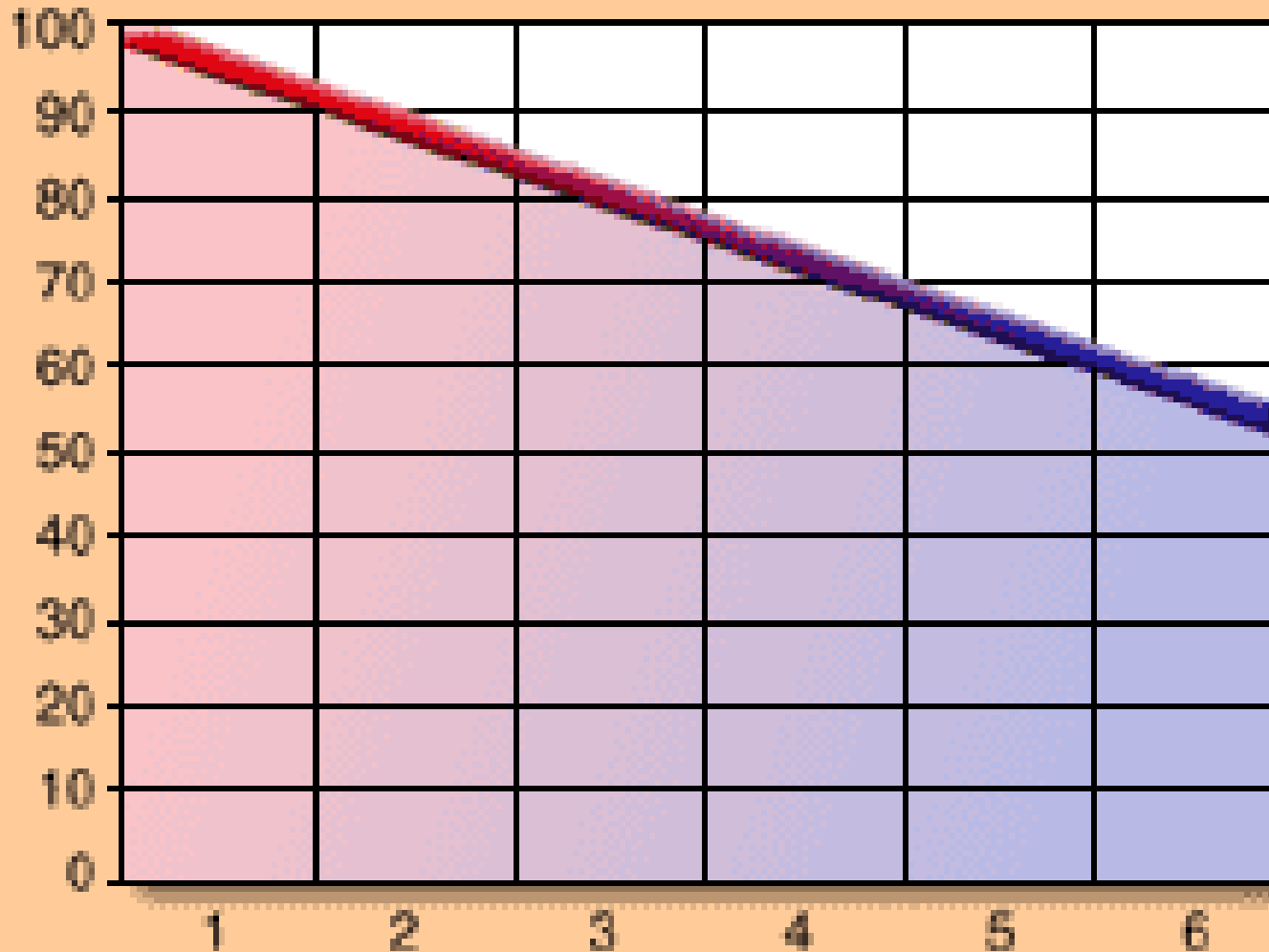
*PRE-*



*6M-POST*



**PERCENTAGE OF FIBROID REDUCTION**



**MONTHS AFTER FIBROID EMBOLIZATION**

# Results

- Thousands of patients treated in U.S.
- Technical success rates average 98%
- High rate of clinical success
  - >90% require no further treatment
  - >85% have significant decrease in bleeding
  - > 90% decrease mass effect
- >90% of patients pleased with results and would chose UFE again
- >95% would recommend the procedure

Am J Obstet Gynecol 1997; 176:938-948  
Radiology 1998; 208:625-629

# UFE vs HYSTERECTOMY

	UFE	HYSTERECTOMY
Hospital Stay	< 1 day	2.3 days
Return to Work	10.7 days	32.5 days
Complication Rate	12.7%	32%

- Many women having a hysterectomy aren't aware of all non-surgical options.
- Many other women suffer needlessly because they want to avoid surgery.



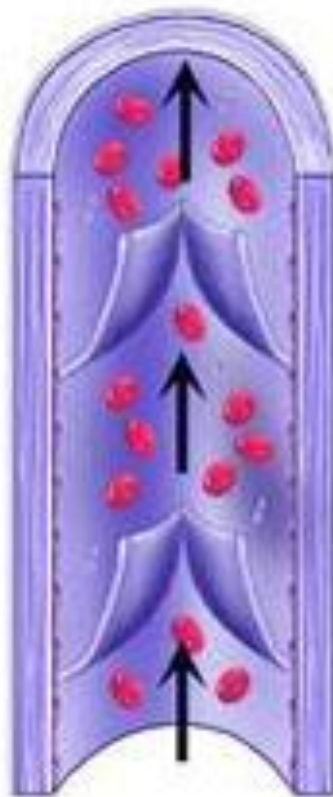
# Another Example

- 38 y/o female G4P4 who presents to your office complaining of leg pain and heaviness. It is limiting her activity and her “bulging veins” don’t allow her to wear shorts anymore.
- Physical examination demonstrates prominent varicose veins along the medial aspect of her left knee and calf.
- Venous Insufficiency Suspected





Normal Vein



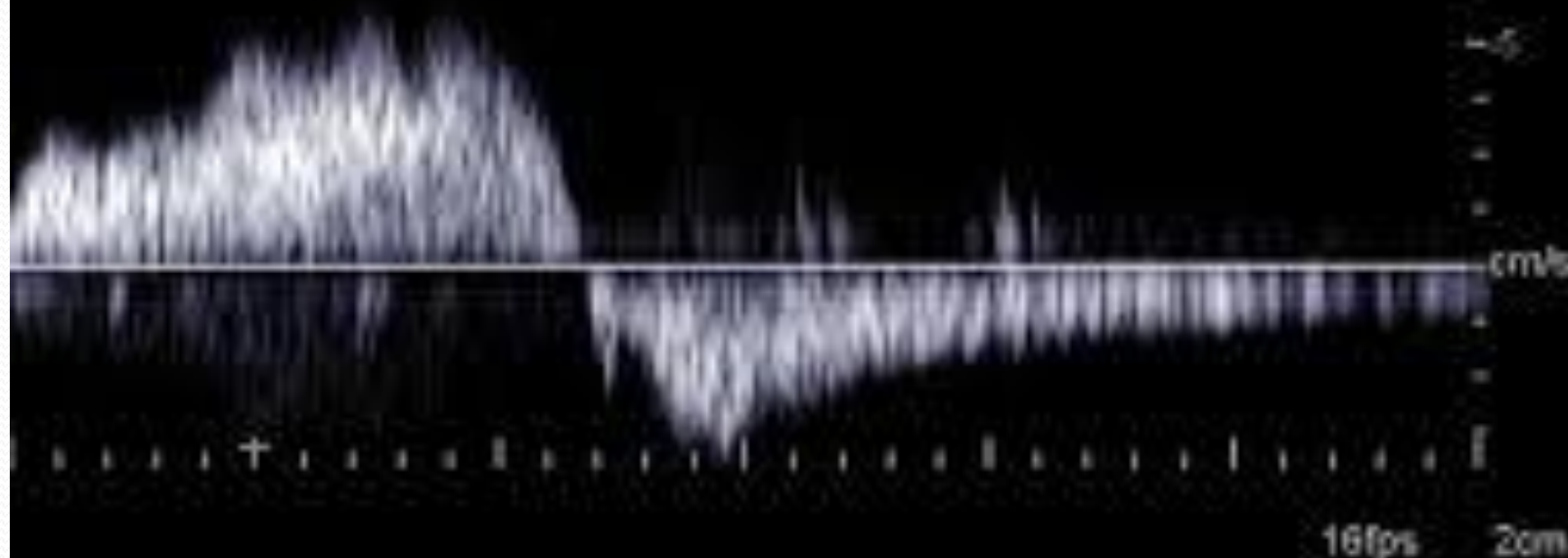
Varicose Vein



TIB: 0.9

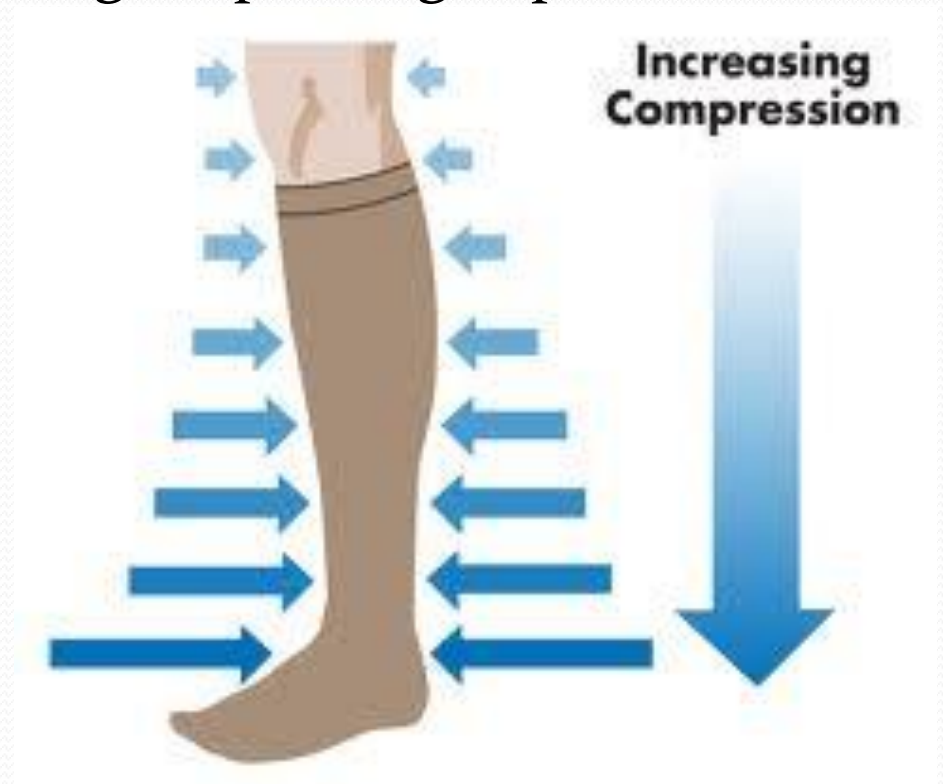


8mm Invert



# Varicose Vein Treatment Options

- Lifestyle Changes-
  - Weight loss
  - Avoiding standing or sitting for prolonged periods of time
  - Exercise
  - Compression stockings





# Varicose Vein Treatment Options

- Vein Stripping and Ligation
- Ambulatory Phlebectomy
  - Smaller superficial varicose veins



# Endovenous Ablation Therapy

- Minimally invasive procedure performed in our outpatient office in less than 1 hour.
- Only local anesthesia is required.
- Patients are encouraged to walk directly after the procedure.
- No limitations to activities of daily living, however, no strenuous activity for one week is encouraged.

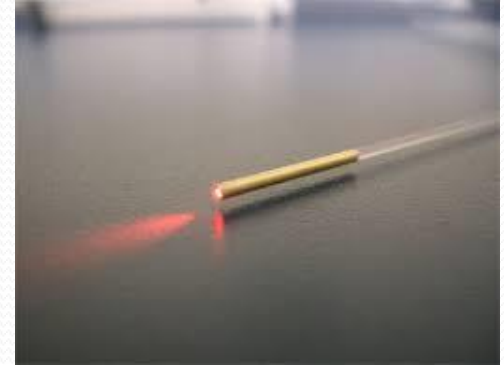


# Sequence of Events

- Office consultation including lower extremity ultrasound evaluating for venous insufficiency and DVT.
- Procedure performed as outpatient.
- F/U office visit with ultrasound in one week.
- F/U office visit in one month to evaluate if sclerotherapy is needed for any persistent smaller varicosities.
- A summary letter of care will be sent to you at the conclusion of our treatment.

# Endovenous Ablation Therapy

- Procedure performed through a tiny incision that doesn't require stitches.
- Similar concept to a PICC insertion using ultrasound guidance.
- Tumescence anesthesia only.
- Laser or radiofrequency (RF) energy is used to create heat and burn the vein closed.



## Superficial Veins of the Leg



## Vein Ablation

Catheter in Vein



Vein Heated



Vein Closes



Before

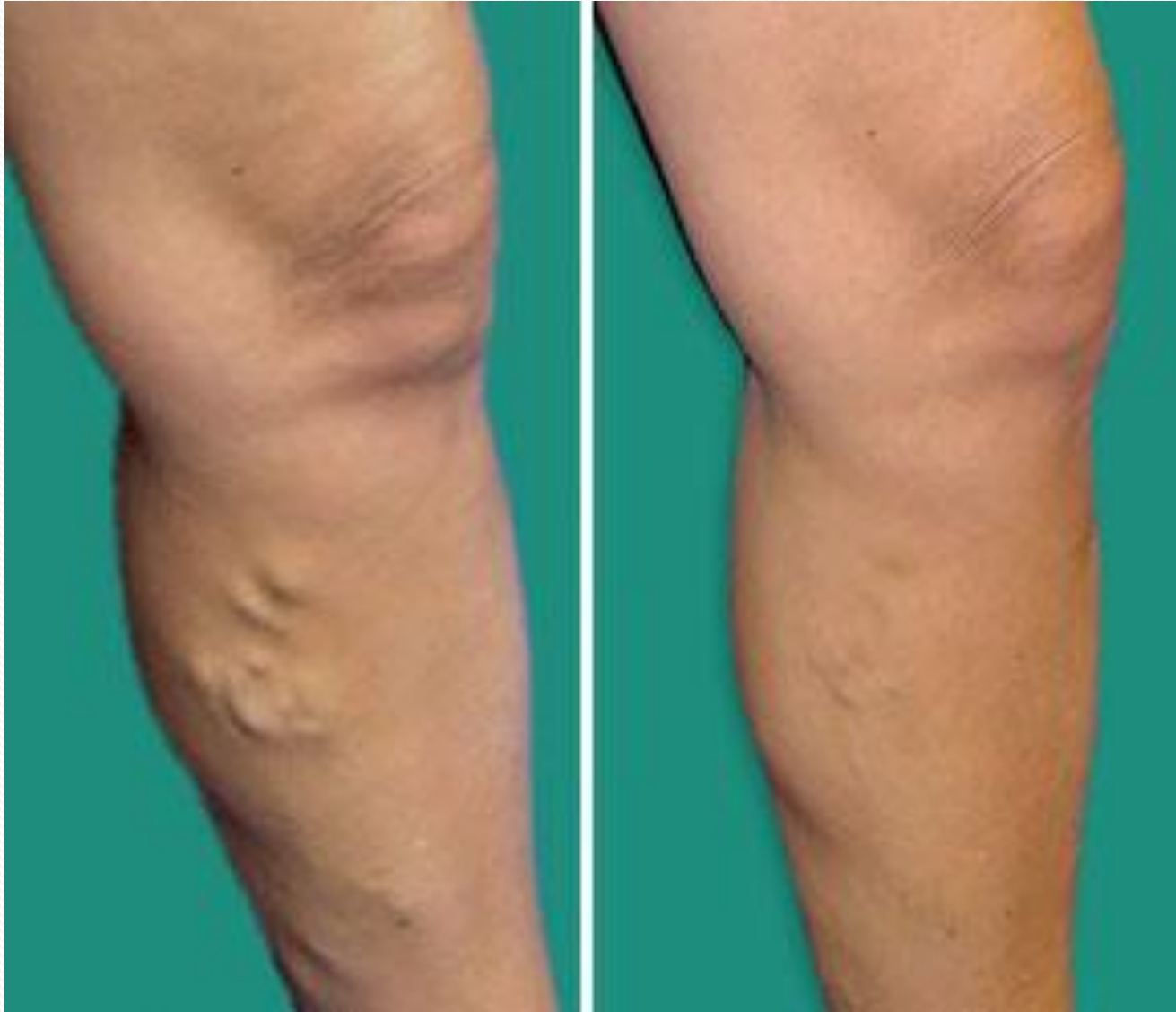


After



Before

After





# Endovenous Ablation Therapy

- Technical success rate of >98%
  - Complication rate of <1%
    - DVT or temporary parasthesia
  - Follow-up sclerotherapy may be required for persistent varicosities.
  - Majority of cases done for symptomatic relief, not cosmetics.
- \*Covered by most insurances



# On The Horizon:

- Peritoneal Dialysis
- Prostate artery embolization
- Gastric artery embolization for weight loss
- Biodegradable IVC filters



# Summary

- Interventional Radiologists perform a wide variety of procedures from venous access to specialized cancer treatments.
- IR is a clinical practice.
- We will provide all-inclusive care for your patient, from the initial consult to the post procedure summary letter.

# Summary

- Advanced care through enhanced technology
  - Interventional radiologists offer patients the least invasive and most advanced treatment options, but patients may not always be aware of their options.
  - Interventional radiology procedures are usually advances in medicine that generally replace surgery, and offer less risk, less pain and less recovery time compared to open surgery.

# Summary

- Feel free to call us at any time for your patient's needs.
- Questions?
  - (860) 676-0110





Thank you for your time