Interventional Procedures
Vascular & Nonvascular

MRT Program

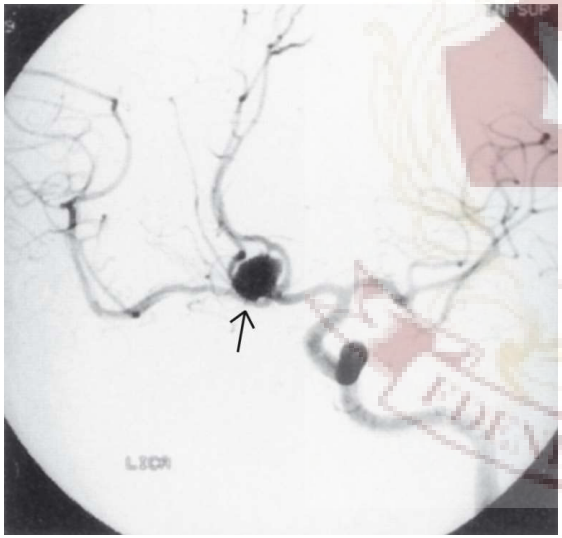
Interventional Imaging Procedures

- Radiologic procedure that provides treatment for disease.
- Benefits:
  - Less invasive than traditional medical/surgical procedures.
  - Less expensive than traditional medical/surgical procedures.
  - Shorter hospital stays.
  - Shorter recovery time.
  - Alternative for nonsurgical candidates.
  - Categorized as vascular or nonvascular.

Vascular Interventional Procedures

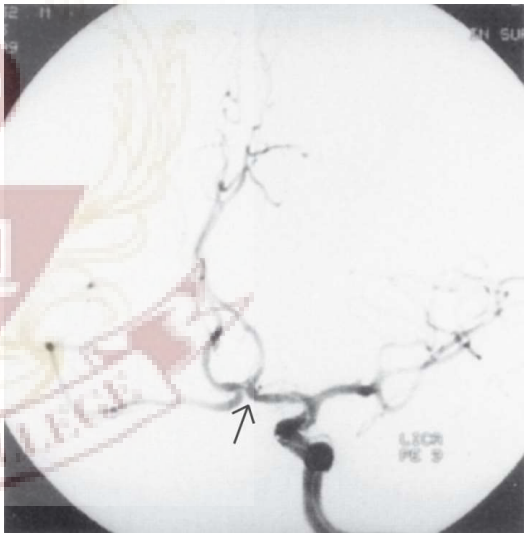
Embolization: Creates embolus in vessel (to control bleeding, reduce blood flow to tumor, or treat aneurysm).

Angiogram (DSA)
prior to embolization



Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

After embolization



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

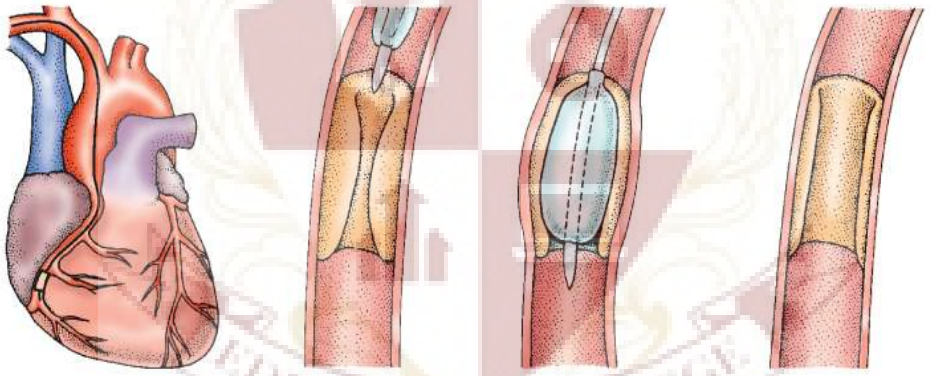
Vascular Interventional Procedures

- Uterine Fibroid Embolization
  - Procedure used to treat symptomatic fibroids
  - Embolization of uterine artery shrinks fibroids and provides pain relief
- Uterine Artery Embolization
  - May be used post partum to stop life threatening bleeding and potentially preventing hysterectomy
- Chemoembolization
  - Used most commonly for hepatic malignancy
  - Chemotherapy agent is injected into the tumour vasculature
  - Survival rate comparable with surgical intervention
- Intracranial Endovascular Coil Embolus
  - Provides alternative with brain aneurysms that are inoperable or high surgical risk
  - Use of microcatheters employs detachable coils to occlude the aneurysmal sac and neck
    https://youtu.be/J2eUByFyBTE

Vascular Interventional Procedures

Percutaneous Transluminal Angiography

https://youtu.be/I45kJJoCa6s Balloon catheter insertion and inflation.

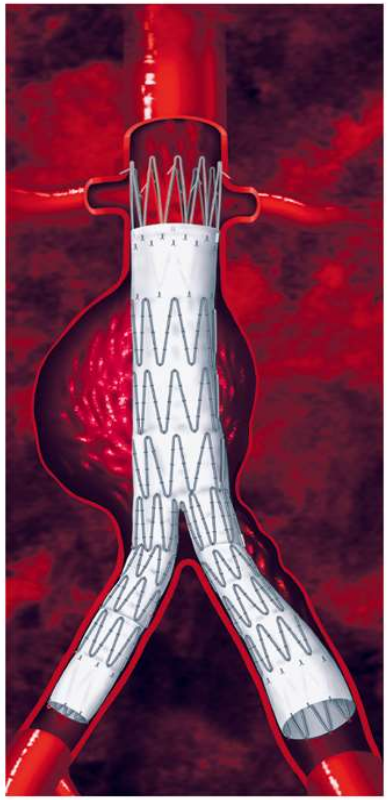


1. The balloon-tipped catheter is positioned in the artery.
2. The uninflated balloon is centered in the obstruction.
3. The balloon is inflated, which flattens plaque against the artery wall.
4. The balloon is removed, and the artery is left unoccluded.

- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Vascular Interventional Procedures

- **Stent Graft Placement**
- Indicated by abdominal aortic
- aneurysm or trauma.
- Combination of interventional and surgical procedure.
- Low risk option.
- Angiographic cut-down approach.
- Fluoroscopy used to progress catheter.
- Stent graft self expands and struts attach to vessel wall.
- Rupture of vessel is a risk.
- https://youtu.be/j9aK2ECcFEY



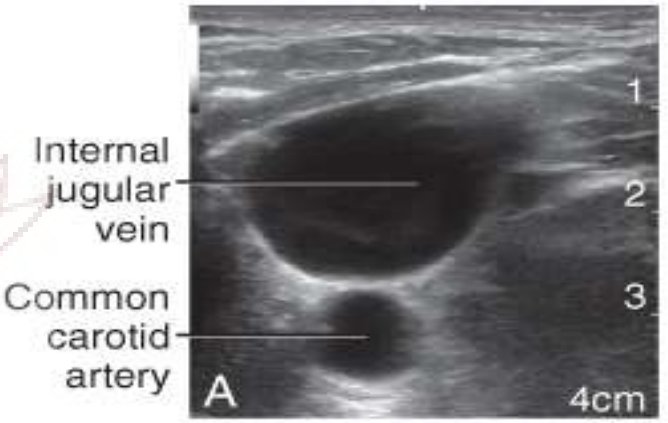
- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Vascular Interventional Procedures

- **Inferior Vena Cava (IVC) Filter**
- Indicated for patients who have recurrent pulmonary emboli or at high risk of developing them.
- Filter is placed in the IVC to trap potentially fatal emboli.
- Femoral or jugular vein is used to gain access and placed inferior to renal veins.
- Risks include infection, bleeding and filter migrating into the heart and lungs.
- Can become occluded over time as well.

Vascular Interventional Procedures

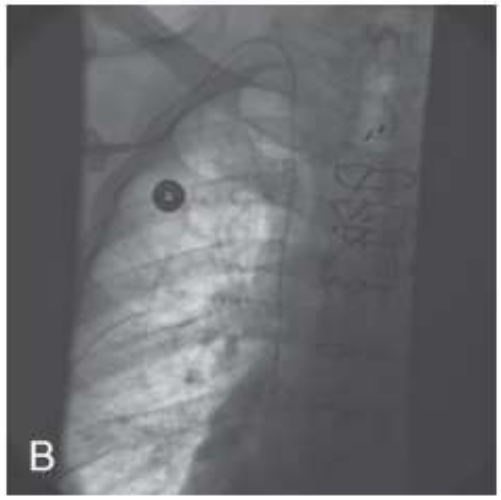
- Venous Access Devices
- Fluoroscopic and ultrasound guidance for line placement used.
- Ultrasound used to locate the internal jugular.
  - These venous catheters administer chemotherapy, large amounts of antibiotics.
  - PICC lines, central lines and subcutaneous ports are 3 most common.
- Risks are infection, bleeding, thrombosis and pneumothorax.



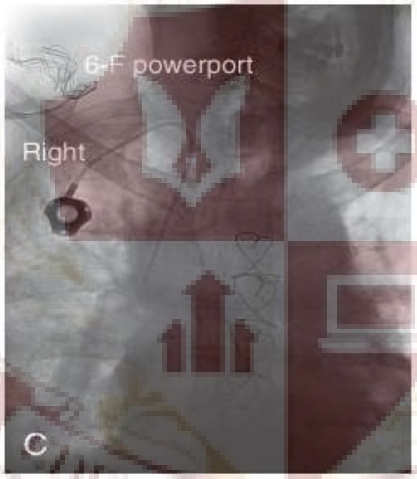
- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Venous Access Devices

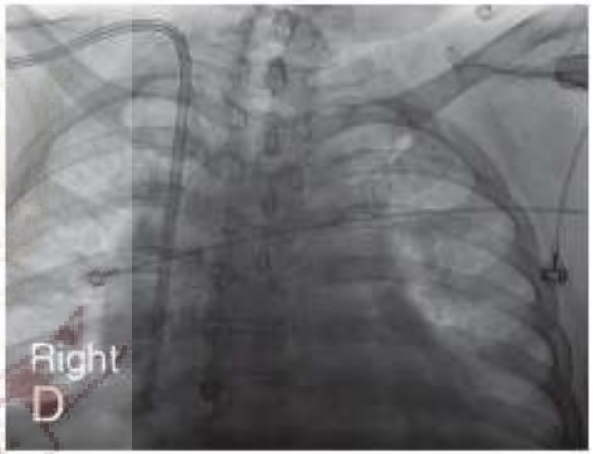
B. Central venous catheter



C. PowerPort



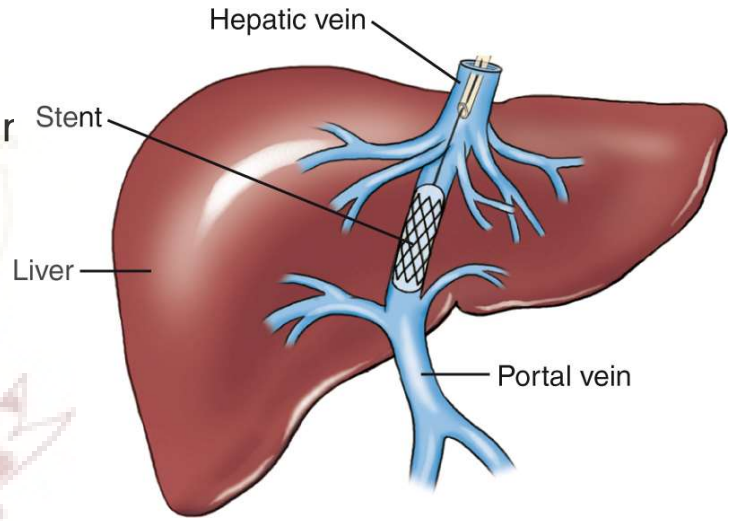
D. Hemodialysis catheter



Source: *Textbook of Radiographic Positioning and Related Anatomy*, Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Vascular Interventional Procedures

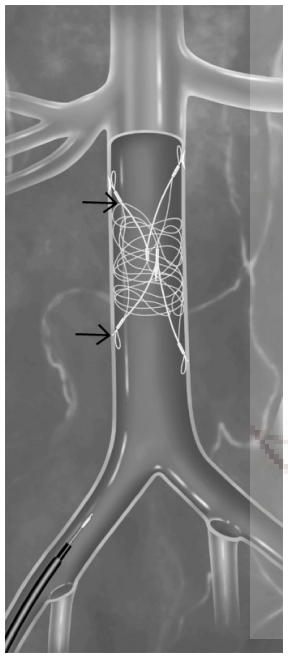
- **Transjugular Intrahepaic Portosystemic Shunt (TIPS)**
- Creates artificial passageway for portal venous circulation
- Clinical indications:
  - Treat variceal bleeding
  - Refractory ascites
  - Advanced cirrhosis
  - End-stage liver disease
  - Risks include hemorrhage, thrombus formation, later risk of stenosis or occlusion



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

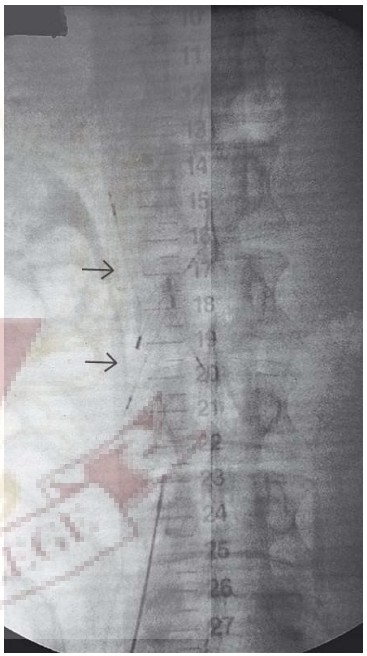
Vascular Interventional Procedures

IVC filter



Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Radiograph of IVC filter in place



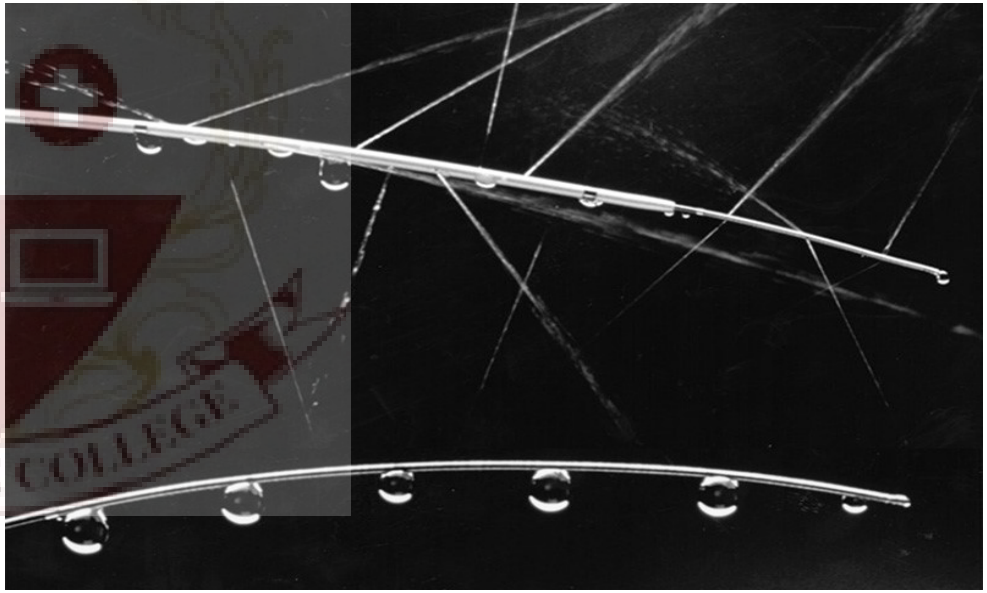
- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

TIPS (cont'd)

- Hepatic portal system is accessed through the right jugular vein.
- Sheath is inserted to protect vessel from needle and catheter manipulations.
- Fluoroscopic guidance of trans jugular needle until it reaches the hepatic vein.
- Needle is advanced through the intrahepatic vein, through the liver and into the portal vein.
- Guidewire is advanced through the needle and is removed so a balloon catheter may be advanced.
- It is inflated to create a tract through the liver.
- Metallic stent is placed across the tract to maintain patency.
- https://youtu.be/O2u4_hF3234

Vascular Interventional Procedures

- **Thrombolysis and Thrombectomy**
- Interventional procedure to dissolve blood clot
- Pulse spray and infusion catheters



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Vascular Interventional Procedures

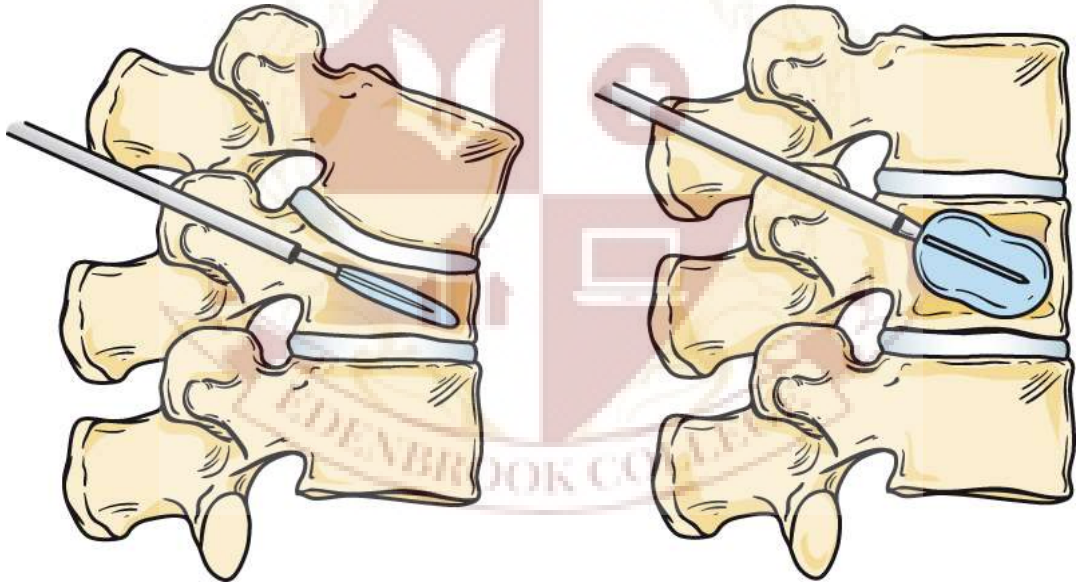
- Infusion Therapy
  - Infusion of therapeutic drugs may occur through a systemic or super selective approach
  - Determined by pathology, area treated and patient condition
  - Include vasoconstrictors, vasodilators, chemotherapy and radioactive materials

- Extraction of Foreign Bodies
  - Limited to fragments of vascular catheters or guidewires, pacemaker electrodes or shunts

Nonvascular Interventional Procedures

Kyphoplasty

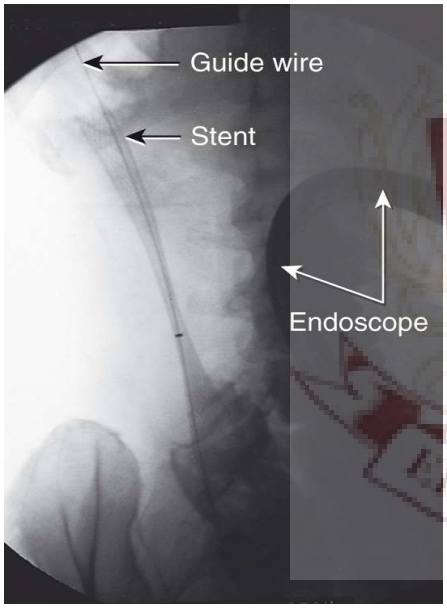
Balloon inserted into collapsed vertebrae to restore collapsed vertebral body before cement injection.



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

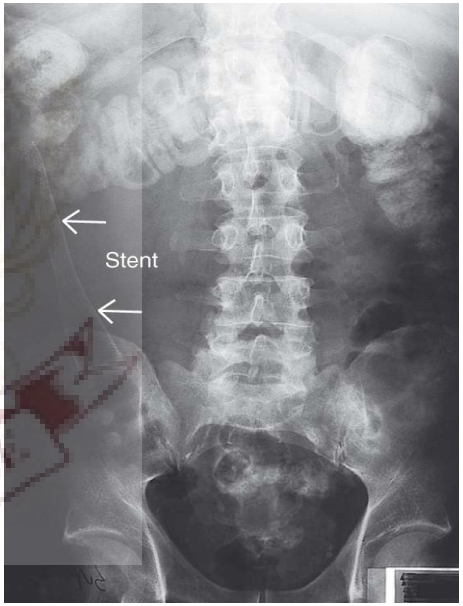
Nonvascular Interventional Procedures

Enteric stent placement to relieve bowel obstruction



Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

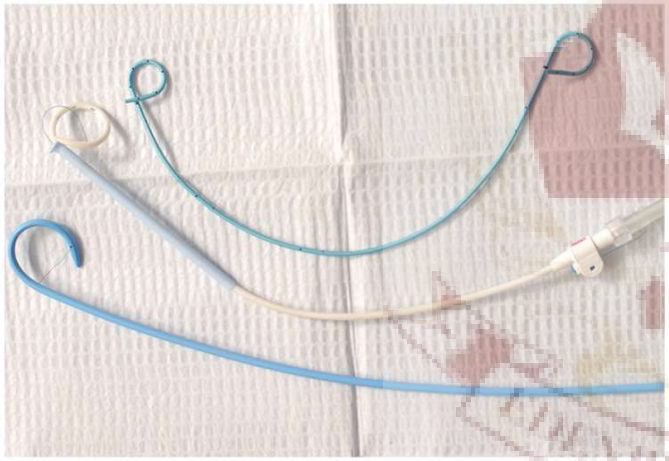
Two days later, some opening of stricture



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

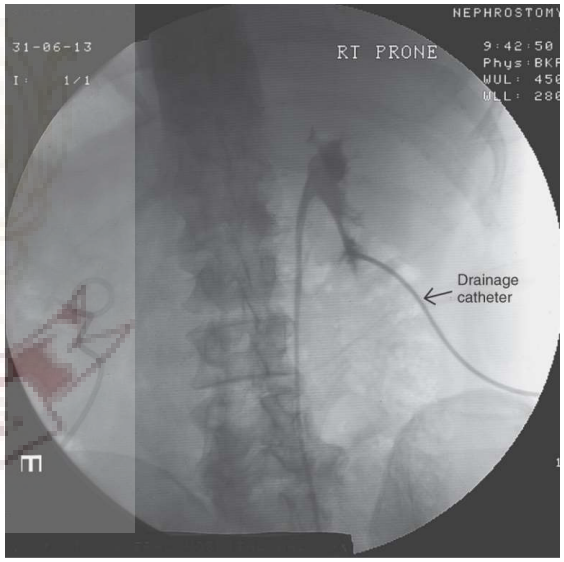
Nonvascular Interventional Procedures

Nephrostomy drainage catheter and uretheral stents



Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

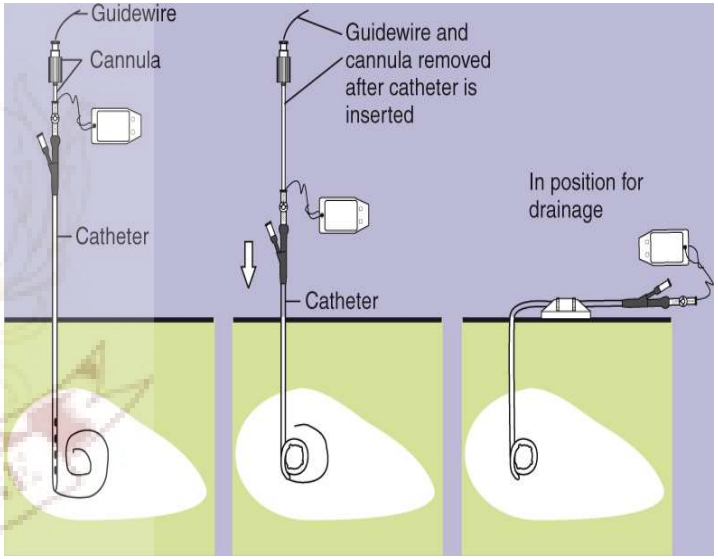
Catheter inserted into renal pelvis



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Nonvascular Interventional Procedures

- **Percutaneous Biliary Drainage (PBD)**
- Internal or external drainage
- Stone removal
- Dilation of obstructed bile duct
- Palliative procedure

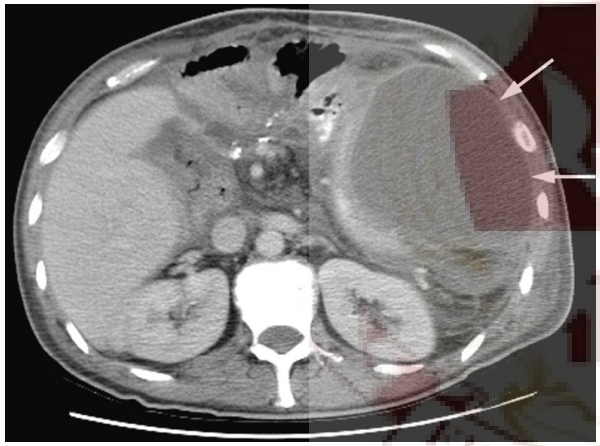


- Source: *Textbook of Radiographic Positioning and Related Anatomy*, Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Nonvascular Interventional Procedures

Percutaneous Abdominal Abscess Drainage (PAD)

Large abscess – left side



Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

After abscess drainage – tube still in place



- Source: *Textbook of Radiographic Positioning and Related Anatomy,* Bontrager & Lampignano. © Mosby Elsevier. Used with permission.

Other Nonvascular Interventions

- Needle aspiration: abscess drainage
- Percutaneous needle biopsy: tissue sample assessment
- Percutaneous gastrostomy: extended feeding or gastric compression