



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore-35
Affiliated to The Dr.M.G.R Medical University, Chennai



RADIOGRAPHY AND IMAGING TECHNOLOGY - II YEAR

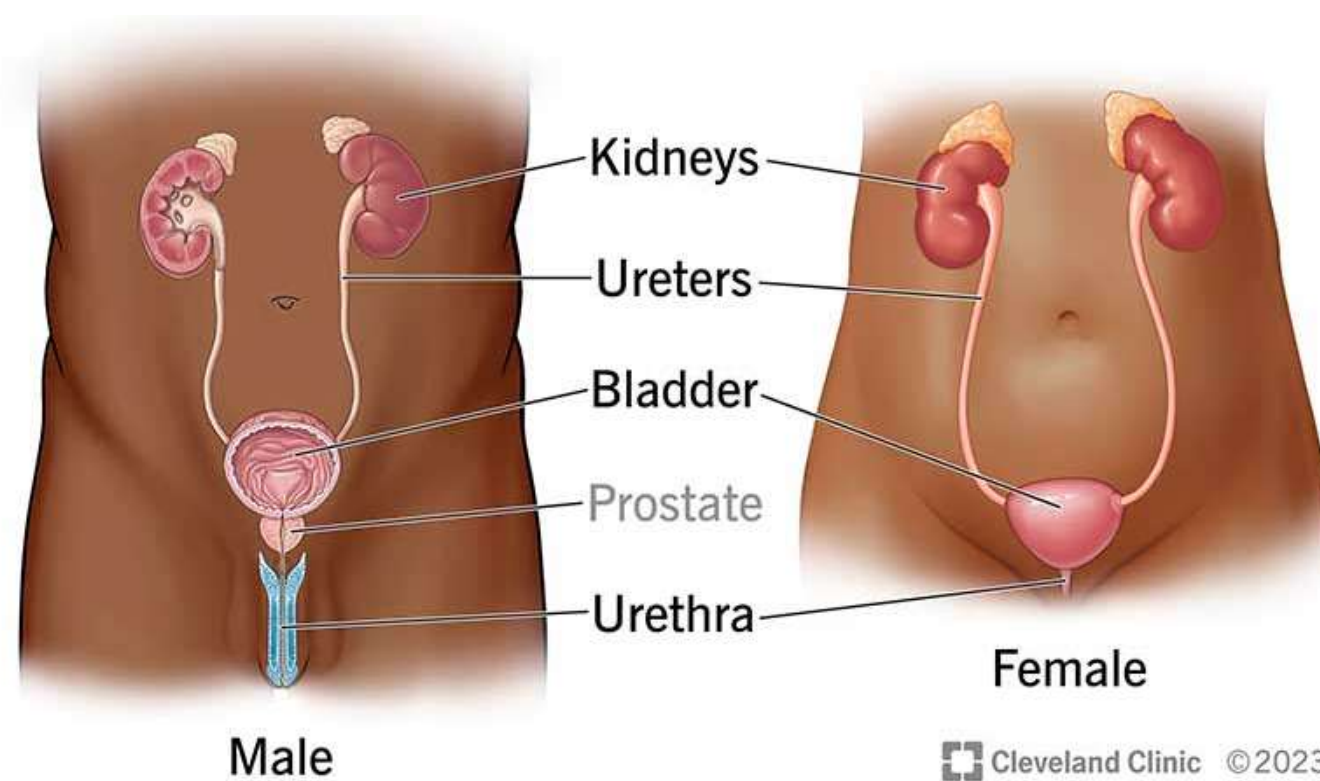
COURSE NAME : CONTRAST & SPECIAL RADIOGRAPHY PROCEDURES

TOPIC : Intravenous Pyelography (IVP) / Intravenous Urogram (IVU)

Radiographic Examination of the Urinary System

Intravenous Pyelography (IVP) / Intravenous Urogram (IVU)

- IVP/IVU is a radiographic study of the urinary system, including kidneys, ureters, and bladder.
- Water-soluble iodinated contrast media is injected intravenously.
- Contrast is filtered by the kidneys and excreted through urine.
- Provides structural and functional information of the urinary system on X-ray images.





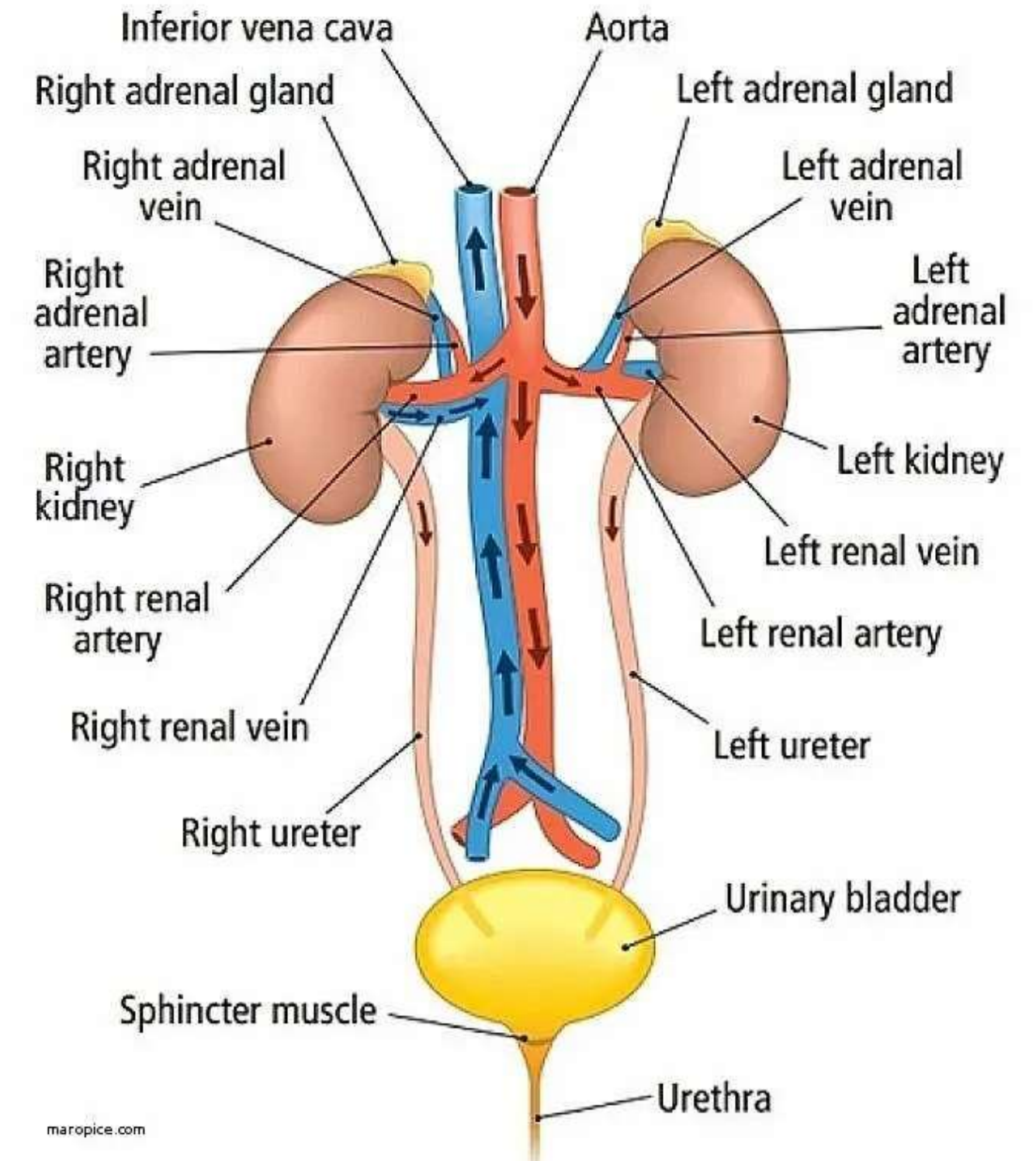
Anatomy – Urinary System



Organs: Kidneys, Ureters, Bladder

Functions:

- Filter blood, produce urine
- Eliminate waste products
- Regulate blood volume, blood pressure, and pH levels

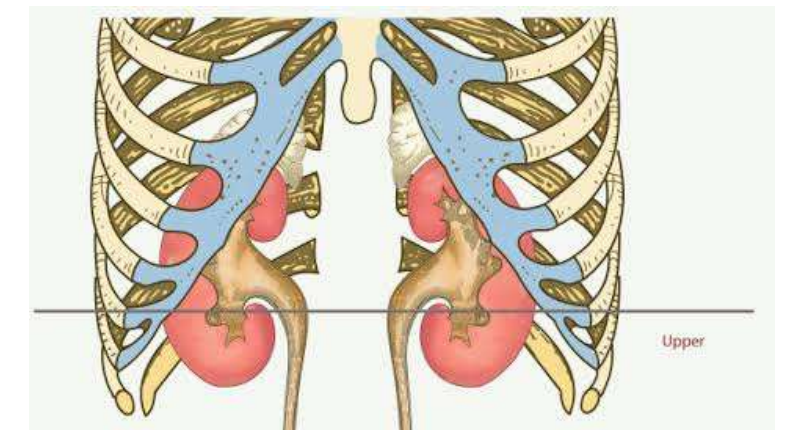
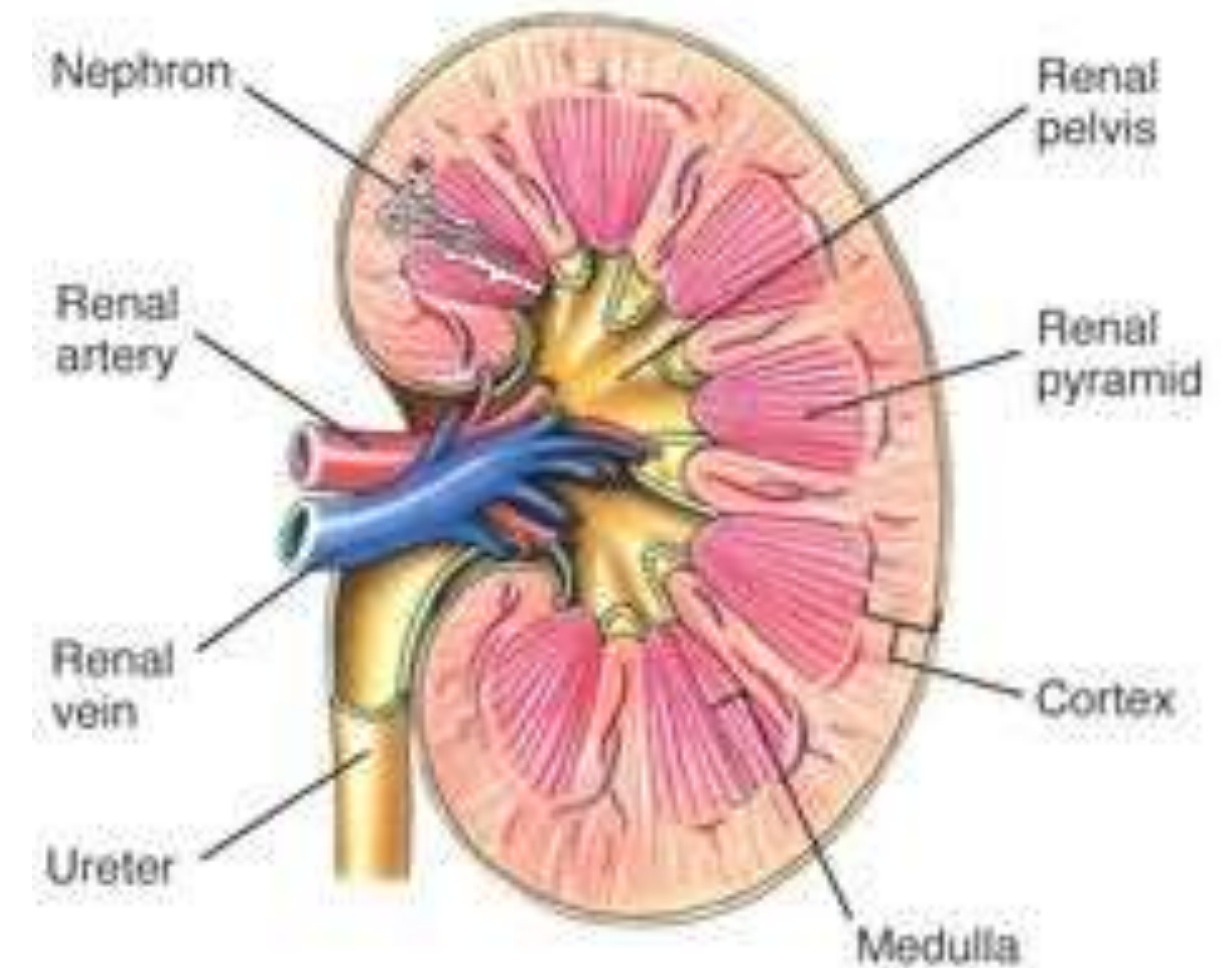




Anatomy – Urinary System (Kidney)



- Bean-shaped organs, 10-12 cm long
- Location: Either side of vertebral column, T12 to L3 vertebrae
- Right kidney slightly lower due to liver
- Enclosed by capsule, fascia, and fat layers
- Adrenal gland on top of each kidney
- Functional unit: **Nephron**
- Divided into: Cortex (outer part), Medulla (inner part with pyramids)
- Urine pathway: Minor calyces → Major calyx → Renal pelvis → Ureter



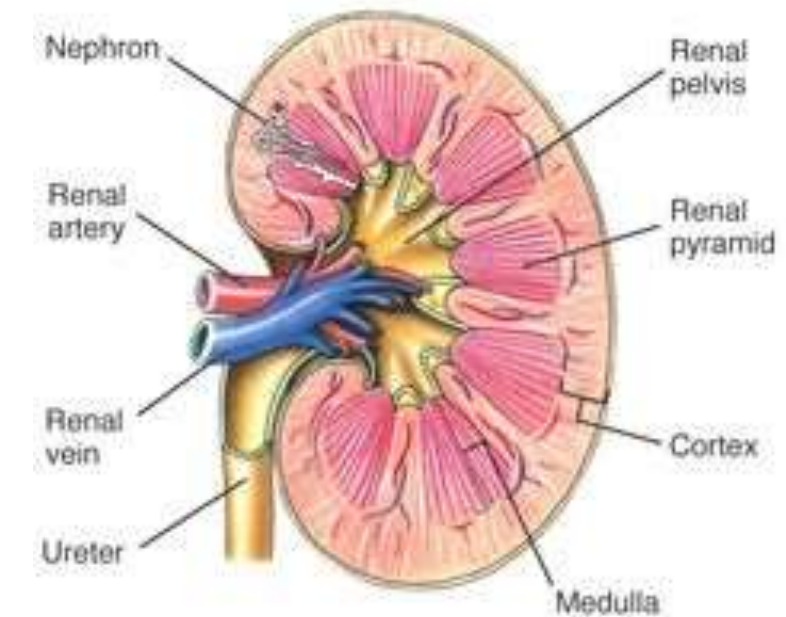


Anatomy – Urinary System



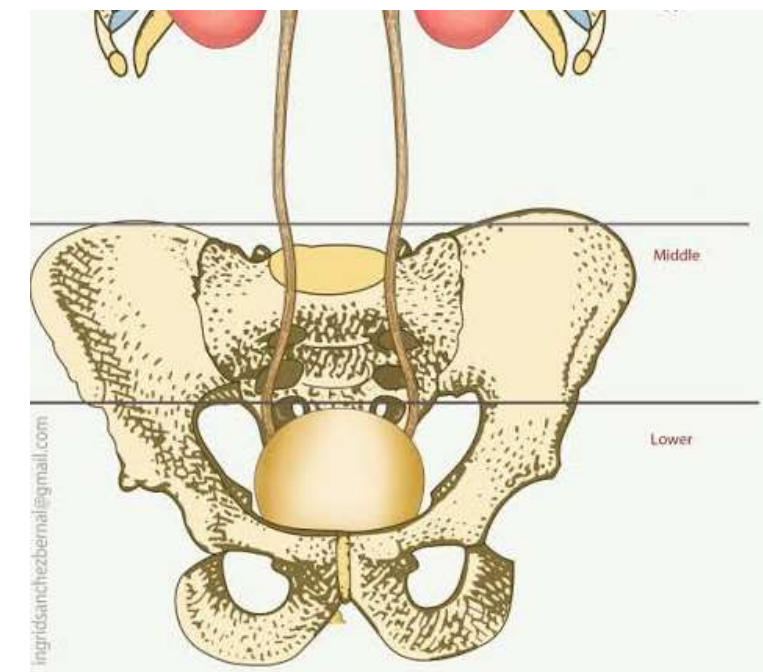
Blood Supply of the Kidneys

- Renal arteries: Supply oxygenated blood from the aorta
- Renal veins: Drain deoxygenated blood into the inferior vena cava
- Enter/exit through renal hilum



Ureters

- Tubes that transport urine from the kidneys to the bladder
- Terminal part: Vesicoureteric junction (joins urinary bladder)





Anatomy – Urinary System

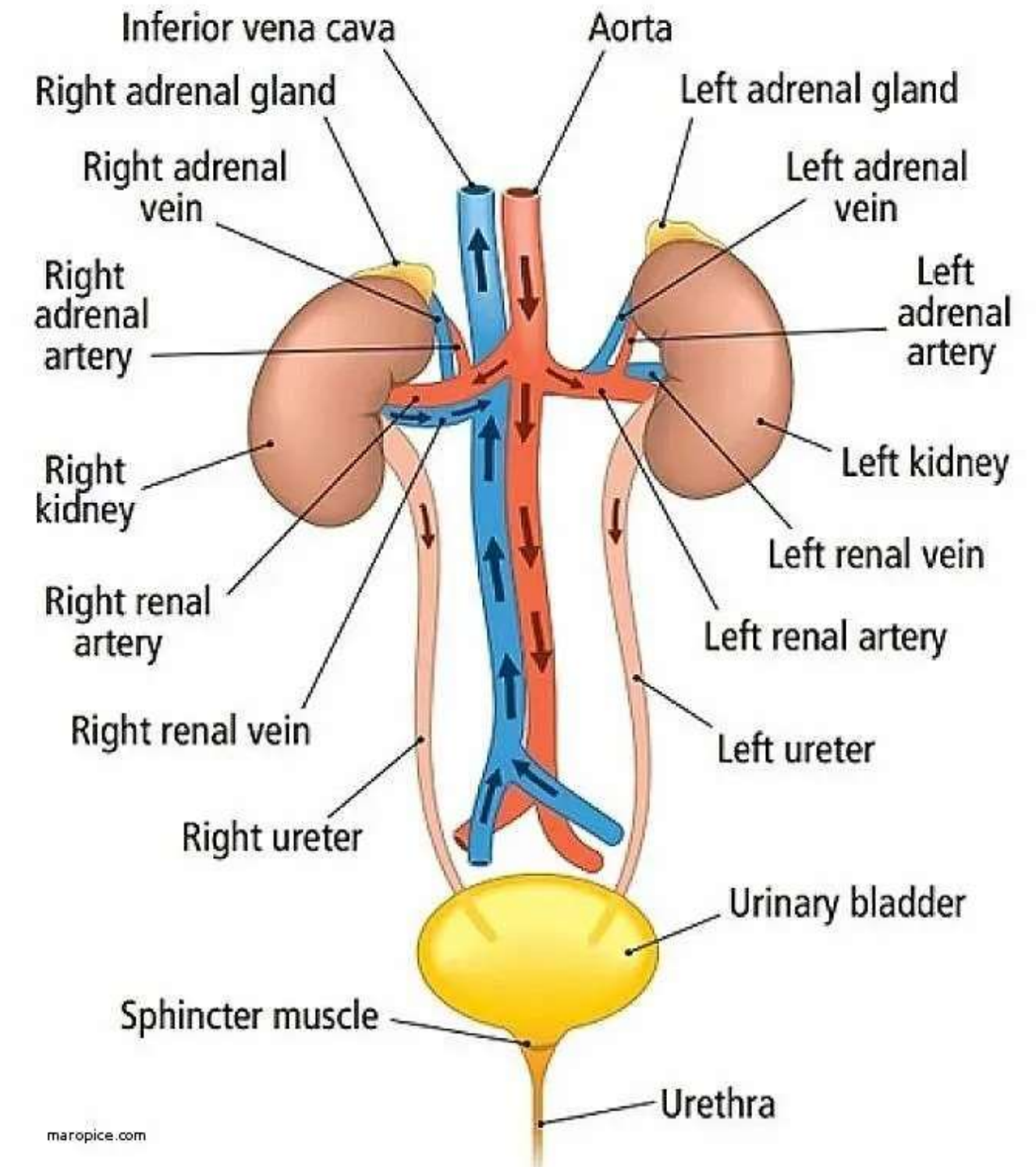


Urinary Bladder - Hollow, muscular sac

- Stores urine until excreted via the urethra

Kidney Functions

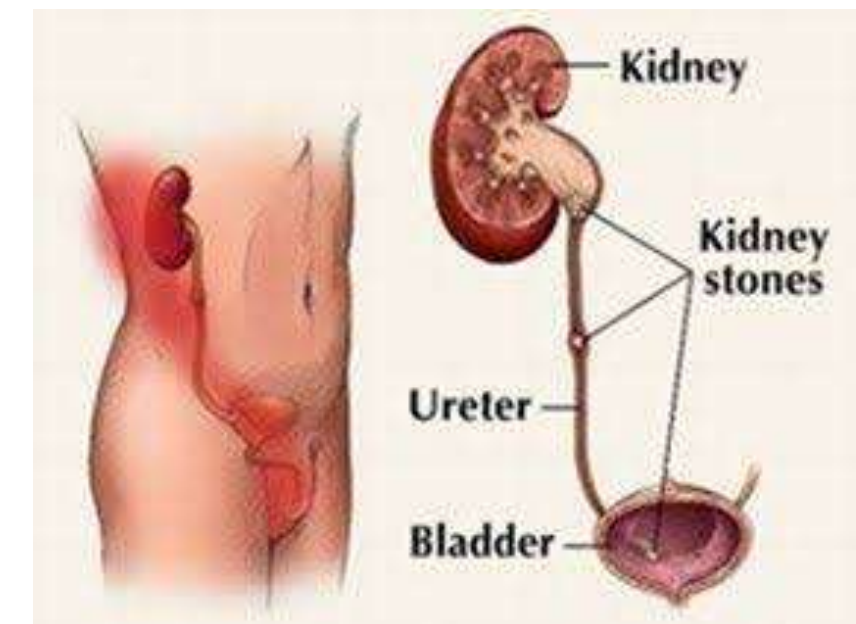
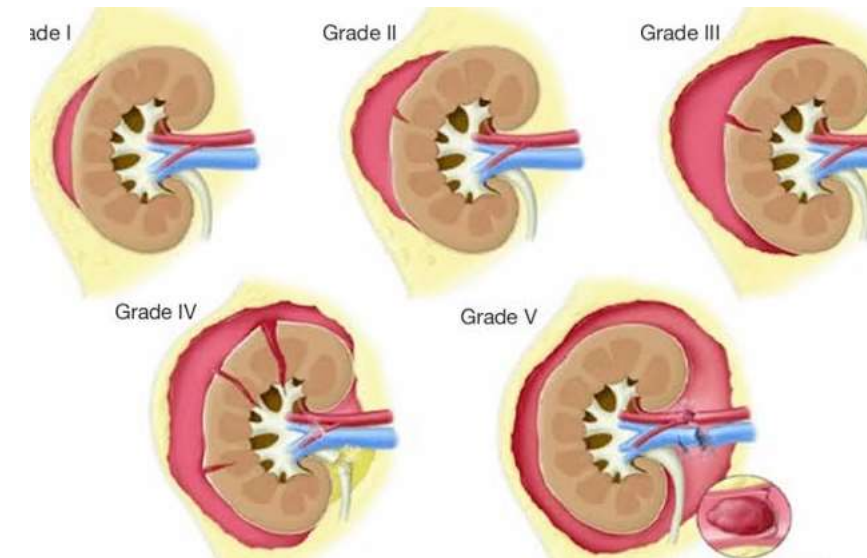
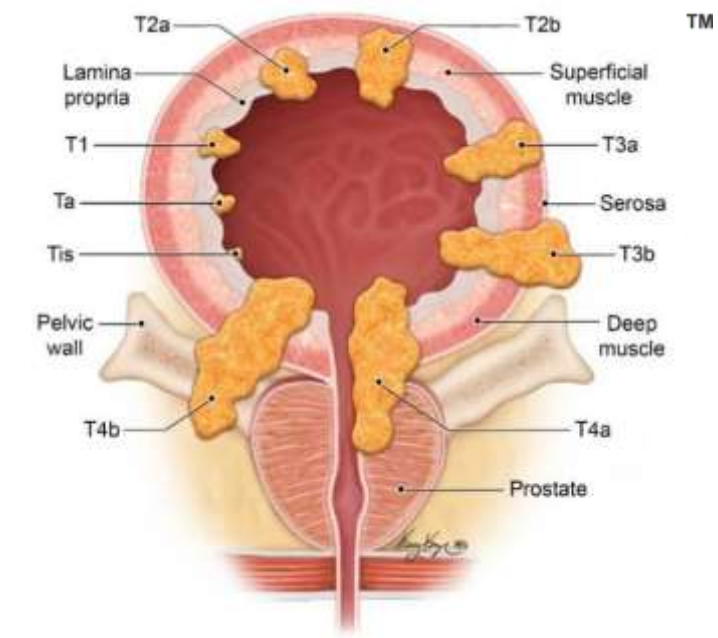
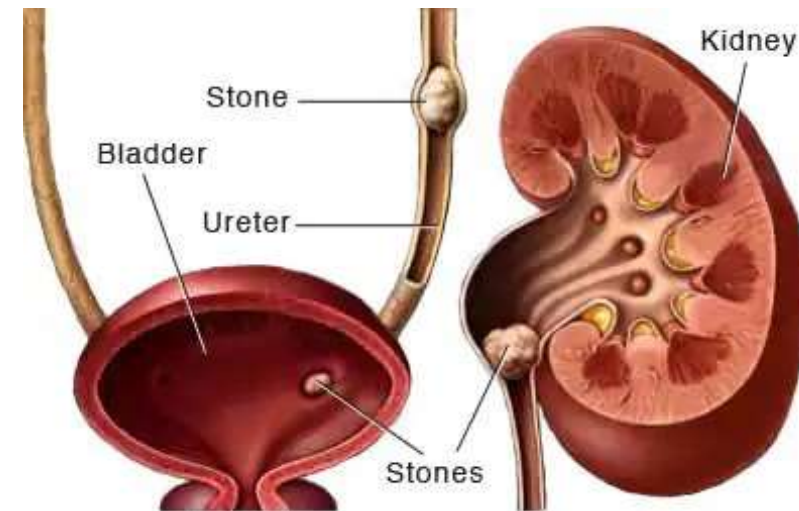
- Maintain blood pressure (Renin hormone)
- Regulate RBC production (Erythropoietin hormone)
- Filter waste (urea, salts, toxins) from the blood
- Maintain water and electrolyte balance





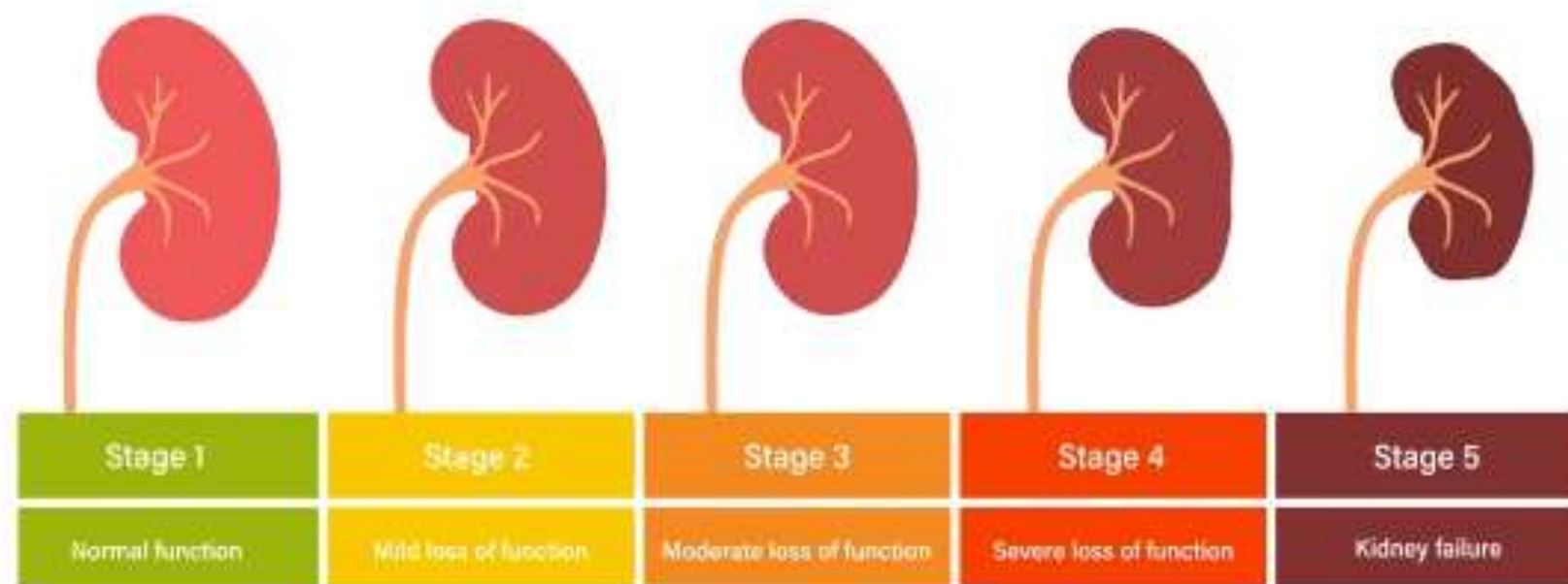
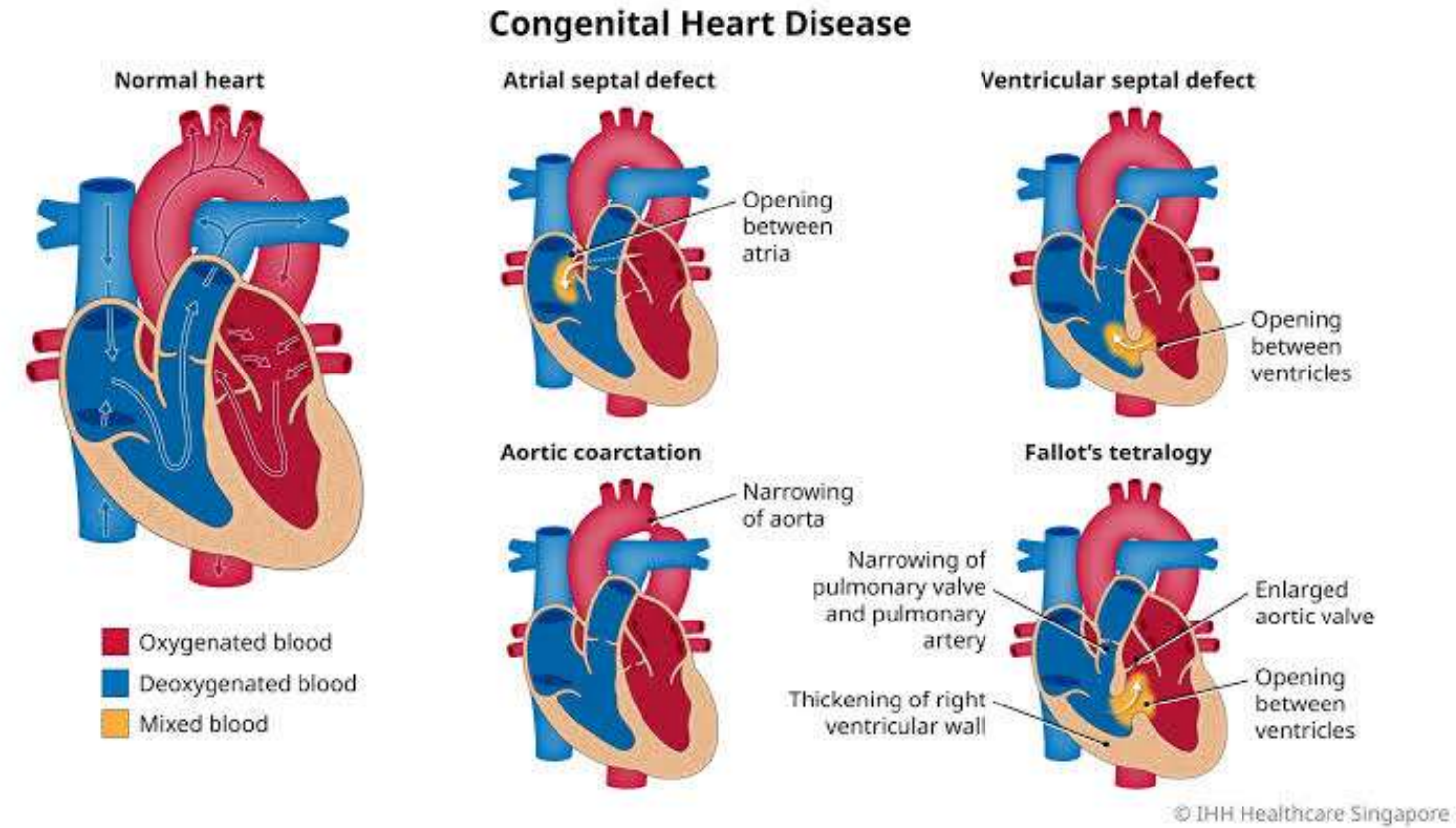
Indications for IVP/IVU

- Suspected renal stone
- Dysuria (painful urination),
- Hematuria (blood in urine), Pyuria (pus in urine)
- Renal colic
- Urinary tract infections (UTI)
- Suspected mass lesions
- Renal trauma evaluation
- Structural and functional assessment of kidneys, ureters, and bladder



Contraindications

- Cardiopulmonary disorders
- Impaired renal function
- Precautions in breastfeeding women





Equipment

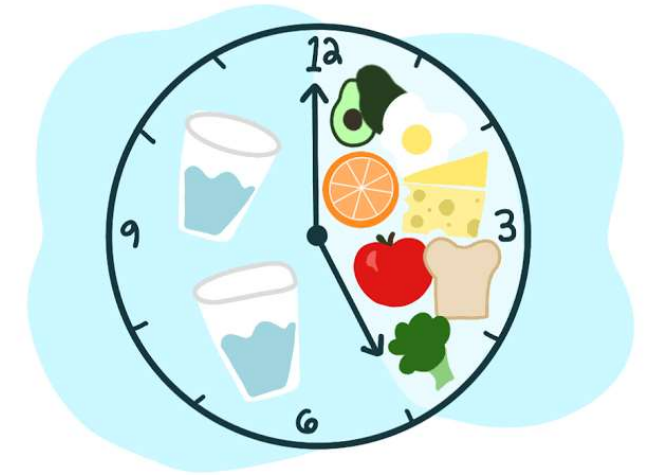
- X-ray machine with Potter-Bucky grid and high-speed cassette
- Syringe and 20G scalp vein set / cannula
- Spirit swabs
- Immobilization band
- Abdominal compression band
- Non-ionic iodinated contrast media (50 ml or 1 ml/kg body weight)





Patient Preparation

- Low residue diet
- Laxatives (Bisacodyl)
- Kidney function tests
- Consent regarding procedure





Procedure



1. Explain procedure and obtain written consent
2. Insert IV line (scalp vein set/cannula) (Void before starting a study)
3. Take a scout film (check bowel prep)
4. Patient lies supine, Apply abdominal compression band
5. Administer test dose → inject contrast media
6. Immobilize patient for stability
7. Take serial X-rays at specific time intervals



SAMPLE PATIENT INFORMATION SHEET AND CONSENT FOR A
CONTRAST ENHANCED IMAGING STUDY

What is a contrast injection and why do I need it?
Explanation of how contrast (dye) helps provide useful information for diagnosis and treatment.

What are the risks involved in this imaging study?
Explanation that risks involved in contrast injection and the imaging study per se are very low, and that the doctors are well prepared to handle these risks. Enumerate the important risks, namely allergic reaction (<1% incidence), contrast leakage or extravasation (<1% incidence), kidney injury in patients with pre-existing renal damage (screened by Sr creatinine), presence of metal (for MRI), and radiation exposure in pregnant patients (for CT).

Enlist certain questions to assess the patient's risk of developing a complication in yes/no format

	YES	NO
Are you pregnant, or is there any chance that you might be pregnant?	☐	☐
Have you had contrast allergy in the past?	☐	☐
Do you have kidney disease (kidney cancer, previous kidney surgery, have a single kidney)?	☐	☐
Are you on dialysis?	☐	☐
Do you take diabetes medicines, specifically metformin?	☐	☐

Clarification that if the patient has any queries or additional questions regarding the exam, a radiologist is always available to answer them.

Patient/ Guardian name and signature:
Witness name and signature:
Name and signature of technologist/ nurse/ radiologist while accepting the form:
Date:
Time:



Film Sequence & Time Intervals



- 1-Minute Film: **Nephrogram** of kidney cortex
- 5-Minute Film: Cortex, **collecting system**, calyces, renal pelvis, upper ureter

(Release abdominal compression after this)

- 15-Minute Film: **Ureters** and bladder filled with contrast

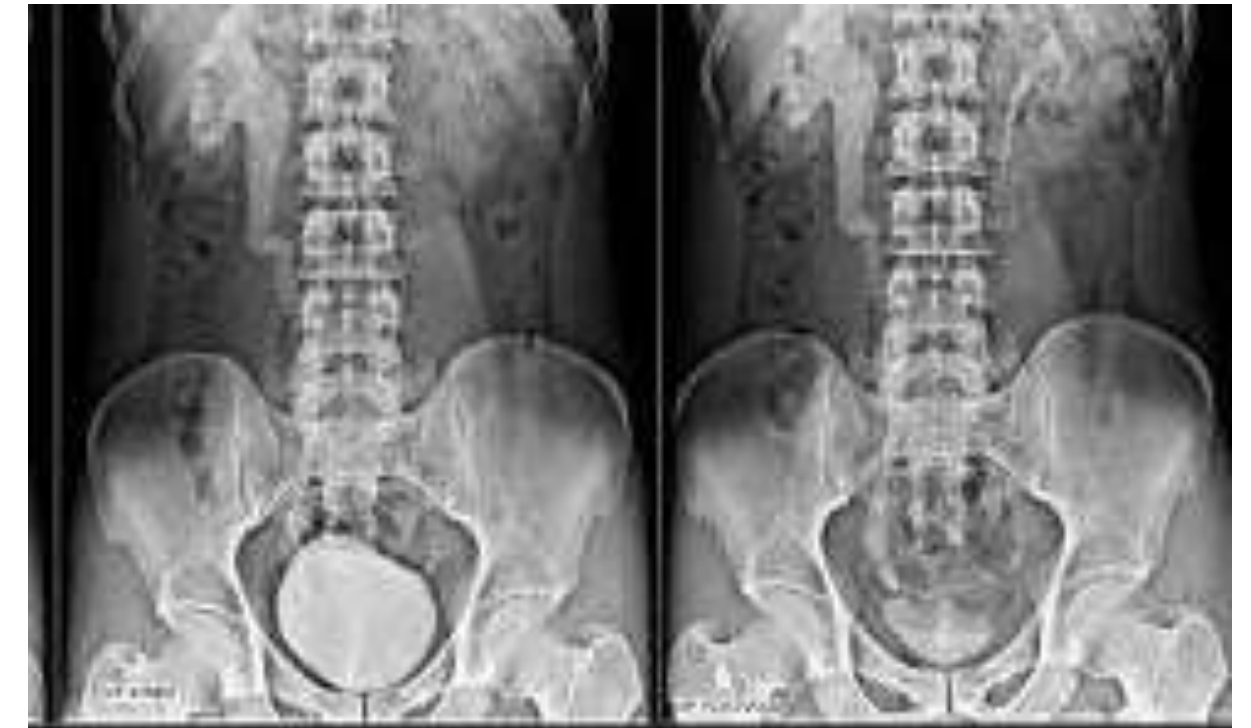




Film Sequence & Time Intervals



- 30-45 Minutes (Pre-void Film): **Distended urinary bladder**
- Post-void Film: **Residual urine**, obstructive pathology
- Delayed Films (if needed): 20 mins, 45 mins, **3 hours, 6 hours**
- Oblique Films: **Separate ureters from vertebral column**





Post-Procedure care



- Remove IV line
- Advise increased fluid intake to flush out contrast
- Observe for any adverse reaction
- Patient may resume normal activities unless otherwise instructed