



**SNS COLLEGE OF ALLIED HEALTH SCIENCES**  
SNS Kalvi Nagar, Coimbatore - 35  
Affiliated to Dr MGR Medical University, Chennai



**DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE**  
**TECHNOLOGY**

**COURSE NAME: Nephrology**

**TOPIC : Examination & Assessment of Renal System**



## Case Study



A 67 Year old, Male Patient presents with complaints of generalized weakness, decreased balance, diabetic with end stage renal disease.

What are the physical examinations and diagnostic assessments will you made to identify the cause of end stage renal disease.



# Physical Examination on Patient

## Inspection:

Skin- pallor, yellow-grey, excoriations, changes in turgor, bruises, texture (e.g. rough, dry skin) Mouth: stomatitis, ammonia breath.





# Physical Examination on Patient



- **Face & extremities:**

Generalized edema, peripheral edema, bladder distention, masses, enlarged kidney.

- **Abdomen-abdominal contour:**

for midline mass in lower abdomen (may indicate urinary retention) or unilateral mass. – **Ascites**

- **Weight:** weight gain 2nd to edema, weight loss & muscle wasting in renal failure.

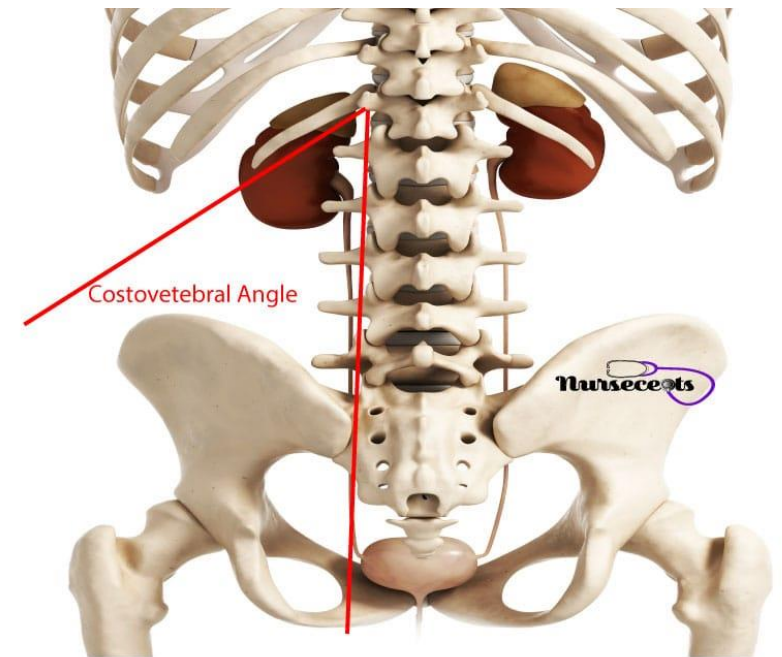




# Physical Examination on Patient

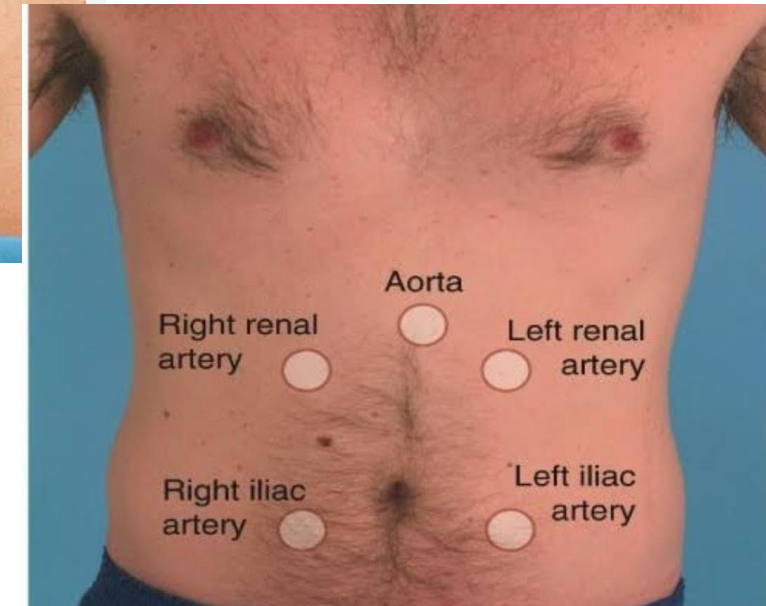


- **General state of health-** fatigue, lethargy, & diminished alertness.
- **Palpation-** No costovertebral angle tenderness, nonpalpable kidney & bladder, no palpable masses.



## Physical Examination on Patient

- **Percussion:** Tenderness in the flank may be detected by fist percussion. If CVA tenderness & pain are present, indicate a kidney infection or polycystic kidney disease.
- **Auscultation:** The abdominal aorta & renal arteries are auscultated for a bruit, which indicates impaired blood flow to the kidneys



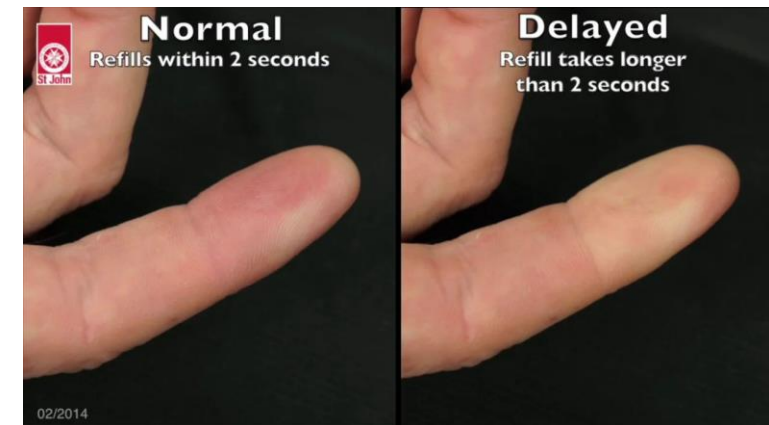


# Physical Examination on Patient



## Check for Hands

- Inspect the **palmar creases for pallor**, Especially important in anemia secondary to end stage renal disease
- Assess patient's **skin turgor** - Gently pull lightly upwards on the patients skin overlying the hand or arm
- The rate at which it returns to baseline when released is roughly associated with degree of hydration
- Measure **capillary refill time** - Should be less than 2 seconds
- Feel the hands to assess temperature
- Palpate the radial pulse to assess rate and volume
- Check for **a flapping tremor** - Can be a sign of uraemia



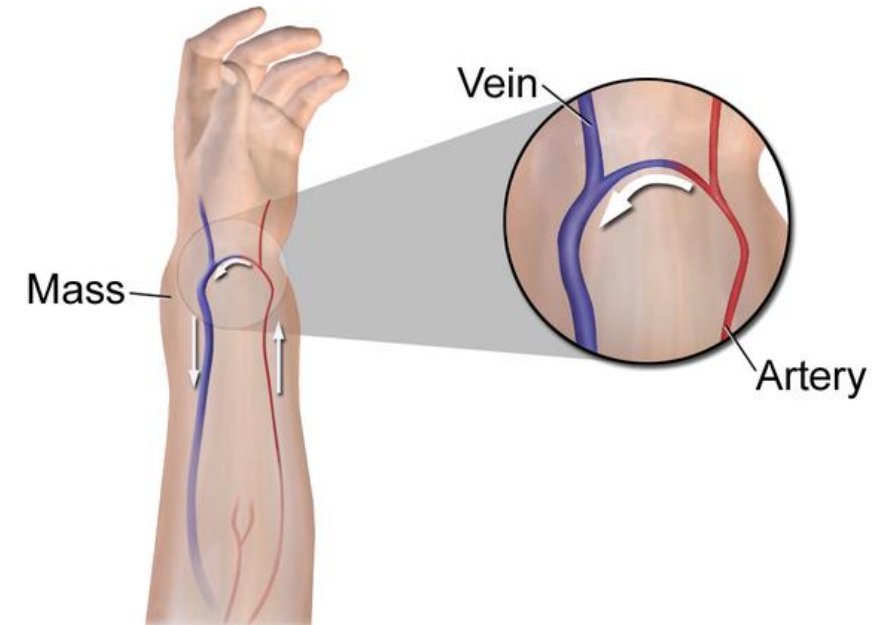


# Physical Examination on Patient



## Check for Arms

- Ask to check the blood pressure
- Assess any **arteriovenous fistulae** that are present.
- These can be **radio-cephalic, brachio-cephalic, or brachio-basilic.**
- Look for signs of recent use (e.g. dressings or needle entry)
- Palpate for thrills (should be continuous) and a pulse (should be s and easily compressible)
- Elevate the upper limb and assess for its collapse





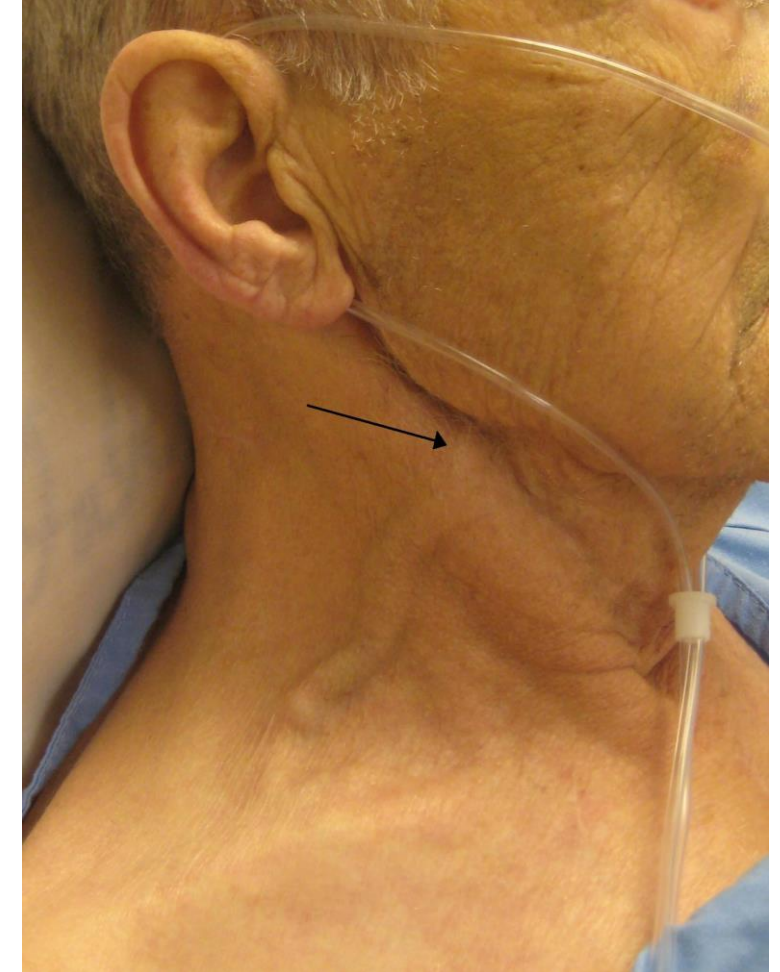


# Physical Examination on Patient



## Check for Neck

- Assess the jugular venous pressure (JVP) -  
Affected by fluid status and contractility of the heart
- Allow patient to relax their head back onto the pillow and turn head to left
- Look between the two heads of the sternocleidomastoid for the double peak of the JVP



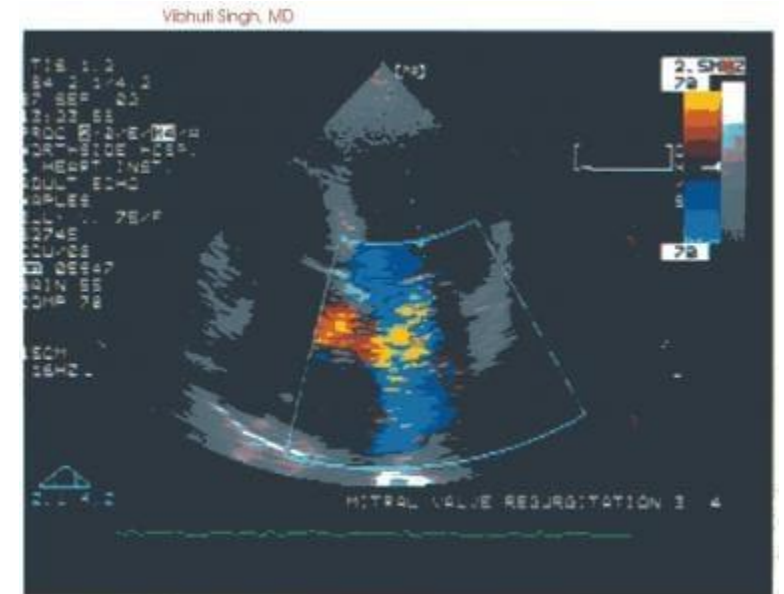


# Physical Examination on Patient



## Check for Chest

- Auscultate over the 4 valve areas for stenosis or murmurs
- Mitral regurgitation is more common in patients with polycystic kidney disease
- Listen for a pericardial rub (for potential cases of uremic pericarditis)
- Auscultate the lungs for evidence of any pulmonary oedema





# Urine Analysis



- Evaluation of the renal system & for determining renal disease.
- Wash perineal area & use a clean container.
- Obtain 10 to 15 mL of the 1st AM sample
- If the client is menstruating, indicate this on the lab. requisition form.
- **Specific Gravity** - measures the kidney's ability to concentrate urine.
- Measured by multiple-test dipstick (most common method), refractometer-instrument used in the lab, urinometer





# Urine Analysis & Culture



- **A decrease in SG** (less conc. urine) occurs with increased fluid intake, diuretic administration, diabetes insipidus.
- **An increase SG** (more conc. Urine) occurs with insufficient fluid intake, decreased renal perfusion, or the presence of ADH.
- **Urine Culture & Sensitivity-** identifies the presence of microorganisms & determines the specific abx. that will treat the existing microorganisms.





# Renal Creatinine Test



- Creatinine clearance test- A blood & timed urine specimen that evaluates kidney function.
- Creatinine clearance is usually determined from a measurement of creatinine in a 24-hour urine sample and from a serum sample taken during the same time period.

## serum creatinine is:

- For adult men, 0.74 to 1.35 mg/dL
- For adult women, 0.59 to 1.04 mg/dL

Creatinine clearance uncorrected

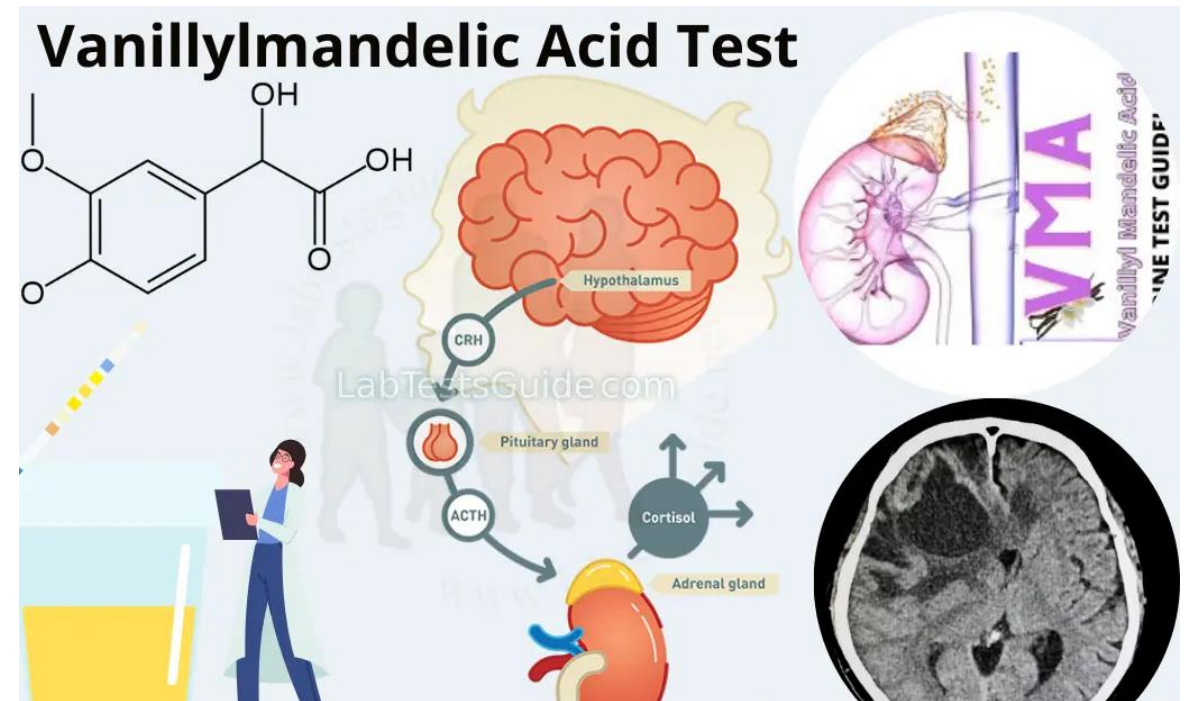
24-hours creatinine clearance = mL/minute

$$\frac{\text{Urine creatinine mg/dL (U)} \times \text{Urine volume in mL (V)}}{\text{Serum creatinine mg/dL (S)} \times \text{Collection time (minutes) T}}$$

Calculation for 24 hours =  $24 \times 60 = 1440$  minutes  
Calculation for 2 hours =  $2 \times 60 = 120$  minutes

# Vanillymandelic acid (VMA) test

- Vanillymandelic acid (VMA)- to diagnose pheochromocytoma, a tumor of the adrenal gland.
- The test identifies an assay of urinary catecholamines in the urine.
- Vanillymandelic acid (VMA) is one of the metabolites of the catecholamines epinephrine and norepinephrine.

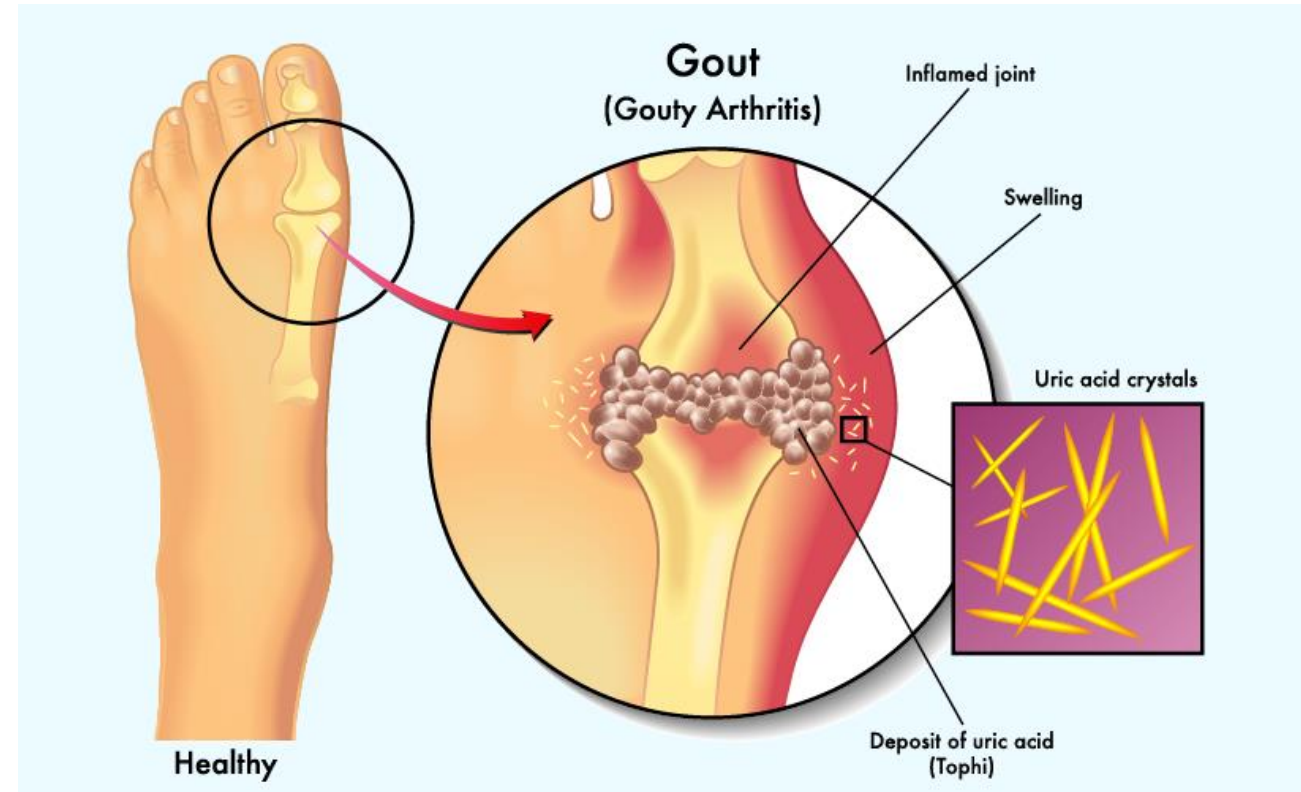


# Uric Acid Test

- Uric acid- A 24-hour collection to diagnose gout & kidney disease.
- Uric acid is a product of the metabolic breakdown of purine, it is a normal body waste product.

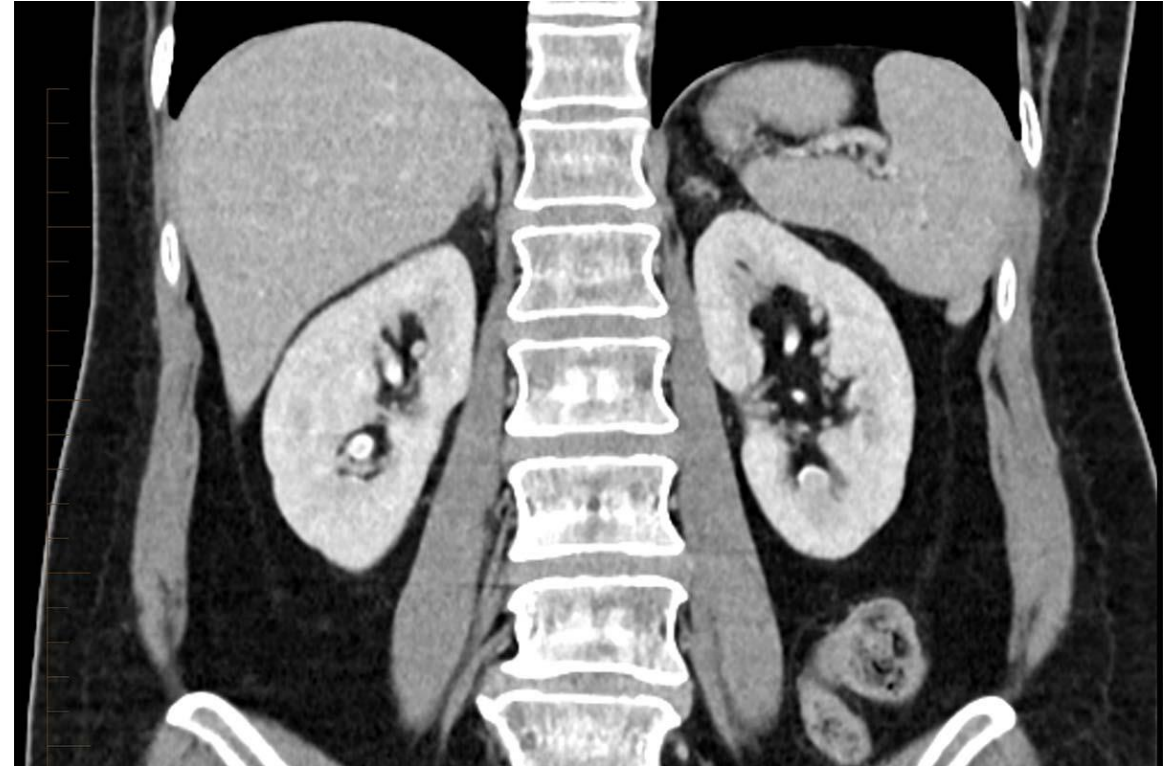
The reference ranges for uric acid in the blood are as follows :

- Adult male: 4.0-8.5 mg/dL
- Adult female: 2.7-7.3 mg/dL



# CT & MRI of Kidney

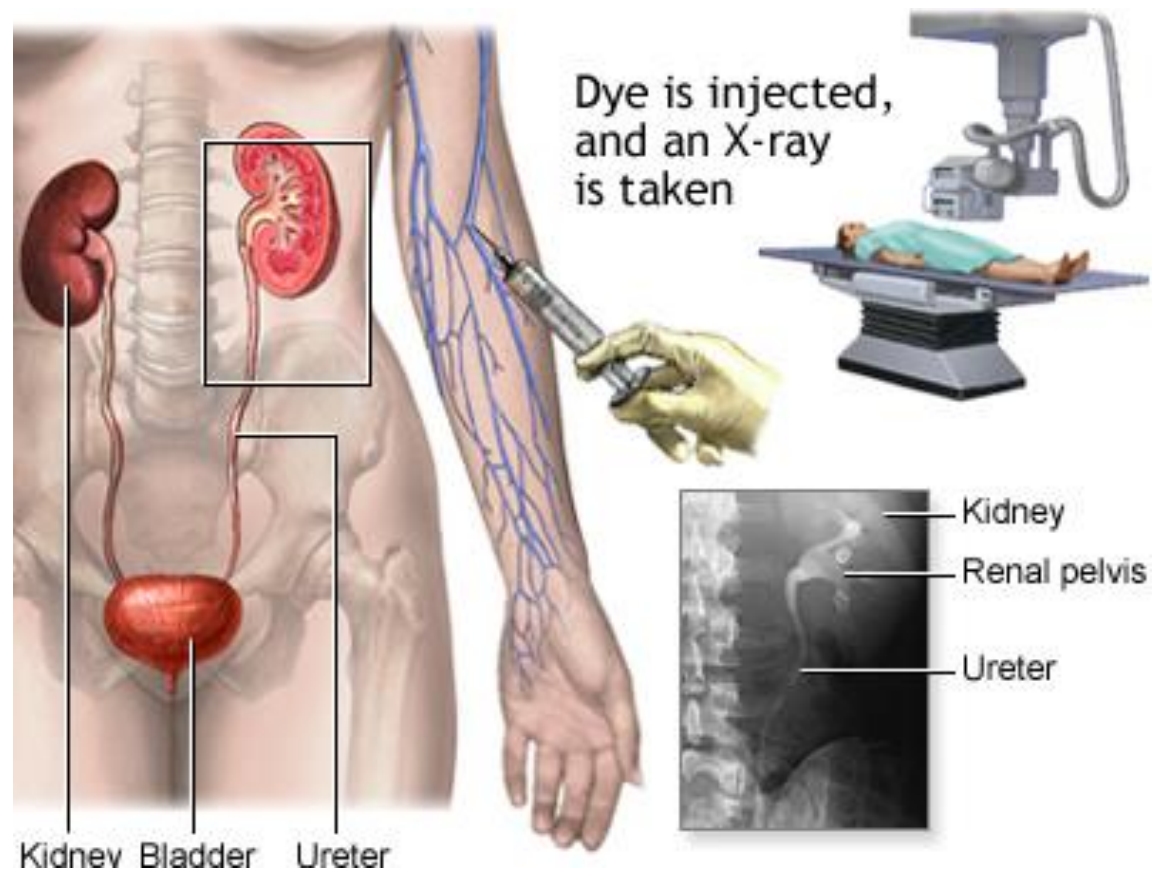
- A CT & MRI scan of the kidney may be performed to assess the kidneys for tumors and other lesions, obstructions such as kidney stones, abscesses, polycystic kidney disease, and congenital anomalies.
- CT Scan shows cross sectional views of Kidney





# Intravenous Pyelogram

- An intravenous pyelogram is an **X-ray** exam of the urinary tract.
- Also called an **excretory urogram**
- An IVP can show the size, shape, and structure of your kidneys, ureters, and bladder.
- IVP is done by **injection of radiopaque dyes**, that outlines the renal system
- Risk of contrast nephrotoxicity in dehydrated subjects.



# Renal Angiography

- A renal angiogram is an imaging test to look at the blood vessels of kidney
- **Injection of radiopaque dyes** through a catheter for examination of block or narrowed blood vessels
- Renal angiography may show the presence of tumors, narrowing of the artery or aneurysms, blood clots, fistulas, or bleeding in the kidney.
- In a renal arteriogram, fluoroscopy is used, which is a type of X-ray that takes continuous pictures.

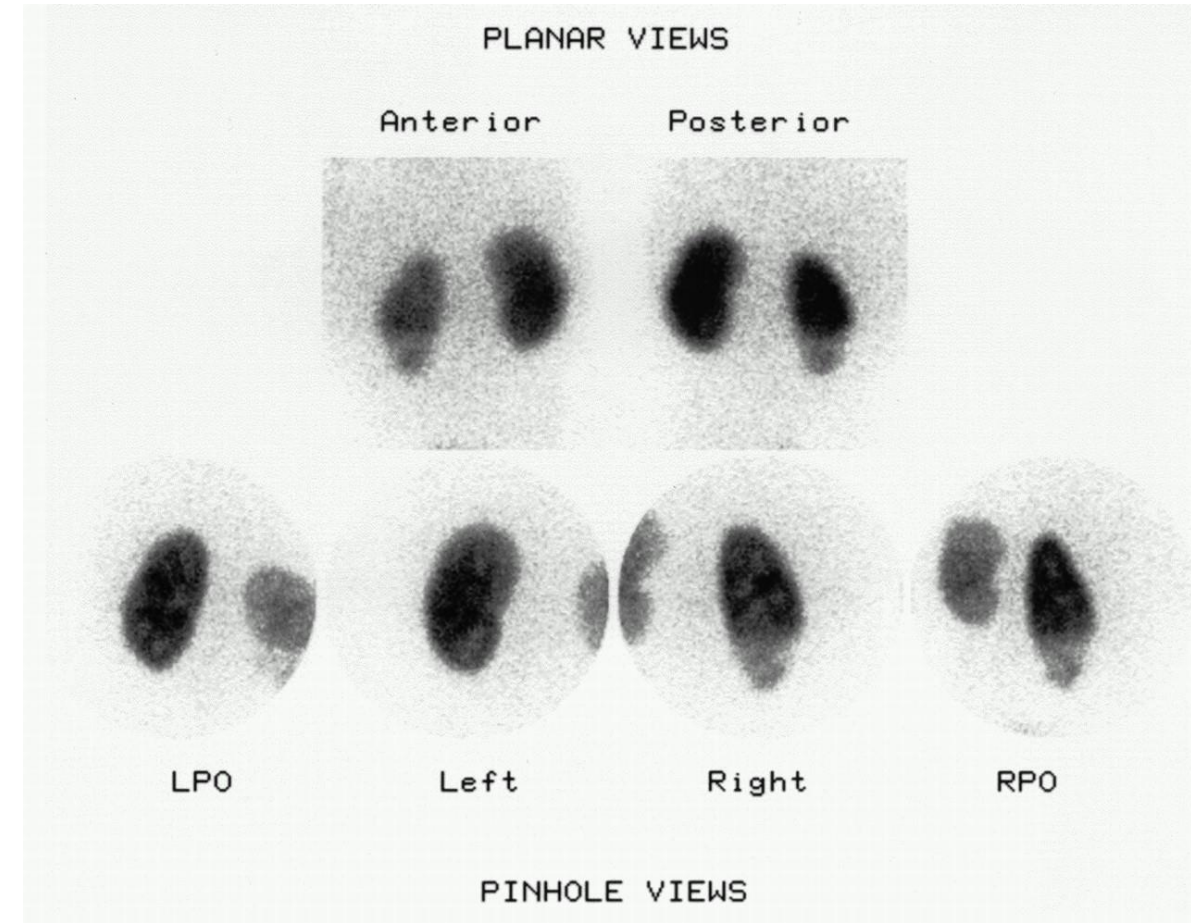




# Kidney Scan

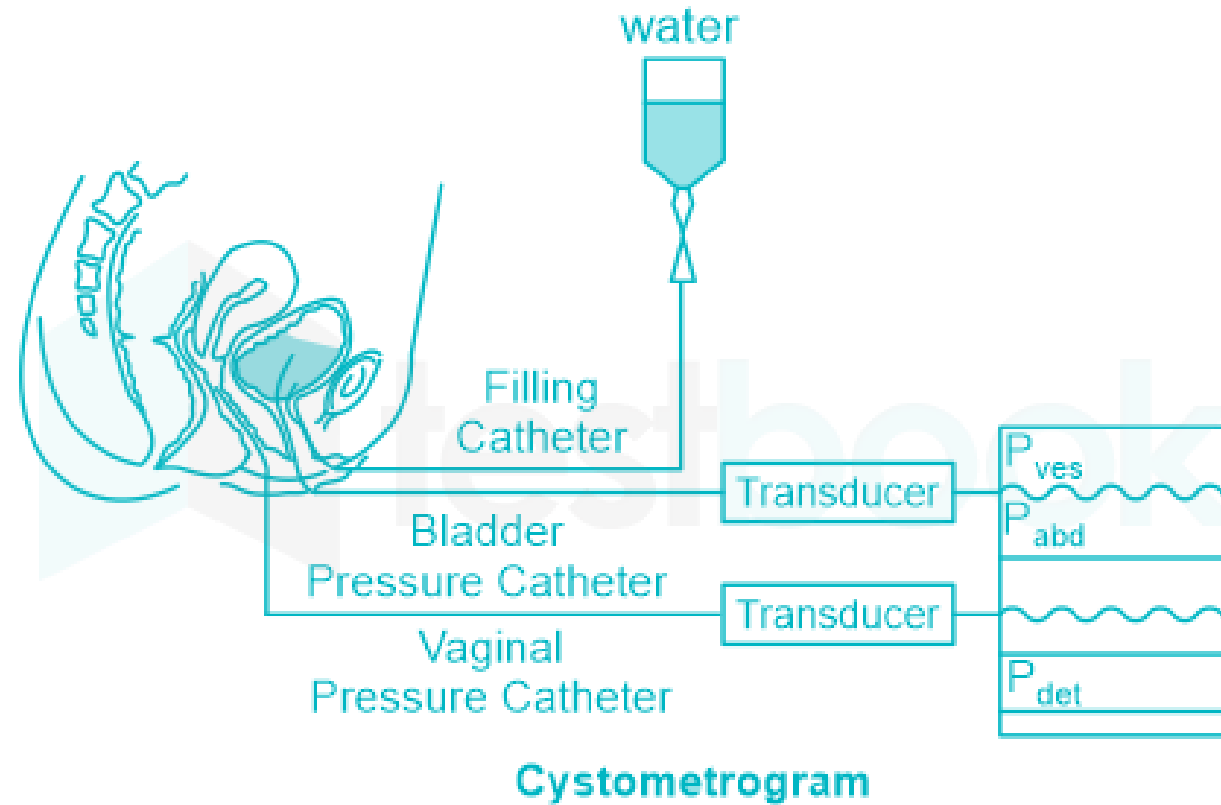


- A renal scan is a **nuclear medicine test**
- The medical term for a kidney scan is **renal scintigraphy**.
- A small amounts of radioactive material – radioisotope is injected into vein
- The scanner will detect the radioactive material in kidney and send signal to computer
- Renal scans detects decreased blood flow to the kidneys, renovascular hypertension, **tumor**, chronic kidney disease, rejection of kidney transplant



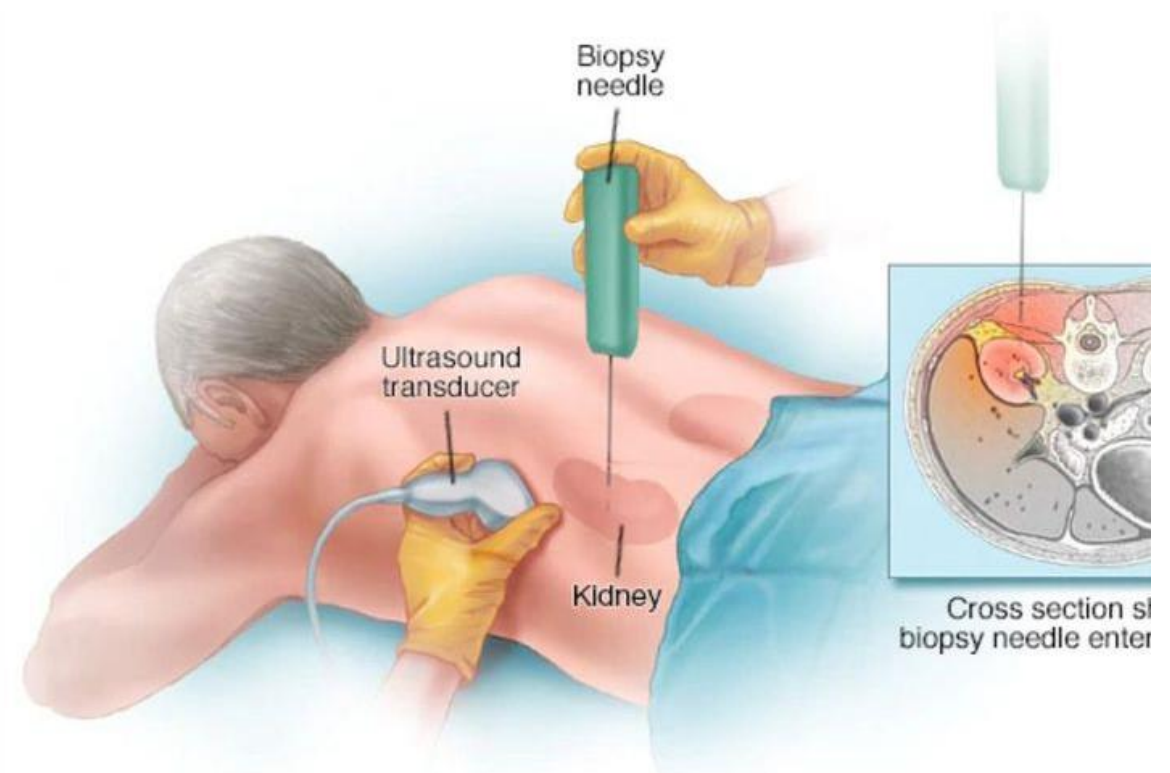
# Cystometrogram

- CMG, is a test used to look for problems with the filling and emptying of the bladder.
- Cystometry measures the amount of urine in the bladder. (pressure-volume relationship)
- It graphically records the pressure of bladder at various phases
- Catheter with sensor is inserted into urinary bladder, urethra and bladder is filled with saline and filling pressure is measured.



# Renal Biopsy

- In renal biopsy, a small sample of kidney tissue is removed with a needle
- The test is used to evaluate a transplanted kidney.
- It is also used to evaluate an unexplained decrease in kidney function, persistent blood in the urine, or protein in the urine.





# Assessment



- What are the skin changes that you can see in renal failure patient?
- What test is used to find the abnormality in filling of urinary bladder?
- What assessment should be made in hands for renal patient?
- what are the diagnostic tests to be made for renal disorders



# Thank You



## References:

- <https://teachmesurgery.com/examinations/misc/renal-system/>
- <https://www.pacehospital.com/kidney-biopsy-indications-preparation-and-procedure>
- <https://www.healthline.com/health/renal-scan#purpose>
- <https://www.mountsinai.org/health-library/tests/kidney-biopsy#:~:text=In%20renal%20biopsy%2C%20a%20small,or%20protein%20in%20the%20urine.>