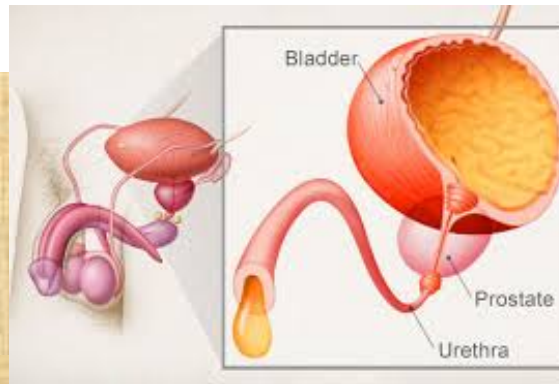




# ANURIA, OLIGURIA



**EMAD HASAN MAHMOOD**  
**PROFESSOR OF UROLOGY**

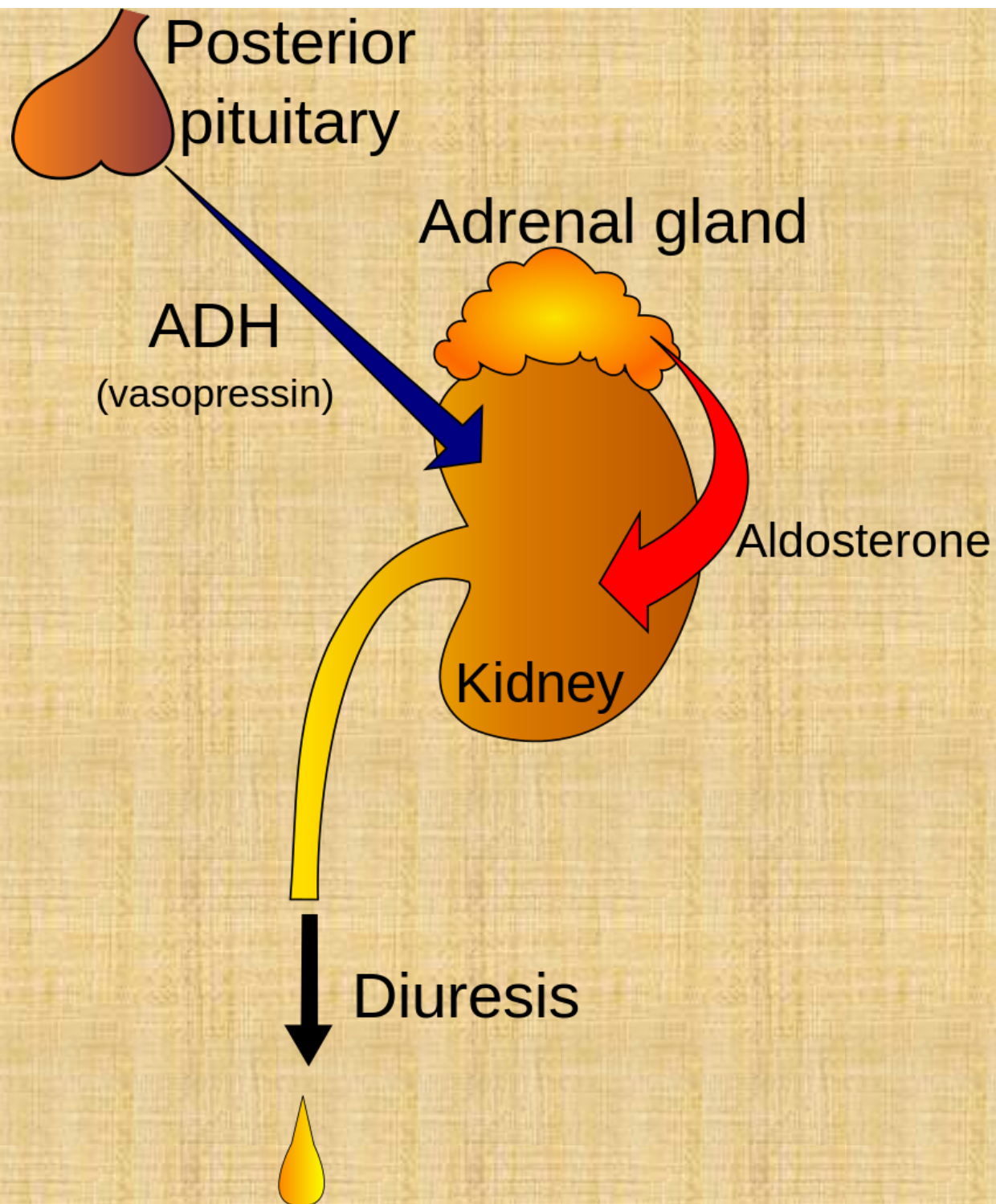
## OBJECTIVES

- ▶ Definition of decreased urine output (oliguria)
- ▶ Questions to consider when first presented with oliguria
- ▶ Recognizing causes of oliguria
- ▶ Focused review of history and physical
- ▶ **Management of oliguria**
  - Recognizing life threatening complications

## DEFENITION

- ▶ Oliguria = Urine output  $<400\text{cc/day}$  ( $<20\text{cc/hr}$ )
  - Another def: urine output  $<0.5\text{ml/kg/hr}$
- ▶ Anuria = no urine output
  - Can signify complete mechanical obstruction of bladder outlet or a blocked Foley





**Aldosterone Hormone: “Salt & H<sub>2</sub>O retaining hormone”**

**Secreted by Adrenal Cortex**

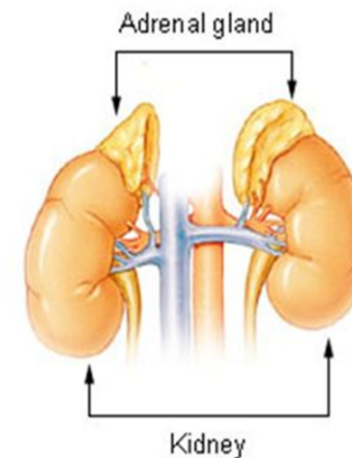
**Stimulates tubules to resorb H<sub>2</sub>O & salt faster**

**Adrenal Gland**

**Abnormal Urine Volume Excretion**

- \* **Anuria: no urine**
- \* **Oliguria: scant urine**
- \* **Polyuria: large amts of urine**

**Chilled → vasoconstriction → ↑ blood  
flow to organs so  
kidneys produce ↑ urine**



**Outer: adrenal cortex  
Inner: adrenal medulla  
Fx in tubule resorption**

# Etiology

- Prerenal - 70% and COMMONEST CAUSE OF OLIGURIA
  - Kidney hypoperfusion due to:
    - Absolute decrease in blood volume (Dehydration, hemorrhage, GI losses, ↓ PO)
    - Relative decrease in blood volume (sepsis, vasodilatory drugs, renal artery stenosis)
- Intrinsic
  - Parenchymal injury due to:
    - Acute Glomerulonephritis
    - Interstitial Nephritis
    - Acute Tubular Necrosis (ischemia, drugs, or toxins)
- Postrenal
  - Obstruction due to
    - Calculi, Tumor, Obstructed Foley Catheter



# Assessing Oliguria

- Review patient immediately
- Assess need for urgent resuscitation
  - ABCs
- Immediate Questions
- 1) Does the patient have any symptoms or predisposing conditions that suggest hypovolemia?
  - Diarrhoea, vomiting, GI bleeding, high fever, low intake (whether oral or IV)
  - Positional dizziness suggests hypo-volaemia
  - If post-op: bleeding, wound drainage, infection leading to septicemia
- 2) Previous symptoms to suggest bladder outlet obstruction from prostatic hypertrophy?
  - Hesitancy, difficulty voiding, dribbling
  - i.e. post renal obstruction
- 3) History of hematuria?
  - Renal stones can lead to obstruction
- 4) Is the patient likely to be suffering from acute renal failure?
  - Previous Hx
  - Renal disease
  - Nephrotoxic drugs (aminoglycoside AB's and NSAIDs)
  - Exposure to nephrotoxic agents (contrast, chemotherapy)
- 5) Any underlying diseases/procedures that could result in oliguria?
  - Cardiac failure, cirrhosis, epidural infusion
- 6) Symptoms suggestive of uremia?
  - Nausea, vomiting, anorexia, insomnia, mental status changes



# Post-Op Oliguria

- Often a patient will have a diminished urine output after a major operation. This may be the result of fluid and blood loss and d/t response of the adrenal cortex to stress - there is an increase in aldosterone release (adrenal cortex) and ADH release (posterior pituitary) in the first 24 hours after surgery. This results in both salt and water retention.
- The oliguria should be temporary and not last more than 24h. If there is a urine output of less than 400ml in the first 24 hours then this warrants investigation.



# Causes of renal (Intrinsic) ARF



- **Acute tubular necrosis (ATN)**
    - Ischaemia
    - Toxin (e.g., aminoglycoside, antibiotics, contrast media)
    - Tubular factors
  - **Acute interstitial Necrosis (AIN)**
    - Inflammation
    - Oedema
    - Drugs (sulfa drugs, penicillin, furosemide, hydrochlorothiazide)
  - **Glomerulonephritis (GN)**
    - Damage to filtering mechanisms
    - Multiple causes
-

# Causes of post renal anuria



Bilateral PUJ obstruction by stone

Unilateral PUJ obstruction by stone with contralateral ureteric obstruction



**BILATERAL Ureteric Obstruction**

- **Extramural**
  - Tumors of cervix, ovary, uterus, vagina, urinary bladder, prostate, rectum, colon, caecum & lymphomas
  - Idiopathic retroperitoneal fibrosis
  - Retrocaval ureter
  - Pararenal cysts
  - Aberrant vessels
  - LIGATURES
- **Intraluminal**
  - Calculus, sloughed papilla, clot, ureteric malignancy, CRYSTALURIA
- **Intramural**
  - Congenital PUJ obstruction or stenosis
  - Ureterocele and congenital small ureteric orifice
  - Strictures ( stone, repair, tuberculosis, schistosomiasis)
  - Ureteric / vesical malignancy
  - Kinks & adhesions ( sec to VUR)



**Unilateral PUJ or ureteric obstruction in case of**

- Contralateral nephrectomy
- Already obstructed or nonfunctional
- Congenitally absent



# Lab data

## Urinalysis

- high specific gravity suggests volume depletion
- large amounts of protein or red cell casts suggests glomerular disease
- significant hematuria (renal embolisation or stones)
- WBC casts (infection or severe inflammation)
- Frequent granular casts (acute tubular necrosis)

## Serum chemistries

- compare blood urea and creatinine
  - if ratio  $>10:1$ , prerenal cause is likely but could also be obstruction, GI bleeding, severe catabolic states
  - If ratio  $<10:1$  renal cause is likely
- always note high/low sodium or high potassium which can complicate acute renal failure

## Urine electrolytes and creatinine

- Urinary sodium  $<15\text{mmol/L}$  suggests pre-renal.....  $>20$  suggests renal

## Acute Renal Failure - **Diagnosis**

### ➤ Ultrasound

- Structural anomalies – polycystic, obstruction, etc.

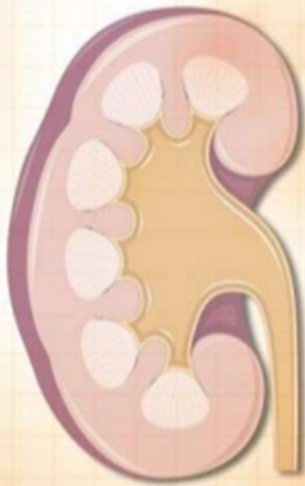
- ATN –

- *poor corticomedullary differentiation*
- *Increased Doppler resistive index*
- *(Systolic Peak – Diastolic peak) / systolic peak*

### ➤ Nuclear medicine scans

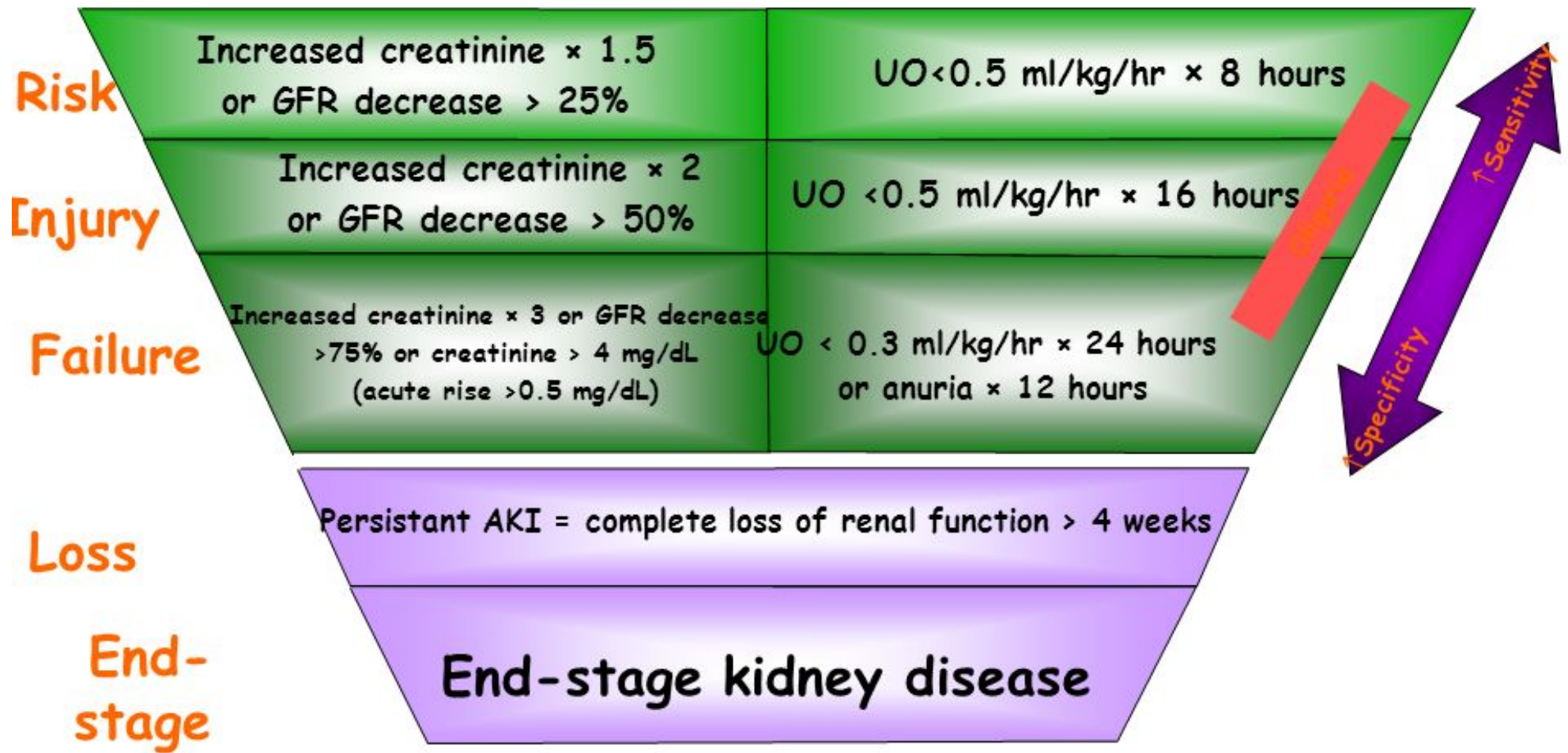
- DMSA – Static - anatomy and scarring

- DTPA/MAG3 – Dynamic – renal function, urinary excretion, and upper tract outflow





# The pRifle Criteria



# Management

## ● SUPPORTIVE

- Renal support - dialysis
- Infection control
- Nutritional support
- Nursing care
- Fluid balance

## ● BYPASS PROCEDURES

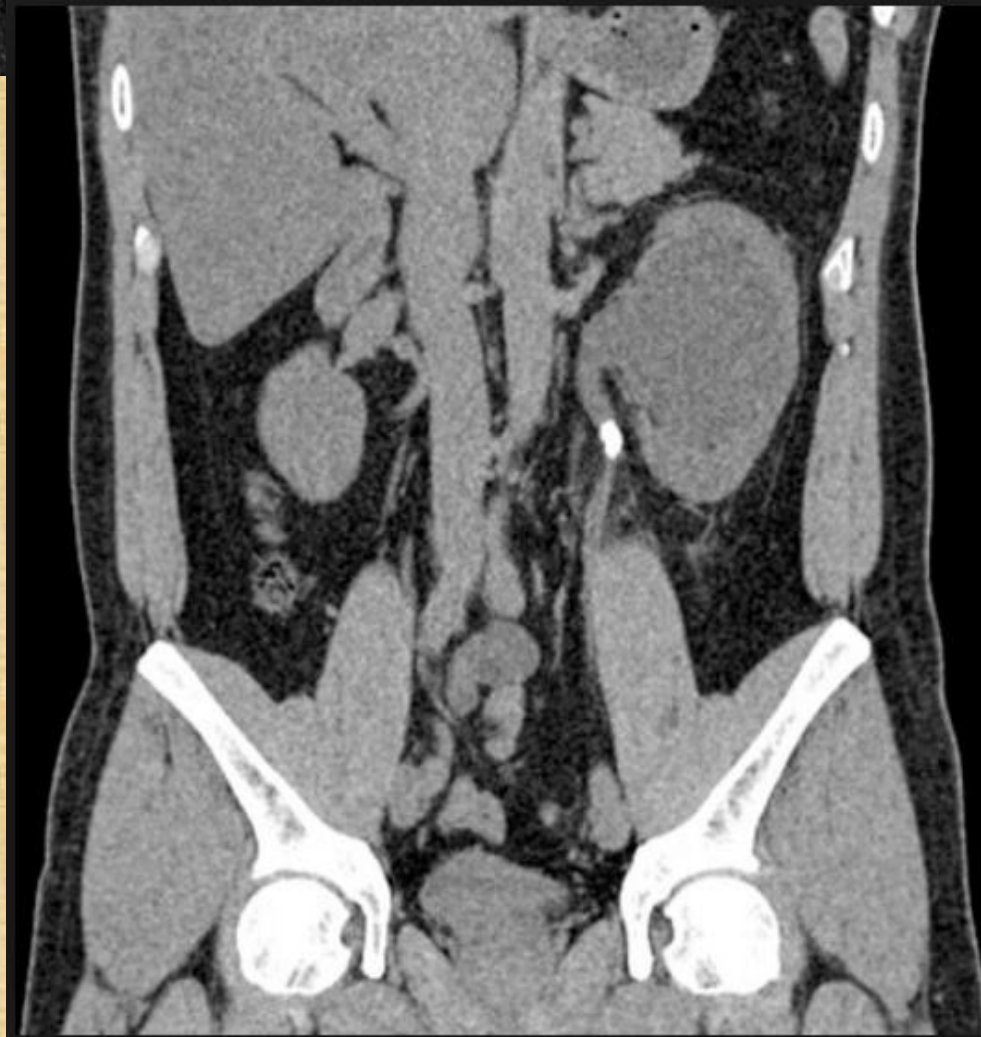
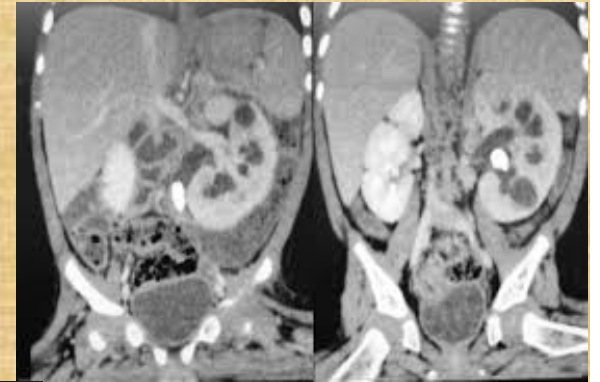
- Ureteric catheterization / stenting
- Nephrostomy
  - PCN – percutaneous nephrostomy
  - Open

## ● DEFINITIVE PROCEDURESSS



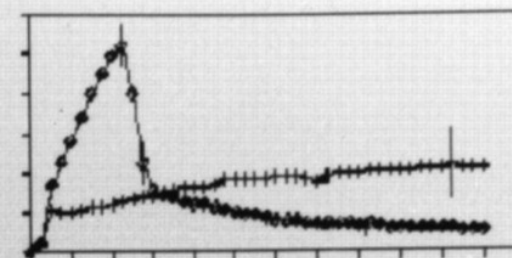
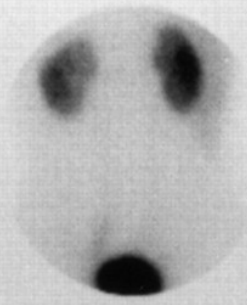
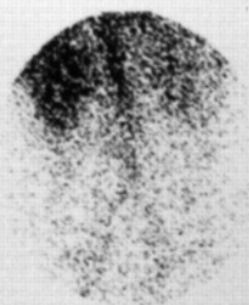
# Summary of obstructive Anuria or Oliguria

- **Causes**
  - **Bilateral upj obstruction or bilateral ureteric obstruction**
  - **Unilateral obstruction with contralateral kidney damage or absent due to nephrectomy or congenitally absent**
- **Diagnosis**
  - **Lab.**
    - **Urinanalysis hematuria microscopic or**

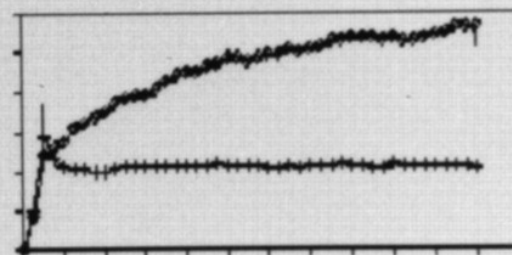
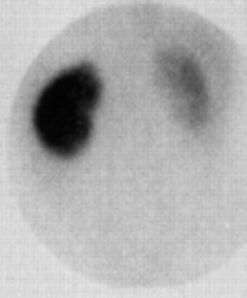
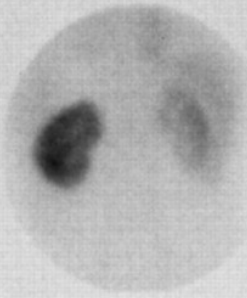




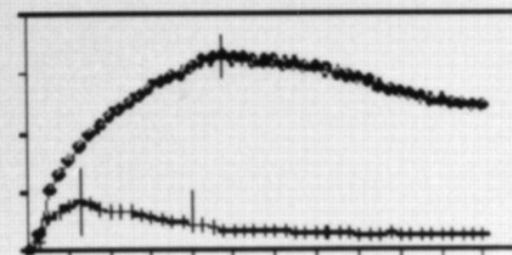
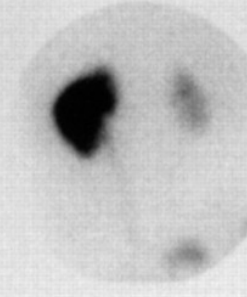
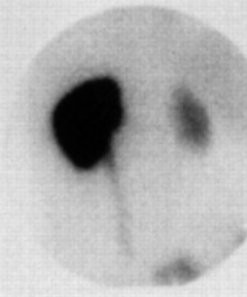
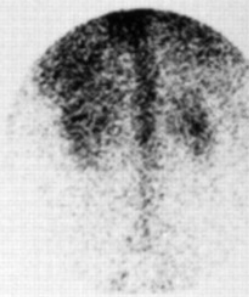
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