



Acute Kidney Injury

Ureteric obstruction



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Ureteric Obstruction

Hydronephrosis (dilatation of pelvicalyceal system)
= feature of obstruction

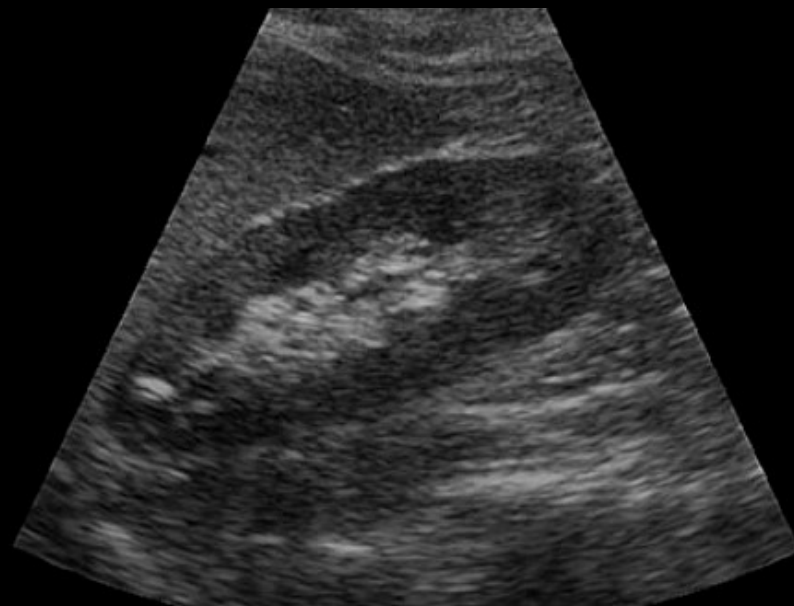
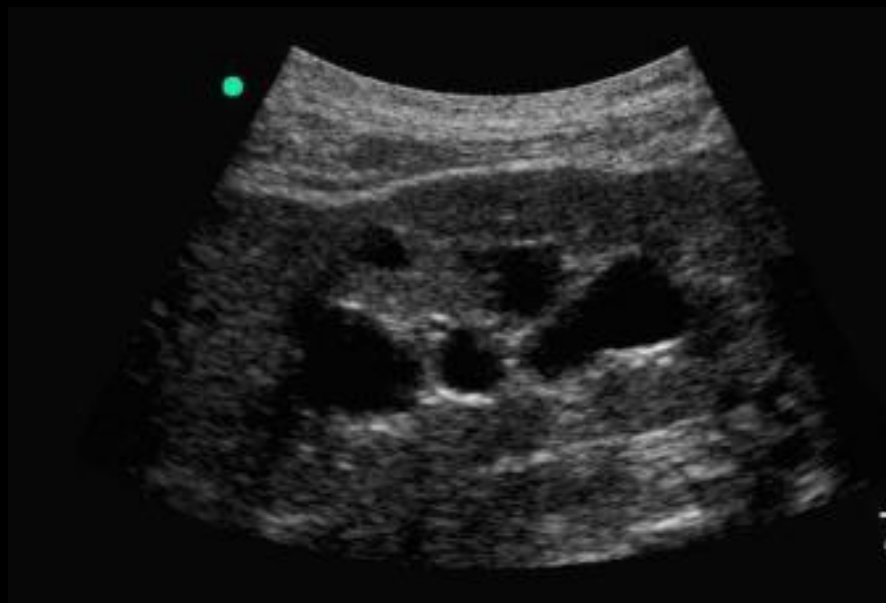
But

1. (Acute) Obstruction can occur without dilatation
2. Dilatation may \neq obstruction

Ureteric Obstruction



Ureteric Obstruction





Ureteric Obstruction

Severity of dilatation \neq severity of obstruction

Gross hydronephrosis = chronic (partial) obstruction

Acute obstruction – usually mild to moderate dilatation

Ureteric Obstruction



Ureteric Obstruction

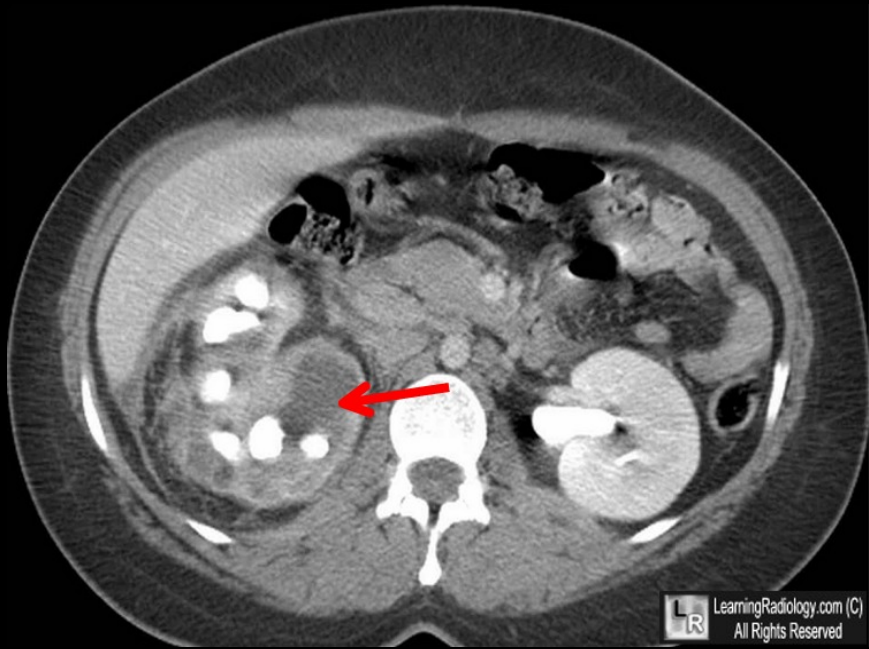
CT Scan – primary imaging / following US

3 critical components for renal assessment

1. Precontrast images - presence of calculi + baseline for evaluating enhancement

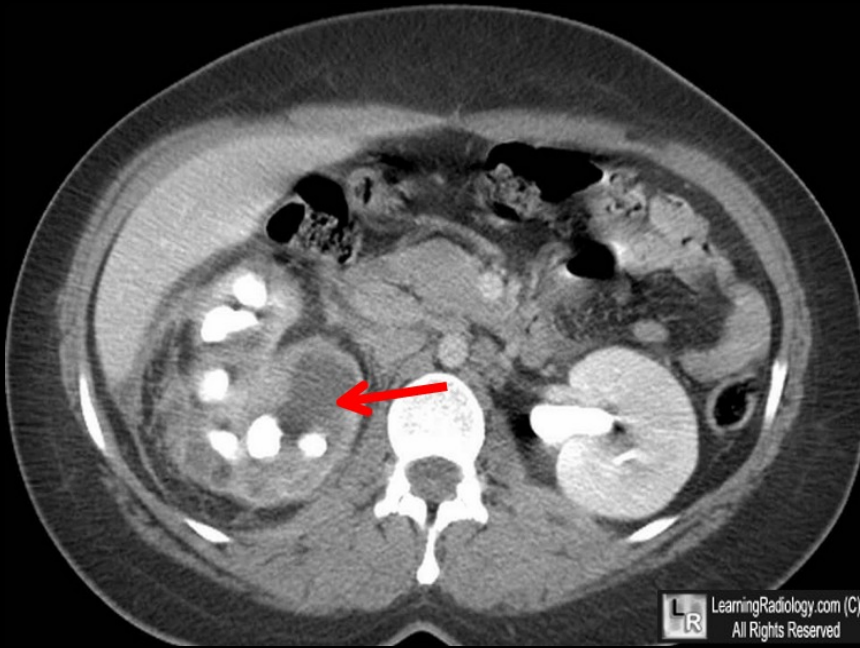


Ureteric Obstruction





Ureteric Obstruction



Ureteric Obstruction

CT Scan – 3 critical components

2. Corticomedullary images -(typical scan delay 70–85 seconds after injection) assesses early perfusion
3. Excretory phase images -(scan delay of 3 minutes + additional later phase) to assess late perfusion + excretion



Ureteric Obstruction

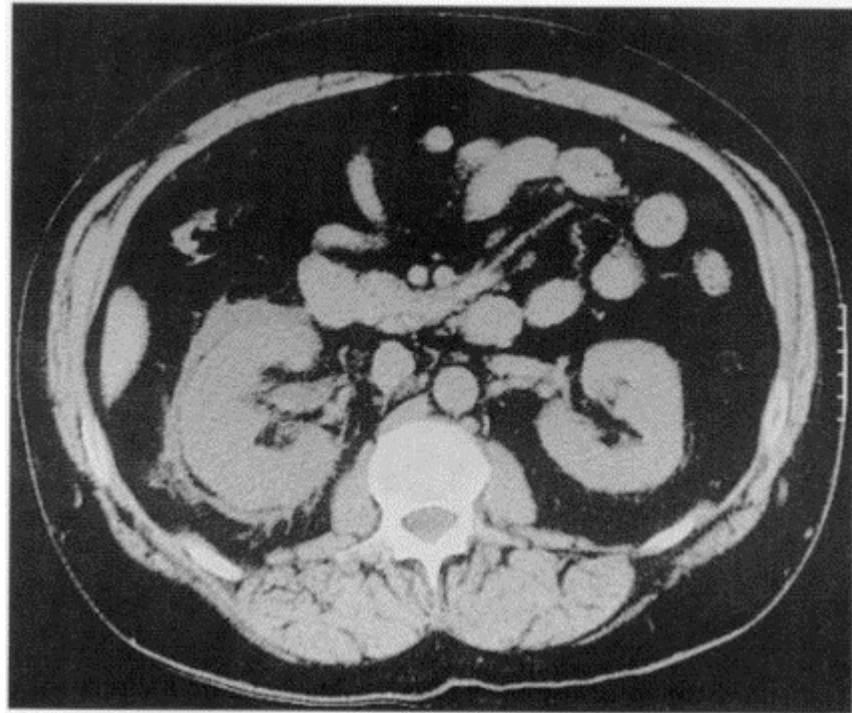
Acute – secondary features

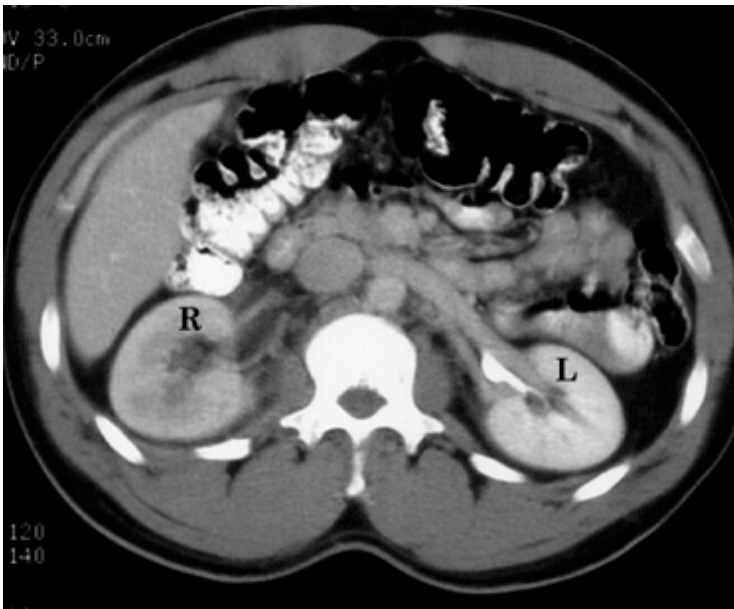
Diffuse parenchymal swelling

Reduced/delayed perfusion

Delayed/reduced excretion

‘Extravasation’





Differential Diagnosis

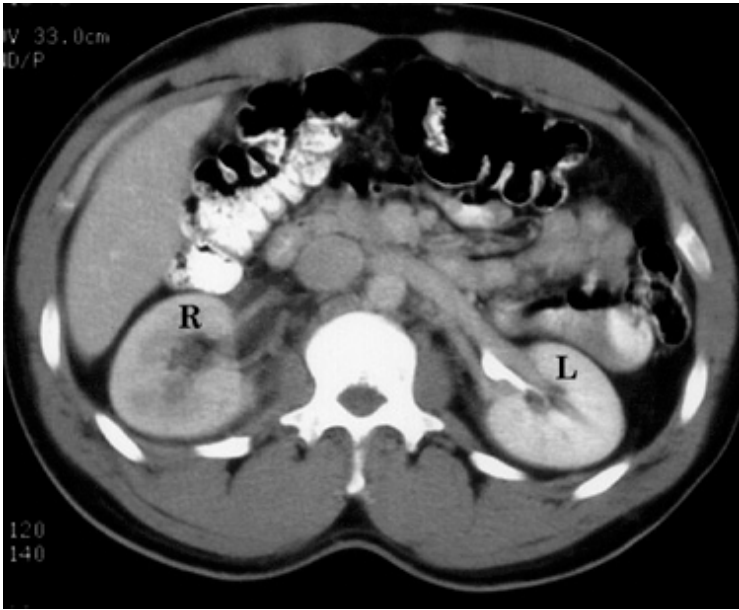
Renal vascular pathology

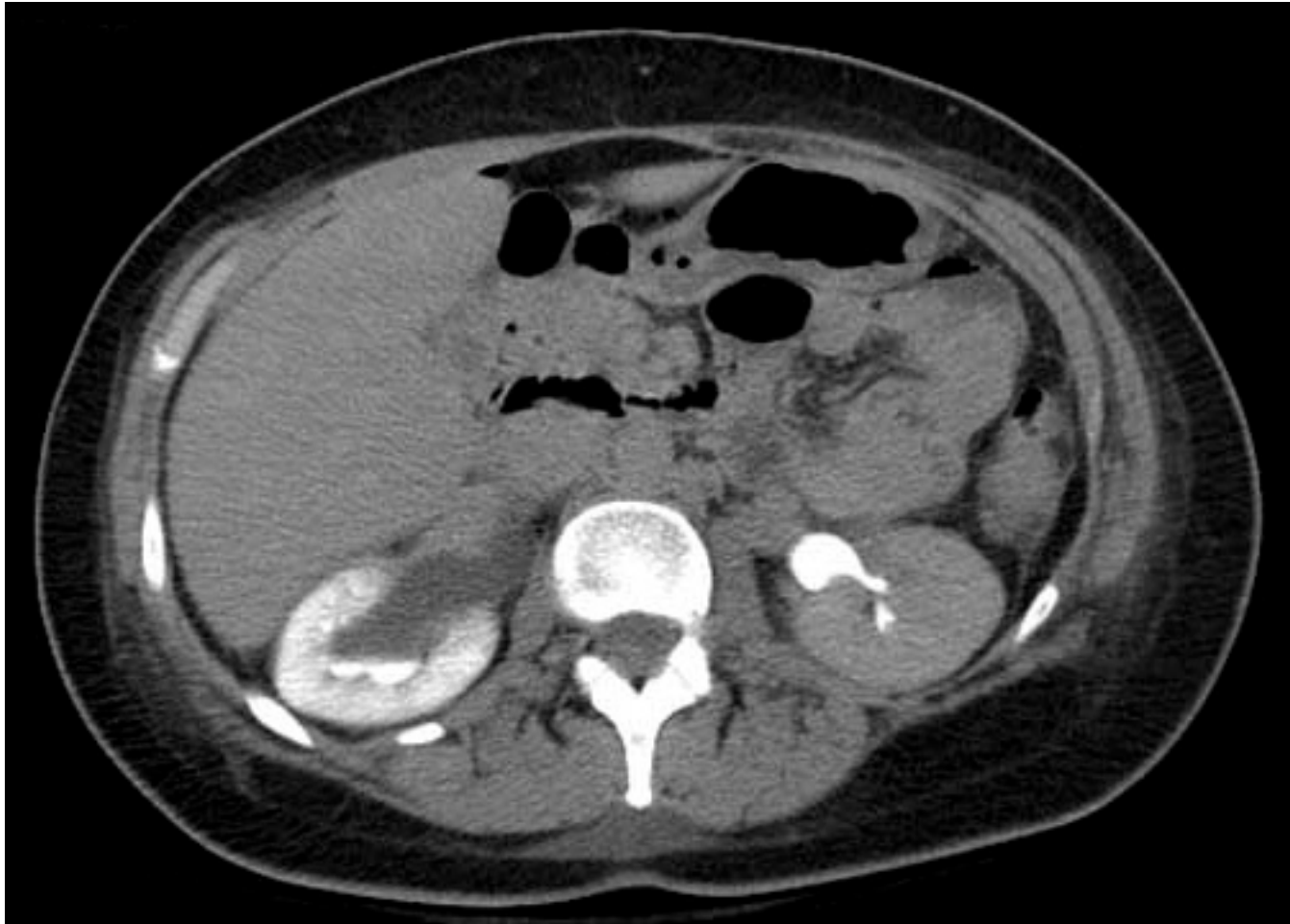
Arterial stenosis

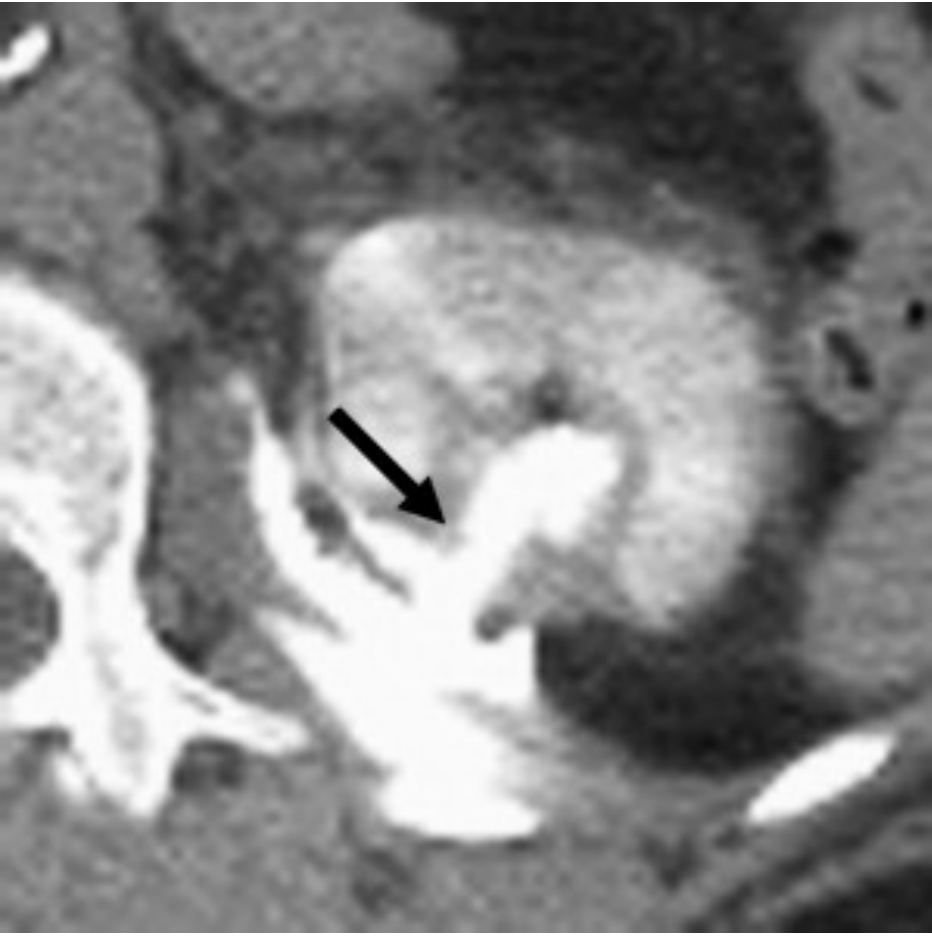
Venous thrombosis

Pyelonephritis

Obstruction











Ureteric Obstruction

Supravesical – unilateral/bilateral

Luminal – *calculus/*sloughed papilla

Intrinsic – stricture/tumour

Extrinsic – tumour/RPF/*surgical(injury)

Ureterovesical – unilateral>bilateral

Usually calculus*

Bladder tumour

*** ACUTE**

Infravesical – usually bilateral

Relates to bladder outlet obstruction



Ureteric Obstruction

Bilateral obstruction

Usually chronic,

Occasional acute on chronic,

Rarely acute – calculus disease/surgical



Ureteric Obstruction

Acute Kidney Injury

Acute obstruction of 'solitary'
or dominant renal unit

Acute/chronic obstruction
complicated by infection



Ureteric Obstruction

Acute Kidney Injury(sepsis)

Urological emergency

Antibiotics

Relief of obstruction



Ureteric Obstruction

Emergency management

Decompression/drainage of obstructed system

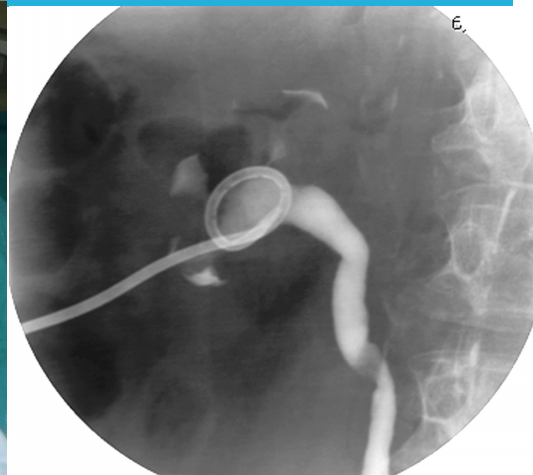
IDC/SPC if infravesical

Stent or nephrostomy if supravesical



Ureteric Obstruction

Nephrostomy





Ureteric Obstruction



Stents





Ureteric Obstruction

Stent vs Nephrostomy

Decompression = key objective

Resources

Timing and practicality

Patient/condition factors



Ureteric Obstruction

Resources

Interventional radiology

Vs

Urology(+theatre+GA)



Ureteric Obstruction

Stent

Operating theatre

Controlled environment – anaesthetist

Primary failure – complete obstruction eg ligation



Ureteric Obstruction

Stent

Failure to drain

Ureteric issue eg malignant obstruction

Pus (also with nephrostomy)



Ureteric Obstruction

Nephrostomy

Interventional radiology

Prone – often unmonitored

Local anaesthetic



Ureteric Obstruction

Nephrostomy - Risks

Bleeding

- perinephric/retroperitoneal
haematoma

AVM

Segmental infarction

Loss of kidney



Ureteric Obstruction

Nephrostomy - limitations

Non-dilated collecting system

Coagulopathy

Anatomical (including obesity)



Ureteric Obstruction

Clinical Scenarios



Ureteric Obstruction

Lack of drainage from nephrostomy

May reflect poor function of affected kidney

Simple flushing

Check position – nephrostogram

Perinephric collection/abscess may evolve if displaced nephrostomy

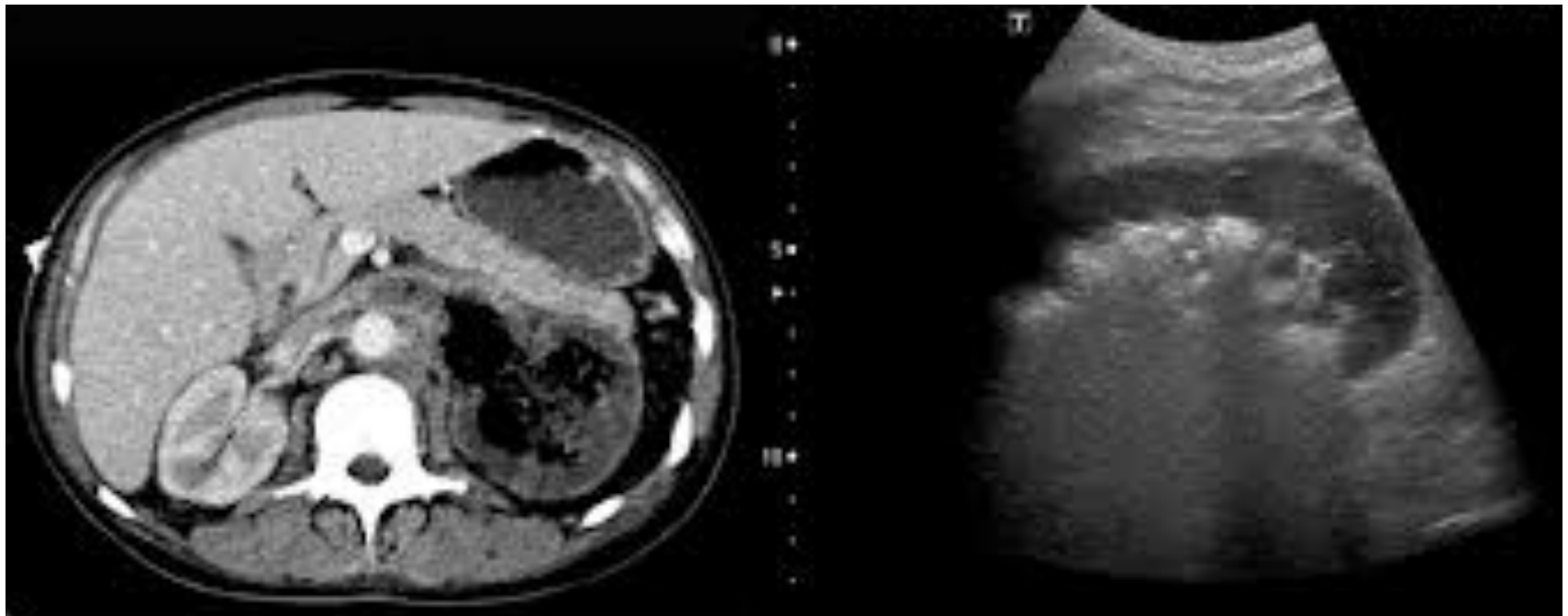


Ureteric Obstruction

Emphysematous Pyelonephritis

Diabetes

Obstruction



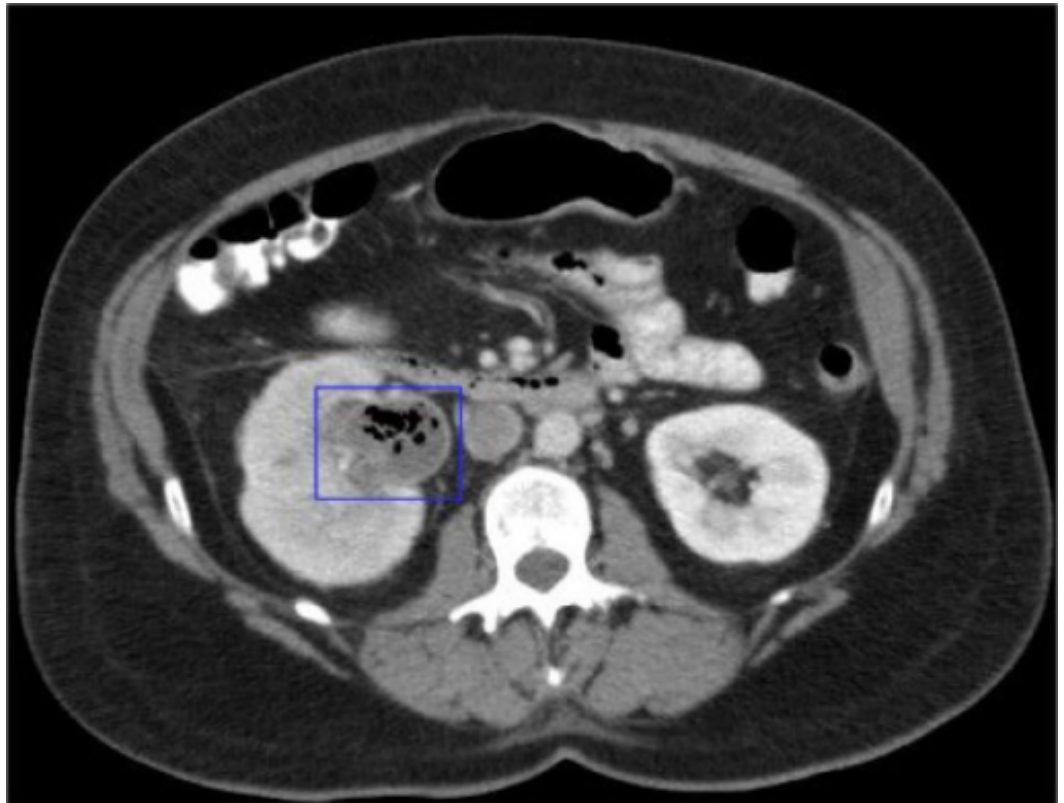


Ureteric Obstruction

Emphysematous Pyelonephritis

Diabetes

Obstruction





Ureteric Obstruction

Emphysematous Pyelonephritis

Critical illness

Presentation may precede 'septic' cascade

Accept stenting or nephrostomy with extreme caution

Consider nephrectomy at a VERY early stage



Ureteric Obstruction

Papillary Necrosis

May evolve as consequence of other acute illness





Ureteric Obstruction

Clinical deterioration following drainage

Reflects manipulation of infected system

Endotoxemia

Inadequate antibiotic dosing*

* Common serious error in scenario of AKI



Gentamicin Dosing

Bacteriostatic

- Binds to bacterial ribosomes
- Irreversible
- Effect persists long after plasma clearance



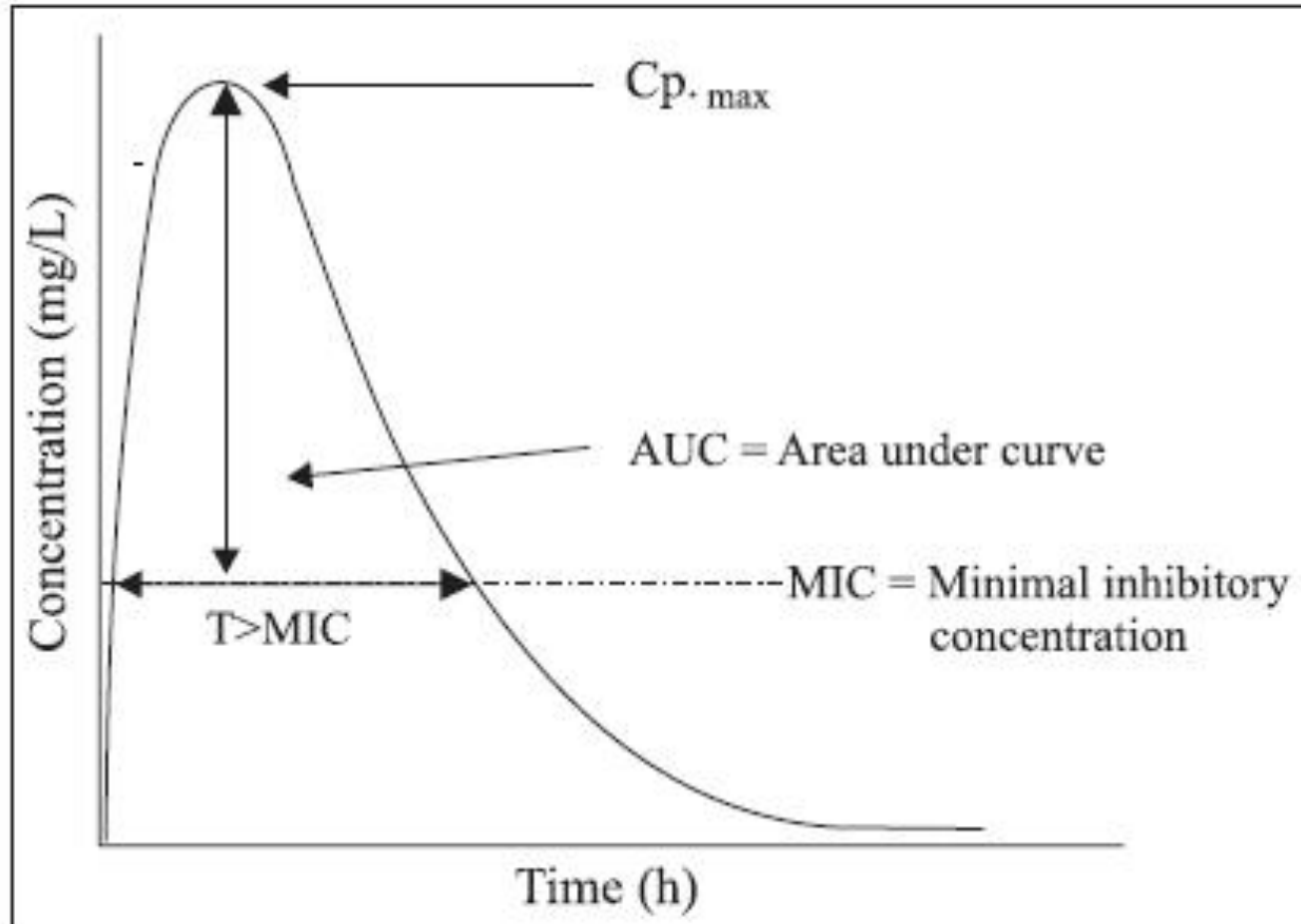
Gentamicin Dosing

Bacteriocidal

- High concentrations
- Displaces cell biofilm associated Mg and Ca
- Disruption of polysaccharide linkages between adjacent LPS molecules

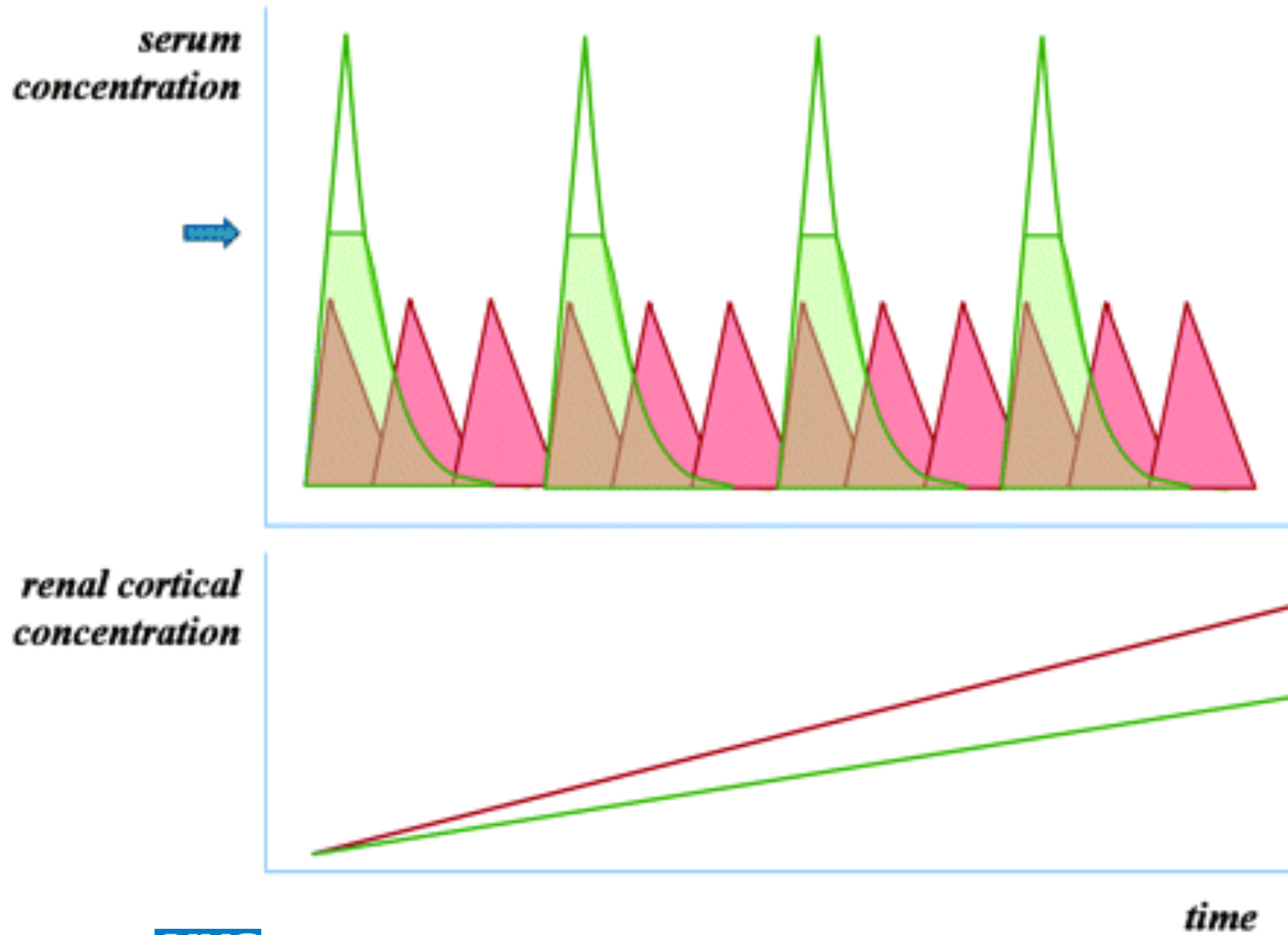


Gentamicin Dosing





Gentamicin Dosing





Gentamicin Dosing

- Intravenous administration
- Initial dose 5-8mg/kg
- Trough level monitoring
- Repeated dosing 3-4mg/kg



Ureteric Obstruction

Clinically obvious

History/symptoms

Imaging – eg calculus + hydronephrosis

‘Suspicious’

Equivocal imaging – contrast may be helpful (NB correct imaging protocol)



Ureteric Obstruction

AKI

Drainage underpins management

Resources/Clinical scenario influence choice

If associated with sepsis – emergency intervention + adequate antibiotic dosing

