



OBSTRUCTIVE UROPATHY

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In Obstructive uropathy

Things get blocked or.....

Disordered!





1. DEFINITION

2. AETIOLOGY

3. PATHOPHYSIOLOGY

4. PRESENTATION

5. MANAGEMENT & Work Up





1. DEFINITION

OBSTRUCTIVE UROPATHY: is structural or functional hindrance of normal urine flow, sometimes leading to renal dysfunction (obstructive nephropathy)

The obstruction may be in the upper or lower urinary tracts and will have corresponding signs and symptoms based on the site, degree of obstruction and duration.



OBSTRUCTIVE UROPATHY

IN THE YOUNG

- Generally due to congenital anomalies of the urinary tract:
 - PUVs
 - VURs

IN THE OLDER LOT

- Equal in under 20s
- F>M in 20-60 due to pregnancy and gynae pathologies
- M>F in over 60 due to prostate disorders.
- Up to 1.7 per 1000 admitted due to O.U annually



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2. AETIOLOGY

(I) According to the cause

A) Congenital

- 1- PUJ
- 2- meatal stenosis
- 3- PUV
- 4- Ectopic ureters
- 5- Damage to sacral roots S2-4 (Sp.B, Meningiomyelocele)
- 6- VUR !!!!

B) Acquired: primary or 2ry

1- Ureteral stones.

2- BPH.

3- Ureteral Stricture.

4- Bl. Ca. (at,).

5- P.C.

6- Ureteral obst by LN at pelvic brim due to PC or cervical cancer.

7- Retroperitoneal fibrosis.

8- Pregnancy.

(II) Functional causes

Seen in line with the neural and myogenic anomalies that impair the contractile or propulsive capacity of the urinary tract.

1. **Neurogenic** conditions like stroke, parkinsonism, SCI, Diabetes Mellitus, MS

2. **Medications** anticholinergics and antihistamines.

3. **Myogenic** conditions like myasthenia gravis and altered muscular functions due to chronic obstruction.



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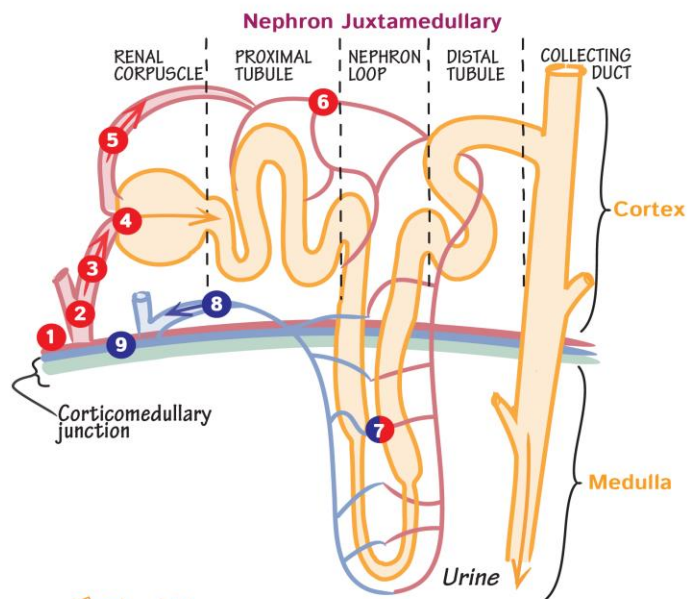


3- Pathophysiology

- Pathologic findings consist of dilation of the collecting ducts and distal tubules and chronic tubular atrophy with little glomerular damage.
 - Dilation takes 3 days from the onset of obstructive uropathy to develop; before then, the collecting system is relatively noncompliant and less likely to dilate.
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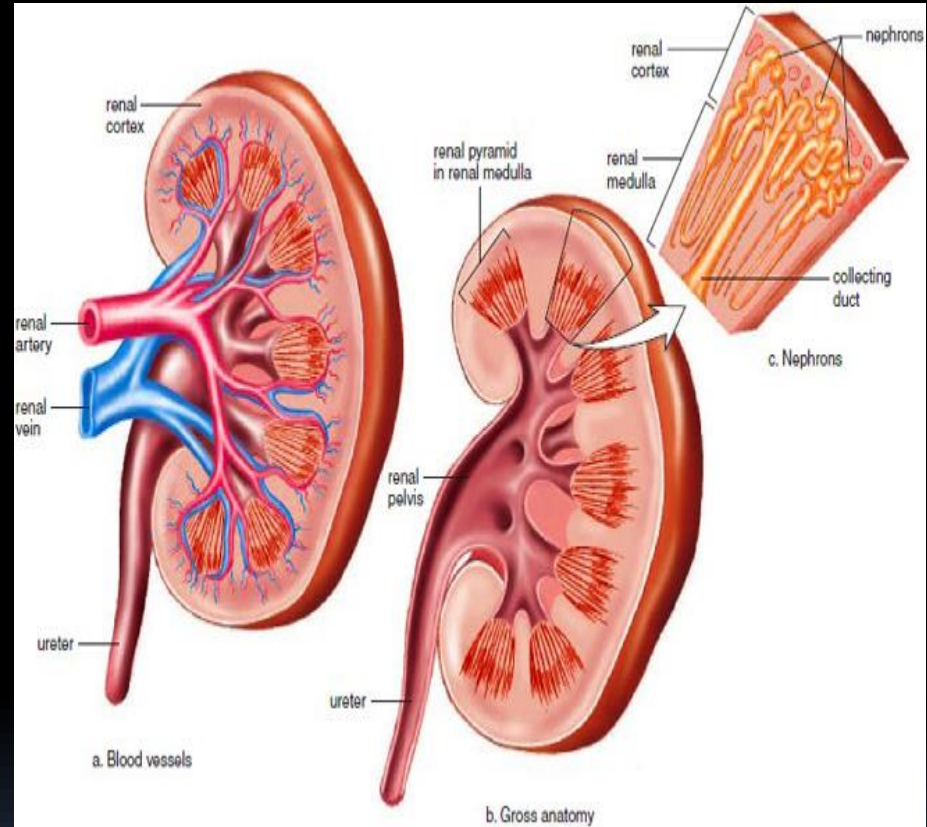
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- *Obstructive uropathy without dilation can also occur when:*

1. fibrosis or a retroperitoneal tumor encases the collecting systems,
 2. when obstructive uropathy is mild and renal function is not impaired,
 3. in the presence of an intrarenal pelvis.
- 



Blood Flow

- | | | |
|-----------------------|-----------------------------|---------------------|
| 1 Arcuate artery | 4 Glomerulus (of corpuscle) | 7 Vasa recta |
| 2 Interlobular artery | 5 Efferent arteriole | 8 Interlobular vein |
| 3 Afferent arteriole | 6 Peritubular capillaries | 9 Arcuate vein |



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- When upper urinary tract obstruction occurs, the kidney undergoes interstitial fibrosis, with the accumulation of collagens and other extracellular matrix components.
 - Culminates in tubulointerstitial fibrosis and renal failure.



Obstructive nephropathy

- Obstructive nephropathy is renal dysfunction (renal insufficiency, renal failure, or tubulointerstitial damage) resulting from urinary tract obstruction.
 - The mechanism involves, among many factors, increased intratubular pressure, local ischemia, and, often, UTI.
 - If obstruction is bilateral, nephropathy may result in renal insufficiency.
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4. Presentation

- Symptoms and signs vary with the site, degree, and rapidity of onset of obstructive uropathy.
- Pain is common when obstruction acutely distends the bladder, collecting system (ie, the ureter plus the renal calyces), or renal capsule.
- Upper ureteral or renal pelvic lesions cause flank pain or tenderness, whereas lower ureteral obstruction causes pain that may radiate to the ipsilateral testis or labia.

- The distribution of kidney and ureteral pain is usually along T₁₁ to T₁₂.
- Acute complete ureteral obstruction (eg, an obstructing ureteral calculus) may cause severe pain accompanied by nausea and vomiting.
- A large fluid load (eg, from beer drinking or osmotic diuresis due to an IV contrast agent) causes dilation and pain if urine production increases to a level greater than the flow rate through the area of obstruction.

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- Pain is typically minimal or absent with partial or slowly developing obstructive uropathy (eg, congenital ureteropelvic junction obstruction, pelvic tumor).
 - Hydronephrosis may occasionally cause a palpable flank mass, particularly in massive hydronephrosis of infancy and childhood.

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- Urine volume does not diminish in unilateral obstruction unless it occurs in the only functioning kidney (solitary kidney).
 - Partial obstruction at the level of BN and urethra may cause difficulty voiding or abnormalities of the urine stream (LUTS).
 - Increased urine output with polyuria and nocturia occur if the ensuing nephropathy causes impaired renal concentrating capacity and Na reabsorption.

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- Long-standing nephropathy may also result in hypertension.
 - Infection complicating obstruction may cause dysuria, pyuria, urinary urgency and frequency, referred kidney and ureteral pain, costovertebral angle tenderness, fever, and, occasionally, septicemia.



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OBSTRUCTIVE UROPATHY WORK UP

Laboratory Studies

Urinalysis

- WBCs in the urine can indicate infection or inflammation.
- Nitrite- or leukocyte esterase–positive urine indicates infection.
- All urine that contains WBCs or is positive for nitrite or leukocyte esterase should be sent for culture analysis and antibiotic susceptibility.
- RBCs in the urine can be present in infection, stones, or tumor. Urine pH is useful in the evaluation and workup of stones.

OBSTRUCTIVE UROPATHY WORK UP

- ***Basic metabolic panel***

- Renal insufficiency is detected on a basic metabolic panel based on elevated BUN and creatinine levels. This can result from bilateral renal obstructive processes or obstruction in a solitary kidney.
- Other metabolic abnormalities can also be present in renal insufficiency. Hyperkalemia and acidosis may be present.

- ***Complete blood cell count***

- Leukocytosis indicates infection.
- Anemia can be due to chronic renal insufficiency or malignancy.

OBSTRUCTIVE UROPATHY WORK UP

Imaging Studies

Ultrasonography

- Ultrasonography of the kidneys and bladder is a useful imaging modality as an initial study. It is a noninvasive inexpensive study that does not involve radiation exposure or depend on renal function.
- It is the initial study of choice in pregnant women.
- In patients with intravenous pyelography (IVP) dye allergies or elevated creatinine levels, ultrasonography is a very useful source of imaging.
- Ultrasonography is sensitive in revealing renal parenchymal masses, hydronephrosis, a distended bladder, and renal calculi.



OBSTRUCTIVE UROPATHY WORK UP

- ***Intravenous pyelography***

- It can be performed in patients with a normal creatinine value (<1.5 mg/dL) for visualization of the upper urinary tract.
- It provides both anatomical and functional information.
- Delayed calyceal filling, delayed contrast excretion, prolonged nephrography results, and dilatation of the urinary tract proximal to the point of obstruction characterize obstruction.
- IVP is superior to CT scan in revealing small urothelial upper tract lesions.
- If IVP is inadequate, **retrograde pyelography** can be performed to completely visualize the renal pelvis or ureter or in those with contrast allergy.

OBSTRUCTIVE UROPATHY WORK UP

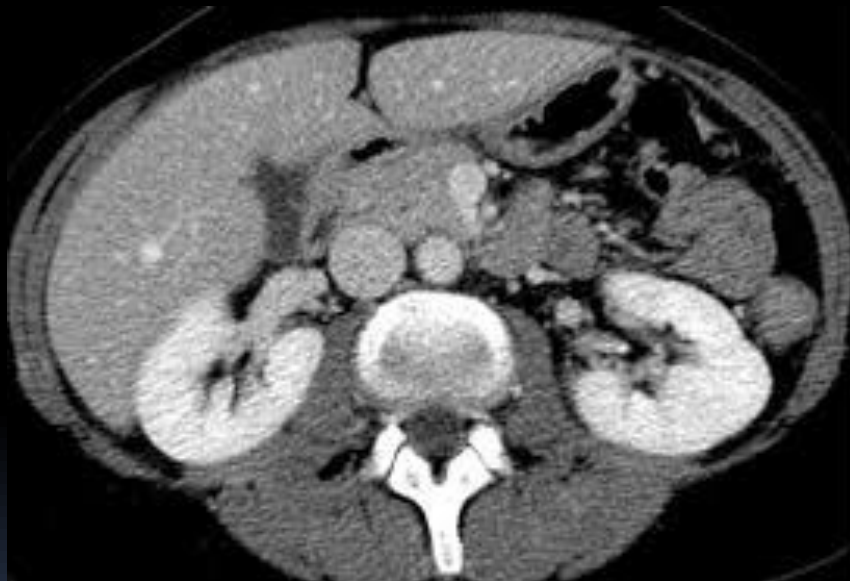
- ***Retrograde urethrography:*** Radiographic dye is injected into the urethral meatus via Foley catheter at the distal urethra. Fluoroscopy is used to visualize the entire urethra for stricture or any abnormalities. This test can be particularly useful in working up lower urinary tract trauma.
- ***Nephrostography:*** This can be performed in patients who have a nephrostomy tube in place. Radiographic dye is injected antegrade through the nephrostomy tube. With fluoroscopy, any abnormalities or filling defects in the renal pelvis or ureter are visible. This can be safely performed even in patients with IVP contrast allergies.

OBSTRUCTIVE UROPATHY WORK UP

- ***Computerized tomography scan***
 - A CT scan is very useful in providing anatomic detail and is often a first-line test in the evaluation of a patient.
 - A CT scan provides information regarding the urinary tract, as well as any possible retroperitoneal or pelvic pathologic condition that can affect the urinary tract via direct extension or external compression.
 - A contrasted CT scan is needed to provide information on renal pathology.
 - If delayed contrast images are obtained, CT urography reconstruction can provide excellent visualization of the entire upper urinary tracts.



CT Abd



Plain CTU



Plain CTU



CTU with cont.



CTU + cont.



IVU



OBSTRUCTIVE UROPATHY WORK UP

Radionucleotide studies:

- A renal scan can be performed to determine the differential function of the kidneys, as well as to demonstrate the concentrating ability, excretion, and drainage of the urinary tract.

OBSTRUCTIVE UROPATHY WORK UP

- ***Magnetic resonance imaging***

- MRI is not a first-line test used to evaluate the urinary tract.
- In patients who cannot tolerate a CT scan with contrast, an MRI with gadolinium can be performed to reveal any enhancing renal lesions.
- MRI is useful in delineating specific tissue planes for surgical planning, as well as in evaluating the presence or extent of a renal vein or inferior vena cava thrombus in cases of renal tumors.
- MRI does not reveal urinary stones well so is not often used as a first-line test.

OBSTRUCTIVE UROPATHY WORK UP

Cystoscopy:

- Any abnormalities in the urethra, prostate, bladder neck, and bladder can be visualized.
- Cystoscopy with retrograde pyelography. The contrast load does not interfere with renal function and can be used in patients with elevated creatinine levels.
- It can also be used in patients with an IVP dye allergy because the contrast remains extravascular.



MANAGEMENT

HISTORY

SHOULD ELICIT :

- ✓ Presenting complaint and duration
- ✓ Past medical and surgical history: diabetes, trauma to the urinary tract, pelvic surgery.
- ✓ Medications being used.
- ✓ Any likely complications that may have arisen.

PHYSICAL

INCLUDES:

- ✓ General appraisal of the patient including co morbid factors.
- ✓ Abdominal examination
- ✓ Local examinations of the urinary tract
- ✓ **DIGITAL RECTAL EXAM AND VAGINAL EXAM WHERE INDICATED.**

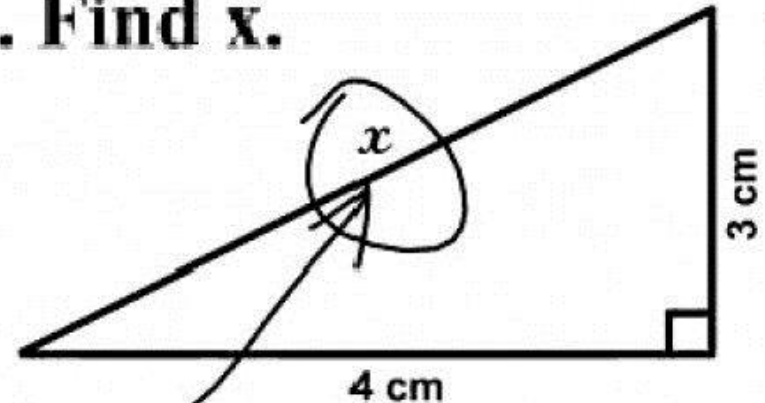
TREATMENT PRINCIPLES

BE LOGICAL IN APPROACH

- ✓ RELIEVE OBSTRUCTION
- ✓ CORRECT THE DERANGEMENTS THAT MAY HAVE OCCURRED.
- ✓ TREAT ANY INFECTION
- ✓ SORT OUT THE PRIMARY CAUSE OF THE PROBLEM

THE ANSWER MAY NOT BE STRAIGHT

3. Find x .



Here it is



Medical Therapy

- A partial urinary tract obstruction in the absence of infection can be initially managed with **analgesics** and prophylactic **antibiotics** until a complete urologic evaluation is performed and definitive management is completed.
 - Commonly used antibiotics include trimethoprim-sulfamethoxazole, nitrofurantoin, cephalosporins, and fluoroquinolones.
- 



Surgical Therapy

- The goal of surgical intervention is to completely relieve the urinary tract obstruction.
 - The recovery of renal function depends on the severity and duration of the obstruction.
- 



Surgical Therapy

Lower urinary tract obstruction (bladder, urethra) can be relieved with the following:

- Urethral catheter
 - **Suprapubic catheter:** If a Foley catheter cannot be passed, a suprapubic catheter can be placed percutaneously
- 



Surgical Therapy

Upper urinary tract obstruction (ureter, kidney)
can be relieved with the following:

- ✓ Ureteral stent
 - ✓ Nephrostomy tube
- 

WARNING!!!!

The following are urologic emergencies that require immediate attention and intervention:

- ✓ Complete urinary tract obstruction
- ✓ Any type of obstruction in a solitary kidney
- ✓ Obstruction with fever, infection, or both
- ✓ Renal failure
- ✓ Pain that is uncontrolled with oral medications
- ✓ Nausea and vomiting that causes dehydration



Thank You