

Hydronephrosis

Hydronephrosis is an aseptic dilatation of the kidney caused by obstruction to the outflow of urine.

1. Unilateral hydronephrosis

Causes of unilateral ureteric obstruction:-

Extramural obstruction (Box)

- Tumour from adjacent structures, e.g. carcinoma of the cervix, prostate, rectum, colon or caecum
- Idiopathic retroperitoneal fibrosis
- Retrocaval ureter
- Intramural obstruction
- Congenital stenosis, physiological narrowing of the pelviureteric junction leading to pelviureteric junction obstruction
- Ureterocele and congenital small ureteric orifice
- Inflammatory stricture following removal of ureteric calculus, repair of a damaged ureter or tuberculous infection
- Neoplasm of the ureter or bladder cancer involving the ureteric orifice

Intraluminal obstruction(Box)

- Calculus in the pelvis or ureter
- Sloughed papilla in papillary necrosis (especially in diabetics, analgesic abusers and those with sickle cell disease) may obstruct the ureter

2. Bilateral hydronephrosis

Bilateral hydronephrosis is usually the result of urethral obstruction, but the lesions described above may occur on both sides.

When due to lower urinary obstruction, the cause may be:-

- Congenital:
 - Posterior urethral valves;
 - Urethral atresia;
- Acquired:
 - Benign prostatic enlargement or carcinoma of the prostate;
 - Postoperative bladder neck scarring;
 - Urethral stricture;
 - Phimosis.

Urethral obstruction tends to lead to detrusor hypertrophy, which can lead to obstruction of the ureters in their intramural course.

Pathology

- There is calyceal dilatation and the renal parenchyma is destroyed by pressure atrophy.
- A kidney destroyed by longstanding hydronephrosis is a thin-walled, lobulated, fluid-filled sac.

Clinical features

Unilateral hydronephrosis

- Unilateral hydronephrosis (commonly caused by idiopathic pelviureteric junction obstruction or calculus) is more common in women and on the right.

Presenting features include the following:

- ✚ **Mild pain or dull aching in the loin:-** Often with a sensation of dragging heaviness made worse by excessive fluid intake. The kidney may be palpable.
- ✚ **Attacks of acute renal colic:-** May occur with no palpable swelling.
- ✚ **Intermittent hydronephrosis (Dietl's crisis):-** A swelling in the loin is associated with acute renal pain. Some hours later the pain is relieved and the swelling disappears when a large volume of urine is passed.
- ✚ **Antenatal detection in the fetus by ultrasound scan:-** Many of these cases are benign but postnatal investigation is required to detect those with significant pelviureteric junction obstruction.

Idiopathic pelviureteric obstruction (Box)

- May be asymptomatic
- May be present as intermittent loin pain exacerbated by a fluid load

Bilateral hydronephrosis

A. From lower urinary obstruction

- ✚ Symptoms of bladder outflow obstruction predominate.
- ✚ The kidneys are unlikely to be palpable because renal failure intervenes before the kidneys become sufficiently large.

B. From bilateral upper urinary tract obstruction

- ✚ This is rare compared with unilateral lesions although idiopathic retroperitoneal fibrosis affects both ureters and idiopathic pelviureteric junction obstruction can be bilateral.
- ✚ Although both systems are obstructed, symptoms may be referred to one side.

From pregnancy

- Dilatation of the ureters and renal pelvis occurs early in pregnancy and becomes more marked until the 20th week.
- It results from the effects on the ureteric smooth muscle of high levels of circulating progesterone and it may be considered as part of normal pregnancy.
- The ureters return to their normal size within 12 weeks of delivery.
- This physiological condition is associated with an increased liability to infection and there is a possibility that abdominal pain during pregnancy may be ascribed to ureteric obstruction.

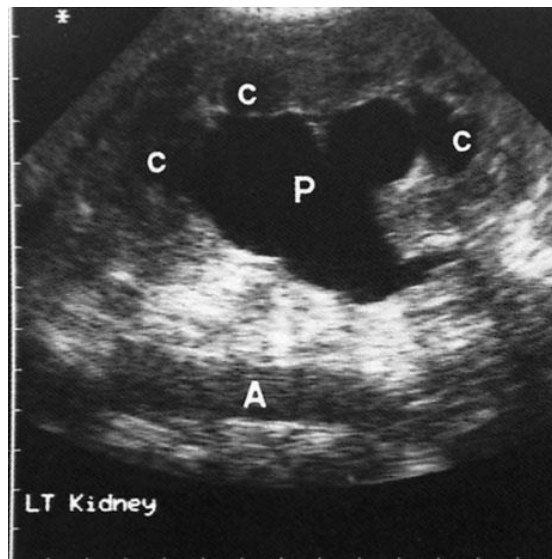
Ureteric dilatation in pregnancy

- Physiological dilatation of the ureter is common in pregnancy

Imaging

1. **Ultrasound scanning** can detect hydronephrosis and also used to diagnose pelviureteric junction obstruction *in utero*.
2. **Excretion urography** is only helpful if there is significant function in the obstructed kidney. The extrarenal pelvis is dilated and the minor calyces lose their normal cupping and become 'clubbed'. It can show the site of obstruction
3. **Isotope renography** is the best test to establish that dilatation of the renal collecting system is caused by obstruction. A substance [usually diethylenetriaminepenta-acetic acid (DTPA)] that is filtered by the glomeruli and not absorbed is injected intravenously. The DTPA is labelled with technetium- 99m, a gamma-ray emitter, so that the passage of 99mTc-labelled DTPA through the kidneys can be tracked using a gamma camera. 99mTc-DTPA is quickly cleared from a normal kidney but is trapped in the renal pelvis on the obstructed side

and will not be washed out even if the flow of urine is increased by administering furosemide (furosemide).



Ultrasound of a hydronephrotic kidney. **A**, artery; **C**, calyces; **P**, pelvis

Imaging in hydronephrosis (Box)

- Obstruction of the ureter is diagnosed by a combination of ultrasound scanning and isotope renography
- An obstructed kidney is worth preserving if the isotope renogram shows that it is contributing more than 20% of total renal function

Treatment

- The indications for operation are:-
 - A.** Bouts of renal pain,
 - B.** Increasing hydronephrosis,
 - C.** Evidence of parenchymal damage and
 - D.** Infection.
- Conservation of renal tissue is the aim
- Nephrectomy should be considered only when the renal parenchyma has been largely destroyed.
- Mild cases should be followed by serial ultrasound scans and operated upon if dilatation is increasing.



Retrograde ureteropyelogram showing hydronephrosis with greatly enlarged pelvis and dilated 'clubbed' calyces

أَمَّنْ يُجِيبُ الْمُضْطَرَّ إِذَا دَعَاهُ وَيَكْشِفُ السُّوءَ

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