



The RPSG

The Renal Patient Support Group

Hydronephrosis

Hydronephrosis

It can be classified based on obstructive and non-obstructive causes.

In this condition urine collecting system surrounding renal tubules can be compromised.

Dilation and swelling of renal tubules owing to a build-up of urine - a common characteristic issue surrounding disorder.

It can occur on both (bilateral) sides of renal tubules

Process of hydronephrosis can be physiological or pathological

Urine cannot drain out from renal tubules to the bladder due to a blockage or obstruction.

The result is decreased glomerular filtration rate, decreased renal blood flow and nephron degenerating.

Hydronephrosis may lead to Pyonephrosis caused by stasis of urine in presence of upper tract.

Risk Factors



Renal stones



Congenital blockage (a defect that is present at birth)



Blood clot formation around genitalia



Scarring of tissue (from injury or previous surgery)



Tumour or cancer



Enlarged prostate



Pregnancy



Urinary tract infection or other disease that cause inflammation of tract

Causes

Obstructive

- Due to structural and functional changes of the kidneys as a result of difficulties in the flow of urine
- Urinary stones
- Blood clots
- Ureteropelvic junction (UPJ) obstruction,
- Structure or external compression by tumour,
- Fibrosis

Non-Obstructive

- Reflux
- Residual

Classification

Cause	<ul style="list-style-type: none">• Congenital, e.g. posterior urethral valves• Acquired, e.g. calculus obstruction
Level	<ul style="list-style-type: none">• Upper tract: ureter or above• Lower tract: bladder or below
Unilateral or Bilateral	<ul style="list-style-type: none">• Both kidneys are usually involved in lower tract obstruction• An individual kidney can be affected by upper tract obstruction
Complete or Partial	<ul style="list-style-type: none">• Complete obstruction is the most common cause of anuria• Partial: can be challenging to diagnose, urine output may vary
Intrinsic or Extrinsic	<ul style="list-style-type: none">• Intrinsic: arising within the urinary tract, e.g. ureteric stone• Extrinsic: arising externally, e.g. tumours

Bilateral Hydronephrosis

- Remain a problem in men secondary to benign prostatic hyperplasia
- Can develop in chronic high-pressure retention as maintenance of voiding with a high bladder volume
- Void spontaneously and often no sensation of incomplete bladder emptying because of gross distention of the bladder
- Pregnancy can be a physiological cause of hydronephrosis and the mechanism is related to high levels of circulating progesterone during pregnancy,
- During pregnancy, about 90% of women will have some degree of the calyces, renal pelvis and proximal ureters

Pathophysiology

Anatomic and/ or functional processes interrupts the flow of urine.

Fluid backs up into renal tubules.

There is a rise in pressure causing stretching and dilation of renal pelvis; if pressure continue to rise, leads to decline in renal blood flow and GFR.

If significant obstruction is persistent, it affects nephrogenic tissue and results in varying degrees of cystic dysplasia and renal impairment.

Diagnosis



Abdominal examination and focused history, look for surgical scars, organomegaly and masses



Important to identify renal physiology for nephromegaly, and/ or enlarged bladder



Measure blood pressure



Examine for signs of fluid overload



Urine dipstick and mid-stream urine



Ultrasound is a method of early detection of obstructive hydronephrosis, allow to evaluate the kidneys and collecting system



X-rays, computerised tomography (CT) and Magnetic Resonance Imaging (MRI), intravenous urography



Mercaptoacetyltriglycine renogram– used to identify obstruction of the ureters



Blood and urine tests (check serum creatinine level, and urea and electrolytes): allow to check renal function, blood in urine

Symptomology

Flank pain – the character of this pain vary depending on whether the obstruction is acute or chronic and partial or complete

Abdominal Mass

Nausea and Vomiting

Increased Urinary Urgency

Urinary tract infection

Painful Urination (Dysuria)

Peritonitis

Hydronephrosis Grading

Grade I	Slight blunting of calyceal Fornices
Grade II	Blunting and enlargement of calyceal Fornices but easily shadow of papillae
Grade III	Rounding of calices with obliteration of papillae
Grade IV	Extreme calyceal ballooning

According to Grainger and Allison's Diagnostic Radiology

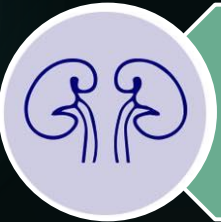
Management



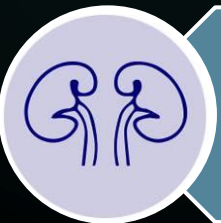
The duration and area of obstruction should guide management



It is essential to treat any co-existing sepsis and metabolic disturbance



The removal of obstruction



The antibiotics can be used to prevent some symptoms (e.g., UTI), however, hydronephrosis is/ should be approached mainly through urology

Summary

- Benign prostatic hyperplasia and ureteric stones are common causes of bilateral and unilateral hydronephrosis.
- Hydronephrosis of pregnancy is a physiological cause of hydronephrosis driven by high levels of circulating progesterone.
- Compelling indications for urgent treatment of hydronephrosis would be in the case of severe ipsilateral flank pain, AKI and signs of sepsis.
- Investigations with suitable imaging are often required before an appropriate management plan can be defined.

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