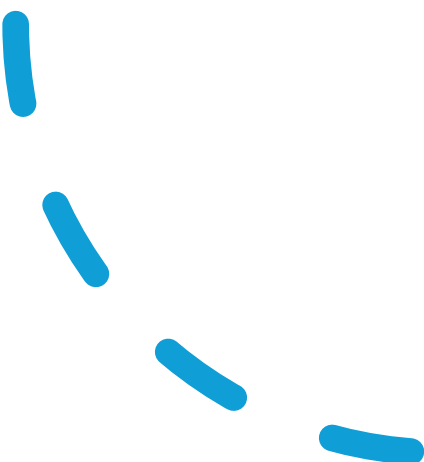




Diagnosis and management of hydronephrosis



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Hydronephrosis is not a diagnosis

Hydronephrosis is a radiological description of a dilated renal tract

- Unilateral or bilateral

Components

- Calyces
- Pelvis
- Proximal ureter
- Distal ureter

Differential diagnosis (isolated / syndromic)

- **Obstructive / partial obstruction**
 - Pelvi-ureteric junction
 - Vesico-ureteric junction
 - Urethra – valves / stricture
- **Vesico-ureteric reflux**
 - Grades I – IV (V – often associated with dysplasia)
- **Physiological / non-obstructive and non-reflux (anatomical variant of normal)**
- **Neurological**
 - Spinal / spina bifida / spinal injury
 - Non-neurogenic neurogenic
 - Immotile – Prune Belly syndrome

Diagnostic tools

- **Bloods**
- **Urine**
 - MC&S
 - Renal stone workup
- **Radiology**
 - Renal ultrasound
 - VCUG
 - Mag3 scan
 - CT - scan / IVP / angiogram
 - MRI scan / angiogram
- **Surgery**
 - Cystoscopy
 - Laparoscopy

Aims of investigation and management

- Establish a firm diagnosis
- Ensure genetic counselling where necessary
- Prevent urosepsis
- Protect the upper renal tracts by ensuring drainage and limiting high grade reflux
- Ensure the bladder is as functional as possible, limit enuresis
- Reduce admissions, medication, and disease burden for the child and family
- Allow the child to grow and develop
 - Often delayed interventions are easier and more successful
- Avoid or limit renal damage
 - Reduce morbidity (CKD / ESKF / dialysis / transplant)

Case

3-month old **white male**

- **Referred after a pyrexial illness admission with a raised CRP**
 - Urine
 - Some white cells, multiple organisms (contamination or contaminated UTI)
 - Normal renal function
 - Normotension
 - Normal general and neurological assessment
 - Circumcised
- **No significant family history**
- **No observation of a good urinary stream**

Renal ultrasound

- Right kidney 6.3cm
- Left kidney 6.7cm
 - No comment re normal size for height = 6cm
- **Mild fullness** of the left collecting system
 - No comment on pelvis AP diameter measurement
- Normal bladder

Question

Which is next most appropriate next step / investigation?

1. Mag3 scan
2. VCUG
3. Repeat ultrasound at 6-weeks of age
4. Nil but observe for UTIs

Right



Left

Answer - VCUG

- Grade IV reflux on right
- Grade V reflux on left
- Normal bladder
- No Posterior urethral valves noted

Why not

- **Mag3 scan** – mild fullness of pelvis, important if $> 2\text{cm}$
- **Repeat ultrasound** at 6-weeks of age – probable UTI, no noticeable good urinary stream, too conservative an approach
- **Nil but observe** for UTIs – too conservative an approach

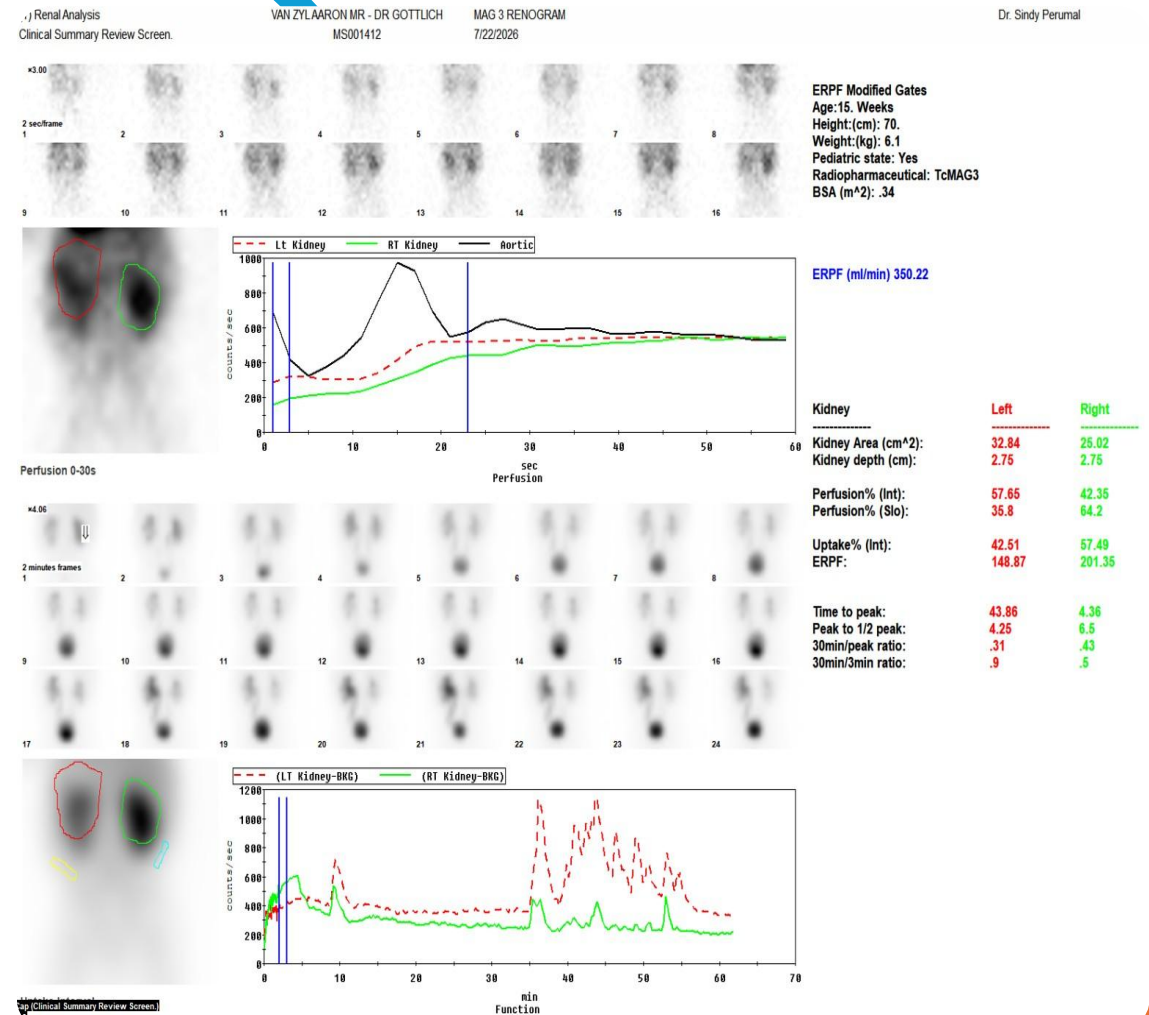
Question

Next best investigation in view of bilateral high grade reflux?

1. Mag3 scan
2. Repeat ultrasound at 6-weeks of age
3. Nil but observe for UTIs

Answer - Mag 3 scan

- **Right kidney: 57% differential function (grade IV VUR)**
 - No renal scarring.
 - **Multiple episodes of high-grade reflux**
 - Non-obstructive.
- **Left kidney: 43% differential function (grade V VUR)**
 - **Renal scarring** lower pole
 - **Multiple episodes of high-grade reflux**
 - Non-obstructive
- **Bladder**
 - A **large residual volume** is noted in the bladder post micturition.
- **Comment:**
 - Evidence of hydroureteronephrosis.
 - Evidence of bilateral severe bilateral vesico-ureteric junction reflux.



Question

Management options

Diagnosis

- High grade VUR
- Probable UTI x1
- Renal scarring on left with reduced cortical function (43% vs. 57%)
- Large post void ladder volume

Question - management options?

- Observation
- Prophylactic antibiotics
- CIC
- Bilateral ureterostomies
- Vesicostomy

Chosen management

Vesicostomy

Question – why not other management options

- **Observation**
 - Significant risk to upper renal tracts
- **Prophylactic antibiotics**
 - Leaving a very dysfunctional bladder
- **CIC**
 - Option, high burden of care, both parents work
- **Bilateral ureterostomies**
 - Option, better for bilateral VUJ obstruction, Prune Belly syndrome





Future management

- **Observe**
 - No prophylactic antibiotics
 - Renal function
 - Renal growth with ultrasounds
 - BP
 - Vesicostomy stenosis
- **Wait until 18-months**
 - Full reassessment
 - Reconstruction
 - Close vesicostomy and...
 - Bilateral re-implantation or
 - Bilateral STING procedure
 - UDS and bladder management

Aims of investigation and management in this child

- ✓ Establish a firm diagnosis
- ✓ Ensure genetic counselling where necessary
- ✓ Prevent urosepsis
- ✓ Protect the upper renal tracts by ensuring drainage
- ✓ Ensure bladder is as functional as possible and avoid / limit enuresis
- ✓ Reduce admissions, medication, and disease burden for the child and family
- ✓ Allow the child to grow and develop
 - ✓ Often delayed interventions easier and more successful
- ✓ Limit renal damage
 - ✓ Reduce morbidity (CKD / ESKF / dialysis / transplant)

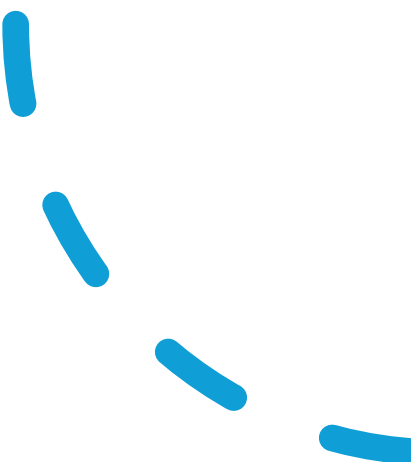
Take home lessons

- Hydronephrosis is not a diagnosis.
- Mild hydronephrosis may not always indicate minimal pathology.
- Underlying pathology may be simple or complex
- Early assessment and management critically important to achieving the aims of management.
- If in doubt, please ask for guidance from a friendly paediatric nephrologist.



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Thank you for your attention



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