Evaluating Renal Parenchymal Disease

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Monash Health

Clinical Indications

- Urinary Tract Infection
- Antenatal Hydronephrosis
- Enuresis
- Abdominal Mass

Renal Ultrasound

- Normal
- Variants
- Size
- Parenchyma
  - Scars
  - Acute pylonephritis
  - Cystic Disease
  - Mass lesion

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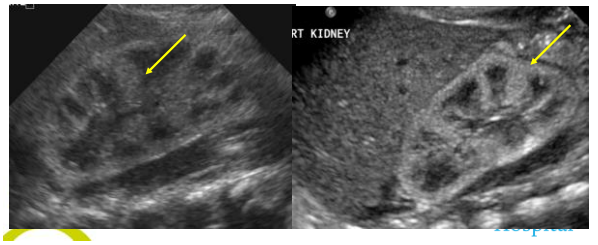
Normal Parenchyma < 1yo

- Echogenic cortex (> liver/spleen, ↑ in preterm)
- Large hypoechoic pyramids
- Fetal lobulation btw pyramids



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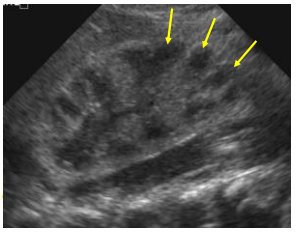

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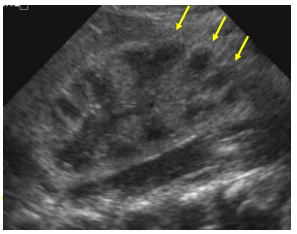
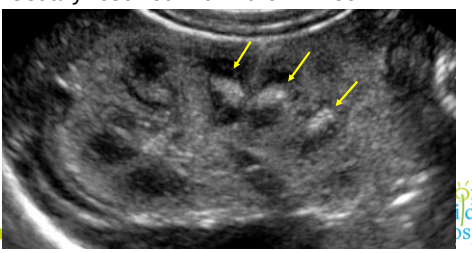


Tamm-Horsfall Protein - Neonates

- Macroglobulin in amniotic fluid, serum & urine
- Normal in neonates
- Usually resolved within the 1st week



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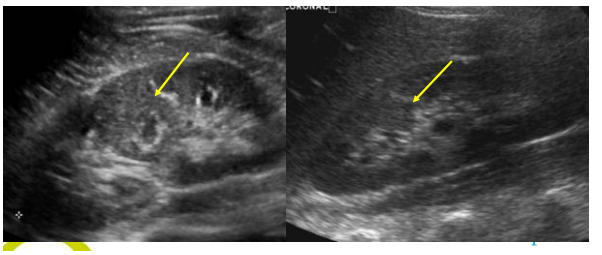
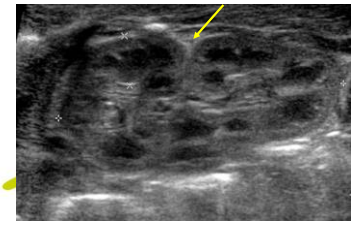
Variants- Column of Bertin

- Thicker layer of cortex (Same echogenicity)
- NOT tumour
- Don't put calipers on it!



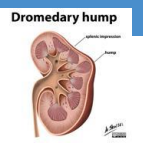
Variants- Interrenuncular Septum

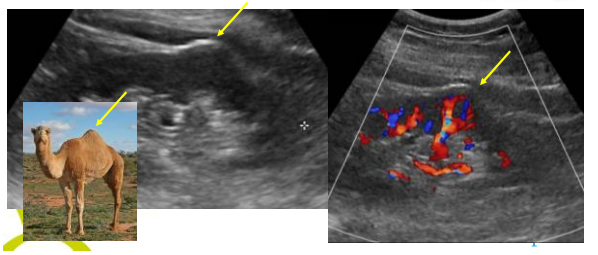
- Incomplete fusion between embyronic renunculi
- Triangular echogenic defect
- Upper & middle 1/3
- Don't mistake for scars



Variants- Dromedary Hump

- Lateral margin Left kidney midpole
- Same echotexture as cortex
- Normal perfusion





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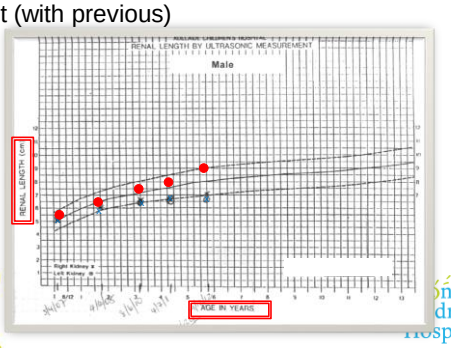
Renal Size

- Plot (with previous)



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Renal Parenchyma

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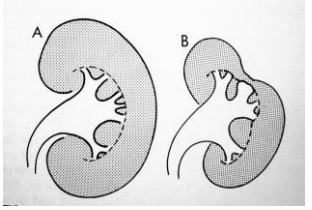
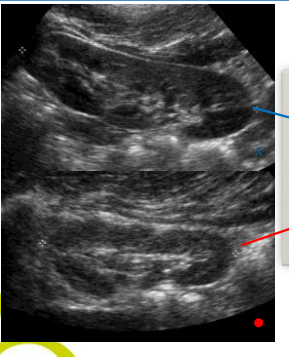
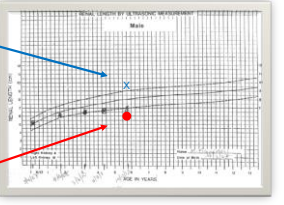
Renal Scarring

- Diffuse scarring
  - Global parenchymal loss
- Focal scarring
  - Focal parenchymal thinning
  - Interrupts renal outline

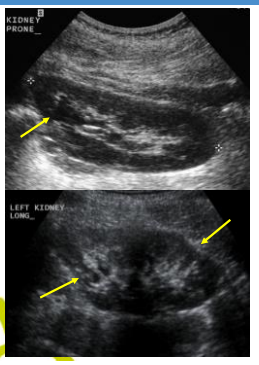


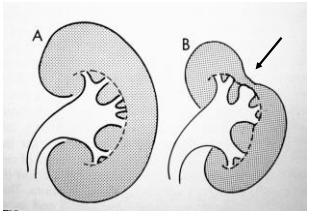
Diffuse Scarring





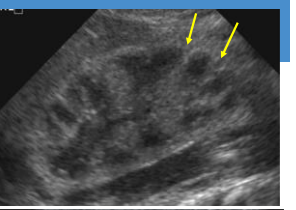
Focal Scarring

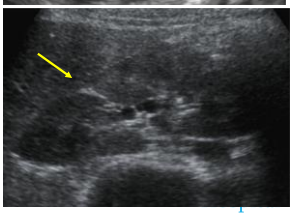




Not Scars

- Fetal lobulation
- Interrenuncular septum (Junctional line)





Renal Parenchyma

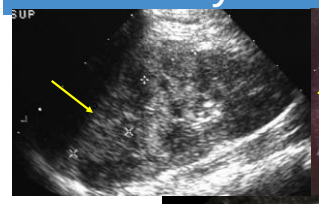
- Scars
- Acute Pyelonephritis
- Cystic Disease
- Mass

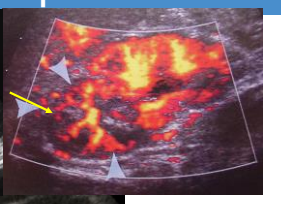
Acute Pyelonephritis

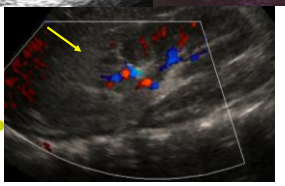
- Ultrasound usually normal
- Global or Focal Enlargement
- Loss of Corticomedullary Differentiation
- Increased or Reduced Echogenicity
- Reduced Colour Doppler (cf CT)
- Thickened Renal Pelvis/Ureter
- Complication: Abscess, pyonephrosis

Size Chart

Acute Pyelonephritis







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Cystic Renal Disease

Isolated or as part of syndrome

- Genetic bilateral
  - ARPKD
  - ADPKD
- Non genetic unilateral or bilateral
  - Simple renal cyst
  - Multicystic dyplastic kidney (MCDK)

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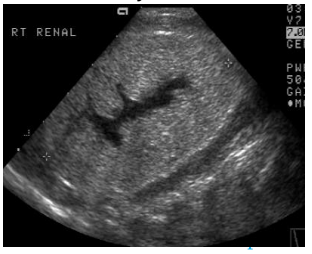
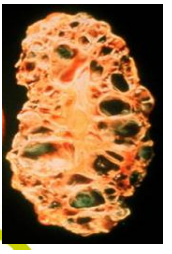
ARPKD

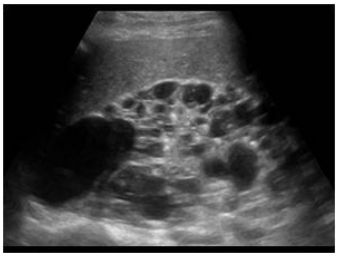
- Bilateral large echogenic kidneys
- Isolated or as part of syndrome
- Inversely assoc. with Hepatic Abnormality
  - Biliary ductal ectasia
  - periportal fibrosis
- Severe: Renal failure, transplant in childhood
- Mild: dx later in childhood



ADPKD

- Normal size or enlarged kidneys
- Hyperechoic cortex with cysts
- 1/3 have cysts in liver, spleen, pancreas or lungs





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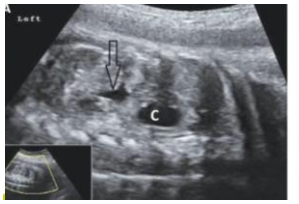
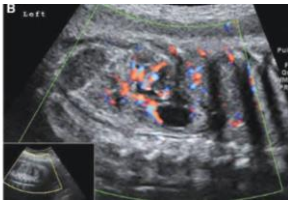
Simple Renal Cyst

- Unilateral
- Solitary
- Rare (<1%)
- Good prognosis if isolated





Simple Renal Cyst

- DDX:
  - Calyceal diverticulum
  - Hydrocalyx
  - Dilated upper moiety of duplex
  - Cystic tumour
  - Hereditary renal cystic disease

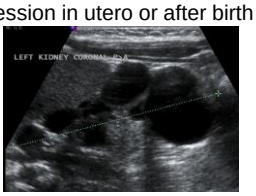
Connects to pelvicalyceal system

Multiseptated mass

Follow up & Family history

MCDK

- Unilateral > Bilateral
- Multiple cysts of varying size.
- No functioning renal parenchyma
- May affect ectopic, or duplex
- Contralateral compensatory hypertrophy
- Can undergo regression in utero or after birth



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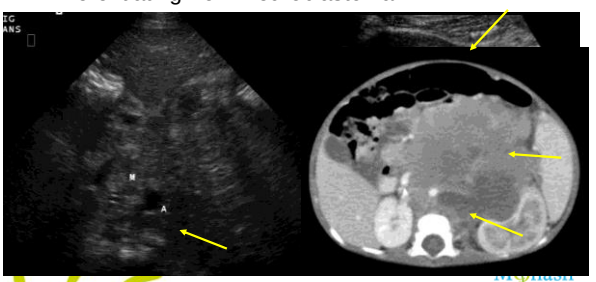
Wilm's Tumour

- Most common (90% renal tumours)
- Peak 4 mths to 4 yo, mean age 3 yo

- Syndromes with increased incidence of Wilm's tumour (screening US)
  - Beckwith-Wiedemann syndrome
  - Hemihypertrophy
  - Drash syndrome
  - WAGR
  - Pearlman syndrome

?Intrarenal

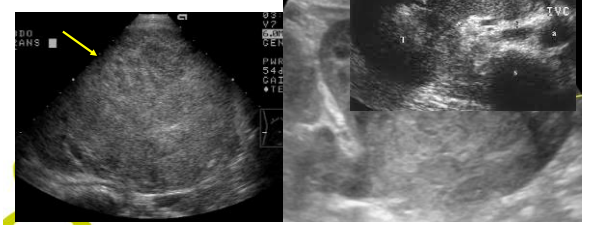
Differentiating from Neuroblastoma



- Not Infiltrative

Wilm's Tumour

- Heterogenoeus mass, calcifications 15%, claw sign
- Renal Vein & IVC invasion
- Mets: Liver (10%), Lymph nodes
- Contralateral Kidney (5-10%)



Renal Ultrasound

- Normal → <1yo- Echogenic cortex, hypoechoic pyramid, fetal lobulation, Tamm-Horsfall protein
- Variants → Column of Bertin, Interrenuncular septum, Dromedary hump
- Size → Graph
- Parenchyma
  - Scars → Size. Focal vs Diffuse
  - Acute pylonephritis → Enlarged, hypo/hyperechoic, ⬇perfusion
  - Cystic Disease → ARPKD, ADPKD, Simple cyst, MCDK
  - Mass lesion → Wilm's tumour: Claw sign, Renal vein/IVC, Mets liver & LN, contralateral kidney

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