Renal Cysts – What should I do now?

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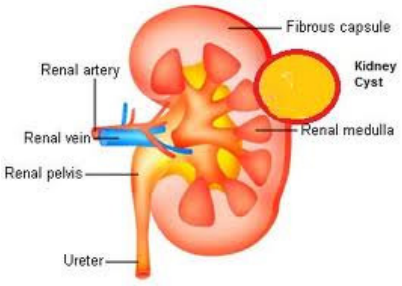
What are renal cysts?

- Fluid-filled structures in the kidney that are not continuous with the nephron or collecting system
- Believed to originate from diverticulae of DCT or collecting tubules, possibly due to weakening of basement membrane

Types of renal cysts:

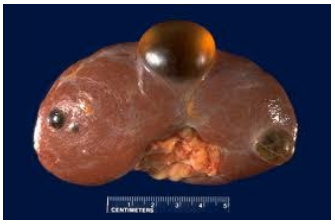
1. Simple cysts
2. Complex cysts
3. Others – acquired, pyogenic, parapelvic



Types of renal cysts

Simple cysts:

- Usually an incidental finding on ultrasound / CT / MRI
- arise from renal parenchyma
- can be solitary or multiple and/or bilateral
- Usually small (<2cm)
- can grow very large (>10cm)



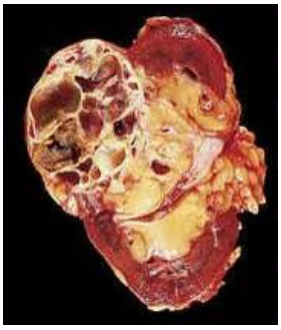
Parapelvic cysts:

- arise from renal sinus
- occasionally cause compression & obstruction to renal pelvis / ureter
- Sometimes confused with hydronephrosis

Types of renal cysts

Complex cysts:

- Contain features not consistent with a simple cyst:
  - increased fluid density (hyperdense cyst)
  - internal thick-walled septations
  - thickened cyst wall
  - nodular projections into the lumen
  - calcifications
  - contrast enhancement



- *Significance:* risk of *malignancy* is higher with increasing complexity

Types of renal cysts

Acquired cysts:

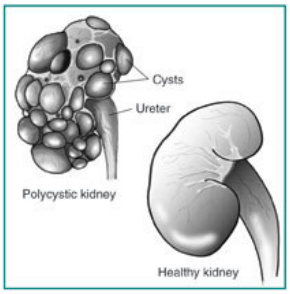
- Associated with chronic haemodialysis
- Increased incidence with duration of dialysis
  - 10-20% after 3 years of dialysis,
  - 40-60% after 5 years of dialysis,
  - >90% after 10 years of dialysis

Epidemiology & Natural History

- Incidence increases with age:
  - 0.2% from 0-18 yrs
  - 20% from 20-40 yrs
  - 33% from 41-60 yrs
- Most simple cysts grow slowly with time:
  - 3.9 mm per year for <50 yrs old
  - 1.8 mm per year for >50 yrs old
- Some may involute and disappear over time

Terada et al J Urol 2002; 167:21

Risk factors & associated conditions



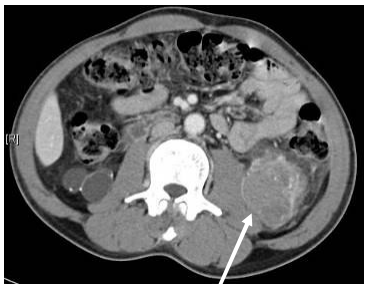
- Increasing age
- ESRF on haemodialysis
- Polycystic kidney disease
  - both autosomal dominant and recessive types
- Von Hippel-Lindau syndrome
  - AD, individuals develop cysts in multiple organs (kidney, pancreas, liver, epididymis), cerebellar haemangioblastomas, pheocromocytomas
  - increased risk of RCC (35-40% incidence)
- Tuberous sclerosis
  - Renal angiomyolipomas & cysts (20-25%), hamartomas in brain & skin
  - 2% incidence of RCC

Presentation of renal cysts

- Incidental (most common), largely asymptomatic
- Few may present with symptoms such as:
  - abdominal mass and pain – large cysts or cysts that cause obstruction/hydronephrosis (more commonly parapelvic cysts that impinge on the proximal ureter)
  - haematuria – from bleeding cysts
  - hypertension – also seen in APKD
  - obstructing cysts may cause UTI or pyelonephritis

Complications

- Compression of adjacent structures by large cysts
- Hydronephrosis due to obstruction by large or parapelvic cysts
- Infected cyst
- Haemorrhage
- Rupture



haemorrhage within renal cyst

Management for renal cysts

- History taking
- Physical examination
- Investigations and imaging
- Treatment &/or Follow-up

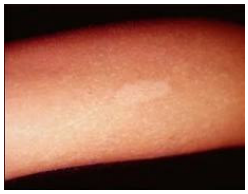
Management for renal cysts – History

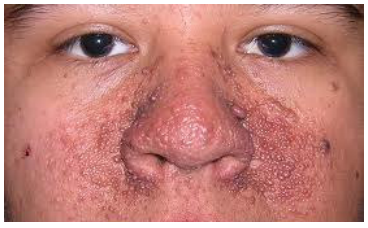
- Local or urinary symptoms eg. flank pain, haematuria

- Personal or family hx of:
  - Polycystic kidneys
  - Co-morbidities – e.g. ESRF on haemodialysis
  - other associated conditions

Management for renal cysts – Physical examination

- Syndromic features (particularly in younger patients):
  - Tuberous sclerosis: adenoma sebaceum, Ashleaf macules, Shagreen patches





- Abdominal examination:
  - usually normal
  - Abdominal mass due to large cysts are rare
  - Bilateral ballotable kidneys from APKD

Management for renal cysts – Investigations

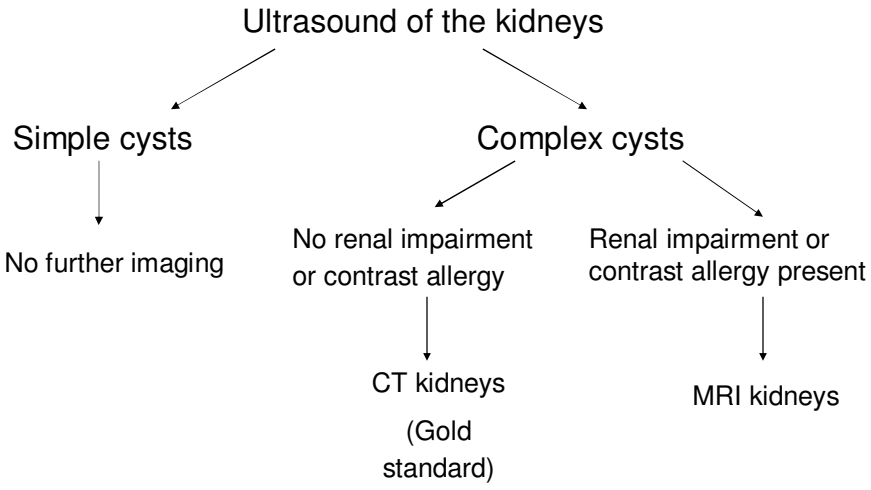
Blood tests

- Renal function test (s. creatinine, eGFR)

Urine tests

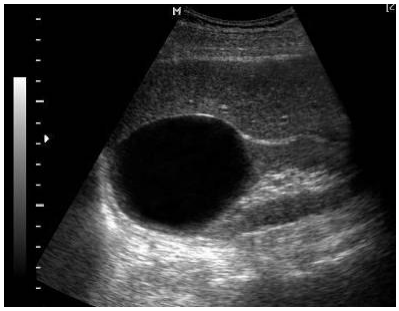
- Urinalysis
  - Haematuria
  - pyuria
- Urine culture

Management for renal cysts – Imaging

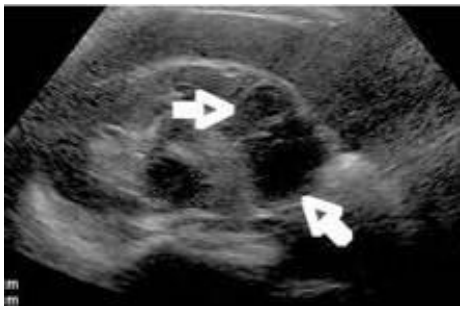


Ultrasound kidneys

- Features of simple cysts:
  - no internal echoes
  - distinct wall with defined margins
- Sufficient for evaluation of simple cysts



Simple renal cyst



Renal cyst with septa

Contrast CT kidneys

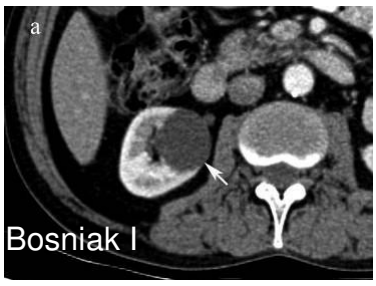
- Helps discriminate cysts from collecting system
- Allows evaluation & classification for complex cysts
- Bosniak classification

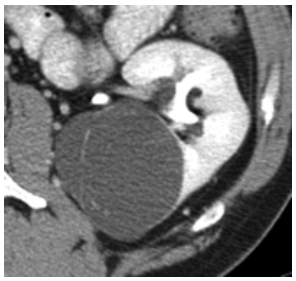
Bosniak class	Features	Significance
I	Benign simple cysts: - Thin wall without septa / calcifications / solid components / water density - No contrast enhancement	Benign
II	Benign cysts with few thin septa - Wall or septa may contain fine calcification - Sharp margins - No contrast enhancement	Largely benign, 0-5% risk of malignancy

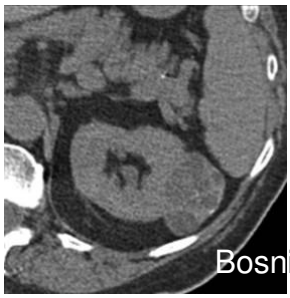
Contrast CT kidneys

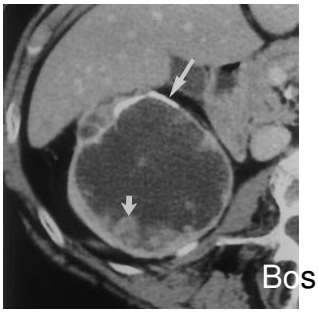
Bosniak class	Features	Significance
IIF	-Well-marginated -May have minimal smooth thickening of septa or wall -Calcification may be thick & nodular -No contrast enhancement	Largely benign but needs follow-up
III	Indeterminate cysts with thickened walls or septa - Contrast enhancement present	40-60% are malignant (cystic RCC or multiloculated cystic RCC) Others are benign and include: - Haemorrhagic cysts - Infected cysts - Multiloculated cystic nephroma
IV	Contain contrast-enhancing soft tissue components	75-90% risk of malignancy

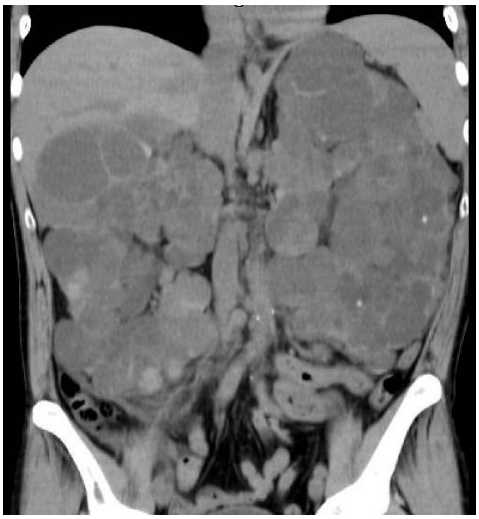
Simple and complex cysts



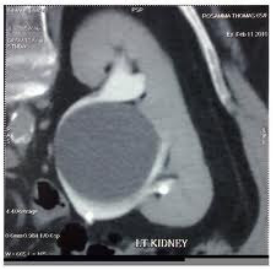

Bosniak II


Bosniak III


Bosniak IV



APKD

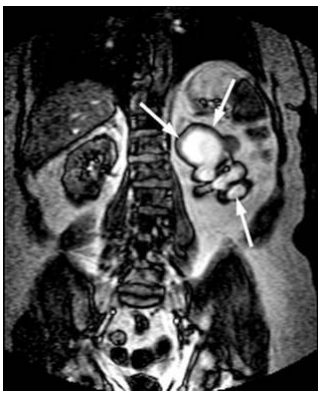


Parapelvic cyst

MRI kidneys

MRI has a role especially when:

- Renal impairment
- Iodine contrast allergy
- Require multiple long term imaging & concerned of excessive radiation eg. VHL
- May be superior to characterize dense cyst contents (due to bleeding or mucin)



Follow-up of renal cysts

- Bosniak I cysts:
  - No action necessary or option to monitor at 1 yr to document stability (ultrasound)
  - repeat ultrasound if symptoms occur
- Bosniak II cysts: option to monitor with ultrasound at 6-12 month intervals
- Periodic imaging for VHL, APKD or acquired renal cysts while on dialysis

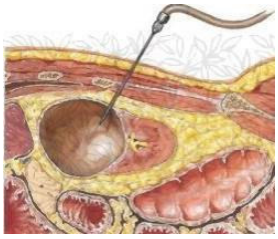
Follow-up of renal cysts

When to refer to Urology?

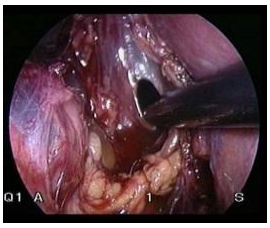
- Bosniak IIF, III and IV cysts
- Symptomatic / rapidly enlarging cysts
  - persistent or worsening flank pain due to large size or obstruction
  - bleeding or ruptured cysts: acute severe flank pain +/- haematuria
  - infected cyst or cyst causing recurrent infections

Management for renal cysts

- For complex or suspicious cysts (Bosniak III & IV): partial or radical nephrectomy



- Cyst aspiration and injection of sclerosant
  - usually done for large symptomatic cysts
  - Cytology usually sent
  - multiple seasons may be required
  - not recommended for parapelvic cysts



- Cyst decortication with marsupialization (laparoscopic, open, percutaneous resection)

Management for renal cysts

Other management:

- Exclude other associated syndromic causes
- Manage all co-existing medical conditions e.g. hypertension, chronic kidney disease
- Screening of family members must be done for patients with ADPKD and VHL

Take Home Summary

- Evaluation of patient with renal cysts:
  - Symptoms or complications arising from cyst
  - Associated conditions or syndromes
  - Baseline renal function & urine parameters
- Evaluation & management of renal cyst:
  - Further imaging (CT or MRI) according to complexity of cyst
  - Follow-up if Bosniak I or II
  - Refer if Bosniak IIF, III, IV or symptomatic

Acknowledgements

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Dept of Urology, NUHS

Questions?