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What is the role for imaging in unilateral single kidney?

Accepted truths

- 30-40% unilateral single kidney have some abnormality:
  - VUR 25%
  - PUJO, VUJO
  - Renal dysplasia
- Mullerian abnormalities
- Early detection and treatment is important to preserve renal function

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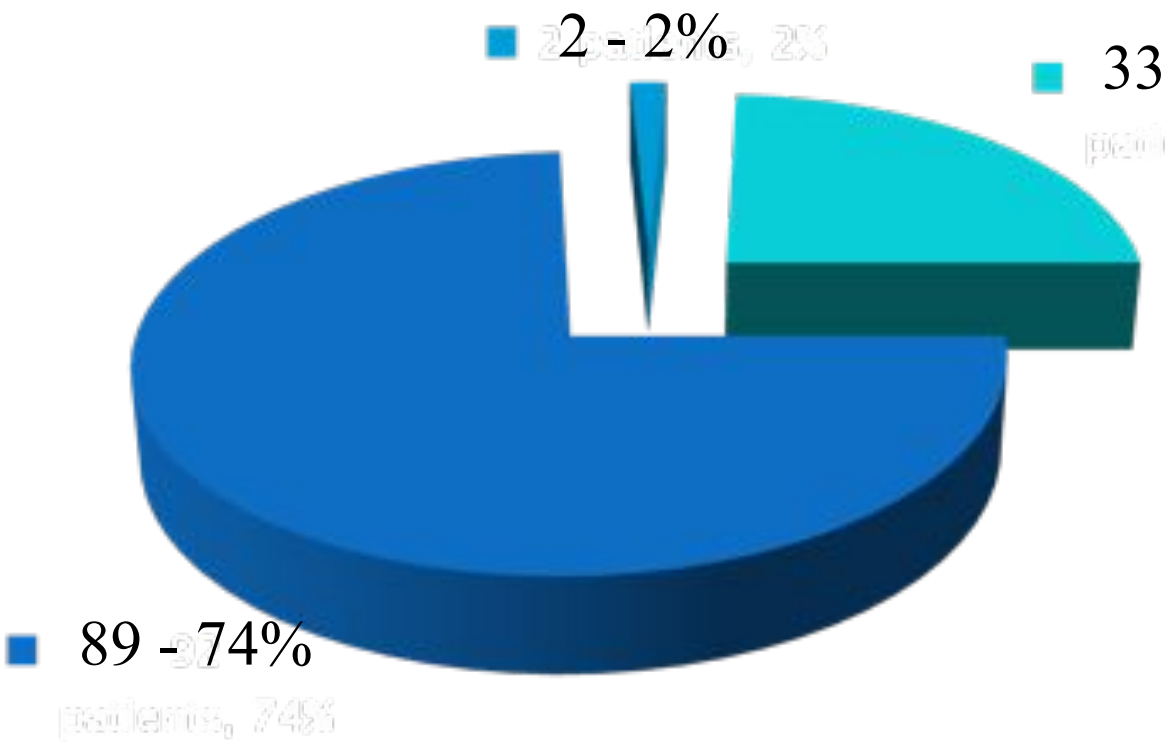
- Records of 124 patients who had an antenatal diagnosis of RA or MCDK between December 1987 and December 2008 were reviewed retrospectively.


2 - 2%
33 - 24%
89 - 74%
MCDK
Pelvic kidney
RA

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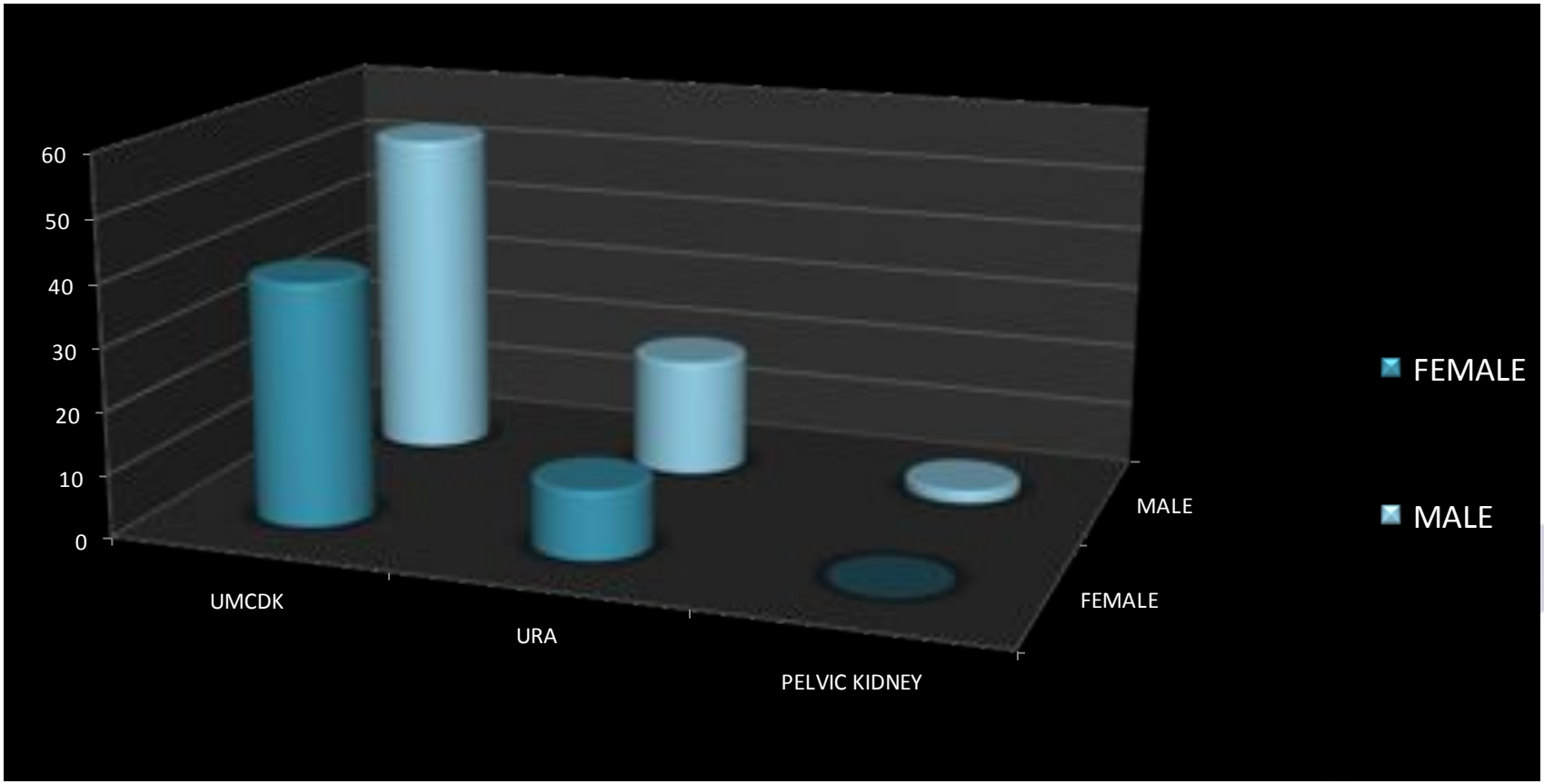
Overall, 124 patients, 75 male, (60%) 49 female, (40%)



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Imaging

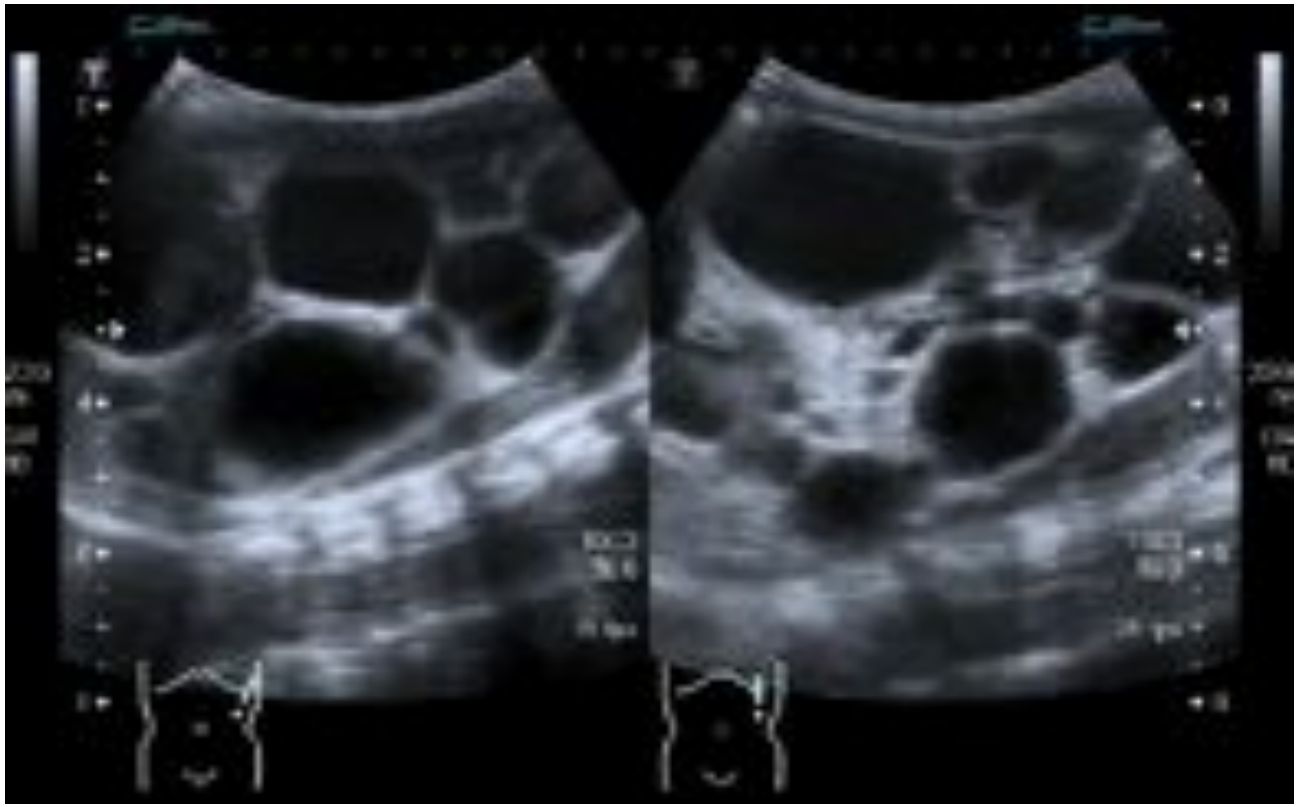
- Confirm the diagnosis
- Is the single kidney normal?
- If not, why not?
- Is the single kidney hypertrophying?
- Is the dysplastic kidney atrophying?

What imaging is needed?

- US
- DMSA?
- MCUG?
- Other – Mag 3 etc.

MCDK

- Multiple non-communicating cysts
- ‘bunch of grapes’



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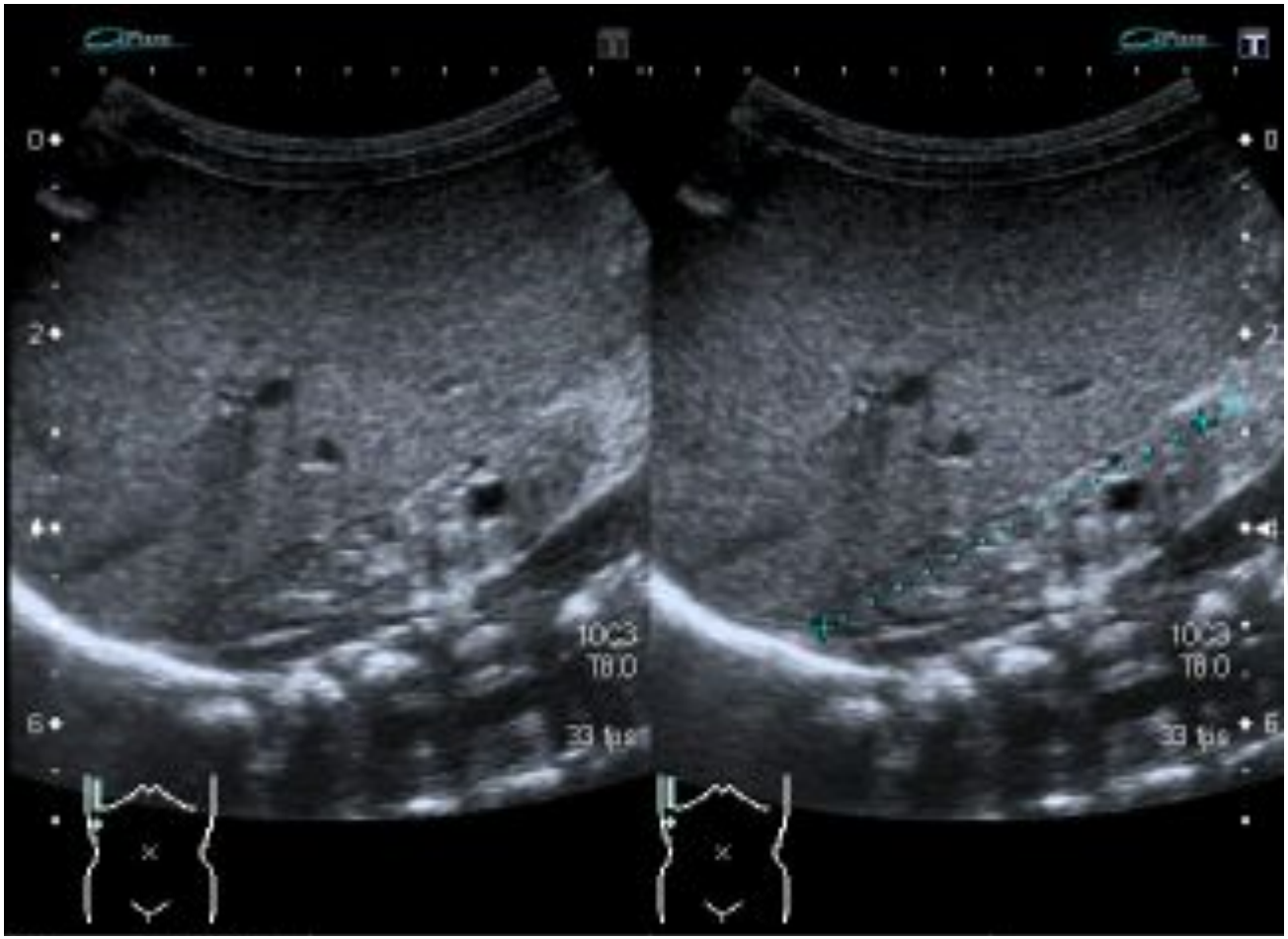

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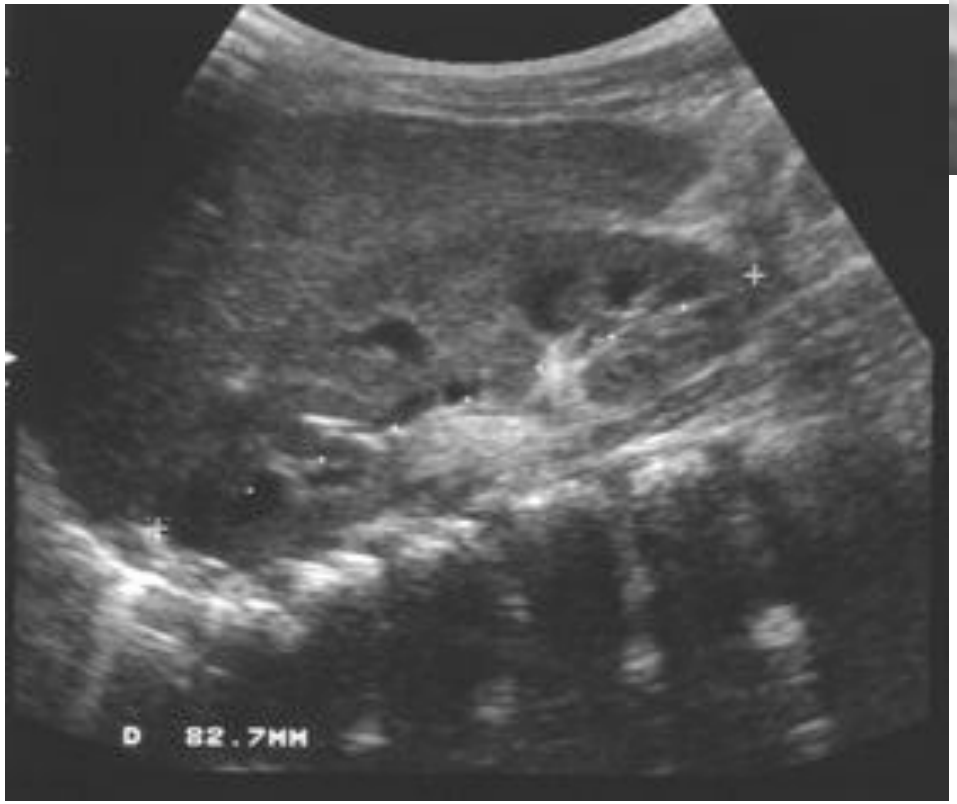

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Atrophy – 5 years

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Renal agenesis

- Incidence ~ 1 : 1000
- In females associated with ipsilateral reproductive system abnormalities, e.g. Unicornuate uterus
- Ultrasound:
  - Discoid adrenal
  - Contralateral hypertrophy
  - Must look for pelvic kidney

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Renal agenesis

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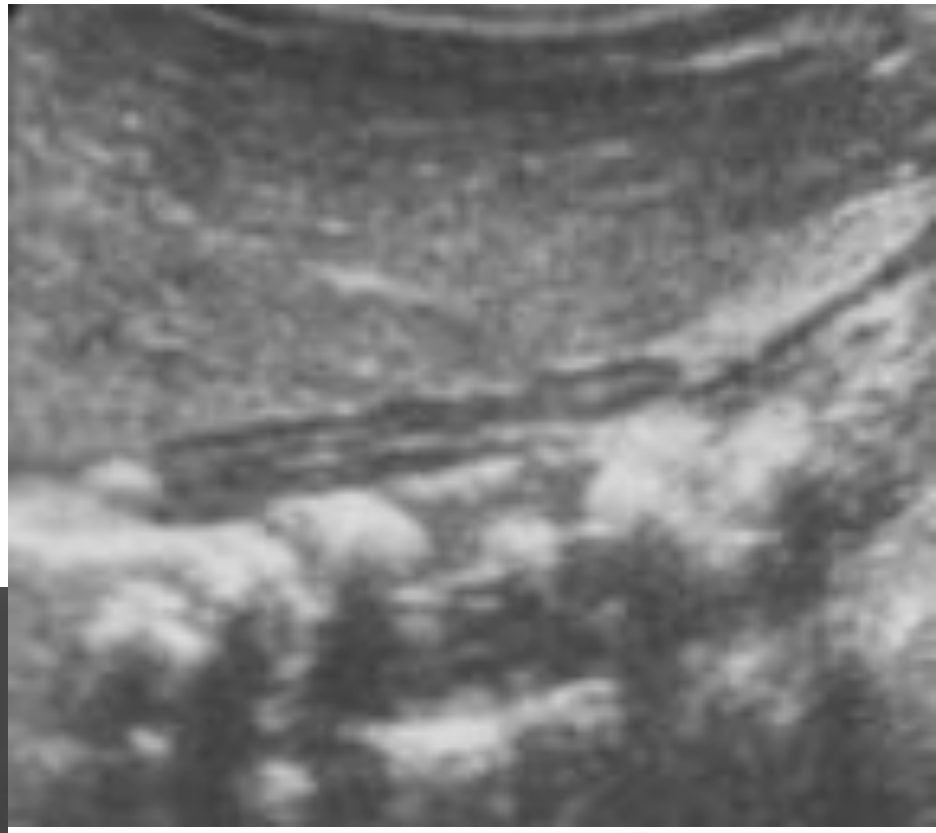

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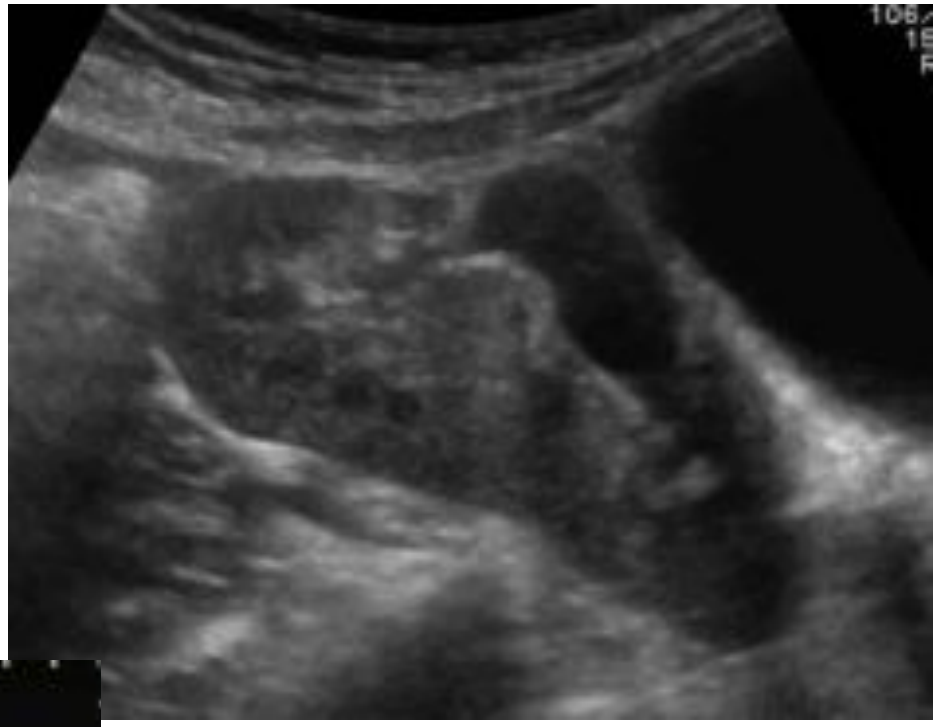

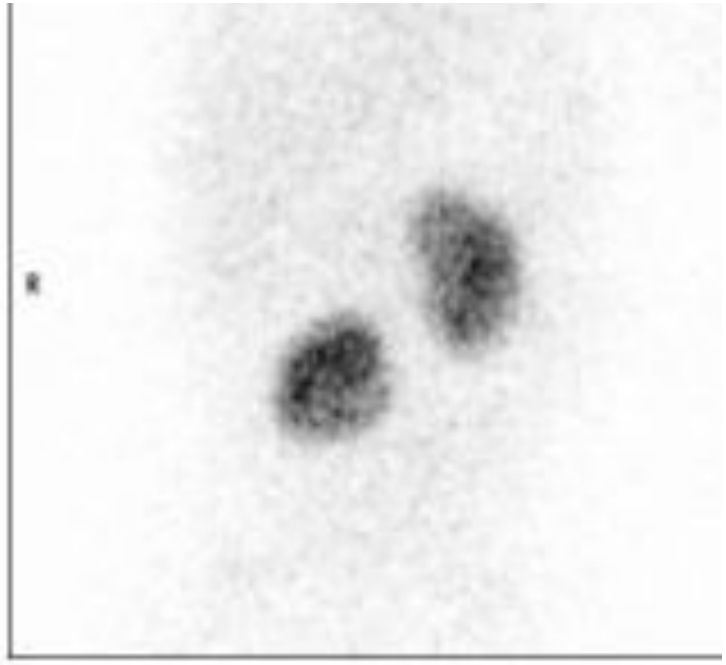

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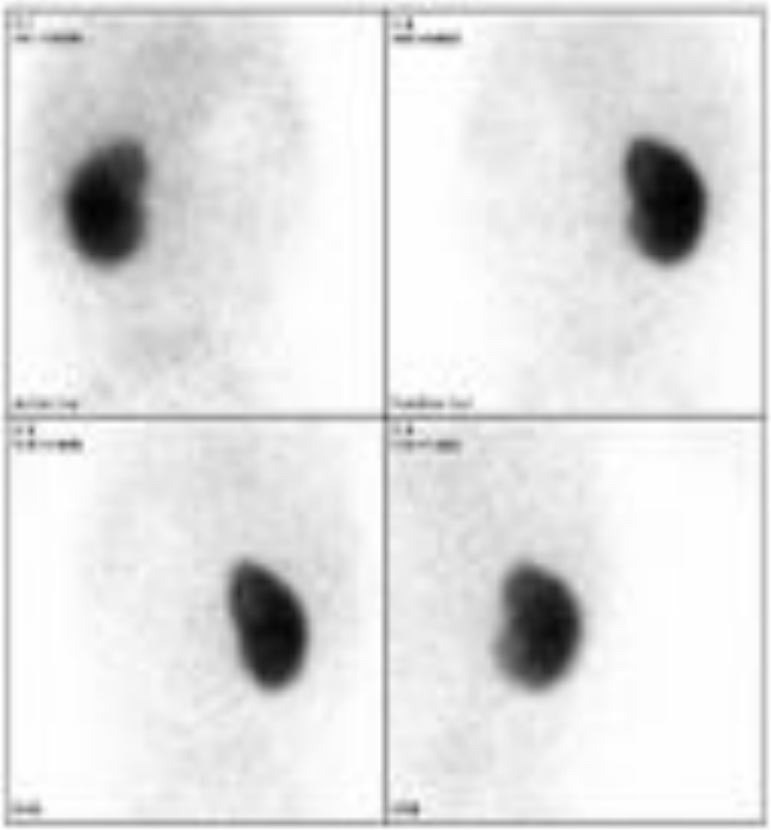
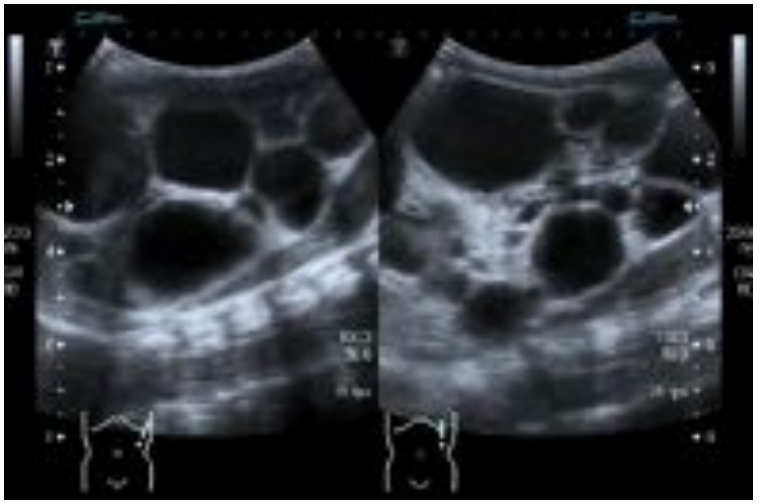
Is anything else needed?

- DMSA?





DMSA

- It is standard practice in most centres to perform both postnatal US and DMSA in patients with Renal Agenesis and Multicystic Dysplastic Kidney, identified on antenatal US.

- What is the evidence behind this practice?

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DMSA

Effective doses for radiological examinations of infants.

PROCEDURE	EFFECTIVE DOSE	RISK
Radiographs of the chest, abdomen or pelvis	20-40μSv	Minimal
Micturating cystourethrogram	0.3-0.6 mSv	Very Low
Barium Meal	0.4-1 mSv	Low
Tc-99m DMSA	1-1.8 mSv	Low

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We reviewed our experience over a 21 year period to determine whether DMSA provided any additional diagnostic information over ultrasound.

Records of 124 patients who had an antenatal diagnosis of RA or MCDK between December 1987 and December 2008 were reviewed retrospectively.

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- In 116, (93.6%) cases, both examinations gave identical results.
- In 1 case, (0.8%) DMSA identified a pelvic kidney missed on ultrasound.

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- US demonstrated significant abnormalities of the solitary kidney, not evident on DMSA in 7 cases (5.6%)
  - Significant hydronephrosis
  - Duplex system
  - Features suggesting high grade reflux
  - Dysplasia in single kidney
  - Mullerian anomalies

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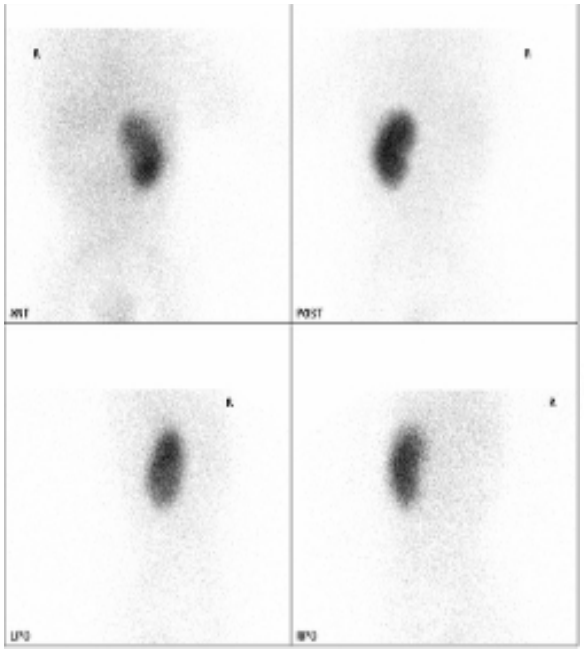

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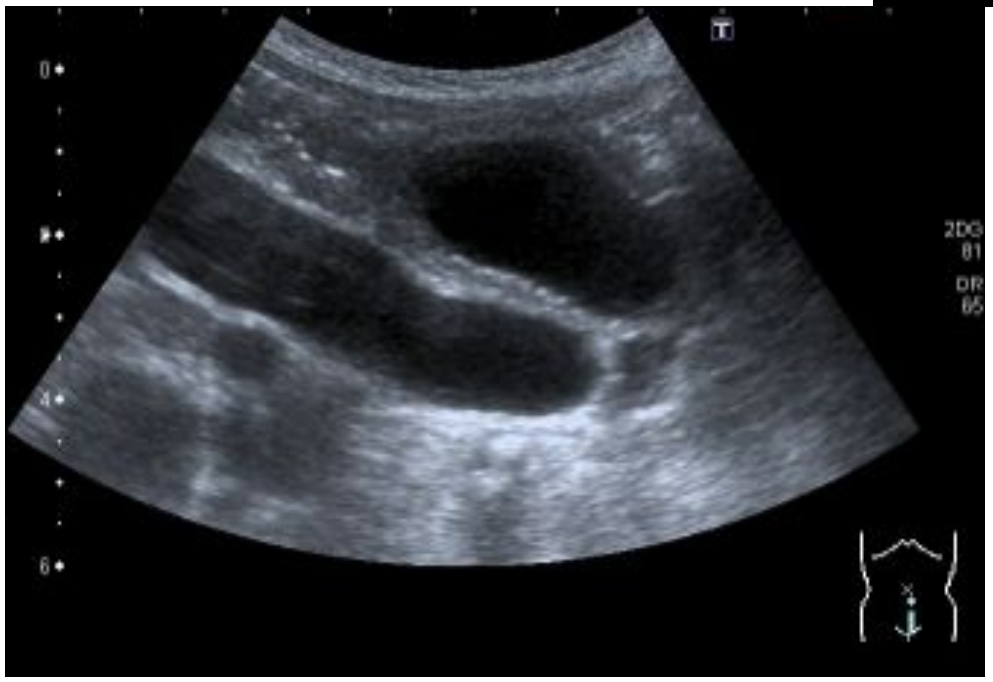

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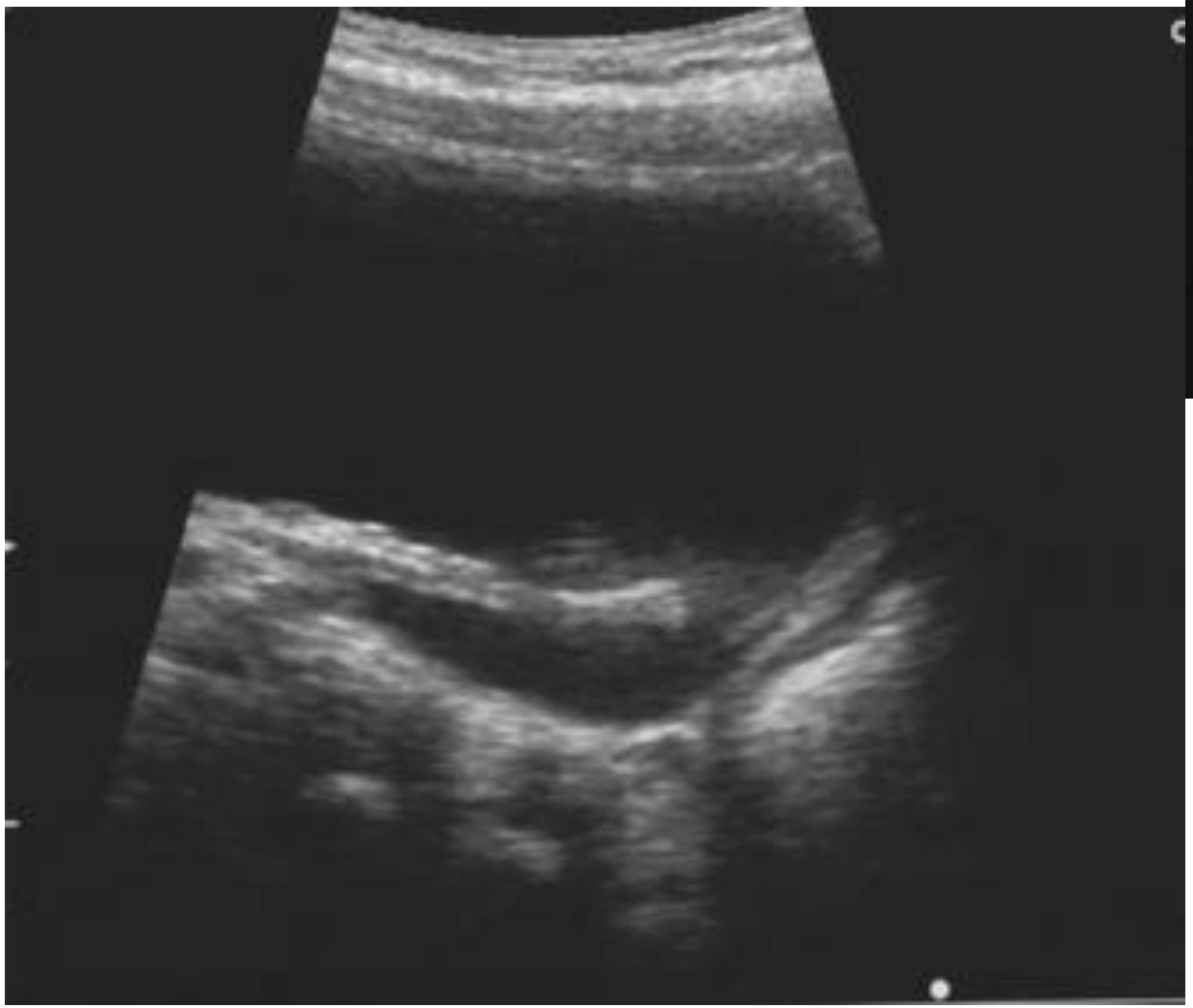

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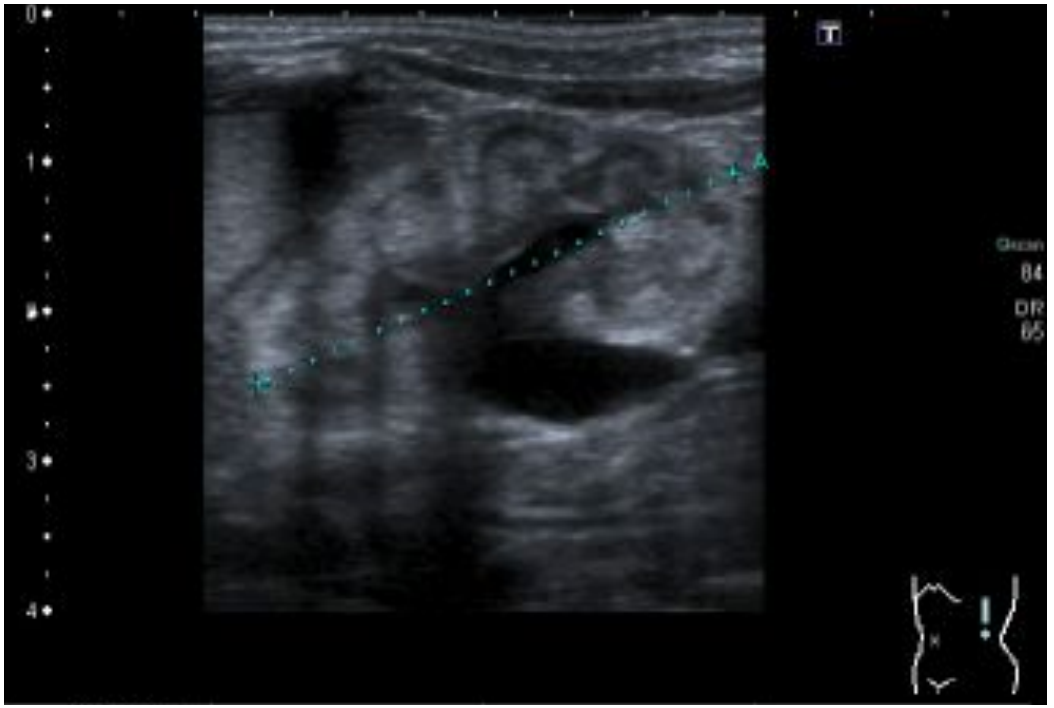
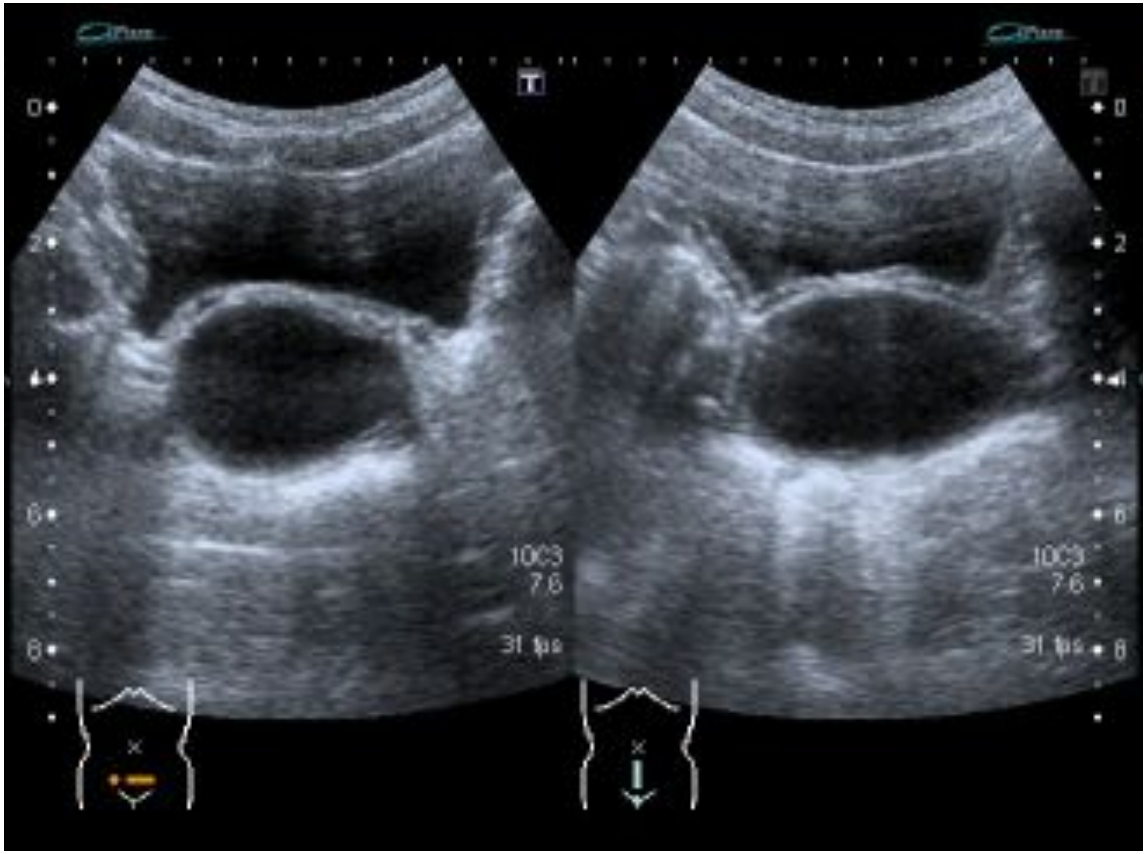


Mullerian abnormalities

- Ipsilateral absent tube/ovary most common



Conclusions

DMSA does not provide additional information over that obtained from US alone.

- US provides superior information regarding the solitary functional kidney.
- Don’t miss the pelvic kidney – it’s embarrassing!

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Cystogram?

- 25% solitary kidneys have reflux
- Mainly low grade
- Is an MCUG required as a routine in solitary kidney?

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Reflux is present in approx. 30% of which of the following:

- Infants with UTI
- Siblings of infants with UTI
- Infants of parent with UTI
- Contra-lateral to MCDK (25%)
- The friends of children with UTI?

Reflux

- Is low grade reflux a normal variant?
- It occurs in high percentages of young chimps, lambs & rats
- It occurs in the normal kidney opposite MCDK and causes no harm
- It occurs in 30% of *normal* infants with mild antenatal dilatation and causes no harm

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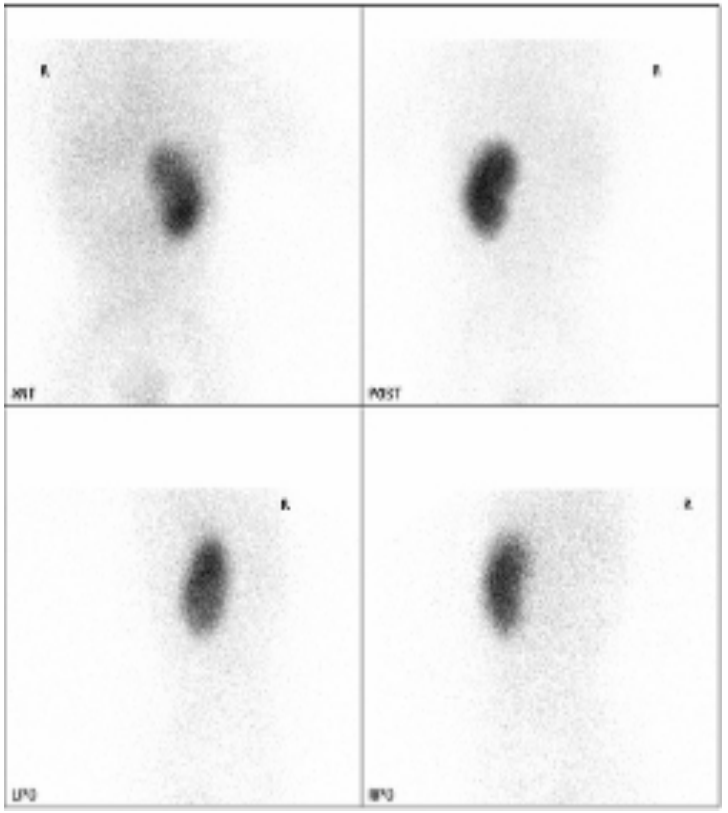

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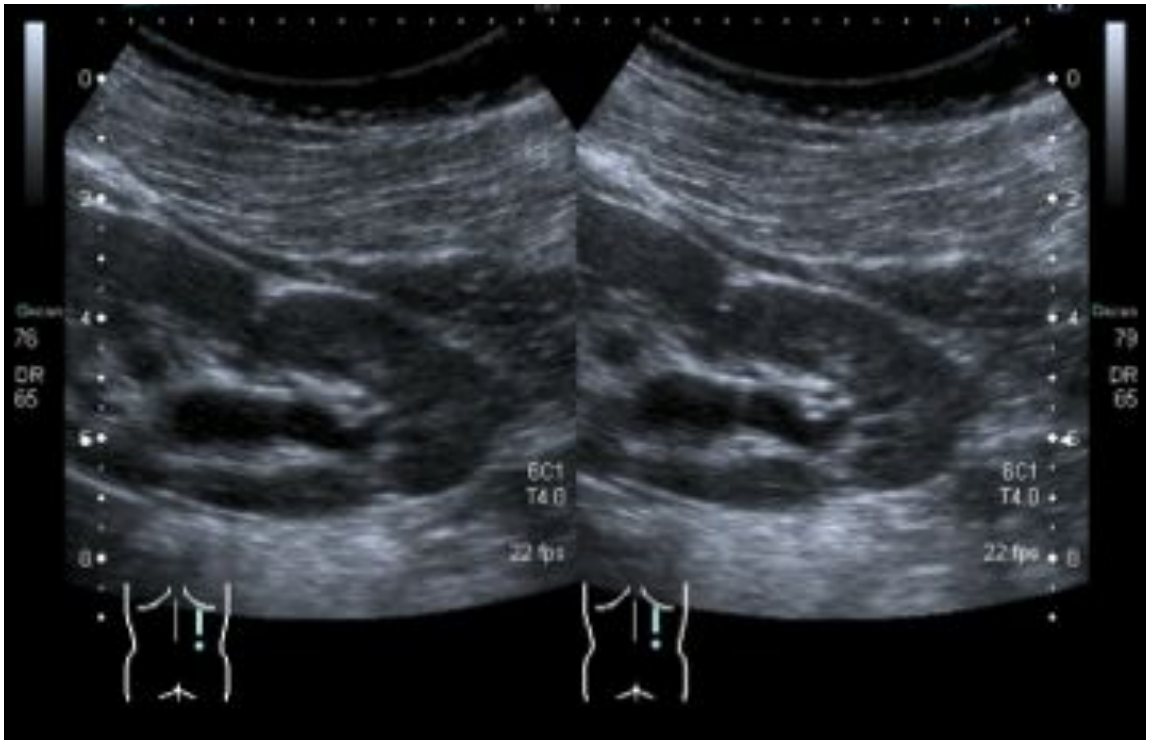

How much follow-up?

- Normal kidneys stay normal but undergo compensatory hypertrophy
- Most MCDKs atrophy over 10 years
- A small number are still visible at 10 years
- They are not seen in adults
- Suggest birth, 1-yr, 5yr & 10yr

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Conclusions

- DMSA does not provide any additional information over that obtained from US alone.
- Good quality US provides excellent information regarding the solitary functional kidney.
- MCUG should not be carried out routinely for solitary kidney
- Further imaging should be directed by US findings
- Don’t miss the pelvic kidney

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QUESTIONS?