URINARY TRACT ABNORMALITIES DIAGNOSED ANTENATALLY

- **This guideline applies to babies managed jointly with Birmingham Children's Hospital. If this is not the referral pathway used locally, seek local advice**

ANTENATAL ASSESSMENT

Fetal diagnostic scans are undertaken at 18–20 weeks and may be repeated at 32–34 weeks

18–20 week scan

- anteroposterior diameter (APD)
- any calyceal dilatation
- ureteric dilation
- appearance of bladder

Possible urinary tract abnormalities

- Kidneys, collecting system and bladder (prognostic factors)

Kidneys

- Renal agenesis +/- oligohydramnios – Potter sequence
- Multi-cystic dysplastic kidney (MCDK), check other kidney for normal appearance
- Solitary kidney
- Abnormal position (e.g. pelvic) or shape (e.g. horseshoe)
- Kidneys with echo-bright parenchyma (suspect cystic diseases)

Collecting system

- Unilateral or bilateral renal pelvic dilatation (RPD)/pelviectasis
- Measured in antero-posterior diameter (APD)
- normal: RPD <10 mm
- mild: RPD 5–9 mm
- moderate: RPD 10–14 mm
- severe: RPD ≥15 mm
- Unilateral or bilateral dilated calyces or ureter

Bladder

- Bladder (dilated or thick-walled; ureterocoele in bladder)

32–34 week scan

- To clarify urinary tract abnormalities found in early fetal scans
- Assess severity of RPD/pelviectasis:
- normal: RPD <7 mm
- mild: RPD 7–9 mm
- moderate: RPD 10–14 mm. If bilateral, suspect critical obstruction
- severe: RPD ≥15 mm. Suspect critical obstruction
- calyceal dilatation: often indicates severity; may suggest obstruction
- Parenchymal thinning: indicates severity and possible damage to kidney
- Unilateral/bilateral dilated ureter(s) – suspect obstruction or vesico-ureteric reflux (VUR)
- Thick-walled bladder, suspect outlet obstruction
- Dilated bladder, suspect poor emptying
- Ureterocoele, suspect duplex system on that side

Communication

- Provide mother with an information leaflet, if available in your hospital, about this antenatal anomaly and proposed plan of management after birth

POSTNATAL MANAGEMENT

- Ultrasound scan **must** comment on:
- APD at the hilum, transverse view in the prone position
- parenchymal thickness
- calyceal dilatation
- ureters
- bladder

Indications for intervention

Urgent

- Bilateral hydronephrosis RPD ≥10 mm +/- thick-walled bladder: suspect posterior urethral valves (boys) or other bladder outlet obstruction
- Unilateral hydronephrosis RPD ≥15 mm, without ureteric dilatation suspect pelvi-ureteric junction (PUJ) obstruction
- Hydroureter
- Megacystis with oligohydramnios
- Significant abnormalities of kidney(s)/urinary tract – if risk of renal insufficiency
- check serum potassium, blood gas for metabolic acidosis and serum creatinine

Non-urgent

- All other abnormalities of urinary tract in the antenatal scan

IMMEDIATE MANAGEMENT

For urgent indications

- If posterior urethral valves (PUV) or bilateral hydronephrosis (PUJ obstruction suspected), check urine output/stream and monitor weight trend
- Arrange **urgent KUB ultrasound scan**, after 48 hr (see above parameters requiring reporting) as minimal milk intake may underestimate the size of renal pelvis, **but do not delay** if there is gross dilatation
- If postnatal scan raises suspicion of posterior urethral valves (dilated ureters + thick walled bladder)
- check serum creatinine
- arrange urgent micturating cysto-urethrogram (MCUG)
- after confirmation by MCUG, refer baby **urgently** to on-call paediatric urologist
- If unilateral RPD ≥20 mm with significant calyceal dilatation and thinned parenchyma (suggestive of PUJ obstruction) discuss with urologist and arrange MAG3 renogram as soon as possible/as advised by urologist (usually after 6–8 weeks)
- Significant abnormalities of kidney(s)/urinary tract – if risk of renal insufficiency:
- check serum potassium, blood gas for metabolic acidosis and serum creatinine
- start trimethoprim 2 mg/kg as single night-time dose
- Discuss with consultant before discharge

For non-urgent indications

- Renal ultrasound scan at age 4-6 weeks
- Consultant review with results

Antibiotic prophylaxis

- For RPD ≥10 mm, give trimethoprim 2 mg/kg as single night-time dose until criteria for stopping are met (see below)

SUBSEQUENT MANAGEMENT

- Subsequent management depends on findings of ultrasound scan at 6 weeks

Severe pelviectasis (RPD ≥15 mm with calyceal dilatation and thinned parenchyma)

- Arrange MAG3 scan – timing depends on severity of obstruction – as soon as possible if RPD ≥20 mm
- if MAG3 scan shows obstructed pattern, discuss with paediatric urologist
- Repeat ultrasound scan at aged 3 months
- If severe calyceal dilatation and/or parenchymal thinning, earlier ultrasound may be required
- Continue antibiotic prophylaxis until advised otherwise by urologist

Moderate unilateral pelviectasis (RPD 10–14 mm) and/or ureteric dilatation

- Presumed mild obstruction or VUR
- If RPD increases beyond 15 mm with calyceal dilatation and parenchymal thinning, arrange MAG3 scan at aged 6–8 weeks
- If VUR suspected, MCUG
- Continue prophylaxis for VUR >grade III (marked dilatation of ureter and calyces) until child is continent (out of nappies)
- Repeat scan 3-monthly in the 1st year, 6-monthly in the 2nd year and yearly until aged 5 yr, or until RPD <10 mm, then follow advice below
- Prophylactic antibiotics required **only** if there is ureteric dilatation

Normal or mild isolated pelviectasis (RPD <10 mm without calyceal dilatation or parenchymal thinning)

- Stop antibiotic prophylaxis
- Repeat scan after 6 months
- if 3 x 6 month scans show no change and there have been no urinary tract infections (UTIs), discharge
- If unwell, especially pyrexial without obvious cause, advise urine MC&S

MCDK

- DMSA to clarify nil function of MCDK and normal uptake pattern of other kidney
- Repeat ultrasound scan at 12 and 24 months to observe involution of kidney), then repeat at aged 10 yr (may take several years)
- Beware of 20% risk of VUR/PUJ obstruction in contralateral ‘normal’ kidney, advise parents to recognise UTI/pyelonephritis (especially if fever is without obvious focus)
- MCUG or prophylaxis until continent **ONLY** if dilated pelvis or ureter in good kidney
- Annual blood pressure check until kidney involuted
- If cysts persist >5 yr, enlarge or hypertension, refer to urology

Ureterocoele (75% occur with duplex kidney)

- MAG3 to check function and drainage from both moieties of the duplex system
- Prophylaxis until problem resolved
- Urology referral – sooner if obstruction suspected

Solitary kidney/unilateral renal agenesis

- Kidney ultrasound at 6 weeks to confirm antenatal findings and rule out other urogenital structural abnormalities
- DMSA to confirm absence of kidney and normal uptake pattern by the solitary kidney

Renal parenchymal problem requiring nephrology review

- Bright kidneys
- Multiple cysts

Other conditions

- Single umbilical artery in cord
- increased risk of renal abnormality but postnatal ultrasound scan only if antenatal scan missed or abnormal
- Ear abnormalities: ultrasound examination only if associated with:
- syndrome
- other malformations
- maternal/gestational diabetes
- family history of deafness