Hydronephrosis in the Prenatal and Neonatal setting

Matthew Hand, D.O.
Section Chief, Pediatric Nephrology and Integrative Medicine
Children's Hospital at Dartmouth
Dartmouth Health Children's

Hydronephrosis

- Commonly picked up prenatally
- Most common fetal anomalies are renal/urologic
- 20-30 % of congenital anomalies
- Rates: 0.2-9% of prenatal visits (the 9% seen locally-national about 5%)
- Initial evaluation
  - Amniotic fluid
  - Other anomalies
  - Family history
  - **Underlying renal parenchyma**

- Primary diagnostic concerns
  - VUR
  - UPJ
  - Patulous collecting system
  - Bladder outlet obstruction (boys-PUV, girls-ureterocoele)

Evaluation decisions

- Why are we doing the diagnostic tests?
- Will we change our therapeutic decisions?
- What are the parents thoughts? Do/Don't want the tests, proph antibiotics etc
- Timing of the tests?
- Do we make a difference?
- High rate of VUR resolution
- What is "High Risk" hydronephrosis?
  - Current opinion >10-15 mm UTD more likely to find something
  - Nguyen et al: based on further eval and treatment rather than outcome.

One Approach

- Renal Ultrasound (within 48 hrs if “high risk”, >2weeks if not)
- VCUG
- If VCUG negative, MAG 3 at 3 months and then again around 9 months
- If VCUG + proph antibiotics
- Surgery based on grade and recurrent infections

Another option

- Early renal US only if bladder outlet concerns, otherwise >1-2 weeks
- Based on severity, bilat, consider VCUG/follow by US or possible proph
- No MAG 3 until >6 months since unlikely repair until >6-12 months.
- Watch closely for UTI. If no infections, why more aggressive behavior?

Do We Change the Outcome? "We have to save the kidneys!"

- Early data on PUV in utero repair, essentially no difference in renal outcome
  - PLUTO study 2013
- Meds vs Surgery: surgery decreased infections but not long term outcome-thus not just infections causing long term issues
- UPJ: unclear if earlier intervention changes the long term outcome-may change the short term renal function. May decrease other symptomatic issues
- Studies vary with underlying biopsy, outcome and radiologic imaging (IE US, MAG3 etc)
  - Peter,C review 2020

UPJ obstruction

- Society for Fetal Urology grades 1-4
- Conflicting evidence:
  - Nephrogenesis stops at 36 weeks gestation
  - Much renal parenchyma develops in first 20 weeks
  - Thus can we change the outcome?
- Short term outcome:
  - Low risk related to clinical issues: IE infection, stone, HTN, feeding issues from pressure etc.
  - Complete resolution likely in 30-70%
  - Primary concern is bilateral/single kidneys

- Long term outcome
  - Biopsy at repair- ~ 80% nml with good renal function on MAG3 scan. Yet 65% with abnormal findings if poor function seen (<40%).
    - Elder, JS et all 1995
  - Another study with 67% with glomerulosclerosis-did not correlate with radiologic findings
    - Huang WY et al 2006

- Single kidney data: Depending on cause~ 1:1000-1:2000 Alfandary H et al 2021
  - Is there worse long term kidney issues? (IE microalbumin, HTN, elevate cr relative to controls)
  - Does it impact long term outcome?
  - Should we not transplant patients with LD?

- UPJ Interventions:
  - Based on relative function, degree of hydronephrosis, residual renal parenchyma
  - Two thoughts:
    - Conservative management and then possible later repair
    - Earlier intervention/repair
    - Some suggestion that earlier repair has better short term improved function but no change in long term has been shown.

- 2000 Australian study: no difference in pre-intervention vs intervention era. Highly debated study at the time
- Unclear benefit of prophylactic antibiotics based on more recent studies
  - PRIVENT2019: may have a modest impact
  - RIVUR: decreased by half (small overall infection rate) no change in scarring
  - Craig et al 2019, review, no benefit

Thus, what do we do?

- Evaluate risk factors
  - Severity of hydro
  - Bladder obstruction
  - Bilat or not
  - Single kidney
  - Other conditions
  - Male/female
  - Age
- Discussion with family and their concerns
- Then decide on antibiotics, probiotics, US, VCUG and MAG3

Dealing

- " Each day of human life contains joy and anger, pain and pleasure, darkness and light, growth and decay. Each moment is etched with nature's grand design - do not try to deny or oppose the cosmic order of things"
  - Morihei Ueshiba The Art of Peace