Raised Creatinine in Childhood

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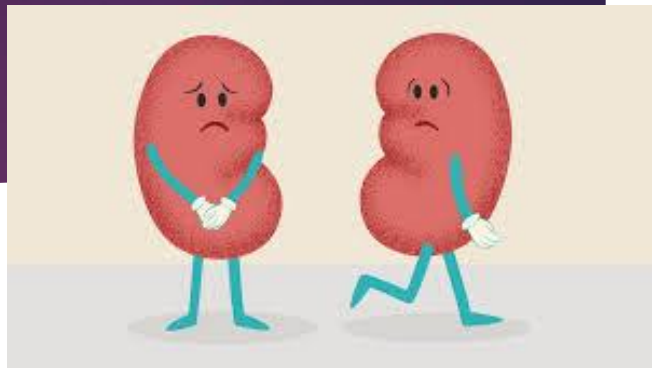
Overview

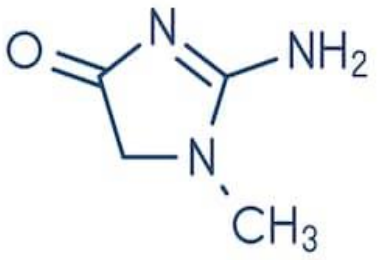
- What is a raised creatinine and why does it matter
- How to calculate eGFR in children
- Causes of renal failure in children
- How to approach raised creatinine
- Red flags and when to refer

Renal failure in children



- Chronic renal failure in children in uncommon
- Children in the UK rarely have routine bloods taken
- Normal ranges of creatinine vary between labs and are dependent on height and muscle mass of the child
- Raised creatinine a child may be physiologically normal or may reflect acute or chronic renal pathology
- Important to identify CKD in children as careful management in childhood may preserve renal function to avoid or delay ESRF

‘Normal Creatinine’



creatinine

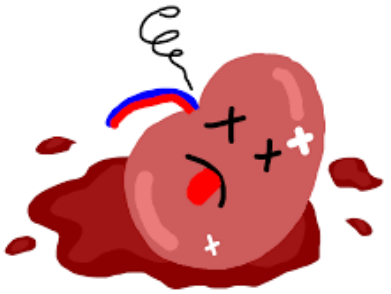
- Creatinine rises throughout childhood
- Normal adult creatinine is only reached once child is post-pubertal and will vary in adulthood
- Creatinine will physiologically rise as the child gets taller and develops increasing muscle mass.
- Children have low muscle mass and so creatinine is more affected by hydration status.

Calculation of eGFR in children

- Allows calculation of creatinine in relation to height
- GFR $\frac{\text{Height (cm) x 40}}{\text{Creatinine umol/L}}$ = GFR (ml/min)
- Many online calculators available

  Nephron.com
- eGFR >90 is normal in children

Presentation of CRF in children



- Creatinine is only part of the picture
- In a small thin child Plasma Cr does not rise until GFR is ~50% of normal.
- But many of these children will have other features of renal pathology including hypertension, proteinuria, haematuria
- Creatinine often jumps significantly at puberty due to growth spurt and development of muscle mass

Approach to raised creatinine in a child

- **History**
  - UTIs
  - Health and hydration when blood taken
  - Abnormal antenatal imaging
  - Family history of renal pathology
  - Urinary symptoms

- **Examination**
  - BP
  - Height and weight and assessment of muscle mass
  - Pubertal status
  - Urine dip
  - Calculate eGFR

Management

- A well child with ‘raised’ creatinine but normal eGFR, normal BP and normal urine dip does not require further investigation

- Modestly raised creatinine when child unwell or dehydrated should be repeated when child recovered and reminded to drink.

Management

- Persistently raised creatinine with eGFR <90 should have further investigation
- Children with hypertension, proteinuria or haematuria are much more likely to have renal pathology
- Significantly raised Cr or rising Cr on serial blood tests needs urgent referral

Tests at time of referral

- Renal uss
- UE, FBC, LFT, Bone, C3/C4, Immunoglobulins, bicarbonate, PTH,
- BP

Summary

- Borderline raised creatinine is a common finding and may be physiologically normal
- Creatinine rises with increasing height and increasing muscle mass
- Significantly raised creatinine or rising creatinine or associated with other abnormal findings are much more likely to have underlying pathology