Guidelines for the management of Acute Nephritis

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DISCLAIMER: These guidelines were produced in good faith by the author(s) in conjunction with the paediatric nephrology team at the University Hospital of Wales, Cardiff reviewing available evidence/opinion. They were designed for use by paediatric nephrologists at the University Hospital of Wales, Cardiff for children under their care. They are neither policies nor protocols but are intended to serve only as guidelines. They are not intended to replace clinical judgment or dictate care of individual patients. Responsibility and decision-making (including checking drug doses) for a specific patient lie with the physician and staff caring for that particular patient.

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Summary
These guidelines are aimed at providing the doctors presented with a child with acute nephritis with information to help identify the underlying problem and to guide treatment. Acute nephritis is one of the causes of acute kidney injury (AKI) and you are advised to also consult the guideline on the management of children with AKI. Further information is also provided by the guideline on haematuria.

Aetiology
Acute nephritis refers to conditions where there is an acute deterioration in renal function associated with salt and water retention leading to hypertension. The main cause is post-infectious (or post-streptococcal) glomerulonephritis. Non-streptococcal causes include:

- Bacteria: S. aureus, H. influenzae, Mycoplasma pneumoniae, E. coli, Yersinia, Campylobacter, Salmonella, Syphillis, Mycobacterium tuberculosis
- Viruses: Herpesviruses (EBV, CMV, HSV, varicella zoster), Parovirus B-19
- Fungi: Candida, Aspergillus, Histoplasmosis, Cryptococcus
- Parasites: Malaria, schistosomiasis, leishmaniasis, toxoplasmosis

Other causes of acute nephritis include:
- Membranoproliferative GN
- HSP nephritis
- SLE
- IgA nephropathy
- ANCA-positive vasculitis

Clinical presentation
- Haematuria - macroscopic or microscopic
- Fluid overload
- Hypertension
- Proteinuria
- Renal impairment - oliguria, raised serum creatinine

Other features to help clarify cause
- Skin rash
- Streptococcal infection - throat or skin
- Arthralgia / arthritis

Clinical features suggesting a diagnosis other than post-infectious GN
- Family history of glomerular disease
- Age less than 4 years or over 15 years
- Extra renal symptoms
- Evidence of chronic renal disease

Clinical examination
Identify any extra renal features as described above.
Assess fluid status - oedema, weight
Blood pressure
Look for signs of heart failure
Investigations

Blood
- Serum U&Es, creatinine, bicarbonate, calcium, phosphate
- Serum magnesium, alkaline phosphatase, albumin, LFTs
- FBC and film (where indicated)
- Blood culture, throat swab and CRP
- Serum urate, LDH, CK, ESR
- Complement (C3, C4),
- Immunoglobulins, ASOT, anti-DNase B,
- ANA, anti-dsDNA abs, ANCA, anti-GBM abs (where indicated)

Urine
- Gross examination
- Urinalysis
- M,C & S - microscopy to assess red cell morphology and presence of casts
- Protein : creatinine ratio

Other
- Throat swab
- Renal US scan

Management

The two problems requiring attention in acute nephritis are renal impairment (AKI) and fluid overload leading to hypertension.

AKI
Monitor urine output, weight, serum [creatinine], serum [K⁺], serum [HCO₃⁻]. If fluid overload, hyperkalaemia not responding to treatment then discuss with paediatric nephrologist. However, most patients will not need dialysis.

Fluid overload
Fluid overload manifests as oedema and hypertension. The management of hypertension in acute nephritis is based on aggressive diuretic therapy (furosemide 2-5 mg /kg as a slow infusion). Higher doses are required in the presence of a raised creatinine. Correction of the salt and water overload will result in resolution of hypertension. Until this is achieved it may be necessary to include additional anti-hypertensive agents if blood pressure is grossly elevated e.g. > 150 systolic in older children. For recommendations please refer to the guideline on hypertension.

Follow up
Most children with post-infectious nephritis will regain normal renal function within a few weeks and the prognosis is good. It is usual for microscopic haematuria to persist for many months up to a few years. Proteinuria should resolve. Complement levels should be rechecked at 8 weeks.

If any of the following are present, the patient should be discussed with a paediatric nephrologist:
- Persistent renal impairment
- Persistent proteinuria
• Failure of complement levels to normalize by 8 weeks