

Guidelines for the diagnosis and management of Acute Kidney Injury

The previous diagnosis of ARF (Acute Renal Failure) has been changed to AKI (Acute Kidney Injury) as it was appreciated that most insults to the kidney result in some degree of injury with a smaller proportion progressing to failure. Recognition of the earlier stages of AKI should result in earlier intervention and consequently fewer patients progressing to ARF. AKI is now classified into three stages indicating increasing degrees of severity.

Three stages of AKI are:

AKIN STAGE	Serum creatinine change	Urinary output change
I	150% to 200% increase	<0.5ml/kg/hr for 6 hours
II	200% to 300% increase	<0.5ml/kg/hr for 12 hours
III	>300% or 350µmols/l	<0.3mls/kg/hr for 24 hours or anuria

Patients admitted with an abnormal serum creatinine (>120µmols/l) need to be assessed.

Q. Is the abnormal result new or old?

A. Check biochemistry results database, GP or case notes for pre-existing serum creatinine values

If pre-existing evidence of renal dysfunction found over >3month period of similar value, one would then regard this as chronic renal impairment.

Remember

History, examination, urine testing and renal USS are all crucial for making a diagnosis.

Pre-renal?

Appropriate history of volume loss; diarrhoea, vomiting, excess diuretic drug usage, bleeding, trauma, pancreatitis, sepsis etc. **Clinical signs** – postural hypotension, reduced skin turgor, cold extremities, low volume pulse tachycardia....

Treat: Restore intravascular volume, treat infection if suspected or documented.

Post-renal?

Symptoms of an altered pattern of micturition e.g. prostatic type symptoms, polyuria, oliguria, or a combination are important pointers. Additionally recurrent urinary tract infections and history of renal calculi are important points to elicit.

Clinical signs – palpable enlarged bladder, enlarged prostate on PR examination, pelvis mass on PV examination

Treat: Bladder catheterisation for lower urinary tract obstruction and bilateral nephrostomies for upper urinary tract obstruction and then specific therapy for underlying cause.

Intrinsic renal disease:

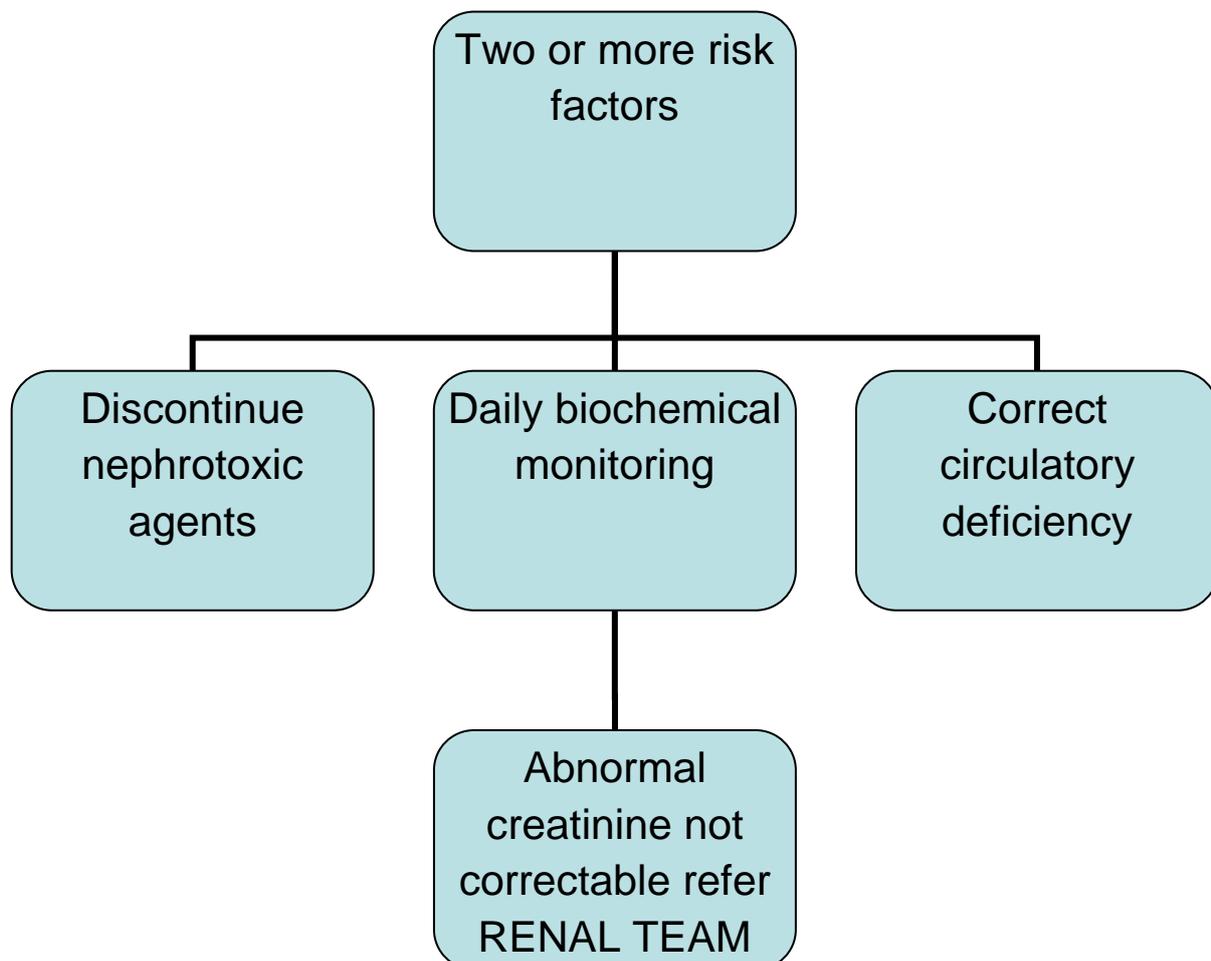
Symptoms of systemic disease such as fever, myalgia, arthralgia, rash, iritis, epistaxis, cough, haemoptysis, paraesthesia, paresis etc. Consider pre-existing and new medication as potentially nephrotoxic. Is there evidence of significant vascular disease to consider a diagnosis of ischaemic nephropathy, also consider any recent intercurrent illness. **Investigations** include urinalysis, myeloma screen, connective tissue screen and vasculitis screen i.e. ESR, CRP, ANA, dsDNA, ENA, RF, C3,C4, Igs +paraprotein strip, serum free light chains, cryoglobulins (when indicated), CK, SACE and FBC with blood film. Renal biopsy is required for diagnosis and prognosis in most cases.

Treat: According to the underlying illness. Depending on degree of renal dysfunction dialysis may be required.

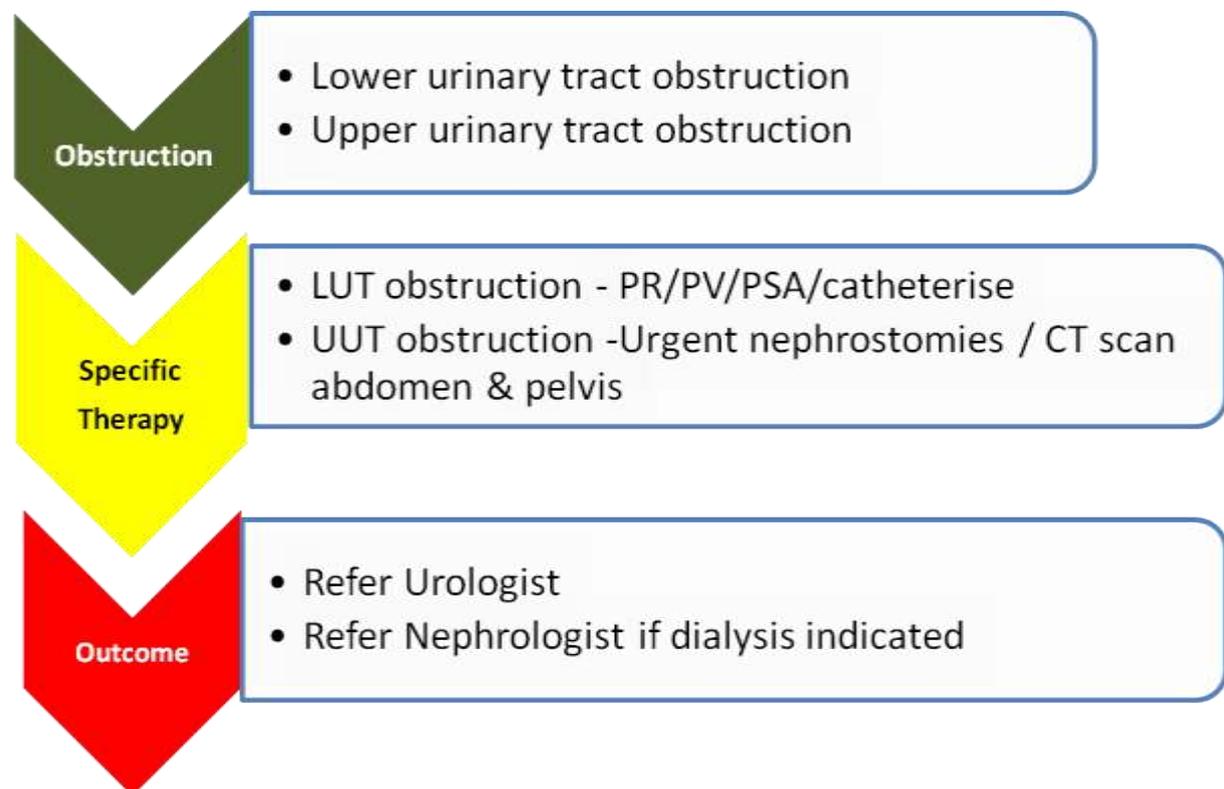
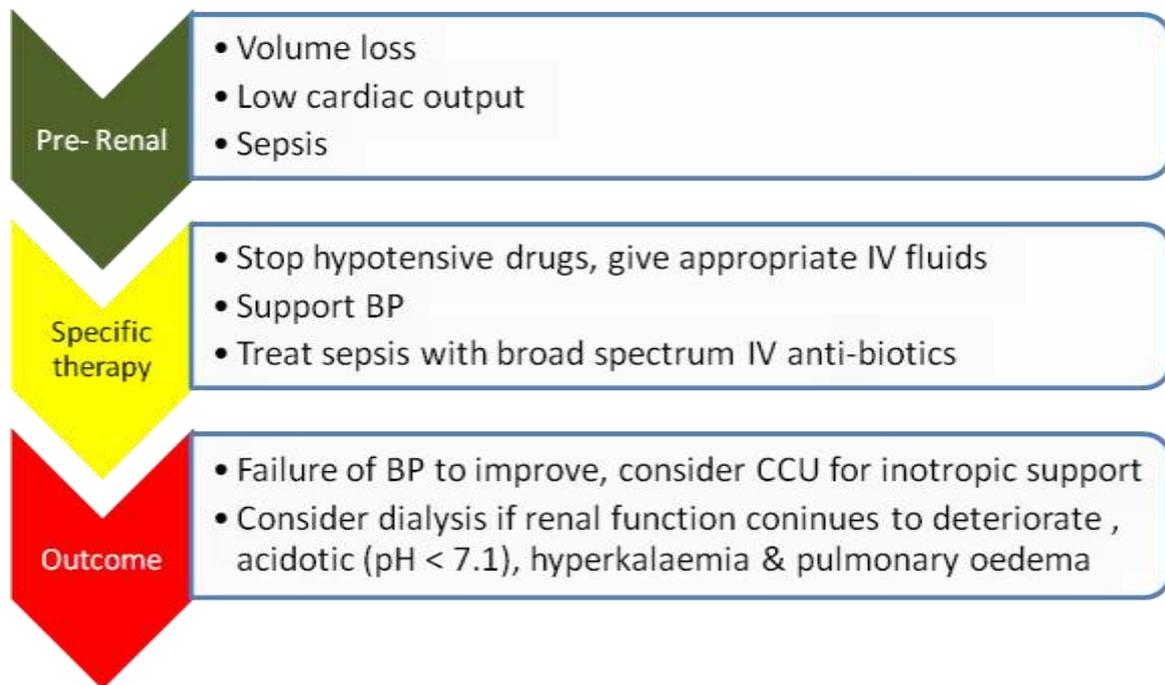
Patients at risk of developing AKI are those patients with normal renal function at the time of admission in the setting of a number of potential risk factors. For those patients who fall into this category it is then important to ensure that they have **daily U&Es** and that potentially **nephrotoxic insults are eliminated**.

Assessment of risk is not well stratified however if one uses the table of risk factors listed below then the presence of 2 or more factors would be sufficient to indicate an at risk patient.

History based		Examination based	
Comorbidity: CHF / CCF / PVD / AAA	Y/N	Abnormal urinalysis	Y/N
Age (>70 years)	Y/N	Sepsis	Y/N
Medication: ACEi / ARB / NSAID	Y/N	Hypovolaemia	Y/N
Pre-existing renal dysfunction	Y/N		



Investigation & management flow diagrams for AKI



Refer to Renal Team

Intrinsic Renal disease

Investigations include:
ANA/ENA/ANCA/anti-GBM
RF/Igs + strip/serum free light chains/C3,C4,/CRP
ESR/MSU/Blood cultures/
blood film

The following haematological & biochemical parameters may aid diagnostic grouping of intrinsic renal disease

Low Haemoglobin

Myeloma, HUS/TTP, anti-GBM, SLE, ANCA-related vasculitides

Low Platelets

HUS/TTP/HELLP /sepsis

Pulmonary-Renal syndrome

- Anti-GBM
- SLE
- ANCA-related vasculitides

Hypercalcaemia

Myeloma
Sarcoidosis

Low complement

SLE
Endocarditis
Mesangiocapillary gn
Post infectious gn
Cryoglobulinaemia