Subject: Acute Kidney Injury Guideline

Objective: To improve the detection and treatment of Acute Kidney Injury in all clinical areas of the Trust.

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Introduction/ Background

Acute Kidney Injury [AKI] is more often than not the consequence of systemic illness. AKI is associated with high mortality and is in itself an indicator of ongoing insult. Rapid recognition and resuscitation helps to prevent or minimize renal involvement and has a major impact on outcomes. Such interventions also buy time to deal with the primary disease, systemic or renal.

Exceptions

Patients with multi-organ failure and those who do not stabilise despite resuscitation, require input from all the relevant specialist teams including Critical Care. There is no point in focusing on the renal failure in isolation.
**Acute Kidney Injury (AKI) Guideline**

**University Hospital Aintree**

Patient admitted to/in hospital with
- Any Acute Illness
- Oliguria / Anuria

**Initial assessment: MEWS**
(Pulse, BP, Respiratory Rate, Temperature, Urine Output)

**Urgent blood test: U&Es and repeat within 48 hours**
Follow NICE clinical guideline 50 for acutely ill patients

**Diagnosis of AKI confirmed on initial or subsequent U&E’s.**

**Confirmed AKI**
- Treat underlying problems (e.g. hypotension, dehydration, sepsis)
- Monitor MEWS
- Treat acute complications (e.g. acidosis, hyperkalaemia, respiratory failure)
- Urine dip test and microscopy
- Stop any nephrotoxic drugs e.g. NSAIDs. Stop ACE Inhibitors and A2 receptor blockers. Avoid gentamicin / contrast
- Withhold anti-hypertensive drugs if hypotensive
- Urinary catheter; strict fluid balance – intake, output monitoring
- Urgent renal ultrasound scan and decompress if obstructed
- Urgent senior review

**AKI stage 1**

- Treat underlying problems (hypotension, dehydration, sepsis etc)
- Treat acute complications (acidosis, hyperkalaemia, respiratory failure)
- Daily U & E’s
- Urine albumin:creatinine ratio
- Consider renal screen (ANCA, Anti GBM Ab, ANA, dsDNA, Immunoglobulins & paraprotein, urine BJP)

- If no improvement: consider renal referral*

**AKI stage 2**

- Same as stage 1
- Also, Urgent renal screen
- Consider renal referral *

**AKI stage 3**

- Same as AKI stage 2
- Refer renal *
- Urgent Hep B, Hep C, HIV screen

* Renal referral: Fax 0151-529-2420 (9am – 3pm)
* On call or urgent: Ring switchboard to speak to renal consultant on call and fax the referral.
When following this guideline staff should be aware of the content of the following documents. They should take them into account in the clinical management of patients.

- Trust MEWS (Modified Early Warning Score) Policy
- Trust clinical guideline on contrast induced nephropathy prophylaxis. This document will be found in the nephrology folder within the clinical subjects index.
- Treatment of Hyperkalaemia in renal failure. http://intranet.aht/Polproc/Clinical/Medical/Nephrology/ClinicalGuidelinesForTheMgmtOfHyperkalaemia.pdf If hyperlink fails this document is found in the nephrology folder within the clinical subjects index.
- Treatment of pulmonary oedema in renal failure http://intranet.aht/Polproc/Clinical/Medical/Nephrology/ClinicalGuidelineForFluidOverloadPulmonaryOedema.pdf If hyperlink fails this document is found in the nephrology folder within the clinical subjects index.

Appendix 1

Diagnostic criteria for AKI

An abrupt (within 48 hours) reduction in kidney function currently defined as an absolute increase in serum creatinine of more than or equal to ≥ 26.4 μmol/l (0.3 mg/dl), a percentage increase in serum creatinine of more than or equal to 50% (1.5-fold from baseline), or a reduction in urine output (documented oliguria of less than 0.5 ml/kg per hour for more than six hours).

<table>
<thead>
<tr>
<th>Stage</th>
<th>Serum Creatinine Criteria</th>
<th>Urine output criteria</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>↑ SCr ≥ 26.4 μmol/l from baseline or ↑ SCr ≥150% to 200% (1.5- to 2-fold) from baseline</td>
<td>≤0.5ml/kg/hr &gt;6hr</td>
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<tr>
<td>2</td>
<td>↑ SCr ≥ 200% to 300% (&gt; 2- to 3-fold) from baseline</td>
<td>≤ 0.5 ml/kg/hr &gt;12 hr</td>
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<tr>
<td>3</td>
<td>↑SCr ≥ 300% (&gt; 3-fold) from baseline (or serum creatinine ≥ 354μmol/l with an acute increase of at least 44 μmol/l in &lt;24 hours) or those patients initiated on RRT</td>
<td>≤ 0.3 ml/kg/hr for 24 hr or anuria for 12 hr</td>
</tr>
</tbody>
</table>


Note:

Changes in serum creatinine or urine output occurring within a 48 hour time period. SCr denotes serum creatinine and RRT denotes renal replacement therapy. Only one criterion (serum creatinine or urine output) needs to be fulfilled to qualify for a stage.
Appendix 2

Clinical Guidelines for Nephrology Referrals at Aintree

Life threatening situations requiring urgent referral to Nephrology (and often Critical Care as well):
1. Pulmonary Oedema*
2. Hyperkalaemia* ( > 5.7 mmol/L)
3. Severe Acidosis* ( < 7.2)
4. Uraemic encephalopathy
5. Uraemic pericarditis
6. Associated with vasculitis/ arterial atheroembolic disease
7. Associated with malignant hypertension*
8. Associated with hypotension*
9. Associated with multi-organ failure*

*All measures to treat these emergencies are to be initiated immediately.

Early Nephrology referral required if:
Rise in Serum Creatinine > 25% above baseline, OR absolute value >200 umol/L.
Nephrotic syndrome or any glomerulonephritis, systemic vasculitis
Renal transplant patients admitted with any medical/ surgical condition

Treatment Guidelines:
1. Monitor and maintain pulse, BP, respiration.
2. If oliguric, obstructed or in doubt, catheterise. Monitor input, output, daily weight.
3. Urine dipstick
4. Urgent U&E, venous bicarbonate or ABG, bone profile, LFT, CK, blood sugar and FBC. CXR and ECG. Urine for casts, spot sodium and culture. Kidney, Ureter, Bladder (KUB) ultrasound.
5. Repeat daily U&E and venous bicarbonate
6. Stop all potentially nephrotoxic drugs and any other nephrotoxins
7. Consider CVP line: aim to keep CVP 8 – 10cm.
8. Pulmonary oedema** – stop IV fluids, minimise intake, IV furosemide, 100% O₂ and other usual measures.
10. Acidosis - IV Sodium Bicarbonate if pH < 7.2 or hypotensive or hyperkalaemic. Oral Sodium Bicarbonate if pH 7.2 – 7.36.
11. Malignant hypertension – IV beta blockers, oral antihypertensives, IV nitrates i.v. nitroprusside.

** Refer to detailed clinical guidelines for Pulmonary Oedema and Hyperkalaemia on the Aintree Intranet

Urgent referrals or if unsure of urgency, contact consultants (24/7)/ (staff grade / SpR-week days) via switchboard or bleep.

All other referrals during week days contact via fax 2420 and renal secretaries ext 3356/ 6054/ 8701/ 8796/ 8797. Please call the renal team for any urgent referrals after 3pm, before faxing the request.
Appendix 3:

Guidance on renal replacement therapy including treatment limitation or withdrawal

Renal replacement therapy (RRT) options for acute kidney injury or end stage renal failure would include intermittent haemodialysis on ward 20 or continuous veno venous haemofiltration in the critical care unit. RRT options would be discussed with all suitable patients by the nephrologist when and if required.

Preparation for RRT which include screening for blood borne viruses such as Hepatitis B, Hepatitis C and HIV should be performed urgently on all patients with verbal informed consent. Blood requests are to be marked as urgent and the Virology Laboratory personnel are to be informed by phone.

Patients who will require central venous access for RRT should be prescribed Octenisan bodywash od and nasal Mupirocin tid for 5 days, starting as soon as the decision is made.

When patients have no mental capacity the physician in charge and the nephrologist would decide jointly in the best interest of the patient and the decision made should be discussed with their family.

Patients who opt for conservative maximum medical management (refused RRT) should receive treatment for all other medical conditions. The majority of informed decisions on non dialytic therapies are taken well before patients are in end stage renal failure. Treatment of other medical conditions should therefore not be withheld. However, in those patients whose renal failure is severe enough to be life limiting and who have opted for non dialytic treatment, a referral to the Hospital Specialist Palliative Care Team should be considered. If the patient is in the dying phase consider starting the Liverpool Care of the Dying Pathway. In all cases the resuscitation status should be determined and documented as per Trust policy.

In those patients in whom prognosis is poor due to the underlying disease process or because they have severe co-morbidity, decisions regarding limitation or withdrawal of RRT will be made by the renal and the admitting teams following discussions with patient and family, where possible.

References: