

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

SCOPE

1 **Guideline title**

Acute kidney injury: prevention, detection and management of acute kidney injury up to the point of renal replacement therapy

1.1 **Short title**

Acute kidney injury

2 **The remit**

The Department of Health has asked NICE: 'To produce a clinical guideline on the diagnosis and management up to the point of dialysis for acute kidney injury'.

3 **Clinical need for the guideline**

3.1 **Epidemiology**

- a) Acute kidney injury (formerly known as acute renal failure) is a common condition in which there is a swift drop in the function of the kidneys over hours or days. It is mainly seen in acutely unwell patients, so about 90% of cases occur in hospital inpatients. It is predominantly seen in older people, people who already have kidney disease (also called chronic kidney disease), and people with a critical illness. However, it is also seen in primary care, in young people and children, after procedures including surgery, and in people with urological diseases (disorders of the rest of the urinary tract). Typically the mortality from acute kidney injury is in the range of 30–60%, depending on the patient group.

- b) Recently there has been much work to develop a standardised way to define acute kidney injury and its severity. This produced the RIFLE (risk, injury, failure, loss of kidney function and end-stage kidney disease) definition, which was then modified to produce the acute kidney injury network (AKIN) definition. A modified version of the RIFLE criteria has been developed for paediatrics (pRIFLE). The related AKIN definition has not been assessed in paediatric patients.
- c) There is evidence that even small deteriorations in renal function are associated with increased mortality. Such modest drops in kidney function are now included in the AKIN definition. The more severe stages of acute kidney injury, that do or do not require dialysis, also have a very considerable risk of mortality.
- d) The incidence of acute kidney injury in the UK has been best studied in relation to the need for renal replacement therapy (also known as dialysis). Typically some 300 adults per million need renal replacement therapy for acute kidney injury each year.
- e) Studies of the incidence of all acute kidney injury have been hampered by the lack of an accepted definition. There have been no published UK studies using the RIFLE or AKIN definitions to determine the incidence of acute kidney injury. A retrospective study using the RIFLE definition in a large Australian hospital found that 18% of all adult admissions had acute kidney injury. The incidence in this study suggests that there are likely to be considerably more than 500,000 cases of acute kidney injury per year among hospitalised adult patients in England. There is extremely limited information on the incidence of acute kidney injury in the general paediatric inpatient population.

3.2 Current practice

- a) Acute kidney injury is typically diagnosed based on either a fall in urine output or a rise in blood creatinine, the blood test commonly

used to estimate kidney function. There is currently no 'gold standard' test to diagnose acute kidney injury in routine clinical practice. No test currently exists that provides non-invasive, inexpensive, real-time and continuous monitoring of kidney function.

- b) The only current guidance on acute kidney injury for UK clinicians is produced by the Renal Association, which recently published its latest version of 'Clinical practice guidelines: acute kidney injury' (2011). The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) published a landmark study in 2009 of the care of more than 500 adult patients who died in hospital with a primary diagnosis of acute kidney injury.
- c) The bulk of adult inpatients who have or develop acute kidney injury are admitted under general medicine or elderly care, with a large range of medical and surgical specialties caring for small numbers of patients. Recent data from the USA suggest that acute kidney injury patients admitted at the weekend have an increased risk of death. Some 31% of patients dying of acute kidney injury were referred to nephrologists in the NCEPOD study, and assessors felt that a further 14% should have been referred.
- d) If a person develops acute kidney injury in primary care, and is not admitted to hospital, their GP will often discuss the case with a secondary care physician or nephrologist.
- e) It is well established that assessment of acute kidney injury in the UK is often suboptimal, and key steps in investigation and management are often lacking. NCEPOD showed a number of key deficiencies in care, including: the condition being avoidable in 14% of cases, recognition and care after admission often being poor, and senior reviews being inadequate in 24% of cases.
- f) Patients with severe acute kidney injury (RIFLE 'Failure' category or AKIN stage 3) may need renal replacement therapy and/or

critical care. In the NCEPOD study 20% of patients were transferred to renal or critical care, and a further 8% should have definitely received such 'step-up' care. It was not possible to determine the need for step-up care in a further 22% because of poor documentation. In the NCEPOD study 12% of patients received renal replacement therapy, and it was felt that a further 8% would have benefited from it but did not receive it. There have been few other studies of renal replacement therapy referral in acute kidney injury.

- g) Children older than 1 month are affected by similar issues to adults in the prevention, detection and management of acute kidney injury. Although there are some differences in acute kidney injury in children, clinicians caring for children older than 1 month will benefit from guidance covering the areas set out in the scope.
- h) This NICE guideline is needed to address the known and unacceptable variations in the recognition, assessment, initial treatment and usage of renal replacement therapy in acute kidney injury.

4 The guideline

The guideline development process is described in detail on the NICE website (see section 6, 'Further information').

This scope defines what the guideline will (and will not) examine, and what the guideline developers will consider. The scope is based on the referral from the Department of Health.

The areas that will be addressed by the guideline are described in the following sections.

4.1 Population

4.1.1 Groups that will be covered

- a) Adults
- b) Children older than 1 month.
- c) Particular consideration will be given to the needs of:
 - older patients (65 years and older)
 - people at high risk of developing acute kidney injury, such as people with chronic kidney disease and urological disorders.

4.1.2 Groups that will not be covered

- a) Children younger than 1 month (neonates). This group has physiologically different needs and care is very specialised. There is little information in this group on outcomes related to acute kidney injury.
- b) Acute kidney injury in renal transplant patients. These patients have a different spectrum of causes of acute kidney injury.
- c) Acute kidney injury in pregnant women. Acute kidney injury in pregnant women has a different spectrum of causes, with less morbidity and mortality than in the non-pregnant population.

4.2 Healthcare setting

- a) All settings in which NHS care is received.

4.3 Clinical management

4.3.1 Key clinical issues that will be covered

- a) Clinical risk assessment in the identification and ongoing assessment of acute kidney injury.
- b) Serum creatinine and urine output in diagnosis and staging.

- c) Urinalysis to determine the underlying cause.
- d) Preventing deterioration:
 - nephrotoxic drugs in patients with, or at high risk of acute kidney injury
 - methods to monitor the use of nephrotoxic and other potentially toxic drugs in patients with suspected or confirmed acute kidney injury.
- e) Acetylcysteine and/or intravenous fluids to prevent contrast-induced nephropathy.
- f) When to use ultrasound, and in which patients.
- g) Timing of relief of urological obstruction by methods such as nephrostomy.
- h) Pharmacological management with:
 - low dose dopamine
 - loop diuretics.
- i) Criteria for involving nephrology services (note that ' Recognition of and response to acute illness in adults in hospital', NICE clinical guideline 50 [2007] covers referral of the acutely ill patients to critical care services).
- j) At what stage renal replacement therapy should be considered
- k) Information and support for patients and carers.

Note that guideline recommendations will normally fall within licensed indications; exceptionally, and only if clearly supported by evidence, use outside a licensed indication may be recommended. The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

4.3.2 Clinical issues that will not be covered

- a) Renal replacement therapy beyond timing of initiation. This includes method of dialysis used; type of dialysis membrane; dialysis dose; method of vascular access and dialysis anticoagulation.
- b) Biomarkers. This is an important developing field in acute kidney injury but they are not widely available and there is insufficient published clinical evidence to support or refute their use, or to compare costs and benefits with standard care.
- c) Intravenous fluid management in adults and paediatrics. A separate NICE guideline on intravenous fluid therapy in adults will be developed in parallel to cover this topic.
- d) The specific management of less common causes of acute kidney injury, such as vasculitis and haemolytic uraemic syndrome.

4.4 Main outcomes

- a) Mortality.
- b) Need for renal replacement therapy.
- c) Length of hospital stay.
- d) Health-related quality of life.

4.5 Economic aspects

Developers will take into account both clinical and cost effectiveness when making recommendations involving a choice between alternative interventions. A review of the economic evidence will be conducted and analyses will be carried out as appropriate. The preferred unit of effectiveness is the quality-adjusted life year (QALY), and the costs considered will usually be only from an NHS and personal social services (PSS) perspective. Further detail on the methods can be found in 'The guidelines manual' (see 'Further information').

4.6 Status

4.6.1 Scope

This is the final scope.

4.6.2 Timing

The development of the guideline recommendations will begin in September 2011.

5 Related NICE guidance

5.1 Published guidance

- Chronic kidney disease. NICE quality standard (2011). Available from www.nice.org.uk/guidance/qualitystandards/chronickidneydisease/ckdqualitystandard.jsp
- Medicines adherence. NICE clinical guideline 76 (2009). Available from www.nice.org.uk/guidance/CG76
- Chronic kidney disease. NICE clinical guideline 73 (2008). Available from www.nice.org.uk/guidance/CG73
- Acutely ill patients in hospital. NICE clinical guideline 50 (2007). Available from www.nice.org.uk/guidance/CG50
- Nutrition support in adults. NICE clinical guideline 32 (2006). Available from www.nice.org.uk/guidance/CG32
- Preoperative tests. NICE clinical guideline 3 (2003). Available from www.nice.org.uk/guidance/CG3

5.2 Guidance under development

NICE is currently developing the following related guidance (details available from the NICE website):

- End of life care. NICE quality standard. Publication expected November 2011.
- Intravenous fluid therapy. NICE clinical guideline and quality standard. Publication date to be confirmed.

6 Further information

Information on the guideline development process is provided in:

- ‘How NICE clinical guidelines are developed: an overview for stakeholders the public and the NHS’
- ‘The guidelines manual’.

These are available from the NICE website

(www.nice.org.uk/GuidelinesManual). Information on the progress of the guideline will also be available from the NICE website (www.nice.org.uk).