

# NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

## Centre for Clinical Practice

### SCOPE

**Clinical guideline title:** Intravenous fluid therapy in adults in hospital

**Quality standard title:** Intravenous fluid therapy in adults in hospital

## 1 Introduction

### 1.1 *Clinical guidelines*

Clinical guidelines are recommendations by NICE on the appropriate treatment and care of people with specific diseases and conditions within the NHS. They are based on the best available evidence.

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.

### 1.2 *Quality standards*

Quality standards are a set of specific, concise quality statements and measures that act as markers of high-quality, cost-effective patient care, covering the treatment and prevention of different diseases and conditions.

For this topic a NICE quality standard will be produced based on the guideline development recommendations. The clinical guideline and the quality standard will be published at the same time.

This scope defines the areas of care for which specific quality statements and measures will (and will not) be developed.

The guideline and quality standard development processes are described in detail on the NICE website (see section 8).

## **2 Need for guidance**

### **2.1 *Epidemiology***

- a) Correct fluid and electrolyte balance is essential to maintain normal physiological function. Hospitalised patients may not be able to eat and drink normally and often have depleted fluid levels and/or an electrolyte imbalance. Intravenous provision of fluid and electrolytes is therefore often needed to maintain or restore balance.
- b) Intravenous fluid and electrolyte therapy may also be needed to correct imbalances from losses of red blood cells, plasma, water or electrolytes beyond the normal losses in urine, stool and sweat and maintain in red blood cells, plasma, water or electrolytes. Causes of abnormal losses include blood loss; plasma or fluid loss from burns; fluid loss from diarrhoea, vomiting or surgical drains; and abnormal leakage of fluid from the circulation into the interstitial space.
- c) There are many issues to consider when prescribing intravenous fluids and electrolytes. It is imperative that the amount and type is correct for the patient. Inadequate fluid provision can lead to hypovolaemia and poor organ perfusion, and excessive provision can result in hypervolaemia, oedema and heart failure. Under or over provision of electrolytes can also lead to potentially serious disturbances of intracellular or extracellular electrolyte balance, particularly in patients with reduced kidney or liver function.
- d) Intravenous fluid therapy spans many medical and surgical disciplines. Inappropriate fluid therapy is rarely documented as being responsible for patient harm, but it is widely accepted that errors in prescribing, leading to insufficient or excessive provision

of intravenous fluids or electrolytes, are common and have adverse effects on patient morbidity and mortality.

- e) These prescribing errors are particularly likely to arise in emergency departments, acute admission units and general ward areas, where initiation and prescription of intravenous fluids may be undertaken by less expert staff. In higher dependency and critical care units more expertise is available and fluid and electrolyte status can be more closely monitored.
- f) A report, which summarises lessons learnt from practice in the post operative period (the 1999 UK National Confidential Enquiry into Perioperative Deaths (NCEPOD)) emphasised that fluid imbalance leads to serious postoperative morbidity and mortality. The report estimated 20% of patients studied had either poorly documented fluid balance or unrecognised and untreated fluid imbalance. It is likely that similar problems exist in other branches of hospital practice.

## **2.2 Current practice**

- a) Prescribers are not always aware of the specific constituents of the various intravenous replacements therapies and as such, many fluid prescriptions provide too little or too much fluid or electrolytes to restore and maintain fluid balance. There is little formal training and education in intravenous fluid management to support correct prescribing.
- b) There is a wide variation in the type of charts used to record fluid and electrolyte status in practice. Monitoring of patients is often suboptimal, with fluid and electrolyte status not being recorded accurately. Changes to patients' requirements are often not assessed. There is often insufficient attention by clinical staff to ensure that appropriate identification, treatment and monitoring of changes in fluid and electrolyte status is maintained and documented.

- c) There is considerable debate about the efficacy of some specialised intravenous fluids in seriously ill patients, and consequent variation in clinical practice.
- d) There is a need for a standardised approach to the clinical assessment of patients' fluid and electrolyte status and the prescription of intravenous fluid therapy in the NHS. This guidance represents a major opportunity to improve patient safety.

### **3 Clinical guideline**

#### **3.1 Population**

##### **3.1.1 Groups that will be covered**

- a) Adults (16 years and older) in hospital.
- b) Medical and surgical (pre- and postoperative) patients, including subspecialties not specifically excluded in section 3.1.2.
- c) Patients with sepsis.
- d) Patients with acute kidney injury who do not need renal replacement therapy.
- e) Chronic kidney disease stage 1–3.
- f) Specific consideration will be given to the particular needs of:
  - older people, who have particular challenges in managing fluid balance
  - specific religious groups, in relation to choice of fluid
  - any other groups shown to have particular clinical needs.

##### **3.1.2 Groups that will not be covered**

- a) People younger than 16 years.
- b) Pregnant women.

- c) Patients with severe (stage 4 or 5) chronic kidney disease or liver disease (Child-Pugh grade A-C).
- d) Patients with diabetes, including those with diabetic ketoacidosis and hyperosmolar states.
- e) Patients needing inotropes to support their circulation.
- f) Patients with burns.
- g) Patients with traumatic brain injury or needing neurosurgery.

### **3.2 *Healthcare settings***

- a) NHS hospitals.

### **3.3 *Management***

#### **3.3.1 Key issues that will be covered**

- a) Training and education in clinical assessment, prescribing, monitoring, evaluating and documenting intravenous fluid therapy in hospitals.
- b) Assessment, monitoring and re-evaluation of fluid and electrolyte status:
  - Clinical assessment, including:
    - physical examination
    - fluid intake and output, including measurement of fluids associated with intravenous drug administration and total parenteral nutrition
    - medical history, including current prescriptions of medications that may affect fluid and electrolyte status.
  - Laboratory- or ward-based assessment of, for example:
    - plasma or blood
      - ◇ sodium
      - ◇ potassium

- ◇ chloride
- ◇ urea
- ◇ creatinine
- ◇ pH
- ◇ bicarbonate
- urinary
  - ◇ sodium
  - ◇ potassium.

- c) Appropriate documentation for clinical assessment, prescribing, monitoring and re-evaluation of the patient's fluid and electrolyte status.
- d) Types, volume and timing of fluids and electrolytes to restore fluid balance (resuscitation):
- crystalloids compared with other crystalloids
  - crystalloids compared with colloids
  - colloids compared with other colloids.
- e) Types, volume and timing of fluids and electrolytes to maintain fluid balance:
- crystalloids compared with other crystalloids.
- f) Types, volume and timing of fluids and electrolytes to replace continuing abnormal fluid losses:
- crystalloids compared with other crystalloids
  - crystalloids compared with colloids
  - colloids compared with other colloids.
- g) Specific considerations related to intravenous fluid therapy in patients who have:
- acute kidney injury, up to the point of renal replacement therapy

- sepsis
- trauma
- congestive heart failure.

### **3.3.2 Key issues that will not be covered**

- a) Route of administration and intravenous catheter-related issues, such as choice of catheter, placement techniques and catheter-related infection.
- b) Use of blood and blood products, except albumin.
- c) The specific monitoring or prescription of electrolytes, minerals and trace elements other than sodium, potassium and chloride, unless their status directly influences sodium, potassium or chloride provision (for example, low magnesium preventing correction of hypokalaemia).
- d) Use of inotropes to support circulatory failure.
- e) Invasive monitoring of fluid status, for example in critical care or during surgical anaesthesia.
- f) Parenteral nutrition beyond consideration of fluid and electrolyte content.
- g) Labelling, preparation and storage of both standard and non-standard intravenous fluids.
- h) Ethical issues related to intravenous fluid prescription at the end of life.

### **3.4 Main outcomes**

- a) Mortality.
- b) Length of stay in hospital.
- c) Adverse events relating to fluid and electrolyte imbalance.

- d) Quality of life.

### **3.5 *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 section 8).

## **4 Quality standard**

Information on the NICE quality standards development process is available on the NICE website, see section 8.

### **4.1 *Areas of care***

The areas of care of a patient's journey that will inform the development of the quality statements are set out below (see 4.1.1). The content of the final quality standard statements may differ before and after consultation with stakeholders.

#### **4.1.1 Areas of care that will be considered**

- a) Training and education.
- b) Assessment, monitoring and re-evaluation of fluid and electrolyte status.
- c) Documentation.
- d) Types, volume and timing of fluids and electrolytes to restore fluid balance (resuscitation).
- e) Types, volume and timing of fluids and electrolytes to maintain fluid balance.



- f) Types, volume and timing of fluids and electrolytes to replace continuing abnormal fluid losses.
- e) Specific considerations related to intravenous fluid therapy in patients who have:
  - acute kidney injury, up to the point of renal replacement therapy
  - sepsis
  - trauma
  - congestive heart failure.

#### **4.1.2 Areas of care that will not be considered**

- a) Route of administration and intravenous catheter-related issues, such as choice of catheter, placement techniques and catheter-related infection.
- b) Use of blood and blood products, except albumin.
- c) The specific monitoring or prescription of electrolytes, minerals and trace elements other than sodium, potassium and chloride, unless their status directly influences sodium, potassium or chloride provision (for example, low magnesium preventing correction of hypokalaemia).
- d) Use of inotropes to support circulatory failure.
- e) Invasive monitoring of fluid status, for example in critical care or during surgical anaesthesia.
- f) Prescription of parenteral nutrition.
- g) Safe practice in relation to labelling, preparation and storage of intravenous fluids.
- h) Ethical issues related to intravenous fluid prescription at the end of life.

## **4.2      *Economic aspects***

Developers will take into account both clinical and cost effectiveness when prioritising the quality statements to be included in the quality standard. The economic evidence will be considered, and the cost and commissioning impact of implementing the quality standard will be assessed.

## **5 Status**

### **5.1 Scope**

This is the final scope.

### **5.2 Timings**

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

## **6 Related NICE guidance**

### **6.1 Published**

- Medicines adherence. NICE clinical guideline 76 (2009). Available from [www.nice.org.uk/guidance/CG76](http://www.nice.org.uk/guidance/CG76)
- Diabetes in pregnancy. NICE clinical guideline 63 (2008). Available from [www.nice.org.uk/guidance/CG63](http://www.nice.org.uk/guidance/CG63)
- Acutely ill patients in hospital. NICE clinical guideline 50 (2007). Available from [www.nice.org.uk/guidance/CG50](http://www.nice.org.uk/guidance/CG50)
- Nutrition support in adults. NICE clinical guideline 32 (2006). Available from [www.nice.org.uk/guidance/CG32](http://www.nice.org.uk/guidance/CG32)
- Type 1 diabetes. NICE clinical guideline 15 (2004). Available from [www.nice.org.uk/guidance/CG15](http://www.nice.org.uk/guidance/CG15)
- Pre-hospital initiation of fluid replacement therapy in trauma. NICE technology appraisal guidance 74 (2004). Available from [www.nice.org.uk/guidance/TA74](http://www.nice.org.uk/guidance/TA74)

### **6.2 NICE guidance under development**

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

- Patient experience in adult NHS services. NICE clinical guideline and quality standard. Publication expected October 2011.
- Prevention and control of healthcare associated infections. NICE public health guidance. Publication expected November 2011.

- Acute kidney injury. NICE clinical guideline and quality standard. Publication expected August 2013.

## **7 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
- ‘Developing NICE quality standards: interim process guide’.

These are available from the NICE website

([www.nice.org.uk/GuidelinesManual](http://www.nice.org.uk/GuidelinesManual) and [www.nice.org.uk/aboutnice/qualitystandards](http://www.nice.org.uk/aboutnice/qualitystandards)). Information on the progress of the guideline and quality standard is also available from the NICE website ([www.nice.org.uk](http://www.nice.org.uk)).