Intravenous fluid therapy in hospitalised adult patients

Stakeholder workshop

25th May 2011
NICE, Level 1A, City Tower, Piccadilly Plaza, Manchester, M1 4BD

Summary notes

The stakeholder scoping workshop is held in addition to the formal consultation on the scope which is taking place from the 14th of June until the 5th of July 2011.

The objectives of the scoping workshop were to:

- obtain feedback on the specified population and key clinical issues included in the first draft of the scope
- seek views on the composition of the Guideline Development Group (GDG)
- encourage applications for GDG membership

The scoping group (Technical Team, NICE and GDG Chair) presented a summary of the guideline development process, the role and importance of patient representatives, the process for GDG recruitment and proposed constituency for this group, and the scope. The stakeholders were then divided into three groups which included a facilitator and a scribe and each group had a structured discussion based around pre-defined questions relating to the draft scope. Comments received from each discussion group have been combined and summarised below.

Abbreviations:
AKI: Acute Kidney Injury
NCEPOD: National Confidential Enquiry into Patient Outcome and Death
CKD: Chronic Kidney Disease
RRT: Renal Replacement Therapy
DKA: Diabetic Ketoacidosis
CVP: Central Venous Pressure
LOS: Length of Stay (in hospital)
HRQoL: Health Related Quality of Life
HDU: High Dependency Unit

ITU: Intensive Therapy Unit
ICU: Intensive Care Unit

Scope section	Comments
Guideline title	
3.1.1 Groups that will be covered: **a) Adults (16 years and older) in hospital.** **b) Medical and surgical (pre and post operative) patients.** **c) Sepsis patients not requiring intensive care.** **d) Acute Kidney Injury patients not requiring intensive care or renal replacement therapy.** **e) Diabetic patients including those with diabetic ketoacidosis and hyperosmolar states.** **f) The particular needs of older people (who have particular challenges in managing fluid balance) and specific religious groups (in relation to choice of fluid) will be considered. Any additional groups that are shown to have particular clinical needs will be given special consideration.** **g) Patients with Chronic Kidney Disease (CKD)**	a) The stakeholders were in agreement that 16 years was the correct cut-off, despite some physiological similarities with younger patients. b) The stakeholders discussed that a lot of post-operative patients have fluid problems so there is a need to look at the fluid they received intraoperatively to evaluate the patient properly. There is a blurred distinction between pre-, post- and intra-operative patients. NCEPOD are producing a report in June into perioperative care (and intensive fluid monitoring) which will look at the whole journey including intra-operative fluid management. c) Sepsis is referred to in other guidelines, such as the surviving sepsis campaign. d) No specific comments made. e) The stakeholders agreed that there are good guidelines on diabetic ketoacidosis (Paed Diabetes 2007 ISPAD consensus 2006-2007) and many trusts already have local DKA guidelines, including very recent NICE guidance. There is already NICE guidance on diabetes mellitus which mentions intravenous fluid therapy and so it was thought that diabetes should be excluded. f) No specific comments made. g) There can be a significant impact on fluid management in people with CKD stage 1 to 3 (where patients are not under the care of renal specialists and renal replacement therapy is generally not required). The CKD guidelines do not state anything about i.v. fluid management in any patients with CKD. Furthermore, patients are susceptible to fluid volume overload which can lead to pulmonary oedema. • Some stakeholders suggested that all the groups still have similar problems, so it is best to keep this section broad, 'all hospital patients', then list specific exclusions in the next section. Others thought the populations covered were correct. • Some stakeholders pointed out the need to indicate that 'surgical patients' do not include neurosurgical groups. • It will be appropriate to include trauma patients (or generally patients needing some form of

	resuscitation).
3.1.2 Groups that will not be covered: **a) People younger than 16 years.** **b) Patients with chronic severe renal or liver disease.** **c) Patients on critical care or high dependency units.** **d) Intra-operative patients (i.e during surgical anaesthesia)** **e) Burns** **f) Head injury** **g) Pregnant women** **h) Specific problems related to abnormalities of endocrine regulation other than diabetes mellitus.**	a) People younger than 16 years was agreed as the correct cut-off. b) Patients with chronic severe renal or liver disease should be changed to 'patients with established renal failure/CKD 5 or end stage liver disease' (see previous discussion about 3.1.1). For liver disease patients we should make clear that it is the management of fluid and electrolytes and not the management of ascites. It will be important to know how to manage these patients when they are not on a liver ward or under the care of a Hepatologist, such as the use of the Child Pugh score. It was questioned what 'severe' renal disease means in this context, the discussion concluded that if this was in relation to dialysis-dependent renal patients then they should be excluded. c) There was a lot of discussion around whether critical care should be excluded or not. The same principles for using IV fluid therapies will apply equally to HDU, ITU and ICU. It was suggested to remove critical care from the population exclusions and instead add inotropes and invasive monitoring to 'the key issues that will not be covered'. It should be noted that it should be called critical care and not ICU or HDU or anything else. d) Some stakeholders thought that intraoperative care should be included but intra operative monitoring should not. Other stakeholders thought that it may need to be widened to include Intra-operative patients as it was too hard to cut one third out. It was felt that neurosurgical patients should be excluded and therefore added to 3.1.2. There was mention of the exclusion of other routes of administration and what about subcutaneous and oral administration. e) Burns patients as a group that will not be covered was agreed. f) Head injury as a group that will not be covered was agreed although it was thought that traumatic brain injury is a better term than head injury. g) No specific comments made. h) There was discussion that all sick patients have endocrine abnormalities, so technically this statement could exclude everyone and it may be simpler to remove it completely. Principles remain the same for these patients, although some details are managed differently for example Diabetes Insipidus. It was suggested that we list the specifics of different management in 'key issues not covered'.
3.2 Healthcare settings	• There was discussion around whether the guideline will apply to private hospitals etc. The

	NCGC explained that NHS hospitals are in the remit so this had to remain and the quality standard would apply more broadly. • Fluids given in an ambulance were also mentioned as the principles were thought to also be applicable in this setting. NCGC replied that out of hospital was not included in the remit, and it was thought that patients should not be in an ambulance long enough to come to harm from fluid prescribing. A Technology Assessment (TA74) exists which focuses on pre-hospital intravenous fluid therapy.
3.3 Management **3.3.1 Key issues that will be covered:**	
a) Training and education for the correct prescription of intravenous fluid therapy in hospitals.	• It was discussed that training should begin in medical school and that education should be delivered appropriately leading to training being 'managed'. The stakeholders highlighted the need for established training competencies. Prescribers need to know the principles of prescribing and why. • It was discussed whether it would be appropriate to broaden this to include information for patients and carers here, particularly as regards issues around use of blood products such as albumin. There is a need to include guidance for those who cannot use certain products, but more detailed information for patients is hard to provide.
b) Clinical and laboratory assessment of patients to include: **a. Fluid and electrolyte requirements** **b. Current fluid and electrolyte status** **c. Current prescriptions.**	• It was thought that clinical assessments (referring to patient observations) should be separated from laboratory assessments. Some stakeholders felt that the word 'clinical' didn't allow for physical observations of patients and that this should be added. • The stakeholders thought that 'current prescriptions' should be clarified, as they were unsure as to whether this means drugs that the patient is already taking. Current prescriptions refer to currently administered drugs.
c) Treatment to include: **a. Types and amount of fluids and electrolytes required for restoring fluid balance (resuscitation) (See scope appendix 1 for matrix of intravenous fluids).** **i. Crystalloids versus crystalloids**	• There was discussion regarding the matrix of fluids (Scope appendix 1) as the group felt that the appendix was missing many fluids. The group noted that the important factor was 'how much fluid and when you give the fluid'. Dextran 70 – the group stated that this was no longer used and should be removed from the appendix. Water was to be definitely removed as should not be there. It was suggested that best not to give all products separately as it will not tell us anything, it should be grouped accordingly: water-based, physiological based, short chain molecules and long chain molecules (colloid). • There are different carrier solutions for colloids that need to be considered, which often come

ii. **Crystalloids versus colloids** iii. **Colloids versus colloids** **b. Type and amount of fluids and electrolytes required to maintain fluid balance.** i. **Crystalloids versus crystalloids** **c. Types and amount of fluids and electrolytes required for replacement of continuing abnormal fluid losses** i. **Crystalloids versus crystalloids** ii. **Crystalloids versus colloids** iii. **Colloids versus colloids**	in saline. Sodium chloride comes as normal and half-normal saline. • There was agreement that the highest priority issue was normal saline vs others such as Hartmann's and Ringer's. • There was discussion around whether blood and blood products should be included. As there are whole transfusion guidelines the general feeling was that they should be excluded, except albumin, which comes under colloids. It may be useful to have statements in the guideline to explain that patients currently receiving blood will not be covered in the guideline – patients with blood loss will be covered, but when to give blood will not be explored. • There is much overlap between resuscitation, maintenance and abnormal losses. For resuscitation and abnormal losses the key issues are saline or not saline and crystalloids vs colloids. Colloids are not an issue for maintenance, so key issue just saline or not. • Colloids versus colloids is only an issue for resuscitation and abnormal losses. The patient's albumin for maintenance of patient with albumin deficits, but these are only patients with liver disease, and they are excluded anyway. • Bear in mind specialist groups such as the elderly, physiologically impaired, mild renal failure, stroke, heart failure – left ventricular hypertrophy, sepsis.
d) Monitoring of fluid and electrolyte status: **a. Clinical assessment** **b. Laboratory assessment**	• It was questioned whether there should be a separation of clinical assessment and laboratory assessment. • It was noted that urinary electrolytes are for people receiving IV fluids for more than 2 days and are not for everybody. • This question covers clinical and laboratory assessments pertaining to that, but not invasive monitoring. It was thought that inotropes and invasive monitoring in fluid and electrolyte therapy should be added as a 'key issue that will not be covered'. • It was discussed whether Doppler tests are invasive. Oesophageal Doppler is the one most often used, and that would fall under invasive and therefore would be excluded, which was agreed. • There was discussion around CVP that it is less common on wards than in ICUs. It was suggested that where available the data should be used, but that we should not discuss when and how CVPs should be used. • There was discussion over whether magnesium and phosphate etc should be included and whether we should list calcium, magnesium and phosphate status as an issue that will not be covered. The general agreement that this is a difficult area and so should not be mentioned

	in the scope. It was suggested including in prescription and monitoring, but exclude specific correction of trace elements, calcium, magnesium, phosphate, selenium etc. perhaps word as exclude 'specific treatment of individual electrolyte abnormalities'. • Clinical assessment refers to examination and prescription records eg blood pressure charts, temperature – so e) should be brought back into d)? • Laboratory assessment included blood counts, blood gasses, urinary electrolytes • Change d) to monitoring and documentation – needs to say what to document, and that it should be done correctly • The group wanted to add a further category c. 'other' such as non-invasive.
e) Documentation of fluid intake and losses including prescription and monitoring records.	• What are the key features/recommendation required involved in this, who needs monitoring carefully? The key is to link the results of the test to what will be prescribed. Connecting the fluid chart and the patient record. • The link to nutrition is crucial as if the patient is not able to drink then the function of electrolytes and water handling is affected – flag – after 2 days i.v. look at nutrition. • Doing monitoring properly will involve documentation as a key issue, so e) should be changed to 'standards of documentation'. • The stakeholders mentioned the various forms for recording this information and the fact it is going computerised. It was recognised that there is a need to standardise such documentation. • Documentation is an important issue but, at the moment, the approach taken is highly variable. It is time to consider IV fluid therapies as "drugs" and apply the same patient-safety concerns as it is applicable to pharmacologic treatments. It was suggested that NICE make a statement around fluids being regarded as drugs.
f) Documentation of electrolyte status including prescription and monitoring records.	• The same issues apply as to e). It was suggested that we combine d), e) and f) into 'monitoring and documentation'.
g) Appropriate care for particular groups of patients who may be at higher risk of issues relating to intravenous fluid therapy: **a. Patients with AKI, up to the point of renal replacement**	• There was disagreement as to whether we need specific groups here or whether we should just state 'patients with co-morbidities' [frail – malnourished?] • The stakeholders identified the following additions to these groups: e. Trauma patients f. Patients with congestive cardiac failure g. Elective post-operative surgical

therapy **b. Diabetic patients (including DKA and hyperosmolar states)** **c. Patients with sepsis** **d. Older patients.**	h. Patients who are vulnerable (dementia and delirium guidelines could be signposted). • With regards to (h) the group discusses that this could be cross referenced to other guidelines relating to this. • For AKI patients we may need to consider the use of potassium-containing fluids in cases of hypokalemia.
4.3.2 Key issues that will not be covered: **a) Route of administration and IV catheter related issues.** **b) Ethical issues related to IV fluid prescribing and palliative care.** **c) Specific endocrine abnormalities affecting fluid or electrolyte balance other than diabetes mellitus eg diabetes insipidus**	• Blood products should be added here except albumin as discussed before. • Route of administration – subcutaneous & oral, what about other access eg rectal? • The NCGC pointed out that we need to clarify that excluding ethical issues does not exclude, for example, ethical animal product issues it is only referring to palliative care issues.
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.**	• The stakeholders agreed the outcomes were correct. • Adverse events – the group wanted to highlight that the 'adverse' event could be related to the disease or the treatment. • The main adverse events were suggested to include: renal failure, heart failure, pulmonary oedema, chest infection, gut failure. • Quality of life – the group discussed that there is hardly any published evidence for this and will be difficult to find literature and studies on the impact of IV fluid therapy on health-related quality of life. The impact of intravenous fluid therapy on HRQoL could be recommended by NICE as the focus of future research.
3.5 Economic considerations	• A lot of intravenous fluids are part of big contracts with the NHS and so NICE need to recognise that the list price is probably not what is paid for them. • There are increasingly complex crystalloids being produced as an alternative to saline, which has big cost implications. • A move from saline to Hartmanns would increase cost up front, but may well bring up ultimate cost savings by reducing LOS and complications – this is an area for an economic model.

	• There is evidence in surgery that saline increases LOS. • There are cost implications of increased laboratory tests, but the laboratories may be carrying out all of the tests already anyway, and just not using the results. An increase in tests should increase patient safety, and so offset additional costs. • The group highlighted that there was a lack of evidence for health economics. They thought that particular attention should be paid to the difference in costs between hospitalised patients and care in the community, where appropriate. The group recognised that there would be varied costs in relation to the type of fluids used and the continued use of IV fluids when the patient could go back to oral fluids. (ie – risk of annula infection). • Modelling the economic consequences of IV fluid therapies will be difficult and controversial primarily because the evidence is lacking. • The group felt that audits could be considered to gather evidence (outreach units of NHS trusts tend to routinely conduct audits that may contain valuable information on the economic impact of IV fluid therapies, especially with regards to the incidence of adverse events). The group suggested that NICE could make a research recommendation within the quality standard that regular audits should be carried out. It was also mentioned that results of the SPOTLIGHT (Sepsis Pathophysiological & Organizational Timing) study could be useful. • The group did not anticipate that there would be much additional cost involved with implementing training/education packages and this would only involve staff time.
Equalities issues	• There may be equalities issues regarding the use of blood products. • Older people may be more vulnerable as they suffer more than younger people from the same mistakes.
5 Mapped areas of care	• The group highlighted that the use of the word 'correction' under treatment, should be changed to 'prevention/detection' of.
GDG Constituency: • **Two patient representatives** • **Commissioner** • **Surgeon** • **Clinical biochemist** • **Intensivist** • **Nephrologist**	• Haematologist as a co-optee? • We should use the term 'medical specialist' instead of 'acute medical specialist' • Pharmacologist • Critical care (outreach) nurse or critical care/ITU nurse • Nutritionist (co-optee) • Hepatologist? • Paramedics could be added to the list as well as anaesthetists.

• **Nurse – Ward based** • **Acute Medicine Specialist** • **Older people Specialist** • **Clinical pharmacist** **Do we have the right expertise on the group?**	• It will be advisable to change 'Nurse – Ward based' to 'Outreach nurse'.

The meeting was closed by a brief summary of the 3 key points discussed at each table. Attendees were informed of the scope consultation dates and process and that GDG recruitment would happen simultaneously. Further comments on the scope and applications for GDG membership were encouraged.