

The Minutes of the meeting of the Derby Medical Society

Held on 25th November 2014 in the Derby Medical School

Apologies: Dr Sally Archer

Welcome: Mr S Iftikhar, President

Minutes for the meeting 11th November 2014: Read by Mr S Milner, Junior Secretary, and approved.

Guest Lecture: Professor Dileep Lobo, Consultant Surgeon, University of Nottingham
“Perioperative fluid therapy: problems with solutions”

Perioperative fluid balance is a big problem. A recent NCEPOD report highlighted problems of increased surgical mortality relating to over, under or inappropriate use of intravenous fluids. Pre-operatively, patients often enter the anaesthetic room dehydrated, worsened by bowel preparation and leading to intra-operative hypotension. 26% of surgical patients are prescribed more than 2 litres of ‘normal’ saline per day – an overdose of salt. Less than 50% receive any potassium in their IV fluids. 17% of surgical patients experience morbidity related to intravenous fluid prescribing. This is often delegated to the most junior member of the team, and there is great variability.

Colloid versus crystalloid

Crystalloids are solutions of salts. Intravenous crystalloids are iso-osmolar, but in fact normal saline has a slightly higher sodium content and a much higher chloride content than plasma. ‘Balanced’ solutions such as Hartman’s solution, Ringer’s lactate and “Plasma-Lyte” are more physiological.

Colloids are suspensions of larger molecules in crystalloid solution, eg albumin, gelatine and hydroxy-ethyl starch (which has recently been banned in the EU).

There are 3 main uses for IV fluids:

- Resuscitation – expansion of the intravascular space
- Replacement – of measurable fluid losses, eg from a fistula
- Maintenance – providing normal daily requirements of fluid and electrolytes

A series of comparative studies have suggested that resuscitation with colloid is better in sepsis, but that there is a slightly increased incidence of acute kidney injury. In trauma with brain injury, crystalloid gives a lower incidence of cerebral oedema than 4% albumin – but the latter is a hypo-osmolar solution.

‘Normal’ Saline

0.9% NaCl solution would be better called ‘abnormal saline’, because it does not contain physiological amounts of sodium and chloride. The adverse effects of IV 0.9% NaCl were described as long ago as 1911 by Evans, and more recently it has been shown to cause metabolic acidosis, reduced renal perfusion, sodium and water retention, and increased blood loss after major surgery. Clinical studies comparing 0.9% NaCl with ‘balanced’ solutions have shown better outcomes in severe infection, with less need for arterial blood gases, blood transfusion and dialysis. Probably the only indication for giving 0.9% NaCl is hypochloraemic alkalosis secondary to vomiting, and it is locked away in some hospitals to prevent widespread use.

Perioperative fluid management

Weight gain of more than 2.5 – 3.0 kg of excess water produces oedema and is associated with increased complication rates in surgical patients. A meta-analysis has shown overall 41% reduction in complications in surgical patients with correct perioperative fluid balance. Comparison of fluid regimes containing 3l of water and 154mmol sodium with 2l of water and 75mmol sodium in patients undergoing bowel surgery have shown the same urine volume and total sodium excretion, but in the 3l group worse gastric emptying, longer hospital stay and increased complications. Too much fluid restriction also gives worse outcomes.

Flow-directed fluid therapy

Measurement of cardiac stroke volume using trans-oesophageal Doppler can be helpful for optimizing perioperative fluid balance. If a fluid bolus increases the stroke volume by more than 10%, the patient is probably under-filled and requires further fluid boluses. This level of monitoring has never been tested against 'standard' restrictive fluid prescribing, but has potential advantages where expected blood loss is >500ml, in major trauma, patients with poor left ventricular function, and unknown volume status.

Fluid gain on Intensive Care Unit

In sepsis, patients can gain as much as 12.5kg in weight as a result of water and salt retention, and this can take 3 weeks to excrete. The process is encouraged by the use of low-volume, low-sodium feeding regimes.

Professor Lobo summarized by re-iterating two important questions:

- Does my patient need parenteral fluid?
- If yes, why? – resuscitation, replacement or maintenance?

Adhering to the concept of zero net fluid balance could save the NHS millions of pounds per year.

Questions included:

- Why proprietary 'balanced' solutions are not exactly like plasma in composition
- Whether all patients can be treated according to the same principles
- What anions are better than chloride in a balanced solution
- The best post-operative fluid regime
- Management of hypo-albuminaemic patients (liver disease, Crohn's disease)
- Management of ileus

Vote of thanks: given by Dr Irfan Wahedna

Register: signed by 28 members and 7 trainees and 3 students

Next meeting: 9th December, 2014

.....
SY Iftikhar, President

Date: