Why is Fluid Balance an important topic?

Fluid balance is an essential tool in determining a patient’s hydration status. Effective and consistent fluid management is recognised nationally as being an area of weak practice. Inadequate staff knowledge and competence in the effective management of volume can lead to over or under hydration of a patient.

“It is the responsibility of the nurse caring for a patient to ensure that observations and fluids are recorded at a timely interval that is appropriate for the patient’s condition and that abnormal recording are reported appropriately”
-NMC (2008)

Impact of Poor Compliance with Fluid Balance
Poor compliance with fluid balance charting is a national problem. The fluid balance chart allows us to monitor a patient’s fluid input and output. However, failing to carefully and accurately complete the chart may delay or inhibit the capacity to recognise and manage a deteriorating patient.

Any resulting avoidable harm will have a significant impact on a patient. Inadequate fluid input with or without excessive fluid loss will lead to dehydration which increases the risk of:
- Cardiac dysfunction
- Acute kidney injury
- falls
- pressure damage
- infection
- deep vein thrombosis

Failure to identify excessive fluid input and suboptimal urine production may lead to:
- Multi-organ dysfunction
- Fluid on the lungs
- Heart failure

“Staff should be trained to complete fluid balance and should view fluid balance with the same importance as a medical prescription.”
-NCEPOD (1999)

Closely monitoring both fluid balance and Vital Signs may prevent detrimental effects on a patient’s health and outcomes including:
- Delayed medical review
- Unexpected deterioration
- Over/under prescribing of fluids
- Prolonged stay in hospital
- Increased patient morbidity
- Death in some cases

Careful clinical assessment plus accurate completion and attention to fluid balance charts could alert staff to fluid imbalances before symptoms occur.

ELHT Improvement Collaborative Work

In order to achieve effective fluid balance charting, three important elements need to be adhered to:
- Filling in the charts correctly
- Reviewing the charts in a timely manner and acting accordingly
- Ensuring the availability of fluid charts when doctors are asked to prescribe more fluids

However, during the scoping for the Deteriorating Patient Project, it was identified that these essential criteria were not being fulfilled. This resulted in a recurrent issue with fluid balance documentation.

Consequently, a project was launched at the beginning of 2017 with the aim of revising the adult fluid balance charts at ELHT with a huge drive across the organisation in order to improve the compliance of fluid balance charting.

To enhance staff knowledge of charting, The Standard Operating Procedure for Measuring Adult Fluid Status (SOP017) which is available on Oli, was developed for guidance on when and how to complete an adult fluid balance chart for ELHT inpatients.

Nursing and medical staff across all divisions contributed to the redesign and trialling of an audit tool, and development of an online educational change package.

“The charts look much better and are easier to read. They are more comprehensively filled out by staff and help with day-to-day patient management which is really vital with our heart patients”
-Dr Robert Noble (CMT2)

The project has been met with a really positive response; staff have embraced changes and have demonstrated excellent leadership skills in order to make the initiative a success.

The charts have received excellent feedback amongst staff who have experienced an improvement in patient management.
Fluid Balance and AKI

Changes to Fluid Balance Chart

The main changes to the chart are:

**Change 1**
Goal intake is now guidance.

**Change 2**
Rather than tick an N/A box, there is an opt-in section to guide staff on when to commence a fluid balance chart.

**Change 3**
Highlighted pink sections to correlate with the intentional rounding. A registered nurse must ensure the chart is completed and sign a minimum of every 4 hours.

**Change 4**
Stop and check - evidence of escalation of concerns to the nurse in charge

**Change 5**
Extra blank columns in the output section (for drains etc).

**Change 6**
Incorporated stool chart within the intentional rounding document.

Fluid Balance Chart Change Package

The Fluid Balance Chart Change Package was developed to raise awareness of the importance of accurate charting and to explain how to effectively use the new fluid balance chart. The package includes information on changes to the chart and the reasoning behind them, staff roles/responsibilities and what elements of charting will be audited.

An online educational change package is available for all staff that assist with fluid balance charting. This can be accessed on the Learning Hub under ‘Fluid Balance’.

Audit Tool

An electronic audit tool is currently in testing phase and is on track for launch in April 2018.

The charts are filtering through on to the wards with monthly monitoring starting on 1 April 2018 as part of the ward audits to provide assurance for compliance of the chart against the Trust’s standards.

If the wards are <90% compliance this is escalated (pending severity) with a request for improvement plans and timescales for assurance to the Board.

Audit Questions:

- Was the previous day total out/in and balance brought forward?
- Was the running total completed four hourly?
- Was the “stop and check” box completed?
- If any of the answers to the “stop and check” questions are “Y” is there evidence this has been escalated?
- Has the total balance been completed?
Results to Date

An audit was conducted pre and post the launch of the new fluid balance charts on several of the test wards.

B18 have seen a huge improvement since April 2017. They have improved by:

- 100% with their 4 hourly checks,
- 57% in compliance with the ‘stop and check’ section
- 50% in documenting the total balance, making them 100% compliant for this.

“We highlight the fluid balance charts on handover and the huddle. We are educating our patients on fluid restriction and measuring so they can assist us with keeping an accurate fluid balance”

Samantha (Sister on B18)

C18 have had the charts for a while and staffs were involved with trialling them. They have improved by:

- 47% in compliance in stop and check. The Sister is reminding everyone at 2pm that it’s time to stop and check.
- 34% in total balance documentation.
- 27% in compliance with the four hourly targets

Next Steps

The work carried out so far on fluid balance charting has reaped excellent results. However, in order to continue to develop and improve in this area we have already planned our next steps.

- The electronic audit tool is being trialled. Training will be delivered so that staff can effectively collect and submit audit data.
- Close monitoring of fluid balance chart compliance will continue. Any non-compliance will be escalated and an action plan will be devised.
- Further work is planned using specific care bundle data collection to drive quality improvement in the AKI high-risk wards around fluid balance charting and AKI bundles.
- A Paediatric fluid balance chart has been developed and is now in use. We will begin to apply the same processes as adult fluid balance charts audit tools, including escalation of non-compliance.
- We are currently working on revising the Family Care fluid balance chart. This will be implemented as part of an intentional rounding booklet. Similar audit processes and escalation of non-compliance will be introduced.

“It’s been a year long journey to date and not without its challenges, but on the whole comments are positive and the fluid balance charts really are starting to improve. It’s taken time to engage with staff around the design, education packages, audit tools and the new charts have only just arrived on the wards so really this is only the beginning of the improvement work. So many staff have been involved and really helped to drive this improvement work, a huge thank you to you all.”

Heather Coleman, Clinical Effectiveness Lead Nurse
Falls prevention essentials: Do you know if these are in place on your ward/department?

Acute Kidney Injury (AKI) is a significant cause of morbidity and mortality. It is responsible for about 53,000 admissions and 10,000 in-hospital deaths per annum (Advancing Quality, 2015).

AKI is the universal term used to describe sudden deterioration of renal function. It involves sudden damage to the kidney that causes them not to work properly. A sudden deterioration in kidney function can occur in a matter of hours and is secondary to many causes.

**Causes of AKI**

Most cases of AKI are caused by reduced blood flow to the kidneys, usually in someone who is already unwell with another health condition.

This reduced blood flow could be caused by:

- Low blood volume after bleeding, excessive vomiting or diarrhoea, or as seen with severe dehydration
- The heart pumping out less blood than normal as a result of heart failure, liver failure or sepsis
- Problems with the blood vessels such as inflammation and blockage in the blood vessels within the kidneys
- Certain medicines which can affect the blood supply to the kidney

AKI can affect both adults and children but the highest risk patients include:

- Over 65’s.
- Already have a kidney problem.
- Have chronic disease such as heart failure, liver failure, lung disease or diabetes.
- Dehydrated or unable to maintain their fluid intake.
- Have a severe infection / sepsis.
- Something blocking the urine leaving the kidney (like a kidney stone).
- Take certain medication such as non-steroidal anti-inflammatory drugs (NSAIDs), ACE inhibitors or diuretics.

**Diagnosis**

AKI is detected by monitoring creatinine blood levels, and urine output.

AKI is diagnosed if a patient is passing less than 0.5mls/kg per hour over 6 hours or their serum creatinine rises from a normal baseline.

Our ICE blood system will categorise the patient into an AKI level 1, 2 or 3, depending on the severity of deterioration in kidney function:

1: Mild
2: Moderate
3: Severe

The evaluation and initial management of patients with AKI should include:

- An assessment of the contributing causes of the kidney injury.
- An assessment of the clinical course, including co-morbidities.
- A careful assessment of volume status.
- The institution of appropriate measures designed to reverse or prevent worsening of functional or structural kidney abnormalities.

**Acute Kidney Injury**

AKI affects 13-18% of hospital admissions

20% of AKI cases are preventable

**Potentially, we could prevent 72 patients a month from having AKI at ELHT**

The cost of AKI to the NHS is £434-620m per year

AKI is 100 times more deadly than MRSA
Without quick treatment, abnormal levels of salts and chemicals can build up in the body, which affects the ability of other organs to work properly.

If the kidneys shut down completely, the patient may need temporary support from a dialysis machine, or even in some cases, lead to death.

Patients can recover from AKI and the majority of those patients can go on to have normal kidney function or a similar level of kidney function as they had before the illness.

It is essential that staff can detect and appropriately treat AKI effectively to increase the patient’s chances of recovery.

As soon as AKI is confirmed you must:
- Initiate and follow the AKI Care Bundle
- Escalate to appropriate medical staff for their input with the medical elements of the bundle. The bundle will support you in providing the right treatment in a timely manner dependent upon the severity of AKI.

**For patients with all AKI severities:**
- Commence an accurate fluid balance chart.
- Check and document the urinalysis.
- Calculate the Early Warning Score, monitor as per algorithm and escalate if necessary.
- Assess the patient’s volume status.
- Review medications - for example, review use of ACE inhibitors, stop non-steroidal anti-inflammatory drugs (NSAIDs).
- Provide information for the GP on the discharge letter - AKI score, medication, further tests required by GP after discharge.

### AKI Care Bundle Data

The following is a summary of the results of the AKI Care Bundle audits. Reporting occurs on a monthly basis to enable data to be shared with leads in a timely manner so improvements to be identified and implemented.

**What is the data telling us?**

The Appropriate Care Score (ACS) measures the proportion of patients that received all of the relevant interventions on the bundle and is therefore a measure of ‘perfect care’. For 2017, the highest ACS was 26% in August and the lowest was 12% in June. This means, in June only 12% of patients audited had received all measures that they were eligible for.

The Composite Process Score (CPS) is an aggregate score that reflects the number of opportunities to ‘do the right thing’ and the proportion that were achieved. For 2017, this was generally 70-80%, with the exception of September which fell to 50%.

Further information on ELHT’s Care Bundles can be found on OLI under ‘Clinical Information’.

---

**ELHT’s average monthly figures for highest count of AKI per patient are:**
- AKI 1: 223
- AKI 2: 66
- AKI 3: 71

---

**Acute Kidney Injury: Measures Oct-17 (n=50) Nov-17 (n=36) Dec-17 (n=32)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Oct-17</th>
<th>Nov-17</th>
<th>Dec-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWS monitoring for appropriate AKI within 4 hours</td>
<td>94%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Fluid Balance Chart Commenced within 4 hours</td>
<td>56%</td>
<td>81%</td>
<td>88%</td>
</tr>
<tr>
<td>Volume Status Assessed within 4 hours</td>
<td>96%</td>
<td>89%</td>
<td>84%</td>
</tr>
<tr>
<td>Bloods taken: according to AKI score within 4 hours</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Nephrotoxic drugs omitted within 4 hours</td>
<td>95%</td>
<td>81%</td>
<td>55%</td>
</tr>
<tr>
<td>Repeated Renal function and HCO3/ph (4-6 hours)</td>
<td>38%</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Ultrasound scan if cause of AKI not clear (within 24hrs)</td>
<td>100%</td>
<td>67%</td>
<td>50%</td>
</tr>
<tr>
<td>Critical Care/Acute Care Team Referral (within 24hrs)</td>
<td>62%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Renal Advice Sought within 24 hours if:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient for escalation of care and renal function not improving</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cause of AKI unclear or patient known to renal team</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• AKI 3 (Outpatient ward referral if AKI improving)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Renal on-call team if renal function not improving despite appropriate care</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Composite Process Score (CPS)</th>
<th>Oct-17</th>
<th>Nov-17</th>
<th>Dec-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>The percentage of measures achieved</td>
<td>78%</td>
<td>78%</td>
<td>77%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appropriate Care Score (ACS)</th>
<th>Oct-17</th>
<th>Nov-17</th>
<th>Dec-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>The percentage of patients who received all measures they were eligible for</td>
<td>20%</td>
<td>17%</td>
<td>16%</td>
</tr>
</tbody>
</table>
Suzanne Wilson has joined the Trust as Acute Care Team Nurse. Suzanne has a specialist interest in Acute Kidney Injury. The focus of her work supports the improvements in the identification and review of AKI patients.

Suzanne takes every opportunity to highlight the importance of hydration. The photo above is of her on World Kidney Day delivering bottled water to our wards to raise awareness of AKI and the need to keep our fluids topped up.