Commissioner's Guide to the NCEPOD Report 'A Balanced Solution'

INTRODUCTION

The measurement of blood sodium levels is one of the most commonly requested pathology tests in the UK and levels outside the reference range are encountered regularly by a wide range of primary and secondary care specialties. The detection of an abnormal blood sodium level is often an incidental finding and may or may not be related to the condition being investigated. Hyponatraemia and hypernatraemia are not diagnoses on their own, and it is vital that the underlying cause of the abnormality is identified and treated. Hyponatraemia in particular can be more challenging as it has several causes, each requiring a different set of investigations and treatment.

The majority of blood sodium measurements are carried out in biochemistry laboratories, but a significant number are now done using point-of-care testing equipment, such as blood gas analysers, close to the patient's bedside. While this has many advantages, it does mean that the results of tests may not always be entered on the patient's laboratory record or filed in the patient's notes. Whichever technique is used, it is important that all results are recorded in the patient's record, and the same method is used when monitoring blood sodium levels, so sequential results are comparable. Thorough assessment and monitoring of patients' fluid status is not easy and may not be done well but is important to help guide both diagnosis and treatment. Accurate fluid balance records should be kept and reviewed regularly. The use of a care bundle, which is easily deliverable in different systems, could help ensure that appropriate ancillary tests are carried out in a timely manner.

There are many causes of abnormal blood sodium levels but one of the most easily identified and corrected is the effect of starting or changing the dose of a medication. An early, thorough medication review should be carried out for all patients, with changes made only after risk assessment and with specialist input if appropriate. It is particularly important that any changes to medications are communicated promptly to the patient's GP and other clinicians, with a rationale for the change, so that appropriate care continues after discharge and in the community.

The diagnosis of the cause of abnormal blood sodium level is not always straight forward, so specialist advice should be available and sought to help inform investigation and treatment decisions. Endocrinologists and clinical biochemists, in particular, have an important role to play in supporting clinicians to investigate and treat electrolyte disturbances such as abnormal blood sodium levels and undertake follow-up after discharge if required.

PATIENT POPULATION

Inclusion criteria

All patients aged 18 or over were admitted to hospital between 1st October 2023 and 31st December 2023 and identified as having hyponatraemia or hypernatraemia during their admission by retrospective ICD10 coding. Patients who presented as an emergency and those who developed abnormal blood sodium levels after surgery were included.

Clinical and Organisational Issues

Develop care bundles and training to reduce variation in the assessment and management of abnormal blood sodium levels.

- Abnormal blood sodium levels were not always acted on as they should have been, leading to under investigation, inappropriate treatments and poor overall management.
- The data showed that 163/348 (46.8%) of patients with hyponatraemia should have had further investigations.
- Serum and urine osmolality results were available in 50% of patients within 3.5 hours and 9 hours respectively.
- Only 25/150 (16.7%) patients had cortisol samples collected between 8:00 am and 9:00 am.
- Training on hyponatraemia was better provided to foundation doctors (84.3%) compared to other grades of doctors (37.0%).
- Training on hypernatraemia was only provided in 14/99 (14.1%) hospitals.

Improve the clinical assessment of fluid status in all patients.

- Patients do not have consistent assessment of their fluid status and monitoring and/or recording of their fluid balance
- 57/248 (23.0%) patients with hyponatraemia did not have an initial fluid status assessment documented.
- Point-of-care ultrasound (PoCUS) was only used in three patients to assist in the initial fluid status assessment.
- Monitoring and documentation of fluid balance was inadequate in 99/267 (37.1%) patients.
- The accuracy of completion of fluid balance charts was only audited in 51/83 (61.4%) hospitals.

Integrate test results into patient electronic records to help identify trends in blood sodium levels.

- Frequently, results from point-of-care testing are not directly linked into the hospital laboratory electronic reporting system leading to delays in treatment.
- There were delays in the initial treatment of patients with emergency admission hyponatraemia (64/255; 25.1%).
- Data showed 92.5% (357/386) of initial hyponatraemia results were done by laboratory testing rather than POC.
- Point-of-care (POC) testing results are typically available more rapidly than formal laboratory testing results.

Standardise the use and the dosing of hypertonic saline solution

- Clinical staff are unsure when to use hypertonic saline and the dosage needed. This is hindered further by the variability in the concentrations stocked across all hospitals
- 55/354 (15.5%) patients received hypertonic saline as part of their treatment. For seven, this was not indicated.
- There was variability in the strength of hypertonic saline use (38 patients got 2.7%, 12 got 1.8% and 2 got both).
- In 17/55 (30.9%) there were issues related to its use (decision, volume, rate and/or duration of administration).

- A further 19 should have hypertonic saline treatment.

Document and communicate all medication changes to all healthcare providers and patients

- Medication changes were not always communicated which could lead to patients restarting medications that had caused their abnormal blood sodium.
- 225/270 (83.3%) patients admitted on an emergency basis with hyponatraemia were taking one or more medication that could have contributed to their hyponatraemia.
- 157 (69.8%) had one or more of their medicines changed during the admission to hospital.
- 140/151 (92.7%) had some form of communication of these changes to the GP at the time of discharge. Most commonly this was omission from the discharge letter.

KEY FEATURES OF A SERVICE

1. Develop care bundles and training to reduce variation in the assessment and management of abnormal blood sodium levels.

The report showed that abnormal blood sodium levels were not always acted on as they should have been, leading to under investigation, inappropriate treatments and poor overall management.

- Care bundles for acute kidney injury, falls and sepsis have been shown to improve patient care by providing clinicians with clear information on what investigations and treatment need to be undertaken and the timeframe in which this should happen. A clear definition is needed on which staff groups deliver which component of these care bundles, along with 'tick boxes' to indicate completion to improve compliance. In addition, the senior responsible clinician for ensuring delivery of the care bundle should be clearly indicated.
- There would need to be appropriate guidance on determining which investigation(s) should be undertaken to prevent over-investigation
- These items, including documentation of the time it was done could be considered as part of the care bundle
- Fluid assessment
- Initiation of fluid balance monitoring
- Medication review
- Urine/plasma osmolality
- Urine sodium
- 08:00-09:00 cortisol and other tests as needed such as liver function, thyroid function and NTproBNP
- Local service level agreements should be put in place specifying turnaround times for urgent investigations and these should be regularly audited
- Development of eLearning training packages for non-specialist healthcare professionals to assess and treat patients with abnormal blood sodium levels, including 'red flags' for escalation to specialists.

2. Develop clear standards and tools for the assessment and recording of fluid status in all patients with abnormal blood sodium levels including, when appropriate, the use of point-of-care ultrasound.

The report showed that patients do not have consistent assessment of their fluid status and monitoring and/or recording of their fluid balance.

- Improved training for medical students, resident doctors and other clinical staff on how to undertake an appropriate clinical assessment of a patient's fluid status
- Trusts/health boards to consider business planning to cover any additional technology required to deliver PoCUS testing

3. Integrate point-of-care testing results into patient electronic records.

The report showed that frequently, results from point-of-care testing are not directly linked into the hospital laboratory electronic reporting system leading to delays in treatment

- Hospital executives, supported by clinical and laboratory staff, should talk to their local business intelligence units (or equivalent) to determine how this integration of point-of-care testing can be achieved.
- Undertake regular audit of adherence to entering full demographic data on point of care analysers to facilitate linkage to patient's electronic records, and identification of when exemption may be indicated (e.g. identity of patient unknown, mass casualty events).

4. Develop a national standard for the use of hypertonic saline in the management of hyponatraemia.

The report showed that clinical staff are unsure when to use hypertonic saline and the dosage needed. This is hindered further by the variability in the concentrations stocked across all hospitals

- Use of hypertonic saline could be improved through localisation of nationally developed guidance, to provide clinicians information on local specialist support for managing hyponatraemia.
- The development of standardised training packages, potentially including multidisciplinary simulation training, would improve the appropriate use of hypertonic saline and the assessment of patients with abnormal blood sodium levels
- Local agreements as to where patients are admitted following administration could be agreed
- Audits of blood sodium monitoring in patients given hypertonic saline

5. Raise awareness of the importance of documenting and communicating all medication changes made in hospital to primary care as well as the patients and their family/carers.

Medication changes were not always communicated which could lead to patients restarting medications that had caused their abnormal blood sodium.

- Patients admitted with hypo- or hypernatraemia should have a comprehensive medication review at the point of identification of the abnormal blood sodium
- Hospitals should have protocols and/or a standard operating procedure on how the medication review should be undertaken, and regular auditing that this has been undertaken
- Chief Executives and others could ensure that discharge letters include a mandatory section on whether any medication changes have occurred, with the rationale for those changes
- Local agreements should be in place about who counsels patients, and their family/carers if appropriate, on their medications, including any changes, at the point of discharge

SUPPORTING NATIONAL GUIDANCE AND RESOURCES

- SOCIETY FOR ENDOCRINOLOGY ENDOCRINE EMERGENCY GUIDANCE - Emergency management of severe and moderately severely symptomatic hyponatraemia in adult patients. Society for Endocrinology: Emergency management of severe and moderately severely symptomatic hyponatraemia in adult patients
- European Society of Endocrinology Clinical guideline for the management of hyponatraemia. European Society of Endocrinology Clinical guideline for the management of hyponatraemia
- NICE: Hyponatraemia scenario management
- British Medical Ultrasound Society: Focused and Point-of-Care Ultrasound
- Intensive Care Society: FUSIC accreditation programme
- Royal College of Physicians: Acute Care Toolkit 17-Managing Multiple Medications