# Document Control

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| **Title**<br>**Algorithm for The Management of Hyponatraemia in Adults** | | | |
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| **Policy categories for Trust's internal website (Bob)**<br>Medicine, Endocrinology, All clincal staff | | | **Tags for Trust's internal website (Bob)**<br>Hyponatraemia, SIADH, Osmolalities, Osmotic Demyelination Syndrome |

# CONTENTS

# 1. Purpose

1.1. The purpose of this document is to detail the process for the management of hyponatraemia in adults.

1.2. The policy applies to all adults with hyponatraemia.

1.3. Implementation of this policy will ensure that:

The correct investigations are performed in a timely manner.
The correct treatment is started and changes monitored appropriately.

1.4. Hyponatraemia is one of the most common electrolyte abnormalities and can range from mild to severe. It is also associated with increased morbidity and mortality. It is therefore important that we assess for it and investigate and treat it appropriately.

# 2. Responsibilities

2.1. **Role of The Doctor**

The Doctor is responsible for:

- Ensuring all previous and current available blood results have been reviewed.
- Assessing patients for possible causes of hyponatraemia by taking a thorough history (including medications) and performing a detail physical examination.
- Ensuring that the correct tests and investigations are ordered.
- Ensuring that an Endocrinology review is requested as necessary.
- Ensuring that patients with severe and/or symptomatic hyponatraemia are referred to ITU if necessary.
- Ensuring that fluctuations in sodium levels are monitored and a follow up plan made on discharge if needed.
- Prescribing any necessary fluids or treatment

2.2. **Role of The Nurse**

2.3. **The Nurse is responsible for:**

- Ensuring paired urine and blood samples are sent for osmolalities either by taking both samples or asking someone competent to take blood when urine obtained.
- Delivering prescribed treatment for the management of the hyponatraemia.
- Monitoring patients for the symptoms of acute hyponatraemia.

# 3. Monitoring Compliance with and the Effectiveness of the Guideline

3.1. **Standards/ Key Performance Indicators**

Key performance indicators comprise:

- Appropriate investigations (listed below in Box 1) being requested at the onset of hyponatraemia or on admission if a patient already has hyponatraemia when admitted to hospital.
- Sodium levels corrected in a timely and safely manner as described.
- Medication reviewed performed and documented. Possible contributing medications stopped or held temporarily and their clinical need reviewed.

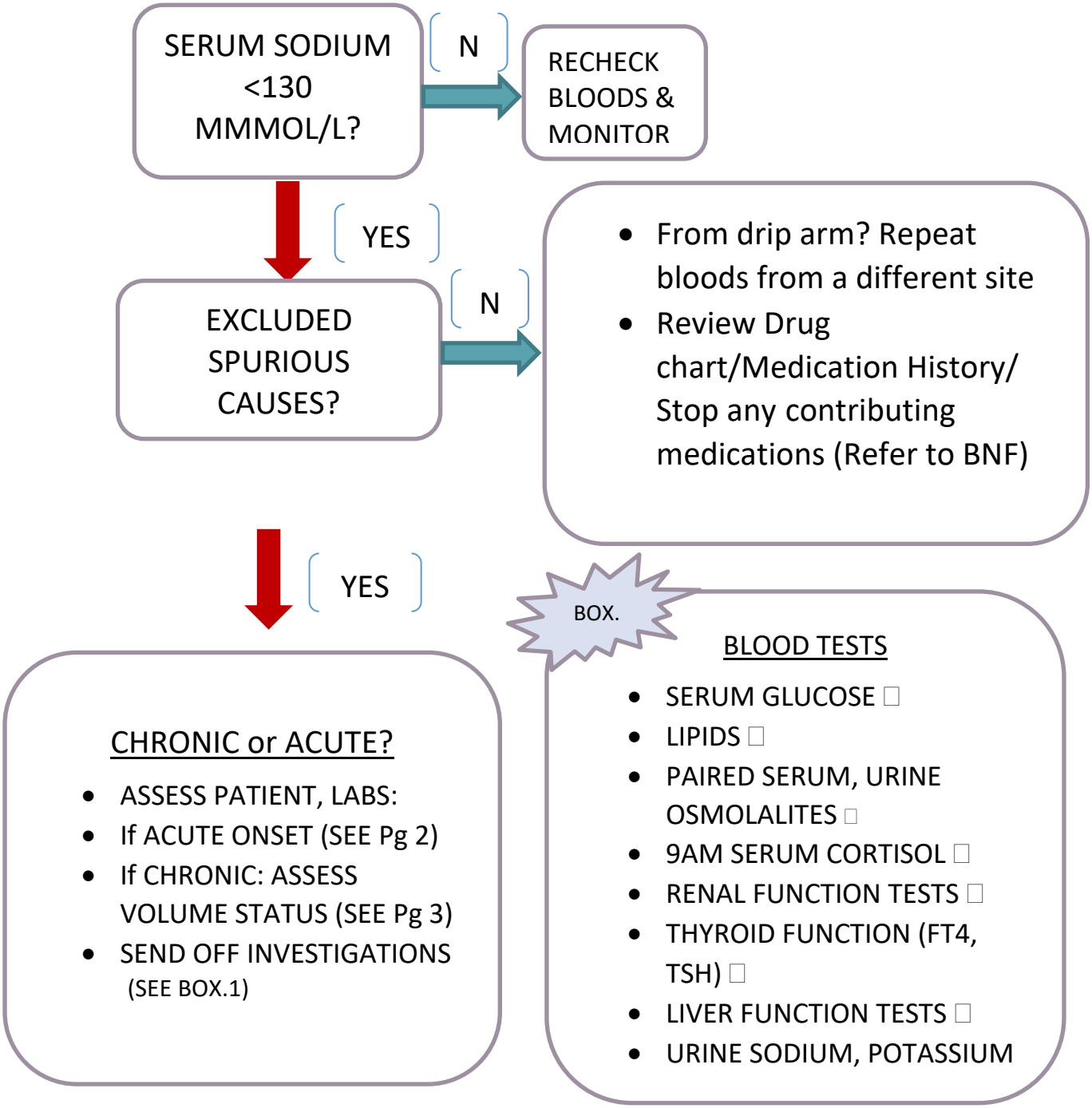
# 4. Process for Implementation and Monitoring Compliance and Effectiveness

- Junior doctors were surveyed on their confidence of managing a patient with hyponatraemia and their knowledge of appropriate investigations. This highlighted a need for further guidance and information on this area. We then audited the management of patients with hyponatraemia for one month looking specifically at the investigations ordered, whether a medication review was performed and if sodium levels rose too quickly. We then introduced our guideline to the junior doctors and presented it at Grand Round to highlight its uses and advice. Following this we re-audited the management of patients with hyponatraemia for one month following the introduction of the guideline. This showed improvement in the three main areas mentioned already. Finally it has been approved by the Drugs and Therapeutic Committee.

- The guideline should be reviewed every three years to ensure it is up to date with current guidance. If changes are needed it will need to be approved by the Drugs and Therapeutic Committee.

# 5. ALGORITHM for the Management of HYPONATRAEMIA in Adults

| | |
|---|---|
| NORMAL SODIUM LEVELS | 133-145mmol/L |
| MILD HYPONATREMIA | 127-132mmol/L |
| MODERATE HYPONATREMIA | 121-126mmol/L |
| SEVERE HYPONATREMIA | ≤ 120mmol/L |



# 6. Acute onset severe hyponatraemia (<48 hours)

SYMPTOMS AND SIGNS OF ACUTE, SEVERE HYPONATRAEMIA PRESENT?

(SEE BOX.2 FOR FEATURES)

NO → PROCEED TO PAGE 3 FOR ASSESSMENT OF CHRONIC HYPONATRAEMIA

YES

- GET HELP IMMEDIATELY (SENIORS, ACUTE MEDICAL TEAM, ENDOCRINOLOGIST, HDU/ICU)
- IF NO OTHER CAUSE FOUND AND SERUM SODIUM < 120MMOL/L

BOX

FEATURES OF ACUTE HYPONATRAEMIA

- REDUCED CONSCIOUSNESS
- HEADACHE
- ACUTE CONFUSION
- DROWSINESS
- SEIZURES

START HYPERTONIC SALINE PREFERABLY ON HDU / LEVEL 2 ITU

- ENSURE PATIENT IS REFERRED TO ITU/HDU
- COMMENCE 2.74% HYPERTONIC SALINE 100ML IV OVER 20 MINS (Available on ITU/ Request Pharmacy)
- REPEAT VBG / U&Es
- IF DETERIORATING CLINICALLY/ NO IMPROVEMENT IN SODIUM LEVELS AFTER 20 MINS; REPEAT AS ABOVE
- AIM FOR 4-6MMOL/L RISE IN SERUM Na OVER FIRST 6 HOURS
- IF 9AM CORTISOL LOW (<300)/ EVIDENCE OF ADRENAL INSUFICIENCY CONSIDER IV/IM STEROIDS
  IV/IM HYDROCORTISONE1OOMG STAT AND 6HOURLY*

- DO NOT CORRECT SODIUM TO NORMAL LEVELS RAPIDLY to avoid OSMOTIC DEMYELINATION SYNDROME
- AIM FOR: ≤ 6mmol/L in the first 6 hours
  ≤ 10mmol/L in the first 24 hours
  ≤ 8mmol/L every 24 hours after (till Na ≥ 130mmol/L)
- DURING THE ACUTE PHASE, MONITOR SODIUM LEVEL UP TO HOURLY AND THEN 6, 12, 24 AND 48 HOURLY

## 7. CHRONIC HYPONATRAEMIA (>48 hours)

### ASSESS HYDRATION/ VOLUME STATUS

*If volume status unclear: consider trial of 0.9% Na Saline IV Infusion over 12 hours. Check Na at 6 hours and reassess

HYPOVOLAEMIC/ CLINICALLY DEHYDRATED

EUVOLAEMIC

HYPERVOLAEMI OVERLOAD

*URINE Na < 20 (Extra renal cause likely)

*URINE Na >20 (renal cause likely)

-INTRAVENOUS FLUID REPLACEMENT 0.9%NACL; Aim for rise in Na ≤ 10mmol/L/24hrs

*IV/IM HYDROCORTISONE 100MG IF ADRENAL INSUFFICIENCY SUSPECTED

REFER TO PATIENT'S

SERUM OSMOLALITY,

URINE OSMOLALITY

URINE SODIUM

*Interpret with caution in patients on Diuretics

CONSIDER EXCESS INTRAVENOUS FLUIDS, HEART FAILURE, LIVER FAILURE, NEPHROTIC SYNDROME

-FLUID RESTRICTION 750-1000MLS/ 24 HOURS

<u>SIADH</u>

SERUM OSM <275

URINE OSM>100

URINE SODIUM >20

-FLUID RESTRICT 750-1000mls/ 24hrs (See Pg.4 for Details)

*If Urine Na <20, reconsider diagnosis as hypovolemic hyponatremia; repeat

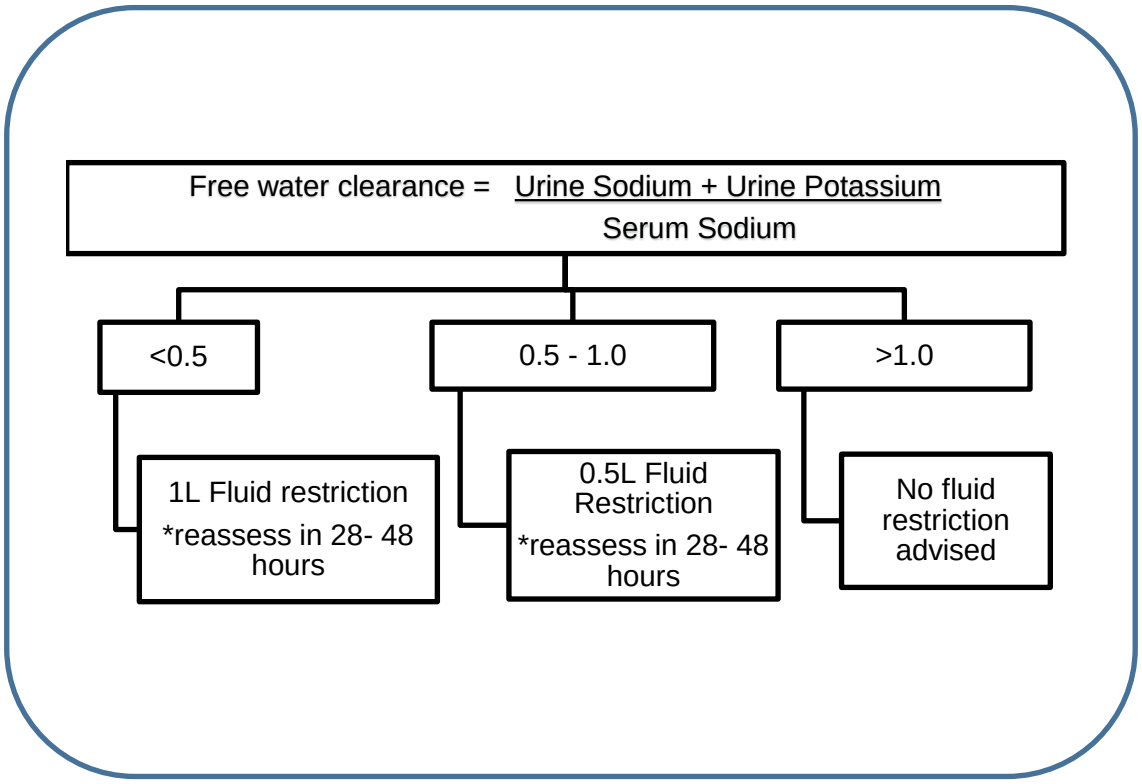
# 8. Management of syndrome of inappropriate adh secretion (SIADH)

## 8.1. CRITERIA FOR DIAGNOSIS OF SIADH:

1. Euvolemia □
2. Serum Osmolality < 275 mOsm/Kg □
3. Urine osmolality >100 mOsm/Kg □
4. Urine Sodium >20 mmol/L □
5. Other treatable / reversible / underlying causes of hyponatraemia ruled out? □
   - Review medications
   - Consider CXR
   - Consider CT Chest Abdomen Pelvis Head
   - Check 9am cortisol
   - Exclude Cortisol Deficiency if 9am Cortisol <300; WITH SYNACTHEN TEST
   - Check Thyroid function (FT4, TSH)

*ABOVE CRITERIA ARE UNRELIABLE IN RENAL FAILURE, RECENT DIURETIC USE (24-24 HRS) AND CONCURRENT USE OF IV FLUIDS.

If SIADH IS DIAGNOSED, USING FURST FORMULA, CALCULATE FREE WATER CLEARANCE.




*If response to fluid restriction is poor consult Endocrinologist!

# 9. POOR RESPONSE TO FLUID RESTRICTION

CONSULT WITH ENDOCRINOLOGISTS.

OPTIONS:

1) DEMECLOCYCLINE: Start at 150mg TDS and reassess after 3 days increasing dose if needed. Max dose is 300mg 3-4 times daily (0.9-1.2g daily in divided doses)
2) Remove fluid restriction and start Tolvaptan 15 mg or alternate days (especially if malignancy present). Monitor Na every 6hours!
3) Furosemide 20mg with oral salt loading with Slow Sodium (Sodium chloride 600mg) 4-8 tablets daily. (Maximum 20/day)

*AIM FOR A RISE IN SODIUM NO MORE THAN:

-10mmol/L in the first 24 Hours

-8 mmol/L in the subsequent 24 hours

-Aim/Target = Na of 130mmol/L

**Please Note: Tolvaptan should ideally only be used in the setting of malignancy associated hyponatraemia. If used outside of this, application for funding would be required.

**Predictors of likely failure of Fluid Restriction**

1) High urine Osmolality >500mOsm/Kg
2) $\frac{\text{Urine Na + K}}{\text{Serum Na}} > 1.0$
3) 24 hour urine volume <1.5L/day
4) Increase in Serum Na < 2mmol/L/day in 24-48 hours on fluid restriction of <1L/day

## 9.1. REFERENCES:

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Dineen R, Thompson C J, Sherlock M. Hyponatraemia – Presentations and Management. Clinical Medicine 2017 Vol 17, No 3: 263-9