

WOMEN'S HEALTH AND PAEDIATRICS

MATERNITY UNIT

Hyponatraemia in Pregnancy: Prevention, Diagnosis and Management

Amendments			
Version	Date	Comments	Approved by
1	May 2023	New guidance	Perinatal Guidelines Group

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In consultation with: Perinatal Governance Group

Ratified by: Perinatal Governance Group

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Target audience: All health professionals within the maternity services

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Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 1 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

Comments on this document to: Perinatal Governance Guideline Group

To be used in conjunction with:

Care of women in labour guideline

Epidural and CSE Labour analgesia (including accidental Dural Puncture)

Waterbirth guideline

Fetal Monitoring guideline

Induction of Labour guideline

Use of Oxytocin (Syntocinon) to induce/augment labour

Bladder Care guideline

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 2 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

Contents

1.0	Peripartum Sodium monitoring pathway	4
2.0	Introduction.....	5
3.0	Background	5
4.0	Signs and Symptoms of Hyponatraemia	6
5.0	Prevention and Diagnosis of Hyponatraemia	6
5.1	Fluid balance in labour.....	6
5.2	Indications for Sodium monitoring.....	7
5.3	Point of Care Testing (POCT).....	7
6.0	Management of Hyponatraemia.....	7
6.1	Clinical review	7
6.2	Dilutional (Hypervolaemic) hyponatraemia.....	7
6.3	Significant Symptomatic Hyponatraemia	8
6.4	Severe neurological symptoms or signs	8
6.5	Hypovolemic Hyponatraemia	8
	References	9

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 3 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

1.0 Peripartum Sodium monitoring pathway



Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 4 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

2.0 Introduction

Hyponatraemia is one of the most common electrolyte disturbances and is a recognised cause of maternal and neonatal morbidity. Hyponatraemia in its most severe form can cause maternal and neonatal encephalopathy, cerebral oedema and seizures.

Hyponatraemia is defined as:

- a blood sodium concentration <130mmol/L in pregnancy (reflecting the physiological changes of pregnancy)
- a blood sodium concentration of <135mmol/L in the non-pregnant population

The physiological changes in pregnancy include lower baseline plasma sodium, an impaired ability to excrete water in third trimester, and exposure to oxytocin with its anti-diuretic effect. This puts them at a higher risk of hyponatraemia in labour. If excess fluid is then administered or consumed then hyponatraemia is more likely to occur.

There has been an increase in the recognised number of cases locally and nationally of hyponatraemia in labouring women, resulting in harmful clinical sequelae for both mothers and babies.

Physiological factors predispose pregnant women to hyponatraemia, especially where additional risk factors such as excessive oral intake, intravenous fluids and exogenous oxytocin are present.

3.0 Background

There has been an increase in the reported incidence of peripartum hyponatraemia .

Labour in itself does not cause hyponatraemia but it does predispose to its occurrence. Women in late pregnancy are less able to excrete excess free water. This is compounded in labour by raised levels of antidiuretic hormone and the additional antidiuretic effect of oxytocin. This causes labouring women to retain water, so that if excess fluid is administered or consumed hyponatraemia is more likely to occur.

An additional important peripartum risk factor is the total volume of fluid intake during labour, both intravenous and oral. This has the potential to affect both low and high risk labours. Healthy women with a neutral fluid balance and up to 1L fluid intake in labour are at low risk of developing hyponatraemia (1%). This increases to 5% in those women who have a fluid intake of 1-2.5L and 26% in those with intake above 2.5L.

The association between hyponatraemia and the use of oxytocin for induction and augmentation of labour is recognised. Hyponatraemia has also been reported as a result of excessive oral fluid intake in low risk labours with no iatrogenic fluids. Immersion in water / water birth are also reported associations.

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 5 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

4.0 Signs and Symptoms of Hyponatraemia

Signs and symptoms of hyponatraemia are primarily related to dysfunction of the central nervous system. Early symptoms are non-specific and may be attributed to pregnancy, labour and common conditions such as pre-eclampsia. The HSIB cohort review (2022) identified maternal symptoms of lethargy, disorientation, anxiety, feeling strange, agitation, cold and shivering and that many of these were attributed to labour.

Early manifestations of hyponatraemia include:

- Anorexia
- Nausea
- Lethargy
- Apathy
- Headache

More advanced signs and symptoms include:

- Disorientation
- Agitation
- Seizures
- Depressed reflexes
- Focal neurological deficits
- Cheyne-Stokes respiration
- Coma

Symptoms correlate with the severity of hyponatraemia and the speed of change in sodium concentration.

5.0 Prevention and Diagnosis of Hyponatraemia

5.1 Fluid balance in labour

Maternal dilutional (hypervolaemic) hyponatraemia during labour can be prevented by keeping a neutral fluid balance and can be recognised by fluid balance monitoring and clear documentation with blood sodium testing when necessary.

Information shared with mothers during the antenatal and intrapartum periods around oral hydration in labour should include optimal amounts of fluid to drink. HSIB identified that whilst hyponatraemia in labour is a rare finding, nulliparous mothers treated with oxytocin infusions in labour have the highest chance of becoming hyponatraemic. Intravenous fluids should be prescribed for labouring mothers only if there is an appropriate indication, and should be administered with care

Women should be advised to drink to thirst (unless any contraindications). Guidance on management of fluid balance in the 'Care of women in labour' and 'Bladder Care in labour' guideline should be followed.

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 6 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

5.2 Indications for Sodium monitoring

Sodium monitoring (Peripartum Sodium Monitoring Pathway) is indicated where:

- Oxytocin infusion for 12hrs or 2nd bag (whichever sooner)
- In labour and require IV insulin and dextrose.
- Noted to have a blood sodium below 130 mmolL-1 for any reason
- Fluid intake > 2.5L (include home consumption)
- > 1.5L positive on fluid balance
- Clinical signs or symptoms

Hyponatraemia can be diagnosed on POCT (VBG on the gas machine) and formal lab UEs should be sent.

5.3 Point of Care Testing (POCT)

Whilst lab results are favoured for accuracy compared to POCT, the long turnaround times hamper the need for rapid results in a dynamic setting such as labour with frequent sampling and changes in management required with changes in results.

POCT can help facilitate management of hyponatraemia in labouring women.

Users should be trained in the appropriate use of POCT and devices must be maintained and calibrated to ensure accurate results.

6.0 Management of Hyponatraemia

6.1 Clinical review

Obstetric or anaesthetic review should take place with a thorough clinical review of the clinical history, medications, volume status, fluid input and output to establish the cause. Most cases will be dilutional (hypervolaemic) and the management flow chart should be followed.

Alternative causes of hyponatraemia should always be considered, particularly in severe hyponatraemia, where concurrent illness exists or symptoms and laboratory results pre-date labour. Blood osmolality, urine sodium and urine osmolality tests are useful in determining the cause of hyponatraemia in more complex cases

The paediatric team should be informed as neonatal hyponatraemia may be present.

6.2 Dilutional (Hypervolaemic) hyponatraemia

Follow the Sodium monitoring Flow chart

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 7 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

6.3 Significant Symptomatic Hyponatraemia

A Multidisciplinary (MDT) approach is required. The Consultant Obstetrician and Consultant Anaesthetist on call should be informed.

- Admit to the Observation Bay on labour ward for monitoring
- IV access
- Consider stopping any oxytocin and fluid restrict (if cause dilutional)
- Follow sodium monitoring flow chart
- The on call medical team (Medical Registrar) may need to be involved if the patient has additional comorbidities or if there is a suspicion of other causes of hyponatraemia such as Syndrome of inappropriate ADH secretion (SIADH)

6.4 Severe neurological symptoms or signs

Involve Critical Care Outreach (CCOT) or ICU in the event of severe neurological symptoms believed to be due to hyponatraemia such as seizures, significant confusion or loss of consciousness. Neuroimaging should be considered to exclude other causes.

Hypertonic saline may be needed in some cases although fluid restriction and expectant management may be an appropriate plan after senior MDT review and critical care input. Hypertonic saline regime - 200 mls of 2.7% saline should be given as an IV bolus over 30 minutes. Consider co-administration of 20 mg IV furosemide if there is any evidence of fluid overload. This will raise serum sodium by approximately 2 – 4 mmolL⁻¹ and will reduce cerebral oedema.

Rapid correction of sodium can cause serious harm (central pontine myelinolysis) therefore 2-4 hourly sodium monitoring will be required after administration of hypertonic saline. This will be managed in a critical care setting. Sodium levels should not rise by more than 12mmol/L in 24 hours.

6.5 Hypovolemic Hyponatraemia

In these cases the hyponatraemia is caused by the loss of both volume and sodium. This is less common but requires a different management approach with treatment of the underlying cause. Fluid restriction is not indicated.

Find the cause of the hypovolemia:

- Blood loss (PPH, intra-abdominal bleeding)
- Bowel obstruction (post CS)
- Diarrhoea or vomiting
- Reduced oral intake/dehydration/fluid restriction
- Use of diuretics (not common in our patient population)
- Pancreatitis (in which fluid moves into third space)

Once cause is established, aim to treat the cause itself. Blood transfusion and IV fluids may be required. Consider liaising with Anaesthetist and Medical registrar for slow correction with

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 8 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------

IV NACL (sodium chloride). Most cases (if due to dehydration) will correct themselves once patient is eating and drinking normally. Detailed information on diagnosis and management of hyponatraemia is available in the 2010 GAIN guideline Hyponatraemia in Adults (see references).

References

1. Guideline for the Prevention, Diagnosis and Management of Hyponatraemia in Labour and the Immediate Postpartum Period. March 2017. GAIN working group RQIA
2. Peripartum Hyponatraemia: Findings from the HSIB cohort Chandrima Biswas and Louise Page on behalf of HSIB BicSoc 2022
3. GAIN Hyponatraemia in Adults (on or after 16th birthday). February 2010. RQIA

Section 1 Organisational Policy	Current Version is held on the Intranet	First ratified: May 2023	Review date: May 2026	Version 1	Page 9 of 9
------------------------------------	--	-----------------------------	--------------------------	--------------	-------------