

Case story

Understanding the risk of maternal and neonatal hyponatraemia

This case story is fictional but based on real events and lessons learnt through cases referred to NHS Resolution's Early Notification scheme. We are sharing the experience to improve the quality of care provided to all patients, families and staff. As you read the story, please ask yourself:

- Could this happen in my organisation?
- Who could I share this with?
- What can we learn from this?

Topic:

Recognising and avoiding significant maternal and neonatal hyponatraemia.

Key points:

- All women in labour are at increased risk of hyponatraemia (defined as blood serum sodium < 130 mmol/l), especially dilutional hyponatraemia which is sometimes referred to as water intoxication.
- This is a result of lower baseline serum sodium in pregnancy, impaired ability to excrete water in the third trimester and exposure to the anti-diuretic effect of oxytocin (synthetic and/or endogenous). Excessive oral or intravenous fluid intake exacerbates this, with potentially serious complications for mother and baby.
- Complications of hyponatraemia include headache, agitation, confusion, seizures and death. Vigilance, diagnosis and active management is therefore imperative.
- Water freely crosses the placenta, lowering the infant's blood sodium concentration in tandem with its mothers. Seizures secondary to hyponatraemia in the newborn infant are similar to those caused by hypoxic ischaemic encephalopathy (HIE) and they are likely to receive therapeutic cooling as a result.
- In a recent study, 26% of low risk mothers who received or ingested >2500 mls of fluid during labour were hyponatraemic¹.
- Significant hyponatraemia can be avoided by giving women evidence-based advice on oral fluid intake, careful monitoring of fluid input and output and responding to positive fluid balance.

Maternity story

A mother in her first pregnancy attends the midwifery-led unit in spontaneous labour at term. The midwife assessing her observes that she has a mild tachycardia on admission and encourages her to drink. The tachycardia settles, however, after a number of hours in labour she is transferred to the labour ward for management of slow progress.

On the labour ward she is advised to have a syntocinon infusion to augment contractions. An intravenous cannula is inserted and syntocinon and intravenous fluids started. Some variable decelerations of the fetal heart are noted on the cardiotocograph (CTG) and the flow of intravenous fluids is increased. After active pushing for around 30 minutes, the CTG is abnormal and the mother consents for a trial of instrumental birth. In theatre, her behaviour is noted to be a little odd, but she is tired and exhausted after a prolonged labour. The baby is delivered by forceps in poor condition, the neonatal team begin resuscitation and transfer the baby to the neonatal intensive care unit for ongoing care including therapeutic cooling for seizures.

In maternity recovery, the mother's behaviour is increasingly odd and a referral to the liaison psychiatry team is made. Approximately an hour after giving birth, her partner calls for help as she begins to have a tonic clonic seizure. An arterial blood gas taken following the seizure reveals a sodium level of 117 mmol/l that is confirmed on a venous sample sent to the laboratory. She is transferred to the intensive care unit for ongoing care. Her partner is not sure but thinks she may have drunk at least three litres of water while in labour. This is in addition to the two litres of intravenous fluid on the drug chart from labour ward and theatre. The neonatal team are also informed and a review of the baby's cord gas results reveal a low sodium at birth of 116 mmol/l, but this was not seen previously.

Considerations for your hospital

- Do all birth settings in your trust have up-to-date guidance on fluid intake, monitoring and fluid balance management in labour?
- Does local guidance cover what is appropriate advice to give to women with regard to oral fluid intake? Current evidence suggests a rise in cases of hyponatraemia in labour due to excessive oral intake of hypo or isotonic fluids in addition to the recognised effects of intravenous fluids and syntocinon.
- Do partograms used in all birth settings have a section to record fluid input and output?
- Read the Northern Ireland GAIN guideline on hyponatraemia in labour² and consider whether it could be implemented in your trust.

What has happened as a result?

A number of cases with similar features and outcomes have been referred to NHS Resolution as part of the Early Notification scheme in light of the potential risk of severe brain injury to the affected infants.

Resources

1. Moen V, Brudin L, Rundgren M, Irestedt L. Hyponatremeia complicating labour-rare or unrecognised? A prospective observational study. BJOG. 2009 116:552-56
2. GAIN Guideline for the Prevention, Diagnosis and Management of Hyponatraemia in Labour and the Immediate Postpartum Period. March 2017. www.rqia.uk/GAIN ISBN:978-1-906805-36-4

(Published in February 2019 and reviewed in August 2022)