Case presentation: a neonate presenting to a District General Hospital with isolated cranial diabetes insipidus evolving to partial hypopituitarism

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Introduction

Hypernatraemia and weight loss in a neonate can be common. It is usually due to high rates of insensible water loss, high urine output and subsequent dehydration. This is commonly resolved by supplementation of feeds.

Birth:

- Preterm baby girl born at 35 weeks gestation, born in good condition following an uneventful pregnancy. She did not require resuscitation at birth or intensive care. The only support required was for feeding and thermoregulation.

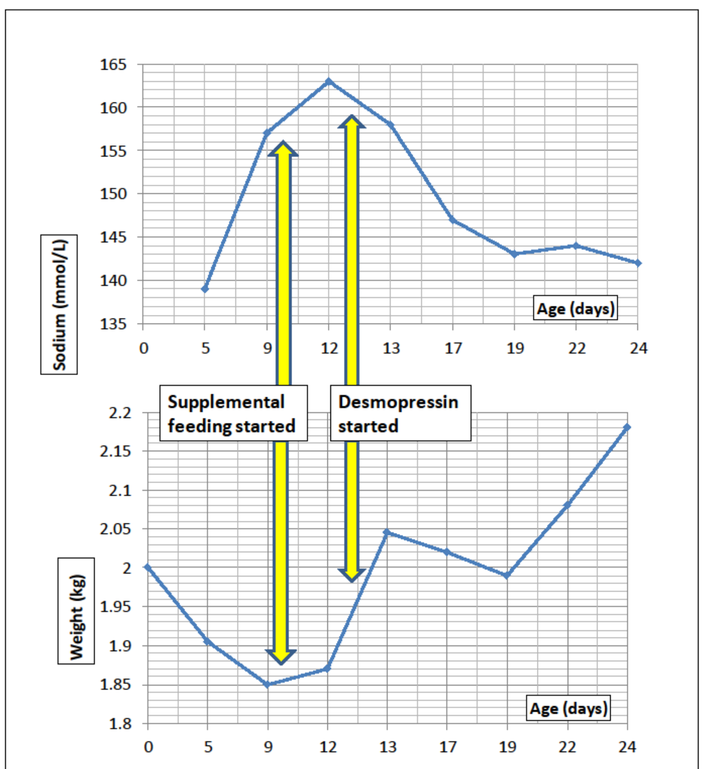

Figure 1: Serial weight and sodium levels

Week 2:

- *Day 9* – Baby was noted to have 7.5% weight loss since birth and hypernatraemia: Na 156 mmol/L, Urea 5.0 mmol/L. These results were thought to be likely due to hypernatraemic dehydration. Feed volumes were therefore increased from demand breastfeeding initially to 180ml/kg/day expressed breast milk and formula in addition to breastfeeds.
- *Day 12* – Despite feed supplementation hypernatraemia persisted; Na 163 mmol/L and minimal weight gain was observed (see figure 1). Paired osmolalities: serum 350 mosm/kg and urine 114 mosm/kg were suggestive of diabetes insipidus. A test dose of 20 micrograms desmopressin was given orally which resulted in weight gain and normalisation of serum osmolality.
- Initial endocrine tests were performed: random cortisol 46 nmol/L on day 12 of life and 285 nmol/L on day 16. Thyroid function TSH 5.4 mU/L, FT4 17.2 pmol/L and FT3 4.3 pmol/L. Low dose short synacthen test cortisol 260 nmol/L at 30 minutes, 474 nmol/L at 60 minutes and 599 nmol/L at 90 minutes. Initial prolactin was high (4731 µIU/ml) and initial MRI head showed a high pituitary signal consistent with patient age but the pituitary stalk was not seen.
- Baby was discharged home on regular desmopressin following a diagnosis of **isolated cranial Diabetes Insipidus**.

3 Years old:

- Regular outpatient follow-up showed reduced height velocity at 3 years of age with height consistently less than the 0.4th centile (see figure 2).
- Endocrine testing was repeated at this point and showed inadequate response to glucagon stimulation test, low IGF1 (<3.3 nmol/L) and low growth hormone (0.65 µg/L). **Partial hypopituitarism** was diagnosed.
- After further clinical review, a course of growth hormone treatment was initiated at 5 years of age, resulting in a significant improvement in height velocity.

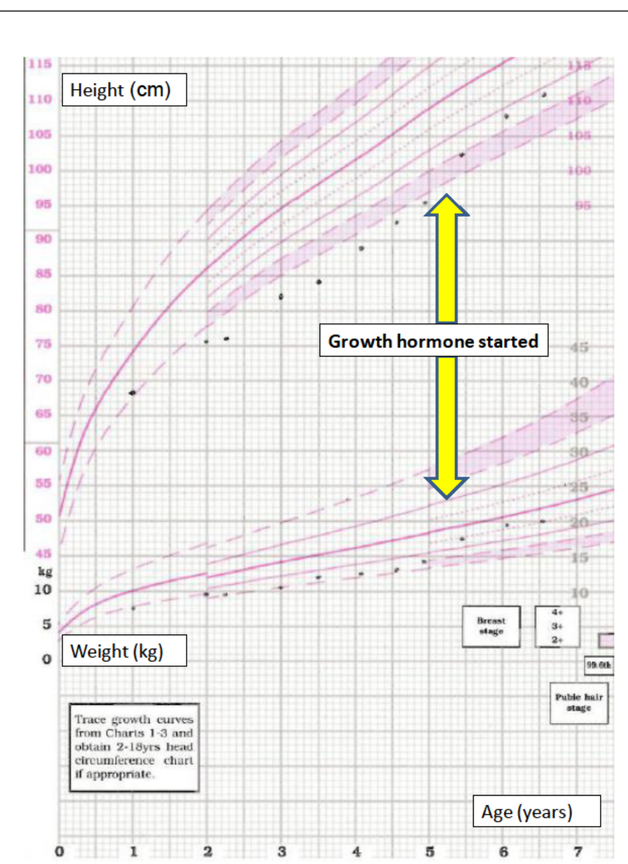

Figure 2: Growth chart with reduced height velocity

Conclusions

Hypernatraemic dehydration in a neonate which is not responsive to rehydration should be further investigated and diabetes insipidus considered, especially in those identified to have weight loss despite satisfactory feed intake.

This case illustrates the importance of continuous monitoring and regular endocrine evaluation to identify wider pituitary dysfunction even after initial diagnosis of isolated cranial diabetes insipidus.

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