HYPERNATREMIA CASE FOR NEPHKIDS

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Case scenario

- A 6 year old,15 kg child with craniopharyngioma, was operated for the same and was shifted to PICU postoperatively on ventilatory support.
- 12 hours postoperatively, child's vitals were
- Heart rate-155/min
- Respiratory rate-34/min
- Arterial Blood pressure -80/46 mmHg
- Child was under sedation in view of ventilatory support
- Urine output- 10 ml /kg/hr last 3 hours

Case scenario

- Investigations done revealed :
- CBG-80 mg/dl
- Serum sodium-159 mEq/L
- Serum potassium-3.8 mEq
- Urea-55 mg/dl
- Creatinine-1 mg/dl
- Serum osmolality -346 mosm/Kg

Question

- What is the inference from the above case scenario?
- Is this common post neurosurgeries?

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- Children with craniopharyngioma are expected to have associated endocrine abnormalities due to its location near the pituitary and hypothalamus.
- 8-35% of patients with craniopharyngioma have Diabetes insipidus preoperatively
- Postoperatively 70-90% of children develop Diabetes Insipidus
- It may be transient or permanent.

Question?

• What type of hypernatremia is this?

• This is Moderate hypovolemic hypernatremia

Question?

 How do we differentiate Central from Nephrogenic diabetes insipidus?

	Central DI	Nephrogenic DI
Defect	Decreased ADH release from Pituitary	ADH resistance in V2 receptors in kidney
Etiology	IdiopathicTraumaIntracranial surgeriesIschemic Encephalopathy	 Drugs (Lithium, cidofovir, Foscarnet) Electrolyte abnormalities (hypercalcemia, Hypokalemia)
Clinical features	Polyuria Nocturia	Polyuria Polydipsia Nocturia
Response to Desmopressin	Increased urine osmolality (> 50% from baseline 1 to 2 hours after administration)	Little or no change

Question

 What are the clinical manifestations of hypernatremia?

- Clinical manifestations are related to neurological system.
- Children manifest hypernatremic symptoms when sodium level approaches 165 mEq/L.
- Acute onset hypernatremia (< 48 hours) present with irritability, high pitched cry, altered sensorium, increased muscle tone or frank seizure.
- Death due to Respiratory failure with serum osmolality >400 mOsm/Kg.
- In chronic hypernatremia(>48 hours) rapid fluid resuscitation will lead to cerebral edema
- Sudden changes in serum osmolality can lead to Osmotic Demyelination Syndrome.

Question

How would you manage this child?

Formula for free water correction:

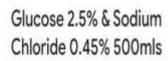
• 0.6 x patient's weight in kg.[Patients Na. -1]

 Where 0.6 x weight is estimated total body water and 140 is desired Na

Can you calculate for this child?







- Once hypovolemia is corrected, ½ NS with 2.5 % or 5 % D is used. depends on the rate of infusion and change in osmolality required based on acute or chronic hypernatremia
- Adrogue Madias equation for correction
- This estimates the change in serum Sodium by 1 Litre of any intravenous fluid
- ={(Na content of IVF) +K content of IVF)} Patient serum Sodium
- 0.6 X weight(TBW in litres)+1
- Do not decrease > 10 m Eq /L of sodium over 24 hours.
- If sodium fall >0.6, decrease the infusion rate
- If sodium fall <0.5, increase the rate
- During therapy, if sodium falls too rapidly and/or neurological symptoms develop, consider a short infusion of 3% NS over 1-2 hours
- Dialysis may be required in extreme cases

THANK YOU!