

VAQ 2010.2.1 (Bloods)

An 8 year girl is brought to your emergency department with a 3 week history of general malaise. On the morning of presentation, she was found by her mother to be very lethargic and difficult to rouse. Her observations are:

GCS	9		
HR	110	/min	
BP	85/50	mmHg	supine
RR	18		
Temperature	36	°C	

Serum biochemical results

			Reference Range
Na ⁺	128	mmol/L	(133-143)
K ⁺	5.9	mmol/L	(3.2-4.8)
Chloride	95	mmol/L	(95-110)
Bicarbonate	17	mmol/L	(21-27)
Urea	3.9	mmol/L	(1.5-6.0)
Creatinine	60	micromol/L	(40-100)
Glucose	1.5	mmol/L	(3.5-8.0)

Describe and interpret the results of her investigations (100%)

This is a critically unwell child with circulatory shock, obtundation, critical hypoglycaemia and a combination of hyponatraemia and hyperkalaemia with a subacute presentation. She requires urgent resuscitation and intravenous glucose and steroids for likely glucocorticoid and mineralocorticoid deficiency (Addisonian crisis). She also requires assessment and treatment for the precipitating illness with a low threshold for broad spectrum antimicrobials for co-existent or causative sepsis.

Physiology

- hypotensive, tachycardic
- altered conscious level
- apyrexial on single measurement

Biochemistry

- moderate** hyponatraemia
 - salt > water losses or water gains
 - hypovolaemic
 - salt > water losses
 - GI
 - urinary
 - natriuresis in mineralocorticoid deficiency
 - third spacing / burns
 - euvolaemic
 - polydipsia
 - SIADH
 - hypervolaemic
 - oedema states
 - iatrogenic

moderate hyperkalaemia

- increased intake
- increased endogenous load
 - rhabdo, burns, tumour lysis
- reduced excretion
 - renal failure
 - potassium retention in mineralocorticoid deficiency
- transcellular shift
 - acidosis
 - insulin treatment

metabolic acidosis implied by low bicarbonate – AG 16 is slightly raised

- AGMA supported by low normal chloride
- lactic acidosis most likely
- other causes differentiated by history
 - salicylate use
 - DKA not supported by low glucose
 - uraemia not supported by urea/creat
 - unlikely in this context to be due to toxic alcohol or drug ingestion (iron, isoniazid)

critical hypoglycaemia

- insulin excess
- overdose or insulinoma
- adrenal failure
 - primary (Addison's)
 - secondary (e.g. meningococcaemia causing Waterhouse Friderichsen syndrome or severe sepsis)

She should be assumed to have an Addisonian crisis and given treatment without delay.

Other possibilities would include sepsis as detailed above and consideration for prompt antibiotics should be taken.