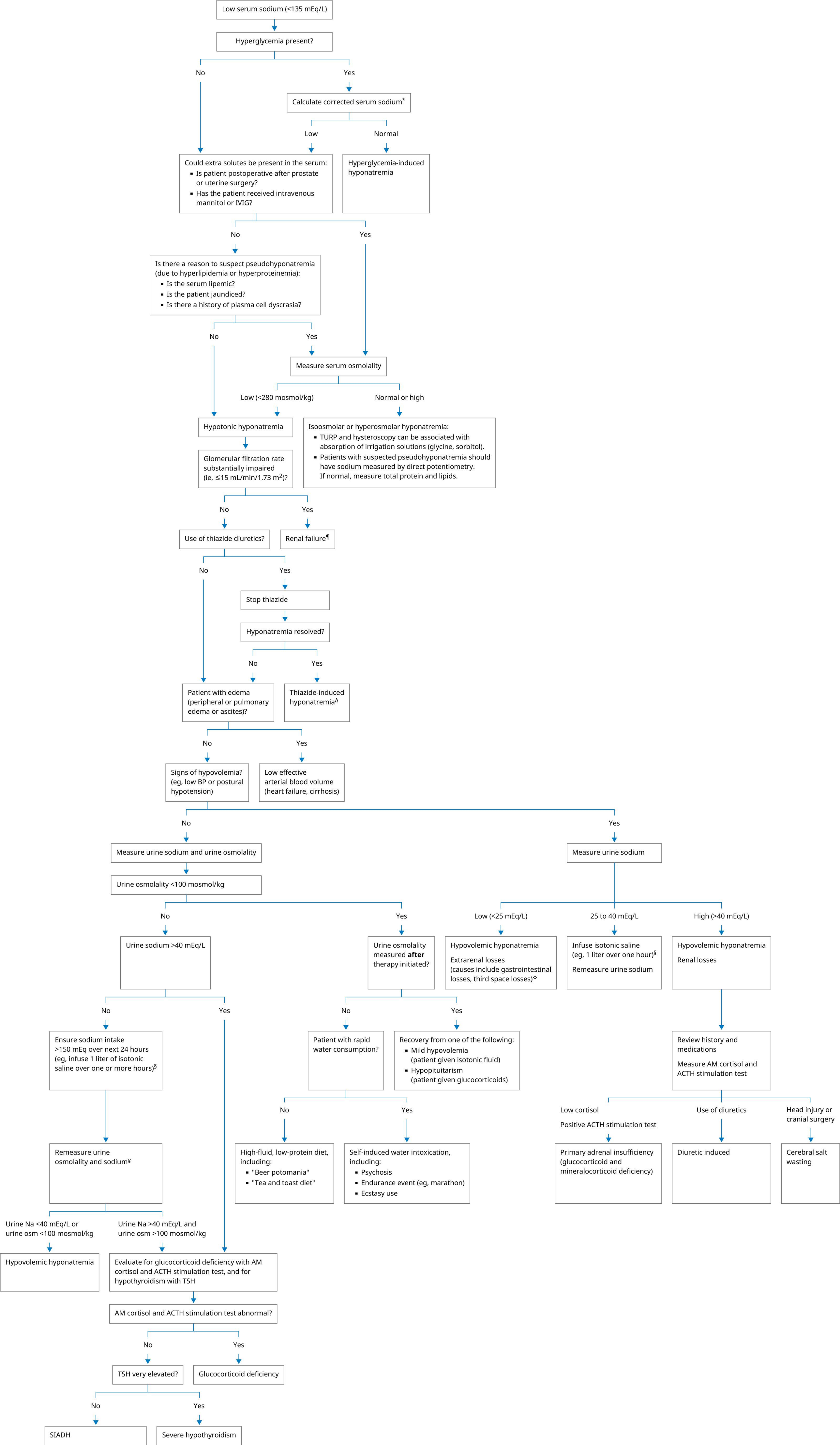
Low serum sodium (<135 mEq/L)
Hyperglycemia present?
No
Yes
Calculate corrected serum sodium*
Low
Normal
Could extra solutes be present in the serum:
Is patient postoperative after prostate or uterine surgery?
Has the patient received intravenous mannitol or IVIG?
Hyperglycemia-induced hyponatremia
No
Yes
Is there a reason to suspect pseudohyponatremia (due to hyperlipidemia or hyperproteinemia):
Is the serum lipemic?
Is the patient jaundiced?
Is there a history of plasma cell dyscrasia?
No
Yes
Measure serum osmolality
Low (<280 mosmol/kg)
Normal or high
Hypotonic hyponatremia
Isoosmolar or hyperosmolar hyponatremia:
TURP and hysteroscopy can be associated with absorption of irrigation solutions (glycine, sorbitol).
Patients with suspected pseudohyponatremia should have sodium measured by direct potentiometry. If normal, measure total protein and lipids.
Glomerular filtration rate substantially impaired (ie, ≤15 mL/min/1.73 m2)?
No
Yes
Use of thiazide diuretics?
Renal failure¶
No
Yes
Stop thiazide
Hyponatremia resolved?
No
Yes
Patient with edema (peripheral or pulmonary edema or ascites)?
Thiazide-induced hyponatremiaΔ
No
Yes
Signs of hypovolemia? (eg, low BP or postural hypotension)
Low effective arterial blood volume (heart failure, cirrhosis)
No
Yes
Measure urine sodium and urine osmolality
Measure urine sodium
Urine osmolality <100 mosmol/kg
No
Yes
Low (<25 mEq/L)
25 to 40 mEq/L
High (>40 mEq/L)
Urine sodium >40 mEq/L
Urine osmolality measured after therapy initiated?
Hypovolemic hyponatremia
Extrarenal losses (causes include gastrointestinal losses, third space losses)◇
Infuse isotonic saline (eg, 1 liter over one hour)§
Remeasure urine sodium
Hypovolemic hyponatremia
Renal losses
No
Yes
No
Yes
Ensure sodium intake >150 mEq over next 24 hours (eg, infuse 1 liter of isotonic saline over one or more hours)§
Patient with rapid water consumption?
Recovery from one of the following:
Mild hypovolemia (patient given isotonic fluid)
Hypopituitarism (patient given glucocorticoids)
Review history and medications
Measure AM cortisol and ACTH stimulation test
Remeasure urine osmolality and sodium¥
No
Yes
Low cortisol
Positive ACTH stimulation test
Use of diuretics
Head injury or cranial surgery
High-fluid, low-protein diet, including:
"Beer potomania"
"Tea and toast diet"
Self-induced water intoxication, including:
Psychosis
Endurance event (eg, marathon)
Ecstasy use
Primary adrenal insufficiency (glucocorticoid and mineralocorticoid deficiency)
Diuretic induced
Cerebral salt wasting
Urine Na <40 mEq/L or urine osm <100 mosmol/kg
Urine Na >40 mEq/L and urine osm >100 mosmol/kg
Hypovolemic hyponatremia
Evaluate for glucocorticoid deficiency with AM cortisol and ACTH stimulation test, and for hypothyroidism with TSH
AM cortisol and ACTH stimulation test abnormal?
No
Yes
TSH very elevated?
Glucocorticoid deficiency
No
Yes
SIADH
Nephrogenic SIADH
Reset osmostat
Severe hypothyroidism
Evaluate underlying etiology