HYPONATREMIA

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SODIUM HOMEOSTASIS

Sodium levels are mostly a reflection of water balance and NOT sodium balance in the body

Hyponatremia mostly reflects water excess – absolute / relative

Common in children with edema / diuretics

Also in situations where the kidney is being externally influenced

Definition of Hyponatremia: Na < 135 mEq/L

HYPONATREMIA - MECHANISMS

1. Gain of free water (most common)

- Obvious (edema)
- Subtle (clinically occult)

1. Loss of sodium and water (less common)

- Commonly iatrogenic
- Rarely pathogenic

APPROACH

Suspect hypornatremia

- Clinical context – edema, diuretics, dehydration, CNS symptoms (drowy, seizures)
- Confirm by lab

Guess the mechanism

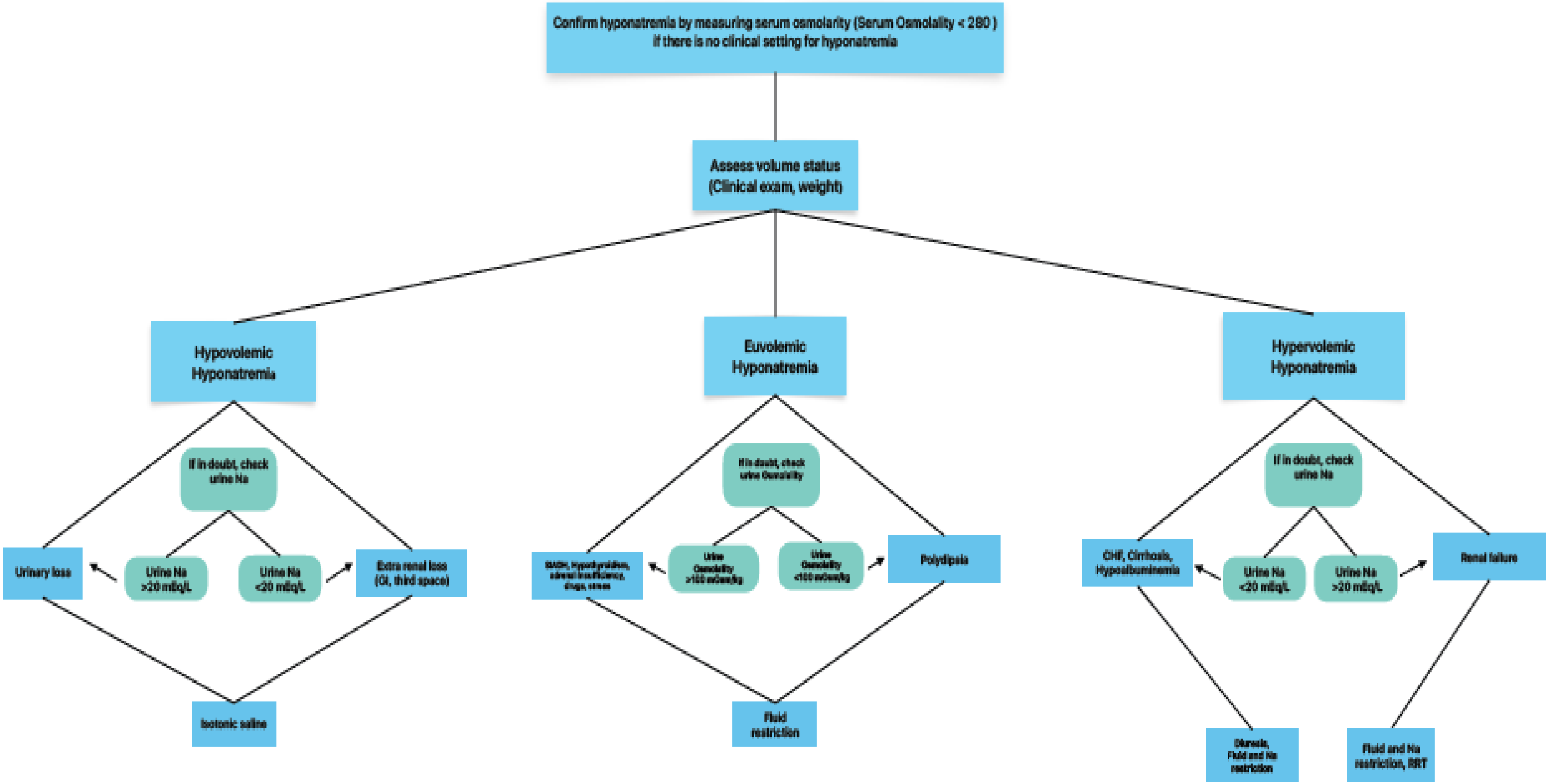
- Mostly evident from clinical context (**history**)
- **Examination (volume status)**
  - *Hypervolemic / normovolemic – water excess*
  - *Hypovolemic – Sodium loss > water loss*
- **Labs**
  - Serial serum sodium
  - Urine electrolytes and osmolarity

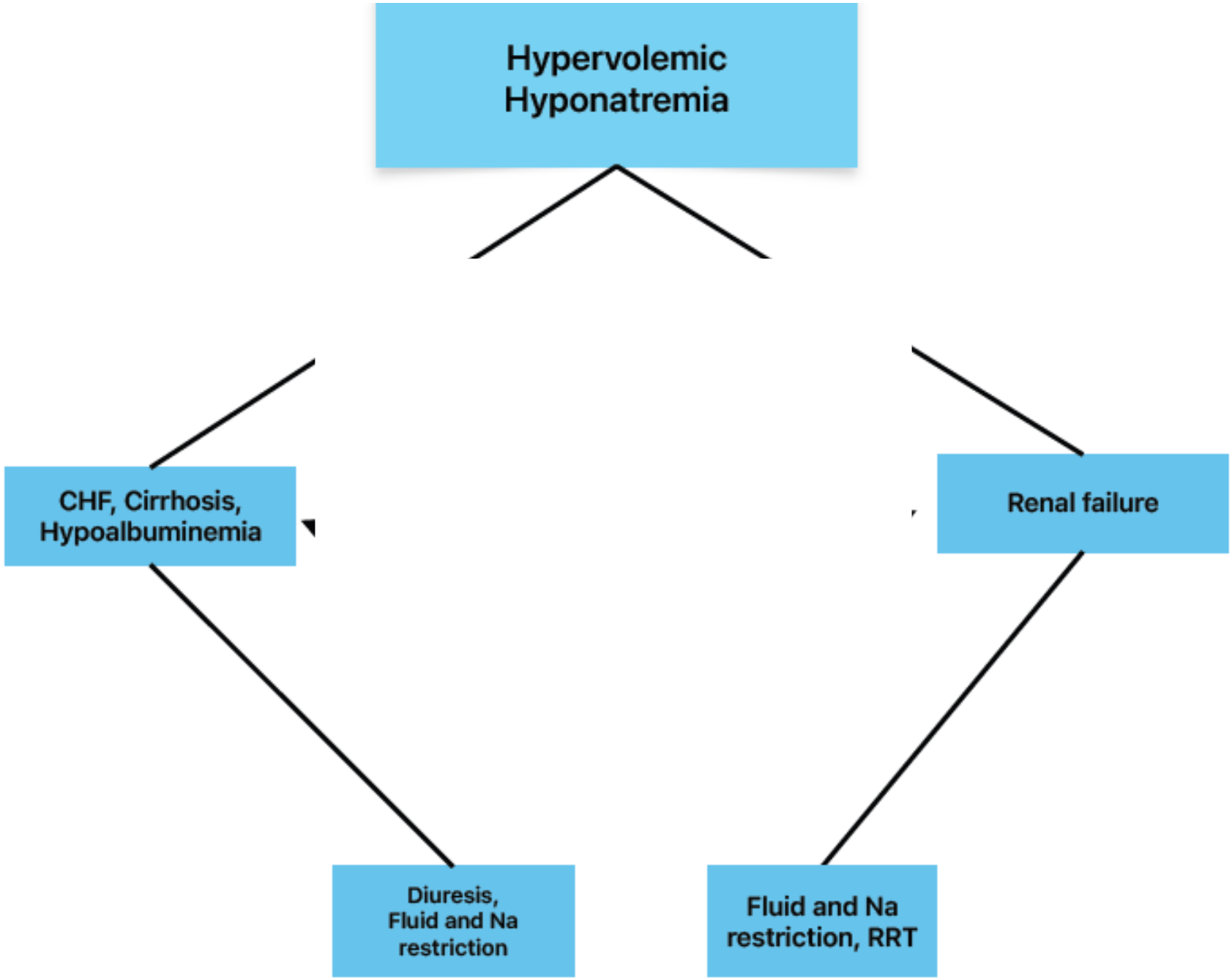
LAB TESTS

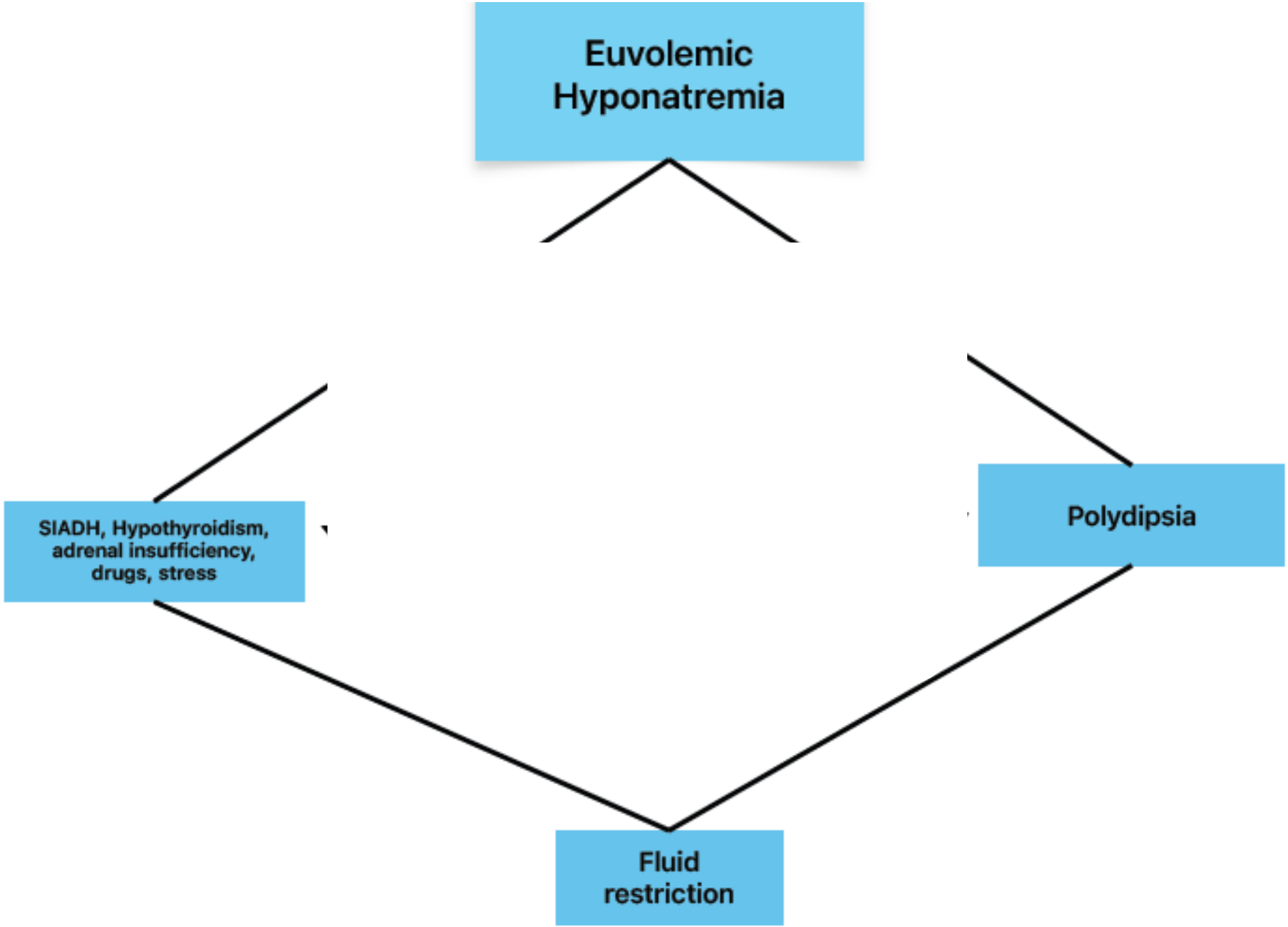
Rarely required other than serum Na+

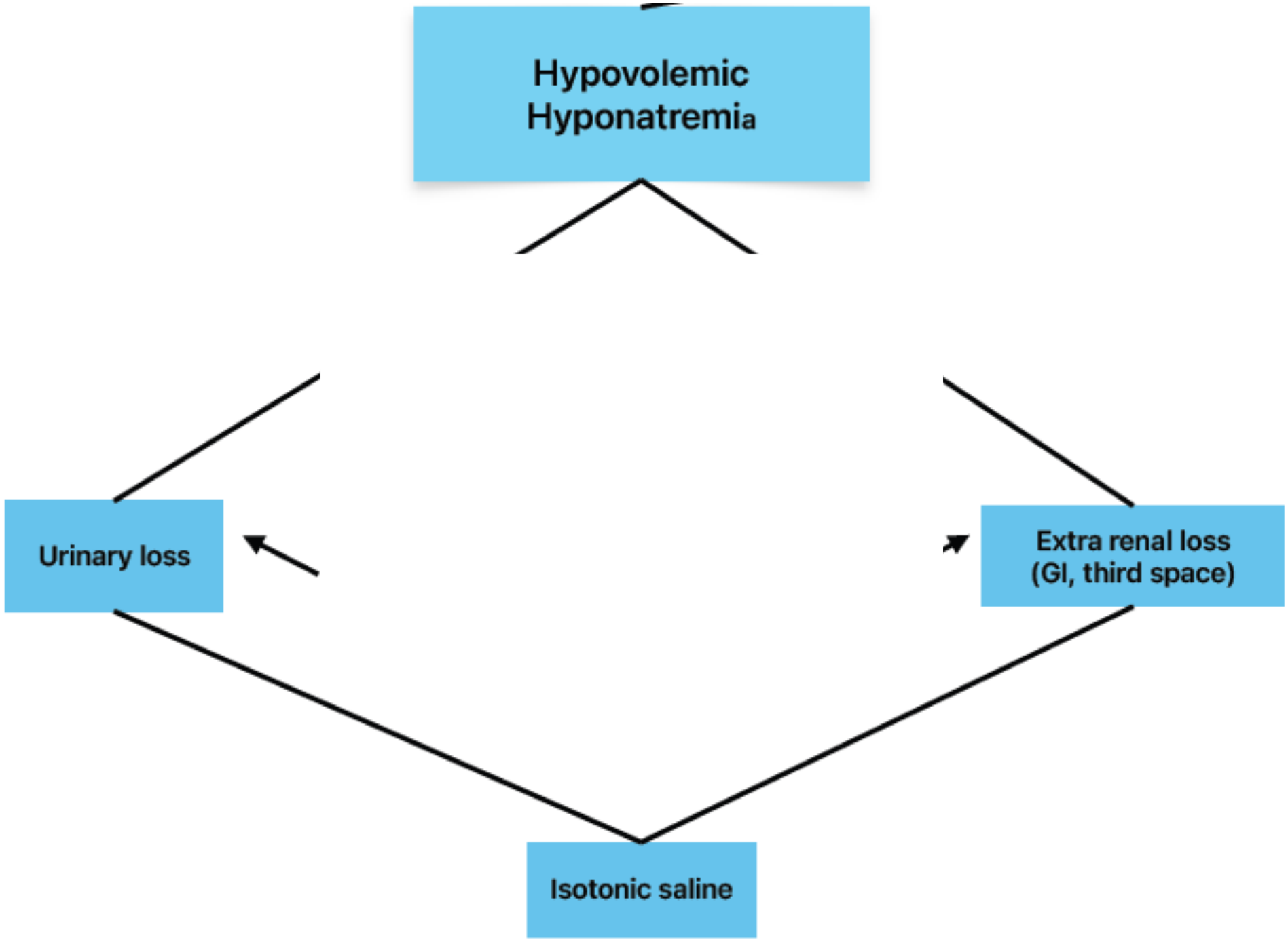
⇩ SERUM OSMOLARITY (SODIUM)

Urine Na+	Urine Osmolarity


Confirm hyponatremia by measuring serum osmolarity (Serum Osmolality < 280)
if there is no clinical setting for hyponatremia
Assess volume status
(Clinical exam, weight)
Hypovolemic
Hyponatremia
If in doubt, check
urine Na
Urinary loss
Urine Na
>20 mEq/L
Urine Na
<20 mEq/L
Extra renal loss
(GI, third space)
Isotonic saline
Euvolemic
Hyponatremia
If in doubt, check
urine Osmolality
Urine
Osmolality
>100 mOsm/kg
Urine
Osmolality
<100 mOsm/kg
Polydipsia
Fluid
restriction
Hypervolemic
Hyponatremia
If in doubt, check
urine Na
CHF, Cirrhosis,
Hypoalbuminemia
Urine Na
<20 mEq/L
Urine Na
>20 mEq/L
Renal failure
Diuresis,
Fluid and Na
restriction
Fluid and Na
restriction, RRT


Hypervolemic Hyponatremia
CHF, Cirrhosis, Hypoalbuminemia
Renal failure
Diuresis, Fluid and Na restriction
Fluid and Na restriction, RRT


Euvolemic Hyponatremia
SIADH, Hypothyroidism, adrenal insufficiency, drugs, stress
Polydipsia
Fluid restriction


Hypovolemic Hyponatremia
Urinary loss
Extra renal loss (GI, third space)
Isotonic saline

HYPONATREMIA – MANAGEMENT PRINCIPLES

- **HOW?** Should be slow and steady - Brain does not like sudden change in osmolarity
- **HOW fast?** Sodium can be brought back to normal at the same rate at which it became abnormal
  - Educated guess based on clinical context and level of sodium
- **HOW exactly?**
  - Fluid restriction (except in hypovolemic) and diuretics
  - Isotonic saline is the preferred in hypovolemic hyponatremia.
  - 3% NS is used when acute rise is needed
  - Works ONLY if kidney (the BOSS) is working well. Otherwise surrender and do RRT

NOW THE FUN STARTS!

ENJOY !!!