Hypernatremia

Treatment

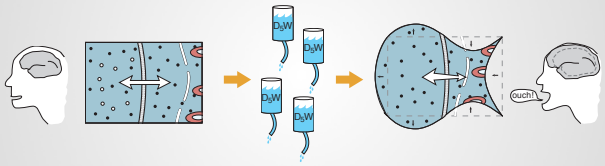
The water losses of yesterday

The water losses of yesterday: water deficit calculation

$$\text{Water deficit} = \frac{\text{Current sodium} - \text{Target sodium}}{\text{Target Sodium}} \times \text{Total body water}$$

Target sodium is where you want the sodium to be tomorrow

The water losses of yesterday: water deficit calculation



0.5 mmol/L/hour or 12 mmol/L in 24 hours

The water losses of yesterday: water deficit calculation

0.5 mmol/L/hour or 12 mmol/L in 24 hours

Sodium 164 Target sodium is 152

Sodium 178 Target sodium is 166

The water losses of yesterday: water deficit calculation

$$\text{Water deficit} = \frac{\text{Current sodium} - \text{Target sodium}}{\text{Target sodium}} \times \text{Total body water}$$

a healthy adult is 60% water by weight

- ➡ less as you get older
- ➡ less as you get fatter

0.6 x kg for young men, 0.5 x kg for young women, 0.4 x kg for older women

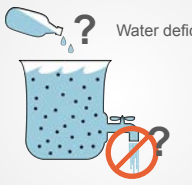
82 year old female nursing home resident presents with altered mental status, fever and foul smelling urine. Serum sodium is 168 mmoL. Body weight is 64 kg

$$\text{Water deficit} = \frac{\text{Current sodium} - \text{Target sodium}}{\text{Target sodium}} \times \text{Total body water}$$

$$\text{Water deficit} = \frac{168 - 156}{156} \times 64 \times 0.4$$

$$\text{Water deficit} = 2 \text{ liters}$$

The water losses of today



Water deficit calculation

Accounting for ongoing water losses can be essential or irrelevant depending on the patient

Patient with DI and 6 liters of urine a day	Patient with ARF and minimal urine output	Patient with a fever of 102 and an open surgical wound
Essential	**Not Essential**	**Essential**

Accounting for ongoing water losses can be essential or irrelevant depending on the patient

0.5 1.0

Low Normal High

Accounting for ongoing water losses: Sample calculation

Sodium: 155
Urine output yesterday: 4,780 mL

Estimate the ongoing losses for today

The ongoing loss is 5 liters

To correct hypernatremia, add the water deficit to the ongoing urinary losses and give that to the patient

$$\textbf{water deficit} = \frac{\text{Current sodium} - \text{Target Sodium}}{\text{Target Sodium}} \times \text{Total body water}$$

$$+ \quad \textbf{on going losses} = \text{Yesterday's urine output} \times 0.5\text{-}1$$

$$= \quad \textbf{Target water intake today}$$

Ideal fluid is water by mouth, D5W is acceptable

On post op day 2, following removal of a pituitary adenoma from a 35 year old 72kg female, the patient has a sodium 162. Yesterday the urine output was 3,500 mL.

water deficit = $\frac{\text{Current sodium} - \text{Target Sodium}}{\text{Target Sodium}}$ x Total body water

\+ **on going losses** = Yesterday's urine output x 0.5-1

= **Target water intake today**

Ideal fluid is water by mouth, D5W is acceptable

On post op day 2, following removal of a pituitary adenoma from a 35 year old 72kg female, the patient has a sodium 162. Yesterday the urine output was 3,500 mL.

water deficit = $\frac{162 - 150}{150}$ x 72 kg x 0.5

\+ **on going losses** = 3,500 x 0.8

= **Target water intake today**

On post op day 2, following removal of a pituitary adenoma from a 35 year old 72kg female, the patient has a sodium 162. Yesterday the urine output was 3,500 mL.

water deficit = 0.08 x 36 = 2.88 liters

\+ **on going losses** = 2.8 liters

= 5.68 liters **Target water intake today**

236 mL/hour to get the patient to 150 mmol/L