FLUID THERAPY

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Fluid Requirements

- Fluid Requirements = Maintenance + Deficit
- Maintenance/ 1 hour = follow the 4 2 1 rule.
- Maintenance / 24 hours = follow the 100 50 20 rule..
- Deficit = Dehydration x weight x 10
- Note: Deficit depends on dehydration percentage. We consider the dehydration as the following:

-Mild Dehydration = 5% -Moderate Dehydration = 10% -Severe Dehydration=15%

- This table will help you in determining the dehydration levels based on patients presentation:

	Level of dehydration		
	Mild	**Moderate**	**Severe**
General appearance	Irritable Thirsty	Irritable Extremely thirsty	Drowsy or unconcious
Anterior fontanelle	normal	Depressed	Strikingly depressed
Eyes	Normal	Sunken	Sunken
Tongue	Normal wet	dry	Very dry, furred
Skin pinch	Goes back immediately	Goes back slowly	Goes back very slowly
Breathing	Normal	Rapid	May be very rapid
Pulse	Normal	Rapid and feeble	Weak and thready
Urine output	Normal	Deep color	Scanty
Weight loss	< 5%	6 – 9 %	≥ 10%

Na+ Requirements

- Na+ Requirements = Na Maintenance + Na Deficit
- Na+ Maintenance = for every 100 cc of fluid maintenance, five **3** mEq of Na
- Na+ Deficit = for every 100 cc of fluid deficit, give **8** mEq of Na
- Note: If the question asked about K+, we calculate K+ maintenance only because the deficit is very low.

- K+ Maintenance = for each 100 cc of fluid maintenance, give 2 mEq of K

Types of Normal Saline

Normal Saline	Half Normal Saline	⅓ Normal Saline	1/5 Normal Saline
154 mEq Na/L	77 mEq/L	51 mEq/L	31 mEq/L

- Note: We give NS with Dextrose 5% in Water, which means that every 100 cc of NS has 5 g of Dextrose.
- Type of NS for each patient is calculated as the following:

1. Calculate fluid requirements.
2. Calculate total Na+ requirements.
3. Cross Multiply.

Hyponatremic Patient

- We have to correct Na+, so add Na+
- Corrected Na+ = 0.6 x weight x (135 - [Na+])
- Then Calculate total water as usual BUT multiply the MAINTENANCE fluid by 2 and add the deficit as usual.
- Then Calculate total Na+ requirements as usual BUT multiply the MAINTENANCE Na by 2 then add the deficit as usual and **add the corrected Na+**
- Note: We multiplied the maintenance (Water and Na+) by 2 because we add fluids and Na+ within 48 hours not 24 hours to avoid side effects.

Hypernatremic Patient

- We will correct Na+ by adding Water.
- Corrected Water = 4 x weight x ([Na+] - 145)
- Then Calculate total water as usual BUT multiply the MAINTENANCE fluid by 2 then add the deficit as usual and **add the corrected water.**
- Then Calculate total Na+ requirements as usual BUT multiply the MAINTENANCE Na by 2 and add the deficit as usual.
- Note: We multiplied the maintenance (Water and Na+) by 2 because we add fluids and Na+ within 48 hours not 24 hours to avoid side effects.

Bolus

- In the ER or in cases of severe dehydration, we give a bolus or more immediately.
- Bolus = 20 x weight
- Every bolus reduces the dehydration 2%