CASE BASE LEARNING

CASE  -1

SHIFTING OF FLUID AND ELECTROLYTE ACROSS CELL MEMBRANE

Learning Objectives:

- Define Osmosis and how hypernatremia disturb the osmolarity and cellular function
- Enumerate the Factors affecting the movement of water and electrolytes across cell membrane (Between extracellular and intracellular compartment)
- Enumerate the causes of Hypervolemic Hypernatremia, Isovolemic Hypernatremia and Hypovolemic Hypernatremia
- How homeostasis is achieved if water and electrolytes are disturbed

Chief Complaint: 58-year-old man with upper abdominal pain and breathing problems

History: A 58-year-old Mohammad Javed resident of Saddar, Karachi known case of heart diseases was admitted in hospital for severe abdominal pain and vomiting. He was not allowed to have food or drink my mouth (N.P.O or nil per oral). He received fluid through an intravenous (IV) line. Misreading the physician's orders, the doctor on duty hooked up a fresh bag of IV fluid that was "3%-normal" saline rather than the prescribed "half-normal" saline. This mistake was not noticed until the following morning when he complained that it was difficult to breathe. At that time, he had marked swelling (pitting edema) around the sacral region and had inspiratory rales ("wet-sounding crackles") at the bases of the lungs on each side. as well. Blood was drawn, revealing the following:

\[
\begin{align*}
\text{Na}^+ &: 157 \text{ mEq/liter (Normal = 136-145 mEq/liter)} \\
\text{K}^+ &: 4.7 \text{ mEq/liter (Normal = 3.5-5.0 mEq/liter)} \\
\text{Cl}^- &: 101 \text{ mEq/liter (Normal = 96-106 mEq/liter)}
\end{align*}
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A chest x-ray revealed interstitial edema (fluid in the interstitial spaces) in the lungs.
CASE -2

Learning Objectives:

Define normal body fluid distribution, its composition and osmolarity

Recognized hypokalemia, Normokalemia, hyperkalemia

Case:

30 year old male presented in ER with history of diarrhea and vomiting for last 24 hours. He gave history of passing or then twenty loss watery stools and 3-4 episodes of vomiting attending doctor examine the patient and found pulse of 110/min BP 90/50 mml, and dry tongue. He immoderately started him on intravenous fluid 0.9/ sodium chloride and send his blood test. Electrolyte report of product was received after 2 hours which showed sodium 135meq/l, Potassium 3.0meq/l, Chloride 105meq/l, and bicarbonate 22meq/l.
CASE -3

Elderly lady of 70 year old not taking by mouth diet and fluid for last few weeks was brought in ER room with the history of drowsiness since last night. Attending doctor sent her serum electrolytes. Started 5% dextrose water solution intravenously. Report of electrolytes shows serum sodium 116 meq/l, potassium 3.8 meq/l Cl 106meq/l bicarbonate 24meq/l, immediately after receiving the report the attending doctor stopped her I/V dextrose solution and called senior doctor for guidance.