



**Fluids :
Extracellular Fluid Volume
Deficit (ECFVD)**

- K p. 9-18
- B p. 286-298
- C p. 35



Objectives

- To understand the physiology and principles of fluid and ECF losses
- To understand the pathophysiology of common fluid and ECF loss disturbances
- To understand how ECF losses cause electrolyte disturbances and the implications for prehospital management



**Priorities of Fluid and
Electrolyte Derangements in
Disease**

- Stratification of priorities
- A / B : oxygenation and ventilation
- C : circulation
- Then equilibrium of acid-base status



Correction : Rate and Priorities

- Rate
 - Rate of correction should mirror the rate of derangement
 - Rapid correction may worsen the outcome
- Priorities
 - 1st Volume - adequate tissue perfusion [C]
 - 2nd pH
 - 3rd Potassium, calcium, and magnesium
 - 4th Sodium and chloride



Correction - Ripple Effects

- Restoration of circulation
 - May return acidotic blood to the circulation
- Rapid IV replacement of volume
 - may result in a dilutional decrease in serum K^+
- Correction of pH
 - Rapid correction of acidosis ($NaHCO_3$) may result in a marked decrease in serum K^+



Categories of Disorders of Fluid Balance

- Categories
- Volume - an isotonic disorder:
 - Loss (deficit)
 - Gain (excess)
 - Concentration - a non isotonic disorder :
 - Water loss (increased osm)
 - Water gain (decreased osm)
 - Composition - # of ions disorder :
 - Lost (eg., Low potassium)
 - Gained (eg., High potassium)



Disorders of Electrolyte Balance

- Categories
 - Na⁺, K⁺, Mg⁺⁺, Ca⁺⁺
 - PO₄⁻⁻⁻
- Clinical settings most likely associated with electrolyte abnormalities
 - Hydration problems
 - Nutrition
 - Kidney disease
 - Diabetic emergencies (DKA)
 - Medications



Disorders of Fluid Balance ECF VD

Volume loss

- First, there is a loss of isotonic fluid from:
 - Circulation (intravascular space)
 - 3rd (tissue interstitial space)
- Then, an osmotic intravascular pull causes:
 - water loss from the cells



Disorders of Fluid Balance ECF VD

Types of Volume Loss

- Clinically, all losses should be first approached as isotonic :
 - Loss from **circulation** (intravascular space)
 - 3rd -space-like losses
 - GI / Abdominal
 - Skin



Etiologies of Fluid Loss ECF VD

Clinically,

- Do NOT quibble about whether the loss is isotonic or hypertonic:
- Losses are from either:
 - Blood (hemorrhage)
 - Sweat (diaphoresis)
 - Tears (discomfort)
 - GI losses
 - DKA
 - And ...



Etiologies of Fluid Loss ECF VD

- GI / abdominal losses
 - Poor po intake
 - Inadequate amount
 - Hypertonic intake (salt tablets)
 - N,V,D
 - Worldwide, diarrhea is a leading cause of childhood deaths
 - NG suction (inpatient)
 - Intestinal obstruction
 - Ascites



Etiologies of Fluid Loss ECF VD

- Third space losses (fluid sequestration or steal)
 - Ascites
 - Intestinal obstruction
 - Pancreatitis
 - Burns
- Diuretics



Clinical Assessment of Fluid Loss

- Symptoms
 - Dry mouth ; thirst
 - Weakness ; postural dizziness
 - ALOC *
 - History of vomiting, diarrhea, pain
 - PMH :
 - DM
 - Renal disease
 - Adrenal disease



Clinical Assessment of Fluid Loss

- Signs
 - Dry airway
 - Abnormal VS
 - + Tilt test
 - Tachycardia
 - Narrowing of the pulse pressure
 - Extremities / skin



Initial Treatment of Fluid Loss

- COMEBIG
 - 1-2 large bore IV NS to support BP *
 - Treat the underlying disorder
- Intervention
 - * If tachycardia and/or a positive tilt test present, then:
 - Suggests a 10% loss of EC Volume
 - Therefore a 10% volume repletion indicated
 - eg., 500mL rapid IV



Summary

We have discussed some basic principles:

- The physiological principles of fluid and ECF losses
- How ECF losses cause electrolyte disturbances and some of the implications for prehospital management
- The etiologies of common fluid and ECF loss disturbances
- The initial prehospital treatment ECF loss
