Extracellular Fluid Volume Excess (ECFVE)

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

EMC 360

Objectives

- To understand the physiology and principles of fluid and ECF Excess (Volume Overload)
- To understand the pathophysiology of common fluid and ECF excess disturbances
- To understand how ECF excess cause ECF and intracellular electrolyte disturbances and the implications for prehospital management

Priority of Fluid and Electrolyte Derangement in Disease

Priorities

- A / B : oxygenation and ventilation
- C : circulation
- then equilibrium of acid-base status

Initial Treatment of Fluid Excess (Vol. overload)

- COMEBIG
  1 LB IV

Pathophysiology of ECF VE (Volume overload)

Terms

- ECFVE
  - Hypervolemia ; Overhydration
  - Edema
- CV mechanics
  - Volume overload [preload]

Location

- 3rd space (interstitial tissues: lungs ; extremities)
- intravascular

Pathophysiology of ECF VE (Volume overload)

Volume Overload

- Vol. overload most often caused by: diseases where excretion of free water is impaired
  - most of are related to renal disease
  - diseases that impair blood flow to the kidneys (resulting in Na+ retention)
  - diseases that diminish intravascular osmolality (liver failure and low-protein states) or
  - diseases that cause undesirable Na+ retention

Factors Causing Volume Overload and Edema

- Decrease in intravascular osmolality causes:
  - Functional, net intravascular contraction with expanded interstitial and cellular volumes
- Unfortunately, any lowered ECV [and BP + cardiac output] will cause :
  - the kidney to conserve Na+, exacerbating the problem

Volume Overload Assessment

Hx.

- SOB
- Cough

PE

- Edema
  - peripheral or
  - central (e.g., pulmonary)

Volume Overload Assessment, cont.

Physical Exam

- Early findings :
  - weight gain
  - resting tachycardia, and
  - peripheral edema
  - JVD - jugular veins elevated.

Volume Overload, cont. - severe [or late]

Physical Exam

- in severe, volume overload
  - eventually right heart failure
    - resultant anasarca and
    - ascites ; and then
- ultimately severe left heart failure
  - with pulmonary edema and pump failure
    - detected as hypotension

Volume Overload Treatment

- Na^+ removal
- Water removal
- Preload volume removal
- Afterload pressure reduction
- Inotropy

Volume Overload Treatment

- Diuretic
  - Na^+ removal
  - water removal
- preload volume removal
  - diuretic
- afterload pressure reduction
  - NTG
- Inotropy [none]

Summary

We have discussed some basic ECFVE principles:

- the physiological principles of fluid and ECF excess, and how this pathophysiology often declines, “the worse it gets, the worse it gets”
- how ECF excess causes electrolyte disturbances and the implications for prehospital management
- the etiologies of common fluid and ECF excess disturbances
- the initial prehospital treatment ECF excess