Third Spacing: Maintaining Fluid and Electrolyte Balance

Presenter: Christine Boev PhD, RN, CCRN, CNE
Objectives

• Identify two causes of third spacing.
• Describe nursing interventions for patients who exhibit third spacing.
Definition and pathophysiology of third spacing

- Third spacing involves a shifting of fluid from the vascular space to the interstitial space.
- Causes
  - Surgery
  - Septic shock
  - Anaphylaxis
  - Biologic therapy
  - Burns
  - Liver failure
  - Vascular access devices
Fluid compartments

- Body Water
  - Extracellular (33%)
  - Intracellular (66%)
- Interstitial (25%)
- Plasma (8%)
2. Body fluid distribution

- Body fluids are distributed in two distinct areas:
  - Intracellular fluid (ICF) 40% body weight
  - Extracellular fluid (ECF) 20% body weight
    - Interstitial fluid -15% body weight
    - Plasma -5% body weight

- Fluid compartment are separated by membranes that are freely permeable to water.
- Movement of fluids due to hydrostatic pressure and osmotic pressure.
When fluid shifts......

• Baroreceptors in aorta are activated due to decreased circulating blood volume

• Sympathetic nervous system activation.....epinephrine and norepinephrine released.....increased heart rate and vasoconstriction

• RAA system activation by the kidneys from decreased GFR

• Body is compensating in an attempt to increase cardiac output
Albumin and Oncotic pressure

- Loss of albumin leads to decreased oncotic pressure causing fluid to "leak" from intravascular space to interstitial space
- Results in decreased cardiac output because of loss of circulating blood volume
2 phases of third spacing

1. First phase occurs immediately after surgery or event. May persist for 24 to 72 hours

2. Second phase or reabsorption phase.
Symptoms of Third-Spacing...

- Blood pressure (↓)
- Heart rate (↑)
- Thirst (↑)
- Urine produced (↓)
- Fatigue (↑)
Hypovolemia secondary to third spacing
Pulmonary edema

Normal
Clear alveoli, no fluid build-up in lungs

Pulmonary Edema
Fluid build-up in alveoli, fluid leakage into lungs
When do we see 3rd spacing

- Burns
- Liver failure
- Trauma and surgery
- Vascular access device infiltration
- Compartment syndrome
Burns

Vascular access devices
# Chemotherapy administration

![Chemotherapy extravasation image](image)

Cidon et al., 2011

<table>
<thead>
<tr>
<th>Adverse event</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infusion site extravasation</td>
<td>Erythema with associated symptoms (edema, pain, induration)</td>
<td>Ulceration or necrosis; severe tissue damage; operative intervention indicated</td>
<td>Life-threatening consequences; urgent intervention indicated</td>
<td>Death</td>
<td></td>
</tr>
</tbody>
</table>
Compartment syndrome
INTRAABDOMINAL HYPERTENSION

GRADE I: 12-15 mmHg
GRADE II: 16-20 mmHg
GRADE III: 21-25 mmHg
GRADE IV: >25 mmHg
Treatment of third spacing

- Treat hypovolemic shock
- Maintain adequate organ perfusion
- Prevent complications
Nursing Interventions
Case report

Lamou et al. 2014
Case report

Lamou et al. 2014
Idiopathic systemic capillary leak syndrome

Iwasa et al., 2014
References


References


