

	Fluid Volume Overload	Fluid Volume Deficit
Vital Signs	<ul style="list-style-type: none"> • normal temperature • tachycardia • bounding pulses • hypertension • tachypnea • decreased oxygen saturation 	<ul style="list-style-type: none"> • hyperthermia • tachycardia • weak, thready pulses • hypotension • tachypnea
Symptoms	<p>Neurological: weakness, visual changes, paresthesia, altered levels of consciousness (ALOC), seizures</p> <p>Gastrointestinal (GI): ascites, increased motility, acute weight gain</p> <p>Renal: increased urine output</p> <p>Respiratory: crackles, cough, dyspnea (pulmonary edema)</p> <p>Other: peripheral edema, distended neck veins, skin cool with pallor</p>	<p>Neurological: dizziness, syncope, confusion, weakness, fatigue, seizures</p> <p>Gastrointestinal (GI): thirst, dry mucous membranes, nausea, acute weight loss</p> <p>Renal: oliguria</p> <p>Respiratory: hypoxia</p> <p>Other: diminished capillary refill, cool clammy skin, diaphoresis, sunken eyeballs, flat neck veins, poor skin turgor and tenting</p>

--**Osmotic pressure** is measured in milliosmoles (mOsm) and may be expressed as either *fluid osmolarity* or *fluid osmolality*. Although the two terms are often used interchangeably, they are different measurements. (CONCENTRATION)

- Osmolarity measures the total milliosmoles per liter of solution (mOsm/L).
- Osmolality measures the number of milliosmoles per kilogram of water (mOsm/kg) and is the preferred measure to evaluate the concentration of plasma, urine, and other body fluids.

--Normal plasma osmolality is between 280 and 295 mOsm/kg. A value greater than 295 mOsm/kg indicates that the concentration of solute is too great or that water content is too little (water deficit).

--A value less than 275 mOsm/kg indicates too little solute for the amount of water or too much water for the amount of solute (water excess).

--Normal urine osmolality is between 100 and 1300 mOsm/kg and depends on fluid intake, amount of antidiuretic hormone (ADH) in circulation, and the renal response to ADH.

Several laboratory studies are used to identify altered fluid balance, such as:

- serum and urine osmolality
- blood urea nitrogen (BUN)
- serum electrolyte levels
- hemoglobin and hematocrit
- Radiology studies, such as a chest x-ray and an echocardiogram,
- **Fluid overload everything decreases**
- **Fluid Deficit everything increases**

	Fluid Volume Overload	Fluid Volume Deficit
H&H: decreased	H&H: increased	H&H: increased
BUN: decreased	BUN: increased	BUN: increased
Urine specific gravity: decreased	Urine specific gravity: elevated	Urine specific gravity: elevated
Serum sodium: decreased	Serum sodium: elevated	Serum sodium: elevated
Blood osmolality: decreased	Blood osmolality: increased	Blood osmolality: increased

Neurological Effects:

- **Fluid volume imbalances = electrolyte abnormalities which cause:**
 - Altered LOC
 - Confusion
 - Seizures
 - Others...
- **Nursing Interventions:**
 - Monitor LOC- imbalance can cause seizures
 - Monitor vital signs, labs, s&s
 - Take seizure precautions- protect client from further injury related to seizure
 - Admin anti seizure meds prn

Cardiovascular Effects:

- Heart failure and arrhythmias can reduce the cardiac output of the heart. When this occurs, fluid can back up into the lungs and peripheral circulation.
- **Nursing Interventions:**
 - Monitor bp, HR, CO- helps to determine if pt has volume loss or overload complications
 - Check 12 lead ECG- determine if there are dysrhythmias present & poss electrolyte imbalance
 - Check B-type natriuretic peptide (BNP) levels- det. If pt is developing heart failure
 - Admin diuretics & monitor electrolytes before, during, & after admin
 - Admin IV fluids if blood/ fluid is lost from intravascular compart- fluid restores volume in the intravascular compart. & expands remaining blood volume

Vascular Effects:

- Vascular system can move fluid into interstitial area causing EDEMA
- Monitoring & treating edema helps restore fluid balance
- **Nursing Interventions:**
 - Assess pitting & non pitting edema
 - Assess extremity using 6 P's
 - pulselessness, pain, poikilothermic, paresthesia, paralysis, & pallor
 - this assesses for peripheral circulation
 - Elevate extremity w/ 2 + pillows – reduces fluid volume in extremity
 - Apply anti embolic stockings & sequential compression devices- improves circulation
 - Admin diuretics prn- helps get rid of excess fluid volume

Edema

- Protein (albumin) in the ICF & ECF compartments create oncotic pressure in tissue to keep water inside the vascular system
 - Shift in albumin = fluid shift from vascular to interstitial fluid compart
- Assess “third spacing” by measuring pitting edema
- TX for edema= diuretics, stockings, elevation above heart, lower sodium in diet
- TX for edema for client w/ renal insufficiency= ACE inhibitor or temp. dialysis
- Monitor kidney function w/ treatment (BUN & creatinine levels are CRITICAL)
 - 0+ -- No pitting edema
 - 1+ -- Mild pitting edema (depression disappears)
 - 2+ -- Moderate pitting edema (depression disappears 10-15 sec)
 - 3+ -- Moderately severe pitting edema (depression last longer than 1 min)
 - 4+ -- Severe pitting edema (depression last longer than 2 min)

Respiratory Effects:

- Fluid imbalance can force the respiratory system to compensate by increasing or decreasing respirations (to help balance acid-base abnormalities)
- **Nursing Interventions:**
 - Elevate HOB to 45-90* (semi- high fowlers position) if pt is having SOB
 - This expands the lungs & moves unwanted fluid to bottom clearing the upper lung fields
 - Monitor RR, breathing patterns, O2
 - Helps identify any acid-base imbalance
 - Check ABG (arterial blood gas)
 - Help identify if gas exchange is affected
 - Admin oxygen therapy prn
 - Helps support gas exchange until fluid imbalance improves

GI Effects:

- GI system impact fluid balance significantly by moving large amounts of fluid & electrolytes quickly out of the vascular system
- **Nursing Interventions:**
 - Monitor intake & output
 - Helps determine if pt needs fluid or NG tube
 - Measure abdominal girth
 - Helps determine if pt has ascites or worsening s/s
 - Check liver function (AST, ALT, Total Bilirubin)
 - Helps determine if pt is developing complications
 - Admin diuretic (spironolactone) or Anti-diarrheal
 - Helps prevent excess fluid loss
 - Assist with paracentesis.
 - Helps reduce the amount of fluid trapped in abdomen due to liver failure or ascites

Genitourinary Effects:

- Kidneys helps body retain or lose fluid, they are also used to fix fluid imbalances or can cause fluid imbalance if they fail
- **Nursing Interventions:**
 - Monitor I/O
 - Monitor BUN & Creatinine (determines if kidneys are functioning properly)
 - Monitor ADH level & serum/ Urine osmolarity (helps r/o if pt has hormone imbalance like SIADH or DI)
 - Admin diuretics unless pt has acute kidney injury

Meds for Fluid Volume Overload

- Diuretics
 - Remember: If the potassium (K) level is high, avoid potassium-sparing diuretics (spironolactone, amiloride, triamterene). Instead, use either loop (furosemide, bumetanide) or thiazide diuretics. If the K level is low, avoid using loop or thiazide diuretics.
- Angiotensin-converting-enzyme (ACE) inhibitors--(captopril, enalapril)
- Beta blockers--(atenolol, metoprolol)
- Calcium channel blockers-- (nifedipine, felodipine)
- Syndrome of inappropriate antidiuretic hormone secretion (SIADH): tolvaptan

Meds for Fluid Volume Deficit

- Intravenous (IV) fluid replacements (isotonic, hypotonic, hypertonic)
- Blood transfusion, if needed
- Diabetes insipidus: desmopressin