

Electrolyte Imbalance of Our Body Fluids



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An ionic compound that breaks apart into positive and negative charged ions in solution is called an electrolyte. Most ions in the body are dissolved in body fluids as electrolytes. They are particles that can carry an electrical charge and are present in our blood, plasma, urine, and other fluids. They exist in the form of calcium, chlorine, magnesium, phosphate, potassium, and sodium ions. They can be obtained from fluids, supplements, and foods. Electrolytes can regulate important functions of our body, they are necessary for nerve and muscle function, and can maintain the body fluid balance. So maintaining the level of our electrolytes is important to maintain the general health.

The balance of electrolytes is constantly shifting due to fluctuating fluid levels in our body. Having too much or too little of any of these will cause an electrolyte imbalance. Electrolyte imbalances can be caused by a deficiency or an overabundance of minerals in the body

They are found naturally in our food and drinks

Changing diet and other personal habits will help combat our electrolyte imbalance

For example, hyperkalemia and hypercalcemia are indicative of excess amounts of potassium and calcium, respectively, which can disrupt the overall balance and functioning of the nerves, cardiovascular system, and muscles etc.

Normal Adult Values

Calcium:	4.5-5.5 mEq/L
Chloride:	97-107 mEq/L
Potassium:	3.5-5.3 mEq/L
Magnesium:	1.5-2.5 mEq/L
Sodium:	136-145 mEq/L

Causes for an electrolyte imbalance

1. Loss of body fluids from prolonged vomiting, diarrhea, sweating or high fever
2. Factors like regular exercise
3. Inadequate diet and lack of vitamins from food

4. Malabsorption - unable to absorb these electrolytes due to a variety of stomach disorders, Medications,
5. It may also depend upon how food is taken in
6. Hormonal or endocrine disorders
7. Kidney disease
8. A complication of chemotherapy -tumor lysis syndrome. This occurs when your body breaks down tumor cells rapidly after chemotherapy, causing a low blood calcium level, high blood potassium levels, and other electrolyte abnormalities.
9. Certain medications may cause an electrolyte imbalance such as:

- Angiotensin converting enzyme (ACE) inhibitors
- Calcium supplements
- Certain hormone that are potassium - sparing (leading to retention of potassium by the kidney.
- Chemotherapy drugs (cisplatin)
- Diuretics (furosemide[Lasix] or bumetanide[Bumex])
- Antibiotics (amphotericin B)
- Potassium supplements
- Corticosteroids (hydrocortisone)

Investigations of Electrolyte Imbalance

- An electrolyte imbalance is usually diagnosed based upon information obtained through:
- History of symptoms.
- physical examination
- Urine and blood test results.
- If there are abnormalities based on these findings, further testing, such as an EKG. (Severely high or low potassium, magnesium and/or sodium levels can affect the heart rhythm.)
- If there is an electrolyte imbalance due to kidney problems an ultrasound can be done.

GENERAL SYMPTOMS

- Dizziness
- Fatigue
- Nausea with or without vomiting
- Trembling

Other symptoms that may relate to other body systems are:

- Change in mental status or sudden behavior changes such as confusions, delirium, lethargy, hallucinations or delusions

Rapid Heart Rate
Sunken Eyes.
Constipation
Dark Urine
Decrease Urine Output
Dry Mouth and foul breath
Dry skin
Lack of Perspiration
Muscle Weakness
Stiff or aching joints

Disease conditions which causes electrolyte imbalance are:

Addison's disease
Alcoholism, which causes the breakdown of muscle fibres resulting in potassium being released into the blood stream.
Diabetes
Diarrhoea
Heat Exhaustion
Kidney diseases
Vomiting

Complications of electrolyte imbalance

Cerebral odema
Overheating
Seizures or convulsions
Unconsciousness and coma

Main electrolytes of our body are:-

Sodium:

It is an electrolyte that we lose in the highest concentration when we sweat. Salt helps the body hold on to water, keeping hydrated for a longer period of time. Athletes can consume a salty meal like soup before a strenuous exercise to retain fluid.

The features of impaired cellular function are most prominent with the brain cells. Features depend on the absolute plasma concentration and its rate of decline. Initially there is apathy, dizziness, and headache with plasma sodium level below 160 mEq/L and drowsiness with further decline. Convulsion and coma sets in.

Hyponatremia (Serum sodium level is less than 130 mEq/L)

Due to decreased sodium intake, increased sodium loss through vomiting, diarrhea, aldosterone deficiency or taking certain diuretics and excessive water intake.

Because of the intimate relationship between salt and water, loss of sodium is usually associated with reduction in water content of the body.

Hypernatremia (Serum sodium more than 145 mEq/L)

It occurs with dehydration, after deprivation or excessive sodium in diet or intravenous fluids causes hypertonicity of ECF which pulls water out of the body cells causing cellular dehydration

Potassium

It is the most important on the cells. 98% of the body potassium is actually intracellular at a concentration of about 160mmol/L. Extracellular concentration is about 3.5 to 5mmol/L. Its major role is in the membrane activity of cell.

During an hour of hard training there is a loss of 200-600 mg of potassium, which supports cell and heart function, regulates blood pressure prevents bone loss and kidney stones and plays a vital role in muscle contraction.

The bananas are excellent source of potassium. Fresh or dried fruits like oranges, melons, raisins, other whole foods rich in potassium include baked and sweet potatoes, green leafy vegetables such as spinach, peas, beans and avocado.

Hypokalemia

May reform excessive loss due to vomiting or diarrhoea, decreased potassium intake, hyperaldosteronism, kidney diseases and therapy with some diuretics.

Hyperkalemia

Due to excessive potassium intake renal failure, aldosterone deficiency, crushing injuries to body tissues or **transfusion of haemolyzed blood**

Calcium

Hypocalcemia

Due to increase calcium loss, reduced calcium intake, elevated potassium phosphates, elevated phosphate level or hypo parathyroidism.

Hypercalcemia

May result from hyper parathyroidism, some cancers excessive intake of vitamin D and paget's disease of bone.

Magnesium

Magnesium level in serum is about 1.9 - 2.5 mg %. Along with calcium, magnesium aids in muscle contraction, nerve function, enzyme activation and bone development. To replenish stores of minerals after exercise use green leafy vegetables, whole grains, nuts, dried beans etc. It helps to fight fatigue.

Chloride

Hypochloremia

Due to excessive vomiting, over hydration, aldosterone deficiency, congestive heart failure and therapy, certain diuretics.

Hyperchloremia

May result from dehydration due to water loss or water deprivation, excessive chloride intake or severe renal failure, hyperaldosteronism certain types of acidosis and some drugs.

Typically paired with sodium, chloride is found in table salt which is needed to maintain fluid balance, blood volume, blood pressure and body fluid pH level.

Treatment of electrolyte imbalance:

- Identifying and treating the underlying problem causing the electrolyte imbalance.
- Intravenous fluids and electrolyte replacement.
- Minor electrolyte replacement can be corrected by diet changes since electrolytes are found in what we eat and drink.
- Fruits and vegetables most electrolyte especially water melons, pineapples, tomatoes and bananas.
- Eat at least one cup servings daily which will restore energy and replenish electrolytes.

During the electrolyte imbalance and in the deficiency state, quantitative electrolyte replacement is

Few Homœopathic medicines which can be used during the electrolyte imbalance ----

Natrum muriaticum; Kalium phosphoricum; Natrum phosphoricum; Magnesium phosphoricum.
Calcarea phosphorica.

- 1.Kumar and Clarke.Fluid, electrolyte, and Acid - Base Homeostasis.
- 2.Gerard J. Tortora, Bryan Derrickson: Principles of Anatomy and Physiology
- 3.[http://chemocare.com/chemotherapy/side effect/ electrolyte imbalance](http://chemocare.com/chemotherapy/side%20effect/electrolyte%20imbalance)
- 4.[www.healthgrades.com/symptoms/electrolyte imbalance](http://www.healthgrades.com/symptoms/electrolyte%20imbalance)