

Dehydration Induced Hyperalbuminemia

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Abstract: Normally proteins circulate throughout our body which helps to maintain homeostasis within the body. Serum albumin which is a human plasma protein which constitutes 50% of the plasma proteins and it is synthesized by hepatocytes in liver. The main function of albumin is to regulate the oncotic pressure also called as colloid osmotic pressure in the blood compartment. However in this condition dehydration induced hyperalbuminemia due to increased plasma albumin level leads to decreased plasma volume and it leads increases in serum albumin concentration resulting dehydration (plasma water decreases) therefore fluid replacement therapy is prescribed.

Keywords: Dehydration, Hyperalbuminemia, homeostasis, Serum albumin, proteins, hepatocytes, liver

1. Introduction of Albumin

Albumin is a type of serum plasma proteins which is one of the most abundant proteins in your blood. Normally meat (such as beef, pork), fish, chicken, peanut butter and eggs are the good sources for albumin. Serum albumin is synthesized by hepatocytes in liver. About 4% of the the total body albumin is replenished each day.

A mature human albumin consists of one polypeptides chain of nearly 585 aminoacids and contains 17 disulfide bonds. Which is ellipsoidal shape and the albumin which is water-soluble ,moderately soluble in concentrated salt solution and it experience heat denaturation. It has a relatively low molecular mass about 69 KDaltons. It has isoelectric PH of 4.7.

The rate of albumin production of albumin depends on the supply of amino acids, plasma oncotic pressure, inhibitory cytokine(especially in IL-6)concentration and the number of functioning hepatocytes. The most important factors are nutrition, adequate nitrogen intake are involved in regulation of albumin synthesis. Thyroid hormones and cortisone also helps to stimulate albumin synthesis invivo conditions. Circulating half life of plasma albumin is 19 to 21 days. Normal range of albumin is 3.5 to 5 g/dl

If the increased levels it leads to hyperalbuminemia indicates acute infections, burns, stress which finally causes dehydration conditions.

If the decreased levels it leads to hypoalbuminemia indicates malnutrition and causes liver diseases/inflammatory diseases.

Functions of Albumin

1) Vascular functions

- Maintenance of oncotic pressure
- Microvascular integrity
- Capillary permeability

2) Transport functions

- Hormones , fatty acids , bile salts , bilirubin .
- Ca²⁺,Mg²⁺ and other metals(copper , zinc)
- Drugs (like warfarin, diazepam)

3) Metabolic functions

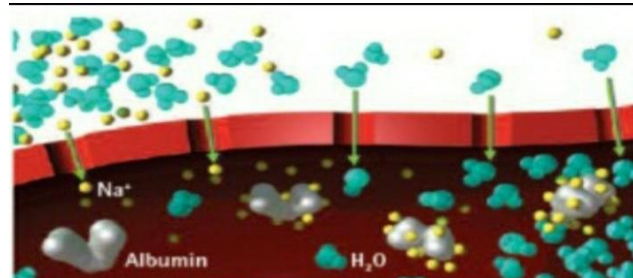
- Acid-base balance

- Anti oxidant effect
- Anti coagulant effect

Introduction to Dehydration

The human body is roughly 75percent of water. We cannot survive without water. Dehydration is defined as the loss of body fluids from our body. When too much water is lost from the body then organ, cells and tissues fail to function normally water lost through breath, sweat, urinate and defecate we can replenish the water in our body by drinking fluids. Common causes include excessive sweating, frequently urination, vomiting and diarrhea. According health recommendations women should drink 92 fluidounces (11.5cups) per day and men should drink 124 fluidounces (15.5cups) per day.

Mechanism of Dehydration Induced Hyperalbuminemia



At first the albumin is synthesized by hepatocytes in liver and from the liver the albumin finds its way directly into the hepatic plasma and hence it reaches systemic circulation. However albumin does not readily move through normal capillary pores and while water and other smaller biological structure moves freely and then sodium is highly attracted to albumin and together they help to maintain colloidal osmotic pressure by attracting water into intra vascular space.

Therefore water is also pulled into the vascular as a result of the sodium attraction to albumin. Each gram of albumin is capable of holding 18 ml of water within the intra vascular space.

However if increases proteins diet it leads to hyperalbuminemia condition then plasma levels of albumin may be increased and then it leads to decreased plasma volume and hence plasma water decreases resulting dehydration conditions.

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Management

2. Conclusion

Colloidal osmotic pressure maintains intra vascular fluid volume vitals to effective circulation of blood and oxygenation of tissues but in this condition dehydration induced hyperalbuminemia so here fluid replacement therapy should prescribed to patients.

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