بسم الله الرحمن الرحيم

وَقُل رَّبِّ زِدْنِي عِلْمًا

صدق الله العظيم

Study Of The Relation Of Serum Cholesterol & Serum Albumin As Indicators Of Nutritional Status To Parameters Of Iron Metabolism In CRF Patients On Regular Hemodialysis

Thesis submitted for partial fulfillment of the master degree
In internal medicine

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2010

Acknowledgment

It gives me great honor to acknowledge this research to

MY SUPERVISOR PROFESSORS

who were of great help for me.

ALSO it will be of my pleasure to present not only this research but all my life to

MY PARENTS.

Who are the mercy of god and who had and still supporting me.

God give them health and extended life.

AND to

MY FIANCÉE,

The shinning future.

Abstract

Malnutrition in HD patients is common The predialysis s. albumin and s. cholesterol are useful screening tools for detecting malnutriton, This Study assesses the relation of serum albumin and serum cholesterol as indicators of nutritional status to parameters of iron metabolism in one hundred HD patients and concludes that : Serum albumin level tends to be normal in MHD patients with CRP –ve, There is a positive correlation between serum albumin and hemoglobin in MHD patients and recommends that In absence of inflammatory signs, serum albumin and serum cholesterol should not be relied upon in interpretation of anemia and iron parameters in patients on MHD

Key words: Malnutrition, Maintenance Hemodialysis , Iron Parameters ,S.Albumiun , S.Cholesterol

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Introduction

Malnutrition in hemodialysis patients is common and may affect as much as one third of the dialysis population. Protein-malnutrition is a major risk factor for morbidity and mortality in dialysis patients. There are several objective methods for assessing the nutritional status; however, all have shortcomings that hamper their systematic clinical application **(Kalantar Zadeh et al., 1998).**

The predialysis or stabilized serum cholesterol concentration may be a useful screening tool for detecting chronically inadequate protein-energy intakes. Individuals undergoing maintenance hemodialysis who have low-normal (less than 150 to 180 mg/dL) nonfasting serum cholesterol have higher mortality than do those with higher cholesterol levels. As an indicator of protein-energy nutritional status, the serum cholesterol concentration is too insensitive and nonspecific to be used for purposes other than for nutritional screening, and maintenance dialysis patients with serum cholesterol concentrations less than 150 to 180 mg/dL should be further evaluated for nutritional deficits as well as for other comorbid conditions ***(NKF K/DOQI 2006).***

Serum albumin level has been used extensively to assess the nutritional status of individuals with and without chronic renal failure (CRF). Hypoalbuminemia is highly predictive of future mortality risk when present at the time of initiation of chronic dialysis as well as during the course of maintenance dialysis. Although no single ideal measure of nutritional status exists, the serum albumin concentration is considered to be a useful indicator of protein-energy nutritional status in maintenance dialysis patients. The extensive literature, in individuals with or without renal failure, relating serum albumin to nutritional status, and the powerful

association between hypoalbuminemia and mortality risk in the maintenance dialysis population, strongly support this contention. In addition, the measurement of serum albumin levels is inexpensive, easy to perform, and widely available. So a predialysis or stabilized serum albumin equal to or greater than the lower limit of the normal range (4.0 g/dl is the outcome goal) and individuals with a predialysis or stabilized serum albumin that is low should be evaluated for protein-energy malnutrition. Presence of acute or chronic inflammation limits the specificity of serum albumin as a nutritional marker. Positive acute-phase proteins are not nutritional parameters but may be used to identify the presence of inflammation in individuals with low serum albumin as Serum albumin concentrations are inversely correlated with serum levels of positive acute-phase proteins (eg, C-reactive protein [CRP])

(NKF K/DOQI , 2006).

IRON METABOLISM

Iron is a critical body substance, transporting oxygen to tissues via hemoglobin and functioning as a cofactor in a number of enzyme systems. Iron is stored in reticuloendothelial cells of the liver, spleen, and bone marrow bound to ferritin and hemosiderin. This storage iron constitutes one third of the 3 to 4 g of total body iron. The remaining iron is present in erythropoietic tissue or red blood cells (RBCs). The majority of circulating iron is carried by transferrin, although at any one time, only 3 to 4 mg of iron are present on transferrin. Ingested iron varies from very small amounts up to 200 mg in end-stage renal disease patients given supplements. However, only 1% to 2% of this iron is absorbed.

Internal iron exchange between the erythroid marrow, circulating red blood cells, and the reticuloendothelial system involves 20 mg or more of iron daily. In the absence of rHuEPO, patients with advanced renal disease have less iron exchanged from the erythroid marrow to RBCs and more stored in the reticuloendothelial system. When the production of RBCs is stimulated by rHuEPO, internal iron exchange in dialysis patients is similar to that seen in normal patients, although the reticuloendothelial system may still have a greater retention of iron than seen in patients with normal renal function ***(Nissenson A & Strobos J, 1999).***

Assessment of Iron Status

Currently, the two best tests of iron status are the percent TSAT and the serum ferritin. The percent TSAT (serum iron multiplied by 100 and divided by total iron binding capacity [TIBC]) reflects iron that is readily available for erythropoiesis. The TIBC essentially measures circulating transferrin. Normally there is a diurnal variation in the level of serum iron and, thus, the TSAT. Since blood for these tests is generally obtained at the same time of day in relation to either clinic or dialysis visits, serial measurements of TSAT typically are not affected by this diurnal variation

(NKF K/DOQI, 2006).

Ferritin Whereas TSAT reflects iron that is readily available for erythropoiesis, serum ferritin reflects storage iron, i.e., iron that is stored in liver, spleen, and bone marrow reticuloendothelial cells. As is the case with the TSAT, the serum ferritin level is most accurate as a predictor of iron deficiency or iron overload when it is extremely

low or extremely high, respectively. Just as serum ferritin is not perfectly sensitive; it also is not perfectly specific. In part, this is due to the fact that, in addition to reflecting body iron stores, serum ferritin also is an acute phase reactant. As such, it can increase in the setting of either acute or chronic inflammation

(NKF K/DOQI, 2006).

Aim of the work