

SERUM ALBUMIN – A MARKER OF SURGICAL SUCCESS

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ABSTRACT

INTRODUCTION

Albumin is the name used to describe proteins readily soluble in water and coagulate by heating. The most abundant protein found in the serum is albumin in humans. Albumin is the key transporting medium i.e. it helps to transport the hydrophobic substances from the blood stream. The normal serum level is 3.2-5.1g/dL. It forms 56% of the total protein. Anything below 2g/dL is known as hypoalbuminemia.

The aim of the study is to find out the pre-operative serum level and try to find out the complications associated with hypoalbuminemia and surgical complications. The study was done in KVG Medical College, Sullia. Seventy five patients were selected irrespective of the sex and divided into three groups based on the age. In the present study it is very clear that the serum albumin reflects the overall outcome of the surgery. As the age progresses the amount of hypoalbuminemia encountered is high. The amount of hospital stay also depends on the protein level. Albumin is no doubt the healer protein of the body. As the albumin level decreases the complications faced by the patients drastically increases.

KEYWORDS

Albumin, Marker, Surgery, Serum.

HOW TO CITE THIS ARTICLE: Sandeep, Rai P. Serum albumin – a marker of surgical success. J. Evid. Based Med. Healthc. 2016; 3(19), 756-757. DOI: 10.18410/jebmh/2016/172

INTRODUCTION: Albumin is the name used to describe proteins readily soluble in water and coagulate by heating. The most abundant protein found in the serum is albumin in humans. Albumin is the key transporting medium i.e. it helps to transport the hydrophobic substances from the blood stream. The normal serum level is 3.2-5.1 g/dL. It forms 56% of the total protein. Anything below 2g/dL is known as hypoalbuminemia. Albumin is synthesized only in liver cells. The amino-acids are collected and the protein synthesis takes place in the hepatic cells. The half- life of albumin is about 21 days. The hepatic cell synthesizes about 15g per day in adult; it is degraded at the rate of about 0.6gm per day. Albumin is a simple protein because it contains only amino acids. It is the chief stabilizer of blood volume and regulator of fluid exchange between the vascular and extra-vascular compartments by exerting colloidal osmotic pressure. It transports a number of substances like fatty acids, bilirubin etc.

The rate of formation and degradation may differ significantly with stress. Hypoalbuminemia is linked to acute or chronic inflammatory responses. The levels have been reported to return to normal upon resolution of inflammation. Chronic stress, via various inflammatory or neuroendocrine mediators, could reduce albumin levels by either increasing the rate of degradation, or by reducing the rate of synthesis.¹ Hypoalbuminemia can facilitate oedema, which can result in further reduction in serum albumin, as

more albumin can now enter the extra vascular space. In mice, TNF- α has been reported to suppresses the transcription of the alb gene.^{2,3} Studies conducted on adult males have suggested that serum albumin levels can drop due to chronic stress and increase following resolution.^{4,5}

Serum albumin captures the pathophysiology of liver and metabolism. It can also capture nutritional state, which can either be an outcome of stress or a confounding exposure. Albumin can be easily measured from blood and hence is useful in animal studies and epidemiology studies, especially those studying associations between stress and nutrition. Many health conditions result in reductions of serum albumin, hence the findings must be analysed in view of such confounding. In animal studies where proper controls are used and baseline albumin levels are known, confounding from existing pathologies can be minimised.

Since the albumin is a major transporting medium many medicines depend on albumin and if the serum level is less, it would be drastic in a patient who is undergoing surgery. This study is done to find the link between albumin level and the complications associated with surgery.

AIMS AND OBJECTIVES: To find out the pre-operative serum level and try to find out the complications associated with hypoalbuminemia and surgical complications.

MATERIALS AND METHODS: The study was done in KVG Medical College, Sullia. Seventy five patients were selected irrespective of the sex and divided into three groups based on the age.

Group 1: Consisted of patients aged below 25.

Group 2: Consisted of patients aged between 25 to 50.

Group 3: Consisted of patients aged above 50.

Submission 09-02-2016, Peer Review 22-02-2016,

Acceptance 02-03-2016, Published 07-03-2016.

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DOI: 10.18410/jebmh/2016/172

Serum was collected one hour before surgery and the serum albumin level was estimated.

Based on the albumin level they were further divided into three groups.

Group A the serum level of albumin was considered to be more than 4.

Group B the serum of albumin was considered to be 2-4.

Group C the serum level was taken to be less than 2.

The study was conducted for a period of two years from May 2013 to May 2015.

RESULTS:

Group 1	A (>4)	B (2-4)	C (<2)
Frequency	18	5	2
Complications	NIL	Intra-operative: Bleeding:1 Post-operative sepsis: Nil	Intra-operative: Bleeding:2 Post-operative sepsis: 1
Number of hospital stay (Mean)	7.45	16.22	21.71

Table 1: Group 1 statistics

Group 2	A (>4)	B (2-4)	C (<2)
Frequency	11	11	3
Complications	NIL	Intra-operative:: Bleeding: 1 Post-operative sepsis: Nil	Intra-operative:: Bleeding: 1 Post-operative sepsis: 1
Number of hospital stay (Mean)	6.44	18.7	21.82

Table 2: Group 2 statistics

Group 3	A(>4)	B(2-4)	C(<2)
Frequency	9	9	7
Complications	NIL	Intra-operative:: Bleeding: 2 Post-operative sepsis: 1	Intra-operative:: Bleeding: 2 Post-operative sepsis: 2
Number of hospital stay (Mean)	8	20.22	26.44

Table 3: Group 3 statistics

DISCUSSION: Since organic defense decrease and malnutrition were recognized as potential factors for higher morbidity and mortality rates in the postoperative period, many studies have dealt with the early detection of immunosuppression and malnourishment in surgical patients.^{6,7} Malnourished patients are at higher risk of postoperative complications and death, if compared to well-nourished patients submitted to similar surgeries. Besides, nutrition therapy has improved clinical prognosis and quality of life.⁸

In the present study it is very clear that the serum albumin reflects the overall outcome of the surgery. As the age progresses the amount of hypoalbuminemia encountered is high. The amount of hospital stay also depends on the protein level. Albumin is no doubt the healer protein of the body. As the albumin level decreases the complications faced by the patients drastically increases.

The study is in agreement with that of other studies of Luiz Ronaldo Alberti, Andy Petroianu⁹ and Donald A Redelmeier.¹⁰

CONCLUSION: Finding serum albumin level pre-operatively can be used as a marker for the surgical outcomes.

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