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To Rohadi MD
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Decision Issued from the meeting

Since research under the topic **"The Effect of Snakehead Fish (Channa striata) Extract Capsule to the Albumin Serum Level of Post-operative Neurosurgery Patients"** that has been submitted to the Ethical Committee for Medical Research by Rohadi MD, Bambang Priyanto MD, Januarman MD (Faculty of Medicine, Universitas Mataram), is in full conformity with the relevant provisions of the International Ethical Recommendations for biomedical researches involving human beings, hereby, we grant an ethical permission for conducting above-mentioned research.

Sincerely,

dr. Arfi Syamsun, Sp.KF., M.Si.Med
Chairman, Ethical Committee for Medical Research
Faculty of Medicine, the University of Mataram
Mataram, INDONESIA

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The Effect of Snakehead Fish (*Channa striata*) Extract Capsule to the Albumin Serum Level of Post-operative Neurosurgery Patients

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To evaluate the Effect of Snakehead Fish (*Channa striata*) Extract Capsule to the Albumin Serum Level of Post-operative Neurosurgery Patients. This research is a clinical research with Quasi-Experimental method. The experimental design used was one group pre-post test. The research design of one group pretest-posttest was measured using a pre-test which carried out before being given treatment and post-test carried out after being treated. The population of this study was all post-neurosurgical patients that treated at the West Nusa Tenggara General Hospital. Each patient who underwent surgery and included within research criteria was given Snakehead Fish (*Channa striata*) up to 3 weeks after surgery and the wound has healed. The sample consisted of 37 patients with criteria of over 18 years of age and no kidney disorders (proteinuria). The results of the data distribution of 37 patients stated that there were 12 males (32.4%) and 25 females (67.6%). The most number of diagnosis were abnormalities of meningioma and skull defect (17; 46% and 13; 35,1%). Mostly patients spent 8 – 14 days to control post-operatively (22; 59,4%). It was found that the pre-operative and post-operative albumin serum level had no significant difference (the significance value 0.115). The pre-operative and post-treatment albumin levels had a significant difference (a significance value of 0.003). However, albumin levels in post-operative and post-treatment had significant differences (significance value (0.001). This research is important for several reasons, including therapy in patients with pre-operative or recovery period after surgery. Snakehead fish can increase serum albumin levels in patients after surgery.

Keywords: Albumin, snakehead fish (*Channa striata*), extract capsule, Post-operative Neurosurgery Patients.

Snakehead fish (*C. striata*) is a carnivorous fish. Snakehead fish has albumin fraction (64.61%) of protein.[1] This number is very high compared to other animal protein sources. Albumin is the most abundant type of protein in blood plasma. The albumin in snakehead fish is generally higher than other fish. The quality of essential and non-essential amino acids in snakehead is also better than of an egg.[1]

The generally used assessment for nutritional status to determine the prevalence of malnutrition on hospitals is done through

anthropometry and biochemical examination of serum albumin levels. Serum albumin and cholesterol levels, especially HDL, can be predictors for hospital mortality, nosocomial infections and length of stay.[2] An accurate nutritional status assessment will result in an accurate nutritional interventions.

The problems of protein-energy malnutrition (PEM) in many hospitals are known as iatrogenic malnutrition. The condition of low serum albumin level is called hypoalbuminemia. Adequate nutrition is important in the process of healing and shortening the period of care.[3]

MATERIAL AND METHODS

This study is a clinical research with Quasi Experimental method. The experimental design used was one group pre-post test. The research design of one group was measured using a pre-test which was carried out before being given treatment and post-tests carried out after being treated. To implement this method, this research was conducted one class and with pre-test and post-test can show differences before and after treatment. Given treatments or interventions to the subject of this study and the effect of mentioned treatments are measured and analyzed. The research subjects are given 2 capsules of snakehead fish extract 3 times a day. Pre-test data was taken by measuring serum albumin levels. After the treatment period was completed (7 days), a post-test was carried out with albumin measurement.

The population of this study was all post-neurosurgical patients that treated at the West Nusa Tenggara General Hospital. Each patient who underwent surgery and included within research criteria was given Snakehead Fish (*C. striata*) up to 3 weeks after surgery, the wound has been healed and all patients showed that there were no surgical wound infections. The sample consisted of 37 patients. All samples in this study were post-neurosurgical patients who were treated in the neurosurgical ward and were chosen based on the age of e" 18 years and no kidney disorders (proteinuria).

The change of albumin levels before and after the intervention were analyzed statistically using SPSS program version 22 with a significance level of 0.05 ($p = 0.05$) and confidence level of 95% ($á = 0.95$). The steps for hypothetic comparative statistical testing are normality test, variance homogeneity test and paired T-Test.

RESULTS AND DISCUSSION

The results of the data distribution of 37 patients stated that there were 12 males (32.4%) and 25 females (67.4%).

The researchers divided the class of age the population into 3 classes. The results of distribution by age of the patients were under 18 years old 3 (8,1%), 18-50 years old 24 (64,9%) and above 50 years old 10 (27 %).

The distribution of the patient based on the diagnoses were meningioma 17(46%) and skull defect 13(35,1%) among others.

Based on the length of operating injury control the results were 0-3 days 2(5,4%), 4-7 days 7(19%), 8-14 days 22(59,4%) and > 14 days 6 (16,2%).

Based on data, there are varied values from pre-operation and post-operation in patients.

The table below is the data of level albumin after giving chana. From the data, it can be concluded that the level of albumin has been increased.

The data (Table 4) was found that pre op and post op albumin levels had no significant differences (the significance value was 0.115). The pre-op and post-treatment albumin levels had a significant difference (a significance value of 0.003). However, albumin levels in the op and post treatment there were significant differences (significance value (0.001).

The result of the data (Figure 1.) was 12 males (32.4%) and 25 females (67.4%) and the age of distribution were under 18 years old 3 (8, 1%), 18-50 years old 24 (64, 9%) and above 50 years old 10 (27 %). A cross-sectional study found that there were significant differences between male and female albumin levels per age group. Only one age group (76-80 years) did not show a significant difference in albumin levels between male and female.[4] However, there are several factors that might influence the result. For example, females who took oral contraceptives generally had albumin levels lower than 2 g / dL compared to those who

did not take oral contraceptives. This supports the hypothesis that there is a hormonal role in albumin levels. At the age of 20, there was an increase in albumin levels, especially in male.[4] Albumin levels in females tend to decline faster after the age of 20, but it can reach, more or less, the same level as male in their 60s.[4] In a prospective study, it was found that albumin, SGPT, gamma-glutamyl transferase, bilirubin, and alkaline phosphatase levels were higher in male than female. The study also compared african and american. It is found that african had lower albumin level. Patients with hypertension are also have a higher albumin level of 0.5 g/dL in this study.[5] Other research shows that albumin levels in male decrease by 1g / L per decade. Female in general has albumin levels of 2 g/L lower than male, but a decrease in albumin levels in female is not big as in male. Therefore, in the age of 50s and 60s, albumin levels between male and female did not show a significant difference.[6]

In 37 patients, the most diagnosed were abnormalities of meningioma and skull defect. Actually, in certain diagnoses other than the mentioned above, hypoalbuminemia must be observed. Pre-operative hypoalbuminemia is a predictor of acute kidney injury in patients undergoing brain tumor surgery, with a cutoff point of 3.8 g / dl.[7] In another study, pre-operative hypoalbuminemia was associated with an increased

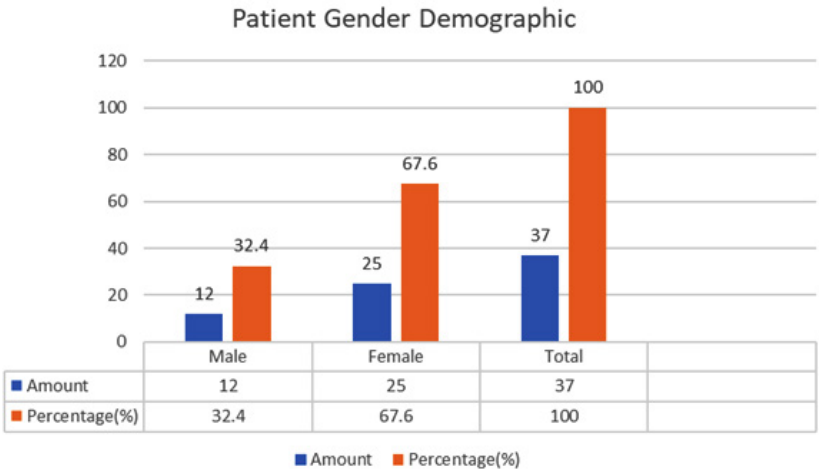

Fig. 1. Patient Gender Demographic

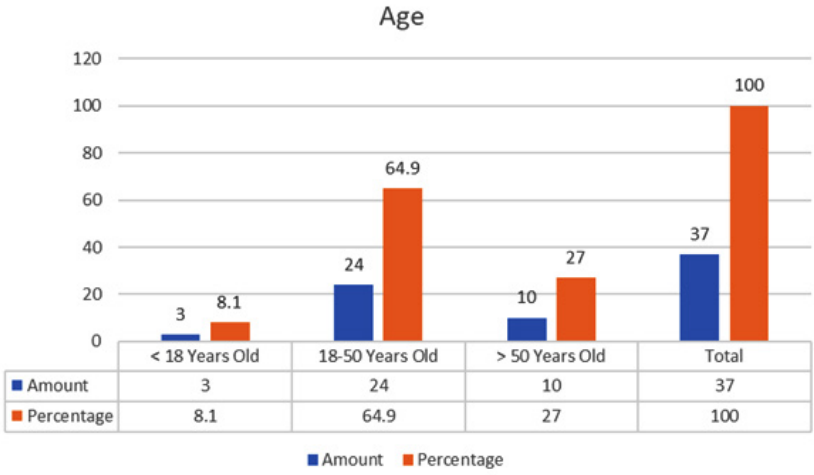

Fig. 2. Patient Age Demographic

risk of mortality and a longer length of stay in tumor patients undergoing craniotomy.[8] The same thing can be found in patients with glioblastoma multiforme (GBM). GBM patients with hypoalbuminemia have a lower 30-day survival, with a cutoff point <3 mg / dL. Not only in cases of brain malignancy, albumin levels also affect the survival of patients with lung, breast, gastric, colon, and metastatic malignancies.[9] Based on the results of a study by Pandey *et al*, (2016) low serum albumin levels were a risk factor for complications of TBI, and the percentage of favorable clinical outcomes was reduced by hypoalbuminemia.[10] It would be better to maintain serum albumin levels in excess of 3.5 gm/dl in traumatic brain injury patients especially in severe brain injuries. Serum albumin can be routinely measured because tests are cheap and accessible even in remote laboratories. Albumin, the main protein of human plasma, plays an important role in the transport of material metabolites and maintenance of plasma osmotic pressure. This not only reflects the body's nutritional status, but also represents the level of inflammation that occurs.[11]

Cytokines, such as IL-6 and TNF, are produced by an inflammatory response, which can inhibit albumin synthesis in liver cells. Long-term chronic inflammation can cause vascular endothelial damage and increase vascular permeability, which can increase albumin levels in the interstitial fluid and produce a decrease in serum albumin. Previous studies have confirmed that low albumin levels are associated with a poor prognosis in various malignant tumors. Although previous studies showed albumin as a significant prognostic factor, which would be influenced by many factors, body dehydration or fluid retention had a large impact on albumin.[11]

Strict perioperative nutritional support and use of immune-modulated formulas have been shown to reduce both complications (infections) after major surgery and hospitalization. Similarly, the use of perioperative corticosteroid has been recommended recently; and the initial results for this simple intervention are promising in respect to post-operative results. Approved albumin can be one of the predictive markers of clinical outcomes in surgery due to trauma. Simple and reliable parameters that represent surgical stress will be clinically important to identify patients at risk and to adjust perioperative care.

Although advances in the science of surgical and perioperative management have reduced post-operative mortality over the past few decades, post-operative morbidity remains high. In addition to the patient's morbidity, post-operative complications pose a significant financial burden, while important efforts are currently being made to reduce health care spending. The magnitude of the metabolic stress response reflects the level of surgery and may contribute to the risk of developing postoperative complications. Early identification of patients is at risk of increasing outcomes, because

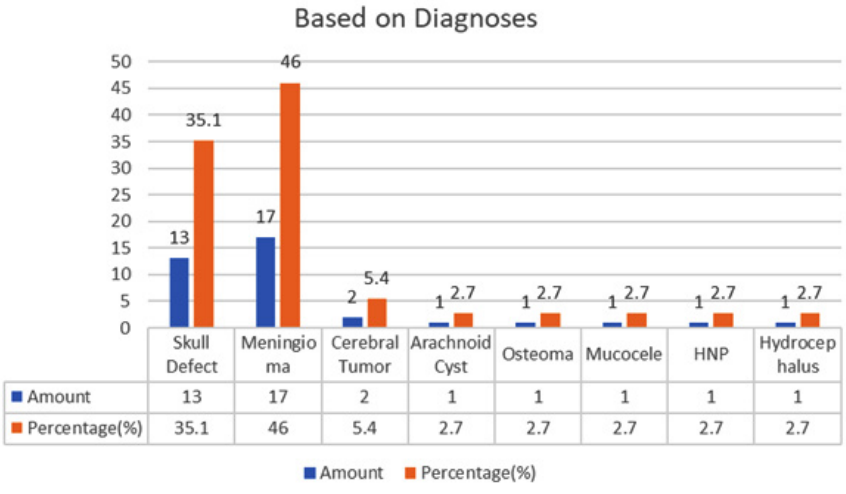

Fig. 3. Patient Diagnoses Demographic

Table 1. Demographics of long operating injury control

Criteria	Amount	Percentage(%)	
Long Operating Injury Control	0 – 3 days	2	5,4
	4 -7 days	7	19
	8 - 14 days	22	59,4
	> 14 days	6	16,2
Total		37	100

Table 2. Level of albumin before giving chana

Patient	Pre op albumin (dd-mm-yy)	Value	Post op albumin (dd-mm-yy)	Value
1.	18-07-17	4.6	29-07-17	3.2
2.	30-10-17	5,0	10-11-17	4,6
3.	26-07-17	4,3	03-08-17	4.0
4.	08-11-17	4.6	13-11-17	3.7
5.	27-08-17	4.5	06-09-17	3.4
6.	07-11-17	4.8	08-11-17	3.6
7.	21-08-17	3.7	22-08-17	4.0
8.	27-11-17	4.5	04-12-17	3.4
9.	02-08-17	4.6	09-08-17	3.9
10.	29-11-17	4.4	12-12-17	3.5
11.	07-08-17	4.0	03-08-17	3.4
12.	05-12-17	4.5	12-12-17	4.0
13.	21-11-17	3.9	20-12-17	3.7
14.	11-12-17	4.2	18-12-17	3.9
15.	07-12-17	4.9	29-12-17	4.6
16.	07-12-17	4.8	02-01-18	3.8
17.	20-12-17	4.1	03-01-18	4.0
18.	14-12-18	4.5	17-01-18	3.6
19.	05-01-18	4.0	19-01-18	3.8
20.	17-01-18	4.7	02-02-18	3.5
21.	05-01-18	4.5	23-01-18	3.4
22.	29-01-18	4.4	10-02-18	3.3
23.	30-01-18	4.6	05-02-18	4.0
24.	31-01-18	2.7	17-02-18	2.8
25.	23-01-18	4.3	19-02-18	4.0
26.	31-01-18	4.1	17-02-18	3.4
27.	10-02-18	4.5	17-02-18	3.7
28.	31-01-18	4.3	01-03-18	4.0
29.	01-03-18	4.2	06-02-18	4.3
30.	27-02-18	4.0	07-03-18	3.5
31.	27-02-18	4.7	07-03-18	3.8
32.	19-03-18	4.4	24-03-18	3.6
33.	06-03-18	5,0	22-03-18	3,6
34.	15-03-18	4.5	21-03-18	4.0
35.	22-03-18	4.3	27-03-18	4,7
36.	03-04-18	4.5	06-04-18	3,2
37.	05-04-18	4.1	14-04-18	4.1

of measures to weaken the surgical stress response and to reduce morbidity exists.

Albumin, a non-blood product, can be used to treat hypovolemia. However, the price of albumin is very expensive and it is also limited. Albumin has a high capacity to bind water, and can survive in intravascular for approximately 4 hours. As much as 50-60% of protein in the blood is albumin, but 80% of intravascular oncotic pressure is the role of albumin. Albumin has a high binding

Table 3. Level of albumin after giving chana

Patient	Albumin after giving Chana (dd-mm-yy)	Value
1.	02-08-17	4.2
2.	15-08-17	4,8
3.	15-08-17	4.1
4.	22-11-17	3.4
5.	20-09-17	3.8
6.	13-11-17	3.8
7.	31-08-17	4.1
8.	28-12-17	4.0
9.	29-08-17	4.2
10.	03-01-18	3.8
11.	07-09-17	4.0
12.	20-12-17	4.2
13.	28-12-17	4.5
14.	28-12-17	4.0
15.	02-01-18	4.7
16.	12-01-18	4.7
17.	12-01-18	4.4
18.	31-01-18	4.2
19.	31-01-18	4.2
20.	13-02-18	4.3
21.	15-02-18	3.7
22.	22-02-18	3.7
23.	15-02-18	4.2
24.	20-02-18	3.0
25.	27-01-18	3.7
26.	06-03-18	4.7
27.	08-03-18	4.6
28.	06-03-18	4.9
29.	13-03-18	4.5
30.	20-03-18	3,8
31.	20-03-18	4.0
32.	31-03-18	4.8
33.	29-03-18	4,9
34.	29-03-18	4.8
35.	05-04-18	5.0
36.	17-04-18	4.6
37.	02-05-18	4.4

Table 4. Analysis Paired T Test

		Pre_OP	Post_OP	Post_Treatment
Pre_OP	Pearson Correlation	1	0,264	0,475**
	Sig. (2-tailed)		0,115	0,003
	Sum of Squares and Cross-products	6,177	1,548	3,241
	Covariance	0,172	0,043	0,090
	N	37	37	37
Post_OP	Pearson Correlation	0,264	1	0,531**
	Sig. (2-tailed)	0,115		0,001
	Sum of Squares and Cross-products	1,548	5,587	3,444
	Covariance	0,043	0,155	0,096
	N	37	37	37
PostTreatment	Pearson Correlation	0,475**	0,531**	1
	Sig. (2-tailed)	0,003	0,001	
	Sum of Squares and Cross-products	3,241	3,444	7,532
	Covariance	0,090	0,096	0,209
	N	37	37	37

**. Significant 0,0

ability, for example in water, calcium and sodium. Albumin is a transport protein that is important for fatty acids, bilirubin, hormones, and various kinds of drugs.[12]

Hypotension, increased blood sugar, and hypoalbuminemia are poor predictors of brain injury patients.[13]. Although albumin affects outcomes in brain injury patients, albumin is not a good choice for the resuscitation phase. A post-hoc analysis of the use of albumin for correction of hypovolemia in brain injury patients actually has a negative impact. The use of albumin to correct hypovolemia in critically ill patients is no better than crystalloid use. Therefore, although albumin has an important role in the transportation of drugs, hormones, and various other important substances, albumin should not be used for hypovolemia.[13]

CONCLUSION

This is an important reason for several reasons, including therapy in patients with pre-operative or recovery period after surgery. Snakehead fish can increase serum albumin levels in patients after surgery.

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