NUTRITIONAL STATUS OF TETANUS PATIENTS ADMITTED TO NATIONAL HOSPITAL FOR TROPICAL DISEASES YEAR 2021 - 2022

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Summary

Objectives: Evaluate nutritional status of tetanus patients admitted to the National Hospital for Tropical Diseases in 2021 and 2022.

Subjects and methods: A cross-sectional study was conducted to assess the nutritional status of 33 patients admitted to the National Hospital for Tropical Diseases (NHTD).

Results: The rate of patients developed chronic energy deficiency increased on the day of discharge compared with this rate on the day of admission (30.3 vs 54.5%). Hypoalbuminemia and hypoproteinemia presented after one week and especially after two weeks of hospitalization (average blood albumin level on admission was at 36.9 ± 5.4 g/L, decreased to 29.2 ± 5.7 g/L on day seven, and still be low at 30.5 ± 4.7 g/L on the day fourteen. Average blood protein level on admission was at 66.1 ± 8.56 g/L, declined to 59.3 ± 7.3 g/L on the day seven, and at 59.0 ± 7.2 g/L on the day fourteen. Assessment of nutritional status based on SGA showed that the rate of both severe malnutrition and mild malnutrition rose up one week and two weeks of hospitalization (37.9 % - 62.1% for severe malnutrition and 19.2% - 80.87% for mild malnutrition based on SGA, respectively).

Conclusion: Nutritional status of tetanus patients worsened after one week and two weeks of hospitalization related to the index of blood albumin, blood protein, SGA.

Keywords: *Nutritional status, tetanus, hypoalbuminemia.*

INTRODUCTION

Nutrition contributes an important part on treating patient. It doesn't only provide energy for maintaining vital functions, it also plays a remarkable role in drug transport and metabolism.

In order to give a proper and effective nutritional plan, it is necessary to evaluate exactly the nutritional of the patient.

Majority of tetanus patients admitted to the Emergency Department (ED) and Intensive Care Unit (ICU) of the National Hospital for Tropical Diseases got generalized tetanus, and quickly developed hypertonic status of all the muscles, especially jaw muscles (trismus), which often impede enteral feeding. Meanwhile, tetanus patients require a nutritional regime with high calories and energy. Therefore, a large number of tetanus patients experience weight loss after leaving hospital, accompanywith moderate to severe loss of muscle mass. And thus, it is necessary to conduct studies periodically for evaluating nutritional status of tetanus patients in the ICU and the ED of the hospital, support clinical doctors enable to adjust adequately nutritional strategies for the patients, based on the collected data, associated with the latest guidelines of nutrition, in order to optimize the quality of care and the treatment. For those reasons, we conduct this study with the objective: Evaluate the nutritional status of tetanus patients admitted to the Intensive Care Unit and Emergency Department of the National Hospital for Tropical Diseases in 2021 and 2022.

SUBJECTS AND METHOD

Subject of research: Patients diagnosed of tetanus, admitted to the Intensive Care Unit and Emergency Department.

1: National Hospital for Tropical Diseases

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Location of study: Intensive Care Unit and Emergency Department of the National Hospital for Tropical Diseases.

Time of study: From October 2021 to October 2022.

Method: Using the method of descriptive epidemiology via a prospective cross-sectional survey.

Collecting data: Collecting data of patient's height, weight, clinical and paraclinical information.

Evaluated index:

**** Body Mass Index - BMI:***

Sample size: Recruit all the patients diagnosed of tetanus admitted to Intensive Care Unit and Emergency Department of the National Hospital for Tropical Diseases from October 2021 to October 2022.

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

Limiting errors:

- Standardize the study protocol and train investigators.

- Review the collected data everyday.

- Standardize techniques: height mesurement, weight mesurement and note-taking.

Ethics: Study was approved by the Scientific Comittee and the Ethics Committee of the National Hospital for Tropical Diseases before implementing. All the patients had been fully informed about the study and agreed to participate in. All mesurement devices had been under quality control to make sure that they were not harmful for the patients. Results of the study is expected to have provided recomandations about clinical nutrition for tetanus patients in order to optimize nutritional issue for the patients.

RESULTS

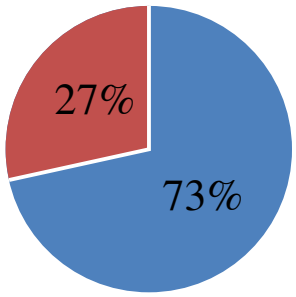

Figure 1. Distribution of patients by gender

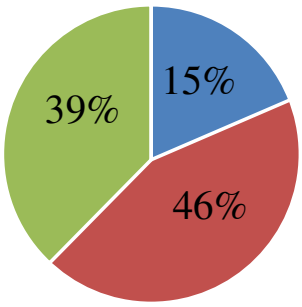

Figure 2. Distribution of patients by age

The majority of tetanus patients were male, accounting for 72.7% versus 27.3% of female patients (Figure 1). The average age of these patients was 57.7 ± 15.4 years. The age group of 40 - 59 had a highest proportion with 45.5%; followed by the group older than 60 years, accounting for 34.9% (Figure 2).

Table 1. General information of the patients in the research

General information		Number of Patients	Percentage (%)
Duration of hospitalization (day)	≤ 14 days	6	18.2
	14 - 21 days	3	9.1
	> 21 days	24	72.7
	Average	30.09 ± 16.55	
Average weight (kg)		54.21 ± 10.8	
Average height (m)		1.61 ± 0.08	

As the results of the table 1: The average length of stay in the hospital was 30.09 ± 16.55, in there, 24 patiens (72.7%) hospitalized for more than 21 days. The average weight of the patients was 54.21 ± 10.8 (kg). And the average height was 1.608 ± 0.08 (m).

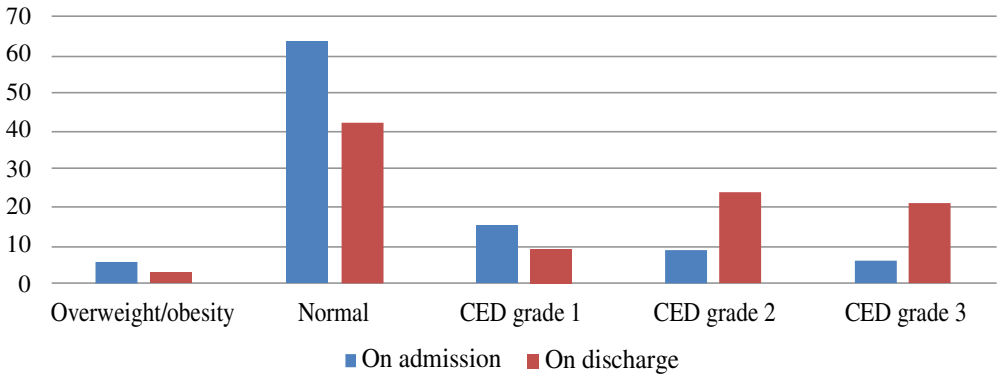

Figure 3. Nutritional status of the patients by BMI

Evaluating the nutritional status according to BMI showed that there were 21 patients having the index in the normal range on admission, accounting for 63.6%. Meanwhile, there were only 14 patients (42.4%) having the normal BMI index on discharge. On admission, 10 patients (30.3%) manifested chronic energy deficiency (BMI < 18.5%). Whereas, there were 18 patients (54.5%) having this status on discharge. (Figure 3).

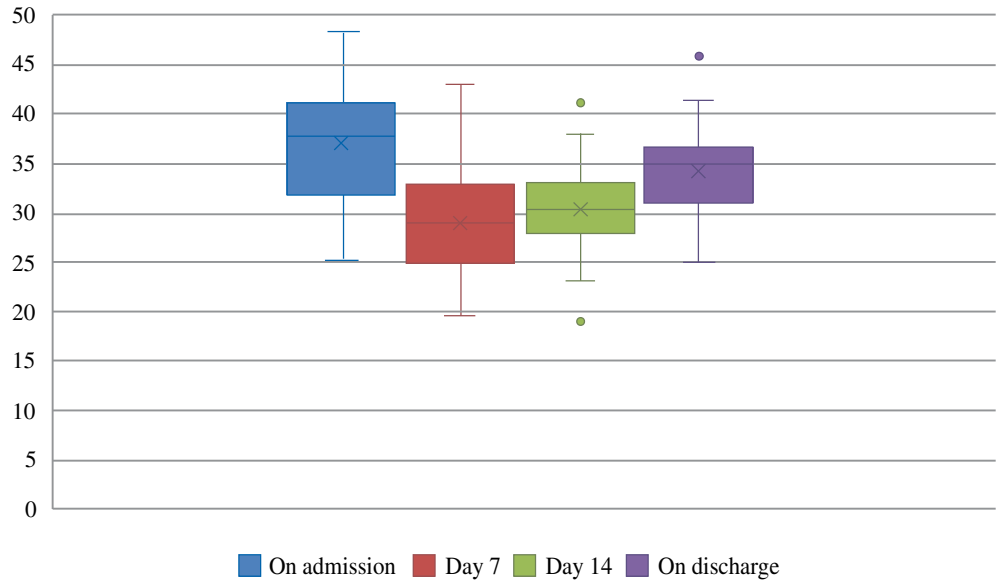

Figure 4. Blood albumin level (g/L) at various times of hospitalization

The average level of albuminemia of the patients in the study tended to decline through the treatment course and went up near the time of discharge. The mean of albuminemia level on admission was 36.9 ± 5.4 g/L, decreased at 29.2 ± 5.7 g/L on day 7, and 30.5 ± 4.7 g/L on day 14, then increased to 34.0 ± 4.3 g/L before discharge from hospital. (Figure 4). On first day of admission, there were 34% of patients (n = 33) having hypoalbuminemia (< 35 g/L). After 7 days of treatment, the hypoalbuminemia was presented at 82.8% of patient (n = 33). On day 14, it remained 80.8 % (n = 26) of patients having low level of albuminemia. The proportion of hypoalbuminemia at the time of dischargement down to 18.2%.

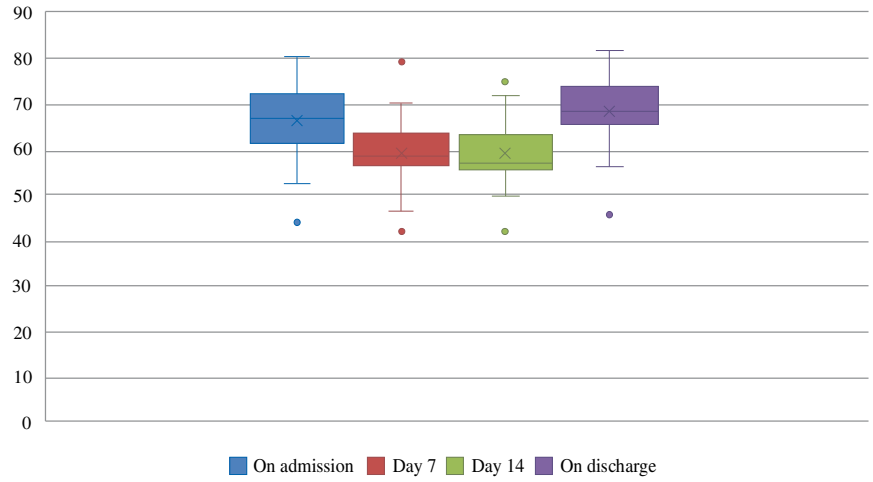

Figure 5. Blood protein level (g/L) in various times of hospitalization

The large number of patients blood protein level in normal range in the beginning of hospitalization. Subsequently, the hypoproteinemia status of the patients was also found on the day 7 and day 14 of treatment course, with the average blood protein levels were59.3 ± 7.3 and 59.3 ± 7.3, respectively. On discharge, these indexes tended to recover to the normal range. (Figure 5).

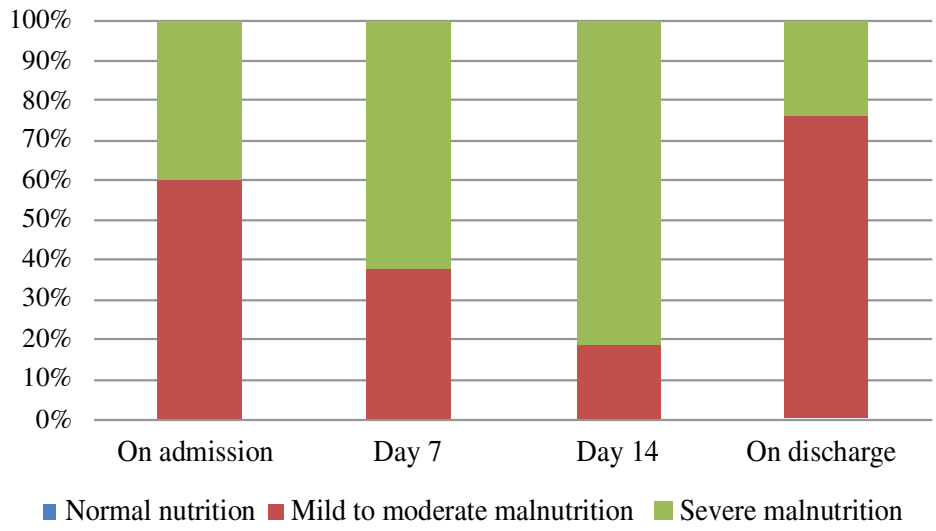

Figure 6. Nutrition assessment according to SGA

Evaluating the malnutrition state according to SGA (Subjective Global Assessment score) showed that here were not any patients in the study having normal nutrition status throughout the hospitalization. While, all patients of the study were ranked as mild to moderate or severe malnutrition. As long as of admission, the mild to moderate malnutrition group accounted for 60.6% of patients, while the severe malnutrition group covered 39.4% of patients (n = 33). The malnutrition state worsened during the treatment course. After one week following admission, there were 37.9% of patients having mild to moderate malnutrition status and the proportion of severe malnutrition patients went up to 62.1% (n = 33). On the day 14, there were only 19% of patients getting mild to moderate malnutrition, while there were 80.9% of the cases

with severe malnutrition patients (n = 26). However, on discharge, 75.8% of patients were ranked to the mild to moderate malnutrition group, versus only 24.2% of the severe malnutrition group.

DISCUSSION

There were totally 33 tetanus patientsrecruited in the study. A great number of patients was male, accounting for 72.7%. The average age was 57.7 ± 15.4 years. In there, the age group of 40 - 59 years had a highest proportion of 45.5%. The average length of stay in hospital was 30.09 ± 16.55 day.

Majority of the patients had normal BMI index (63.6%) on admission and 36.4% of the patients have malnutrition according to BMI; however, on discharge, there were only 42.4% of the patients having normal BMI index. The proportion of the patients having malnutrition by BMI at the time of admission in our study was higher by comparison with the group of patients nourished via nasogastric tube in the 108 Military Central Hospital (16.7%), although both groups have had nearly the same average age (57.7 ± 15.4 versus 66.7 ± 15.3)[1]. The number of patients having chronic energy deficiency (BMI < 18.5) increased from 10 on admission to 18 patients on discharge, this also indicated the losing-weight of tetanus patients in our study. This weight loss might be related to the repeated muscle spasms, hypersecretion of sweat glands, that are usually seen in tetanus cases or due to sepsis, superinfection. However, the principal reason could be not-enough enteral feeding. In fact, tetanus patients with intensive spasms requires high dose of sedative drugs and anti-spasm drugs. It leads to abdominal bloating and distension, dyspepsia, associated with poor parenteral feeding, finally results in rapidly losing weight. Thus, it is recommended that for the tetanus cases having poorly enteral feeding in first 1 or 2 week of treatment,need to supplement by parenteral feeding.

Weight loss of patients is not only found in tetanus cases, it presents in almost hospitalized patients in general. According to the European Society for Clinical Nutrition and Metabolism (EPSEN), the proportion of patients having weight loss during treatment process was 30 to 90%[2].

Poor nutrition also manifests via many aspects, such as albuminemia, proteinemia. Hypoalbuminemia was found in nearly half of the patients at the time of discharge (45.5% versus 34% on admission). This result was similar to the report of Do Tuan Anh in 2013, around the tetanus patients in National Hospital for Tropical Diseases (42.6%)[3]. However, the low level of blood albuminpresented mostly after 1 week and 2 weeks followed admission with about 80% patients having hypoalbuminemia.

Study of Tran Thi Le Thu in 2020, also in National Hospital for Tropical Diseases showed that there was a significant improvement of patient blood albumin level associated with consulting nutrition specialist4. Meanwhile, the majority of patients in our study were not asked for nutrition specialist's opinion. Thus, the hypoalbuminemia presented remarkably on admission, 1 week and 2 weeks following admission, at 36.9 ± 5.4 g/L, 29.2 ± 5.7 g/L, and 30.5 ± 4.7 g/L respectively.

Although both albuminemia and proteinemia are not specific for evaluating nutritional status, especially in presenting-inflammatory patients. However, increasing demand on nutrition supplement while the feeding is not enough contributes on hypoalbuminemia and proteinemia.

Aboutthe hemoglobin index, there was reductions of hemoglobin concentrations after 1 week and 2 weeks following admission. The average hemoglobin concentration of the patients declined from 126.6 ± 16.3 g/L on admission to 108.6 ± 13.8 g/L on day 7, continued to decrease to 99.6 ± 13.6 g/L on day 14. It tends to recover back to 113.7 ± 19.2 g/L on discharge.

Evaluating malnutrition according to SGA also revealed a remarkable alteration on proportion

of patients having severe malnutrition state, that increased from 39,4% on admission to 62.1% after 1 week, and 80,9% after 2 weeks of treatment, before went down to 24.2% on discharge. Study of Nguyen Thi Thu in the 108 Military Central Hospital also indicated the malnutrition state by SGA (> 11 points). This result increased significantly after 1 week from 35.7% to 78.6% (OR = 2.0; $p < 0.05$)[1]. Proportion of patient having severe malnutrition state on discharge was similarly lower than this on admission might be explained by swelling status presenting in the cases with renal failure or hypoalbuminemia.

CONCLUSION

- On admission, the majority of tetanus patients had mild to moderate malnutrition. This status worsened after 1 week and 2 weeks following admission, manifested via many indices, including albuminemia, proteinemia, hemoglobin, SGA.

- It is recommended that for the tetanus cases having poorly enteral feeding in first 1 or 2 weeks of treatment, need to supplement by parenteral feeding, associated with consulting nutrition specialist.

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