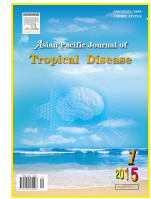




Contents lists available at ScienceDirect

Asian Pacific Journal of Tropical Disease

journal homepage: www.elsevier.com/locate/apjtd

Editorial doi: 10.1016/S2222-1808(15)60846-5

©2015 by the Asian Pacific Journal of Tropical Disease. All rights reserved.

Nutritional management in Ebola haemorrhagic fever

Kamon Chaiyasit^{1*}, Viroj Wiwanitkit²¹Vitalife Wellness Center at Bumrungrad International Hospital, Thailand²Joseph Ayobabalola University, Nigeria

ARTICLE INFO

Article history:

Received 15 Dec 2014

Received in revised form 20 Dec 2014

Available online 1 Jun 2015

Keywords:

Ebola

Nutrition

Management

ABSTRACT

Ebola haemorrhagic fever is a viral infection causing a major health problem worldwide. In this short article, the authors briefly review and discuss on the nutritional management (energy, protein, fat and micronutrient) in management of Ebola infection.

1. Introduction

Ebola haemorrhagic fever is a viral infection causing a major health problem worldwide. The rate of survival after infection is quite few. Therefore, the body's immune system of one who get infection can potentially help prevent or reduce the likelihood of death from viral infections.

Nutrition is an important concern in the patients who get the infection by the virus. This should be a population scale consideration. In a country that experienced problems of food security, the controlling infection is usually a big problem. It seems that limited access to food, the more serious and difficult situation usually exists. Therefore, the problems associated with malnutrition and malnutrition (both macronutrients and micronutrients) have to be mentioned. In such mentioned conditions, the problem can affect the immune system, which result in the impaired of patients' body. Therefore, taking care of the nutrition is something important and should not be ignored in patients with infection. Good management means controlling the risk of severe infection and

promoting the complete immune system. Poor nutrition can have effect on mortality rate. In the patients with malnutrition problems, the poor outcome associated with high morbidity and mortality is the important point that the health care workers should take into consideration[1].

2. Food and energy consideration

In patients with chronic illnesses, protein energy malnutrition is increased. Hence, management of this problem is needed. As a recommendation, protein is required at 1.2 g/kg of ideal body weight[2] and the source should be meat-based proteins. Therefore, in patients with infection, it is necessary to assure that the patient can have access to medical care and must get adequate protein and meat. When the protein is sufficient, then management of food in groups of carbohydrate and fat have to be considered later. In catering to patients with hemorrhagic problem, it should take into account for the texture of the food. The food should be soft and this must be considered in food preparation. Hardness may result in irritation to the gastrointestinal tract and this is the risk for bleeding. Also, the patients avoid foods that are spicy. This consideration have to be applied for selection of proper drinks to the patients. The closed monitoring of bleeding in the gastrointestinal tract and urinary difficulties have to be done[3]. In the case with inadequate nutrition, practitioner may consider liquid food supplementation or parenteral nutrition, such as dextrose and NaCl, to prevent

*Corresponding author: Dr Kamon Chaiyasit, Vitalife Wellness Center at Bumrungrad International Hospital, Thailand.
E-mail: kamolchaiyasit@hotmail.com

malnutrition and energy depletion problem[4].

3. Carbohydrate

Carbohydrate is the major energy source derived from daily diet. Generally, the derived amount should be approximately 55%-60% of the energy that human body needs per day. It is required to care and concern about the “Glycemic Index” in patients who require boosting immunity. In the group receiving high Glycemic Index food source for a long time, it may cause the immune system dysfunction. Having diets with high Glycemic Index and low fiber such as desserts and sweets will result in stimulating of the inflammatory process. This can also result in immune dysfunction. The problem can be more serious in the cases with low body weight[5]. Also, one with the problem of dysphagia has to take specially prepared liquid food, to promote high energy since the nectar sip is always lack of sufficient energy to the body. Regardless of the type of food, physiological status of the patient, has to be considered.

4. Protein

Protein is focused as the first priority in the dietary management of the patients. Patients should be given adequate protein, generally 1-1.2 g/kg of ideal body weight. This can be achieved by taking a high biological value protein sources such as meat. For the case of patients who do not have access to food, such as those living in the area with chronic food insecurity, the good and simplest source of protein is the egg. The patients who get food protein source as protein in eggs can get at least 13-14 g of protein from 100 g of egg[6], and the derived protein contains appropriate amino acids. The main amino acids, which are good for the immune system, include glutamine, glutamate, and arginine. Methionine, cysteine and threonine can affect the body’s immune system as well. In addition, the branch chain amino acid should be specially given to the patients since it can help enhance the immune system via the mTOR pathway.

5. Fat

Fatty acid composition of dietary fat is associated with inflammation and immunity. The trans-fatty acid can deteriorate the body’s immunity. Since it can destroy macrophage function and further result in easy occurrence of inflammation. As good examples, olive oil and sunflower oil supplementation can be helpful in rats with induced infections *Listeria monocytogenes*. In mice that received the two oil types, the rate of complication is less than the mice that received oil from other sources[8]. Therefore, getting the ratio omega 3 that is not considered saturated fatty acid and avoidance of trans - fatty acid is another option to maintain a healthy body immunity that is necessary for the patients infected with ebola.

6. Micronutrients

There are many published articles in several journals on the possible effect and the beliefs of ascorbic acid. In cases infected with

ebola, it is usually discussed for the effect of intravenous vitamin C or high dose oral vitamin C. However, this lacks scientific evidence sufficient support. However, there are reports that vitamin C help strengthen the immune system and reduce inflammation[9]. There is an interesting report, a case report, mentioned that combined vitamin C and calcium given intravenously plus blood transfusion can be helpful in patients infected with ebola[10]. In addition to vitamin C, it is also mentioned that vitamin A might help reduce the chance of infection. Nevertheless, there is no report on the beneficial of this nutrient in ebola management. For the other group of micronutrients, special care for each patient should not be overlooked[11].

Conflict of interest statement

We declare that we have no conflict of interest.

References

- [1] Rytter MJ, Kolte L, Briend A, Friis H, Christensen VB. The immune system in children with malnutrition-a systemic review. *PLoS One* 2014; **9**(8): e105017.
- [2] Bourdel-Marchasson I, Blanc-Bisson C, Doussau A, Germain C, Blanc JF, Dauba J, et al. Nutritional advice in older patients at risk of malnutrition during treatment for chemotherapy: a two-year randomized controlled trial. *PLoS One* 2014; **9**(9): e108687.
- [3] Singhi S, Kisson N, Bansal A. Dengue and dengue hemorrhagic fever: management issues in an intensive care unit. *J Pediatr (Rio J)* 2007; **83**(2 Suppl): S22-35.
- [4] Tumwine JK. Ebola and other issues in the health sector in Africa. *Afr Health Sci* 2014; **14**(3): i-iii.
- [5] Geraldo JM, Alfenas Rde C. Role of diet on chronic inflammation prevention and control - current evidences. *Arq Bras Endocrinol Metabol* 2008; **52**(6): 951-67.
- [6] Department of Health. Nutrient analysis of eggs-summary report. London: Department of Health; 2012. [Online] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/167972/Nutrient_analysis_of_eggs_Summary_Report.pdf [Accessed on 25th January, 2015]
- [7] Ruth MR, Field CJ. The immune modifying effects of amino acids on gut-associated lymphoid tissue. *J Anim Sci Biotechnol* 2013; **4**(1): 27.
- [8] Cerón Rodríguez JM, Puertollano Vacas MÁ, Puertollano Vacas ME, Alvarez de Cienfuegos López G. [Immunomodulatory role of dietary lipids in an immunosuppressed mouse model and infected with listeria monocytogenes]. *Nutr Hosp* 2014; **30**(4): 837-44. Spanish.
- [9] Chambial S, Dwivedi S, Shukla KK, John PJ, Sharma P. Vitamin C in disease prevention and cure: an overview. *Indian J Clin Biochem* 2013; **28**(4): 314-28.
- [10] Mupapa K, Massamba M, Kibadi K, Kuvula K, Bwaka A, Kipasa M, et al. Treatment of Ebola hemorrhagic fever with blood transfusions from convalescent patients. *J Infect Dis* 1999; **179**(Suppl 1): S18-23.
- [11] Taylor CE, Higgs ES. Micronutrients and infectious diseases: thoughts on integration of mechanistic approaches into micronutrient research. *J Infect Dis* 2000; **182**(Suppl 1): S1-4.