영양지원팀의 임상적 적용 방법

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The Clinical Application Methods of the Nutritional Support Team

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Purpose: Most hospitals have been reply to the consultation if the needed departments consult with the Nutritional Support Team (NST) for patient evaluation and management. However, as a common occurrence, some people requiring treatment cannot receive care due to lack of cognition of nutritional support and lack of resources for assessment of nutritional status.

Methods: We provide an indication for screening of patients and for active nutritional support. Indications include symptoms that reflect the conditions of increasing nutritional requirement and decreasing nutritional supply. Two surgical wards and surgical intensive care unit were included and nursing teams recommended patients to the NST by interviewing inpatients if they met the indications.

Results: We included 60 patients referred to the NST before applying for screening, from January 2005 to January 2009 and 44 patients selected for only five months by the NST after applying for screening. The number of consultations showed a slow decrease, 27 in 2005, 23 in 2006 to 10 in 2007, before applying for screening, but increased significantly to 44 for only five months after applying for screening. While the number of departments applying to the NST was five departments in 2005, six

departments in 2006, and two departments in 2007, it increased significantly to eight departments. After applying for screening, the most common cause was 'artificial nutrition longer than five days' in 48.1%; the second cause was 'poor nutrition status' in 13.5%, and the third was 'significant weight loss' or 'gastrointestinal function change' in 8%. Moderate risk patients showed improvement and shifted to minor risk patients and normal patients. The rate of improvement was approximately 47.7%.

Conclusion: The screening tools should be simple, as well as easy to use. Therefore, using this tool, we must actively select patients with poor nutrition and apply the screening tools rapidly. (J Korean Soc Parenter Enter Nutr 2013;5(3):117-121)

Key Words: Nutritional Support Team, Nutritional status, Screening

중심 단어: 영양지원팀, 영양지표, 검색

INTRODUCTION

Recently every hospital conducts the Nutritional Support Team (NST) consisted of nutritional experts with the improvement for nutritional support. There are two ways for selecting the allocated patient. First, using nutrition search tool, we analyze the result of eating habits, weight change, diagnosis and physical examination. And then we select the risky patients. Second, by entering the laboratory findings into computer data-base, we select the risky patients. It is a nutritional search tool commonly used, Nutritional risk screening 2002 (NRS 2002), mini nutritional assessment (MNA), malnutrition universal screening tool (MUST), short nutritional assessment questionnaire (SNAQ), malnutrition screening tool (MST) or subjective global assessment (SGA). These methods have two advantages, first it is accurate and second they enable individualized therapy, by history taking for nutritional status and disease severity. However, this method has limitation. For ex-

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ample, the process is complex and consumes much time and labor force. So it has no practical use.

On the other hand, it has limitation to conduct the NST practically, because too many people have been selected by the selection method which enters the laboratory data into computer. So most hospitals have been reply to the consultation if the needed departments consult to NST for patient evaluation and management. But in this way, it commonly occurs that some people required treatment cannot be cared due to lack of cognition of nutritional support and lack of resources of nutritional status assessment. Although St. Mary's Hospital also has been NST since October in 2004, it was not active. The activity of NST was poor because we had been passive working on nutritional consultation reliance on request only. We would like to express our successful experience. We designed the revitalization of the NST. Through the development of new search tool, we would like to provide an active nutritional support.

MATERIALS AND METHODS

1. Backgrounds and subjects

In this study, St. Mary's Hospital with the capacity of 660

St. MARY's HOSPITAL The Catholic University of Korea		등록번호: 환자이름: 성별/나이: 입원일:
Nutrition Screening Tool		
병실 :	진료과 / 주치의 :	의뢰일 : 2008 . . .
신장/체중 : cm / kg	상병명 :	
해당사항에 check하시고, 영양집중지원팀으로 연락 주십시오. (☎ 1997)		
General condition ☐ 1. Poor nutritional status(oral intake < 50% of energy needs) ☐ 2. Catabolic disease(burn, sepsis, pancreatitis) ☐ 3. Significant weight loss(>10%/6mon.) ☐ 4. Nonfunctioning gastrointestinal tract ☐ 5. Intra-abdominal leak ☐ 6. Massive gastrointestinal Bleed ☐ 7. Anticipated duration of artificial nutrition longer than 5days		
Diagnosis ☐ 8. Anorexia nervosa/Bulimia nervosa ☐ 9. Malabsorption(ceeliac sprue, ulcerative colitis, crohn's disease, short bowel syndrome) ☐ 10. Multiple trauma(closed-head injury, penetrating trauma, multiple fractures) ☐ 11. Coma ☐ 12. Esophageal Ca. & rupture(post OP state) ☐ 13. Gastrointestinal cutaneous fistulas ☐ 14. Hepatic failure(acute decompensation superimposed on cirrhosis) ☐ 15. Nonhealing wounds ☐ 16. Renal failure(acute tubular necrosis)		
기타 ☐ 17. Diarrhea(>500ml x 2 days) ☐ 18. Vomiting(>5days) ☐ 19. Reduced intake(<1/2 normal intake for >5days) ☐ 20. 기타 : _____		
* Chart에 부착하여 주십시오.		
Nutrition Support Chart		작성자 : _____

Fig. 1. Screening indications for nutritional support.

beds were only included. Although Yeouido St. Mary's Hospital had been made up of NST since October in 2004, the activity was poor. We analyze the cause of the slump, passive working on nutritional consultation reliance on request only. Therefore, we provide the indication for screening the patient and the active nutritional support (Fig. 1). Indication is made up of symptoms that are reflecting the conditions of increasing nutritional requirement and decreasing nutritional supply. Two surgical wards and SICU included and nursing teams recommend the patient to NST by interviewing inpatients if they meet the indications. From January in 2005 to July in 2009, we were reviewing the TPN monitoring profile and EMR by case-control study.

2. The composition of NST

NST was made up of two doctors, two pharmacists, two nutritionists and two nurses. First, if each nursing team recommended the patient through screening, nutritionists and pharmacists were interviewing the state of nutrition. This information was used in a weekly conference. In a weekly conference, we decided the treatment plan and carried out rounding for targeted patients. Since then, we checked CBC, BUN/Cr, LFT, electrolyte, lipid profile, albumin, prealbumin, transferrin, retinol binding protein and 24 hours urine urea/Cr twice a week for the first two weeks and checked weekly after two weeks. We also checked the weight, isolator culture and osmolality weekly. This helps us evaluate the appropriacy and the effectiveness of nutritional support.

3. Methods

We included 60 patients referred to NST before applying for screening, from January in 2005 to January in 2009, and 44 patients selected by NST after applying for screening. There are 104 patients in this study. Patients are classified as mild protein calorie malnutrition (PCM), moderate PCM, severe PCM, Kwashiorkor type and Marasmus type by the status of admission. We use the PCM ICD-9-code for classifying. The sum of the nutritional risk score is composed of weight loss, body mass index, state of appetite, gastrointestinal trouble, habitus of defecation, activity, dietary prescription, age, and so on, for recent 3 years. The sum of the nutritional risk score is used for risk classification. And then, we evaluate the consultation number, department number applying to NST and conference number before and after screening. We also evaluate the distribution of

nutritional state and nutritional state before and after nutritional support.

This study was approved by the institutional review board of the Ethical Committee of The Catholic University of Korea College of Medicine (SC12 RIS0080).

RESULTS

1. The characteristics of patients

There are totally 104 patients, 57 males (54.8%) and 47 females (45.2%), from January in 2005 to July in 2009. And average age is 57.13 ± 17.35 years old. Average weight is 53.88 ± 11.1 kg. The age distribution is composed of 10 patients over 20 under 30, 11 patients over 30 under 40, 13 patients over 40 under 50, 15 patients over 50 under 60, 27 patients over 60 under 70, 22 patients over 70 under 80, and 6 patients over 80.

2. The distribution of nutritional state

There are 36 patients in the minor risk category. This category is the largest and accompanied by tissue wasting but is not accompanied by laboratory abnormality. There are 25 patients in the moderate risk category. This is accompanied by marked weight loss, loss of appetite, and tissue wasting and is also accompanied by laboratory abnormality. There are 7 patients in the severe risk category. This is accompanied by weight loss of 5% or more. Except for that, there are 11 patients who have normal nutritional state, 21 Kwashiorkor type patients, 2 Marasmus type patients.

Fig. 2. Annual comparison of number of Nutritional Support Team consultation.

3. The number and department of consultation, the number of conferences

The number of consultation decreases slowly, 27 in 2005, 23 in 2006 to 10 in 2007, before applying for screening, but increases greatly to 44 only for 5 months after applying for screening (Fig. 2). The number of NST conference also increases from 25 in 2005, 21 in 2006, 9 in 2007 to 22 for 5 months (January in 2009~July in 2009). While the number of department applying to NST is 5 departments (mainly general surgery=77.8%, CS, gastroenterology, and so on) in 2005, 6 departments (GS, CS, OBGY and so on) in 2006 and 2 departments (GS and OBGY) in 2007, it increase greatly to 8 departments, in example, GS, CS, NS, ENT, etc.

4. The distribution of indication

After applying for screening, the cause of consultation is in Table 1. The most cause is 'artificial nutrition longer than 5 days' in 48.1%. The second cause is 'poor nutrition status' in 13.5%. And the third is 'significant weight loss' or 'GI tract function change' in 8%.

5. The assessment of nutritional state and follow up

From January in 2009 to July in 2009, we evaluate the nutritional state at admission and discharge for 44 patients. The results show that the number of moderate nutrition state decreases from 9 to 5, Marasmus type and Kwashiorkor type decrease from 2 to 0, from 8 to 2, respectively. And mild malnutrition increases from 19 to 24, normalized patients from 5 to 9. Moderate risk patients are improved and shifting to minor risk patients and normal patients. The rate of improvement is about 47.7% (Fig. 3).

The result of nutritional support is reflected in EMR via the

Table 1. Causes of nutritional support

Indication	Case (%)
Artificial nutrition longer than 5 days	25 (48.1)
Poor nutrition status	7 (13.5)
Significant weight loss	4 (7.7)
Nonfunctional GI tract	4 (7.7)
GI cutaneous fistulas	3 (5.7)
Malabsorption	3 (5.7)
Miscellaneous	6 (11.5)

GI = gastrointestinal.

Fig. 3. Comparison of change of nutritional status after screening.

independent category, 'assessment of nutritional state'. We can write the initial nutritional state screening, care plan and reevaluation point during nutritional support. This makes the clinician check the treatment course and induce the consistent interest for the plan.

DISCUSSION

Malnutrition is common in patients affected by acute or chronic disease. The rate of malnutrition is up to 40% of the inpatients. Among them, 75% of patients have not received appropriate nutritional support during hospitalized period. And they become progressively worse.¹ It is important to select the undernourished patients rapidly, because it influences the prognosis as much as the control of the main disease. This makes the clinician think about how to select the undernourished patients, rapidly and accurately. In this context, many screening tools such as MNA, NRS 2002, and SNAQ are suggested. The ESPEN guidelines made in 2002 shows that good screening tools have to satisfy the requirements, high degree of content validity and high reliability. They have to be practical, rapid, simple and purposeful but don't have to include too much information.² We need to select the most appropriate screening tools in the light of the scale and patient characteristics of each center. In this way the NST is managing successfully.^{3,4} We reviewed the existing screening tool, and concluded that it is difficult to apply the screening tools practically more or less, because they have some problems that they require too much information and are complex for screening tools. For example

existing screening tools are scoring the disease severity and information about recent dietary habits, weight change and bowel habit change. The risk is classified upon the sum of scores. In this way, we are able to assess the patient status accurately and predict the prognosis such as hospitalized period consistent with the nutritional status, infection morbidity and mortality.⁵ However, there are many disadvantages. It takes a long time for screening and is a complex course to scoring about many factors, summing the score and assorting into 2~3 groups. First, in NRS, it has to be scoring from 0 to 6 point. But the treatment is not different by each score, we decide whether to apply the nutritional support or not, on the basis of 3 points. Although, in case of SGA, it has 5 questionnaires and 5 check-ups of physical examination, we only assorted into 3 groups such as minor, moderate, severe risk groups, finally. Therefore, present screening tools are complex unnecessarily and inappropriate for the purpose of screening. We suggest alternatives; 20 indications including symptoms and diagnosis of patients. If the patient is included in the indications, we apply the patient to the screening. This way is simple, easy and clearly. Also, it has high practicability and reproducibility.

However, the limitation of these screening tools is lower specificity rather than others. For example, if the diagnosis is appropriate but condition is not severe, despite their good condition, they are included. It includes many patients unnecessarily because it doesn't assess dietary history and physical examination in a variety of viewpoints. In this way, it is not appropriate in large hospitals for the final decision of selecting the patient, because the loading of reevaluation is so heavy. Therefore, the NST which is our study suggested is appropriate in small-mid hospitals. Fig. 2 compared the nutritional state of admission with discharge. At admission, through appropriate evaluation, we provide the patient nutritional support. But the number of patients who is in severe malnutrition state, increases from 1 (admission) to 4 (discharge). The 4 patients consist of terminal cancer patients. In this wasting disease, even if the NST involve the patient aggressively, it cannot improve the nutritional state. Also, our study has limitation that is only focused on surgical disease. The more surgical diseases are included into the indication than medical diseases. The number of the medical disease is small and the classification of the medical disease is so broad by using the word of hepatic failure, renal failure or heart failure. This factor affects the lower specificity. We have to study about the indication including more medical disease,

and make reformed and replenished forms of screening tools. We would like to have long-term study, because the period of this study was too short. And we would like to analyze the outcome of nutritional support by assessing the improvement of quality such as quality of life and physical activity and the functional improvement in a variety of viewpoints.

Nutritional support is an important treatment because it is directly connected with prognosis. And the screening tools should be simple, easy and rapid for using. Therefore, by using this tool, we have to select undernutrition patients actively and apply the screening tools rapidly.

REFERENCES

1. McWhirter JP, Pennington CR. Incidence and recognition of malnutrition in hospital. *BMJ* 1994;308(6934):945-8.
2. Kondrup J, Allison SP, Elia M, Vellas B, Plauth M; Educational and Clinical Practice Committee, European Society of Parenteral and Enteral Nutrition (ESPEN). ESPEN guidelines for nutrition screening 2002. *Clin Nutr* 2003;22(4):415-21.
3. Jones JM. The methodology of nutritional screening and assessment tools. *J Hum Nutr Diet* 2002;15(1):59-71; quiz 73-5.
4. Anthony PS. Nutrition screening tools for hospitalized patients. *Nutr Clin Pract* 2008;23(4):373-82.
5. Mueller C, Compher C, Ellen DM; American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors. A.S.P.E.N. clinical guidelines: Nutrition screening, assessment, and intervention in adults. *JPEN J Parenter Enteral Nutr* 2011;35(1):16-24.

1. McWhirter JP, Pennington CR. Incidence and recognition of