입원환자를 위한 영양지원 프로그램 개발

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정미진 · 이수택 · 김동찬 · 유희철¹ · 김 원 · 김행순 · 김주신 · 김선형 · 강민우² · 김광옥¹ · 조백환¹

The Development of a Computerized Nutrition Support Program for Inpatients

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Purpose: The importance of detecting malnourished patients or those at risk of becoming malnourished early has been emphasized recently. However, it is difficult with limited resources to rapidly identify patients requiring nutrition management. Therefore, the Nutrition Support Team (NST) at our hospital wanted to use the adult nursing admission questionnaire, which is documented by a nurse at admission, for nutrition screening with various parameters of the SGA. The aim of this study was to develop a computerized program that includes nutrition screening using the adult nursing admission questionnaire, a nutrition assessment, a care plan, monitoring and reevaluation for more effective and earlier nutrition management with limited staff.

Methods: The task force team within the NST is composed of a physician, nurse, pharmacist and dietitian, whose aim is to develop a practical and fast screening program. The reports express a score that is dependent on the impact of the symptoms and the nutritional status of the patient derived from the adult nursing admission questionnaire. The scores are added to give a total. A score of 0~5 is deemed adequate nutrition, 6~10 denotes moderate or suspected malnutrition; 11 or more indicates severe malnutrition. The score uses the ordered diet, percent IBW, albumin and TLC according to the objective index. Malnutrition was defined as two items out of four being abnormal.

Results: This program consists of whole procedures in the following order: nutrition screening, malnutrition, assessment and monitoring. The computerized system is as follows: nutrition screening, consultation, assessment and care plan, reply, monitoring, reevaluation and the end.

Conclusion: It is expected that this program will facilitate nutrition screening using the adult nursing admission questionnaire, and provide early nutrition management through cooperation with various occupations. However, further study will be needed to assess the validity of identifying malnourished patients using the adult nursing admission questionnaire. (JKSPEN 2007;1(1):28-37)

Key Words: Nutrition screening, SGA, Nutrition support program

중심 단어: 위장관암 수술, 영양검색, 영양위험군, 영양지원

INTRODUCTION

The Joint Commission for Accreditation of Healthcare Organization (JACHO) recommends that nutrition screening should be completed within 24 h of admission.¹ Nutrition screening is the process of identifying parameters known to be associated with nutritional problems. The purpose of nutrition screening is to identify individuals who are malnourished or at risk of becoming malnourished and who may benefit from nutrition support.² The screen is conducted by a dietitian, nurse or health worker. The nutrition screening parameters should be cost-effective and easy to administer.^{3,4} We need to select the most appropriate nutritional parameters from the data available to our hospital.⁵

In recent years, several screening tools have been developed. Kruizenga et al. have developed the Short Nutritional Assessment Questionnaire (SNAQ) which is the nutrition screening tool to use items of nutrition assessment from other tools such as the Subjective Global Assessment (SGA) and Mini Nutrition Assessment (MNA).⁶ In particular, the SGA methodology has

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been used as a “gold standard” for the development of some nutrition screening tools.⁷ The SGA is a validated method for nutritional assessment based on the features of a medical history and physical examination.⁸ However, the final results of SGA always require subjective judgments. If the screening tool for all inpatient requires corresponding staff's judgment the NST activity will be jammed.

In the Guidelines for Hospital Evaluation that has the items of the faith of nursing process, the hospital understand the patient's problems through the systematic observation of his/her nursing needs and a nursing care plan is established and implemented according to those needs.⁹ The adult nursing admission questionnaire is the first, most basic step in the nursing process; it records the patient's identification information, vital signs, lifestyle considerations, physical condition, development, and information about the patient's society, culture, property, patient and family history.¹⁰ Our hospital had nutrition screening program; however it was of limited because it failed to ac-

count for involuntary weight loss and percent ideal body weight (%IBW). It was also hard to rapidly identify patients who needed nutrition management through personal interviews or medical records as we had limited staff. Thus the nutrition support team (NST) used selected items from the existing adult nursing admission questionnaire as a nutrition screening tool, because the nursing assessment satisfied the SGA and the European Society of Clinical Nutrition and Metabolism (ESPEN) guidelines.^{3,8} This was cost effective, given the computerized intake process and limited number of workers. The aim of this study was to develop a program which includes nutrition screening using the adult nursing admission questionnaire, assessment, a care plan, monitoring and reevaluation for more effective and earlier nutrition management.

MATERIAL AND METHODS

The task force team (TFT) within the NST was composed

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간호정보조사지(성인)		성명
		연령 55 성별 M
		진료과 GSHT 병동 1052

1. 환자 일반 정보	
입원일 2006년 06월 28일 1808시	정보제공자 작성간호사
직업 농업 교육정도 고졸	종교 무교 결혼상태 기혼
흡연 □무 □유- 양() 기간()	음주 □무 □유- 종류(소주, 맥주,) 양() 3-4병/회 횟수() 3-6회/월, 기간() 30년
전화번호 자택 : 휴대 :	
II. 입원 관련 정보	
입원경로 □외래 □응급실 □기타	입원방법 □도보 □휠체어 □능는차 □기타
보호자 동반 □무 □유	진단명 R/O CBD CA
입원동기 □발병일 : 2006년 6월 28일 새벽 3시경 □주증상 : □복통, 구역 및 VOMITTING 있어 local dpt) 초음파 검사 및 MRCP 실시하고 외래 경유하여 □복통, 구역 및 VOMITTING 있어 local dpt) 초음파 검사 및 MRCP 실시하고 외래 경유하여	
과거병력 □무 □유 (□고혈압 □당뇨 □결핵 □간염 □종양 □유전질환 기타:) * 세부내용 : 6개월전 DM DX & TX 115년전 성대 탈락 OP At ENT 130년전 우울증, 신경쇠약증, 건갈 염려 증 DX & MED 간헐적 복통증(경증마산병원)	
알레르기 □무 □유 (약물 - , 음식 - , 기타 -)	최근투약상태 □무 □유 (당뇨약, 정신과MED)
병에 대한 인식 □무 □유	

III. 신체사정	
기형 □무 □유 (부위 -)	통증 □무 □유 (부위 -) □유 양상 - □둔함 □부심 □퍼짐 □에리함 □찌름 기타:)
전반적	식욕상태 □좋은 □보통 □나쁨
반복	체중변화 □무 □유 ()
상태	수면상태 □숙면 □불면 (복용약 - , 수면을 돕는법 -)
	대변장애 □무 □유 (횟수 회/ 일, 색깔 □설사 □변비 □혈변 기타:)
	배뇨장애 □무 □유 (횟수 회/ 일, 색깔 □유 □진급뇨 □실금 □배뇨곤란 □작열감 기타:)
	활동상태 □자유로움 □자유롭지 못함 (보조기구 □휠체어 □목발 □보조기 기타:)
피부	피부상태 □정상 (기타: □비정상 □발진 □물집 □종괴 □상처 □반점 □욕창 □발한 □건조 □소양감 □불결함)
부	피부색깔 □정상 (부위- □비정상 색갈- □창백 □홍조 □청색증 □황달 기타:)
소화기	소화기장애 □무 (기타: □유 □연하곤란 □오심 □구토 □토혈 □소화장애 □복부팽만 □복부통증 □점액변)
순환기	순환기장애 □무 (기타: □유 □심계항진 □흉통 □청색증 □호흡곤란 □식은암 □부정맥 □심정지)
호흡기	호흡기장애 □무 (기타: □유 □정신 □사지 □상지 □하지 □얼굴 □안검)
	호흡기장애 □무 (기타: □유 □호흡곤란 □가래 □기침 □폐렴 □청색증 □객혈 □이상호흡음 □기관지폐관)
신경계	동공크기 □대칭 □비대칭 □빛 반사 (□좌: □반응 □무반응 □우: □반응 □무반응)
	시력장애 □무 (기타: □유 □좌 □우 □안경 □콘택트렌즈 □의안 □야맹증)
	청력장애 □무 (기타: □유 □좌 □우 □보청기 □청력저하 □이명 □청각상실)
	신경근육 □이상없음 □무감각 / 저림 □통증 (부위)
마비	□무 □유 (□상지 □좌 □우, □하지 □좌 □우)
의식	의식상태 □사람 (□있음 □없음) □시간 (□있음 □없음) □장소 (□있음 □없음)
의식	의식 □명료 □혼돈 □반의식 □무의식
의사소통	□원만함 □곤란함 □불가능함
정서상태	□안정 □불안 □슬픔 □분노 □우울 □흥분 □안절부절

Fig. 1. The adult nursing admission questionnaire of Chonbuk National University which used a partially modified version of the standardized documentation.

Table 1. Nutrition scoresheet based on the adult nursing questionnaire

Variable	Score			
Route of hospital admission	Exotic (0)	Emergency (1)	Etc (0)	
How to hospitalize	Afoot (0)	Wheelchair (1)	Stretcher cart (1)	Etc (1)
Patient history	None (0)	Hypertension (1)	Diabetes (1)	
	Tuberculosis (1)	Hepatitis (1)	Tumor (1)	Genetic disease (1)
Appetite	Good(0)	Normal (0)	Bad (2)	
Weight change	No (0)	Yes (2)		
Defecation disorder	None (0)	Diarrhea (2)	Constipation (1)	Melena (1)
Functional Capacity	Full capacity (0)	Dysphagia (2)		
Bowel dysfunction	None (0)	Dysphagia (2)	Nausea(1)	Vomiting (3)
	Hematemesis (1)	Bowel dysfunction (2)	Abdominal distention (1)	Abdominal pain (3)
	mucous stool (1)			
Edema	No (0)	Yes (1)		
Age	< 60 (0)	≥ 60 (1)		
Total score*				

*Score of 0~5 = adequate; 6~10 = moderate or suspected malnutrition; 11 or more = severe malnutrition.

of a physician, nurse, pharmacist and dietitian, and they were designated to develop. The TFT developed one which included nutrition screening, assessment and monitoring within the Ordering Communication System (OCS), which referred to various literature and material related to another hospital's program. We had made the final plan in April 2006, and asked it the Department of Medical Information. The program was instituted in July 2007.

1. Nutrition screening and assessment

1) Nutrition screening

(1) **Nutrition screening based on the adult nursing admission questionnaire:** The adult nursing admission questionnaire has used a partially modified version of the standardized documentation that was developed by Park et al.¹¹ (Fig. 1). The nutrition screening questions were developed from various parameters (weight change, dietary intake change, gastrointestinal symptoms, functional capacity, physical assessment, age) of the modified SGA and Patient-Generated Subjective Global Assessment (PG-SGA) based on the SGA and ESPEN guidelines.^{3,12,13} The reports express a score depending on the impact of the symptoms and nutritional status in the nursing assessment tool, and then a total score is summed. A score of 0~5 denotes adequate nutrition; 6~10 is moderate or suspected malnutrition; and 11 or more is severe malnutrition (Table 1).

(2) **Nutrition screening based on objective parameters:** We used the objective parameters such as the ordered diet, per-

Table 2. Nutrition screening based on the objective parameter

Variables	Reference value*	
	At risk of malnutrition	At high risk of malnutrition
Diet (day)	NPO, tube feeding, liquid diet	>5day
%IBW	75~90	<75
Serum Albumin (g/dl)	2.8~3.5	<2.8
TLC (/mm ³)	1,200~1,500	<1,200

*Malnutrition was defined as two items out of four being abnormal.

cent ideal body weight (%IBW), albumin and total lymphocyte count (TLC) for nutrition screening.¹⁴ Malnutrition was as having two or more abnormal items out of four items (Table 2). Urinary urea nitrogen (UUN) and prealbumin are used as a reference.

Patients with a nutrition score of ≥6 or the more than two abnormal items out of four are classified as nutritionally at risk or high risk.

2) The nutrition assessment and nutrient requirement

(1) **The nutrition assessment:** This used a modified metabolic nutrition profile,¹⁴ and fat reserves (triceps skinfold thickness), somatic proteins (%IBW, percent weight loss [%wt], mid-upper arm muscle circumference), visceral proteins (albumin, prealbumin) and immune competence (TLC) as indicators assessing nutritional status.

(2) **The nutrient requirements:** For caloric requirement, "the rule-of-thumb" was used, which is done by multiplying

Fig. 2. The data process diagram of the program.

input fields to the adult nursing admission assessment since height and weight weren't computerized.

2) Analysis

The analysis of work is done on the computerized range. We analyze the work with enough time to minimize the error. The workflow is as follows:

(1) **Hospitalization:** The adult nursing admission questionnaire is conducted by the nurse on the day of admission to the hospital.

(2) **Nutrition screening:** The NST identifies the malnourished patient through the adult nursing admission questionnaire and informs the physician rapidly through the ordering program.

(3) **The consultation:** The attending physician can check the results of the screening using the ordering program and he asks for a consultation about nutrition support by his decision.

(4) **The reply:** The NST checks whether the physician asks for the consultation through the nutrition support program and

then he confirms the answer through the ordering program

(5) **Monitoring:** The NST monitors the nutritional condition of the patient for two weeks.

(6) **The end:** They draw up the work flowchart and a functional specification.

3) Design

The program design was created on the basis of the work analysis to make the data inquiry associated with OCS convenient; inputs and outputs were designed according to the data process; the interface design focused on connecting well to the OCS. Fig. 2 shows the data flow diagram of this program. The sever environment of the program used the UNIX system and operates under a distributed system environment using middle-ware (Tuxedo). The database designed using Oracle, the program language using Power Builder. The client computers operating system is based on Windows XP.

4) Practice

This program is operated in combination with the OCS and restricts the use of the program through the rights of the user.

영양지원업무(ocs_nwin:w_nstmdi)

영양선별 영양불량 영양평가 모니터링 통계 프로그램권한관리 종료

영양 Nutrition Score+ 객관적지표(w_ons2051a:ONS0240a)

조회일자: 20070817 병동: 52 병동

Sort1: ☒ 병실 ☐ 환자번호 ☐ 환자명 ☐ 입원일

Sort2: ☐ 영양불량 ☐ 진행상태

조회 종료

No	환자번호	환자명	병동	진료과	입원일자	주치의	NS	식이	*표제	Alb	TLC	UUN	Prealb	영양선별	진행상태
1			1052-29	소화기외과	20070716		3		91	3.4	1126		13.9	☐ 위험도 ☐ 고위험도	
2			1052-29	유방내분비외과	20070816		2	1	111	4.3	1009			☐ 위험도 ☐ 고위험도	
3			1052-29	호흡기알레르기내과	20070707		4	4	117	3.3	1767	11.6	23.9	☐ 위험도 ☐ 고위험도	
4			1052-29	소화기외과	20070806		11	4	95	2.7	312			☐ 위험도 ☐ 고위험도	회신
5			1052-29	소화기외과	20070718		7		76	3.4	590			☐ 위험도 ☐ 고위험도	
6			1052-29	소화기외과	20070816		1		104	4.1	2818			☐ 위험도 ☐ 고위험도	
7			1052-30	소화기외과	20070816		3		78	4.4	2699			☐ 위험도 ☐ 고위험도	
8			1052-30	소화기외과	20070815		1	1	113	3.4	2381			☐ 위험도 ☐ 고위험도	
9			1052-30	소화기외과	20070803		4		100	3.3	960			☐ 위험도 ☐ 고위험도	
10			1052-30	소화기외과	20070712		5		93	3	2334			☐ 위험도 ☐ 고위험도	
11			1052-30	호흡기알레르기내과	20070723		0		95	3.4	1142	3.1	16	☐ 위험도 ☐ 고위험도	
12			1052-30	소화기외과	20070808		1		96	3.1	2004			☐ 위험도 ☐ 고위험도	
13			1052-31	소화기외과	20070815		4		142	4.2	1599			☐ 위험도 ☐ 고위험도	
14			1052-31	간담체이식외과	20070809		2	4	99	3.6	1278			☐ 위험도 ☐ 고위험도	회신
15			1052-31	유방내분비외과	20070807		0		127	4.5	1290			☐ 위험도 ☐ 고위험도	
16			1052-31	간담체이식외과	20070816		0		143	4.3	2130		25.5	☐ 위험도 ☐ 고위험도	
17			1052-31	유방내분비외과	20070807		0		104	4.4	2418			☐ 위험도 ☐ 고위험도	
18			1052-31	유방내분비외과	20070806		2		133	4.1	1652			☐ 위험도 ☐ 고위험도	
19			1052-32	간담체이식외과	20070814		3		118	4.5	1484			☐ 위험도 ☐ 고위험도	
20			1052-32	소화기외과	20070812		5	3	98	3.6	1783			☐ 위험도 ☐ 고위험도	
21			1052-32	소화기외과	20070816		3		109	3.5	2927			☐ 위험도 ☐ 고위험도	
22			1052-32	유방내분비외과	20070725		2		120	3.9	2091			☐ 위험도 ☐ 고위험도	
23			1052-32	유방내분비외과	20070729		1		138	4.1	1523			☐ 위험도 ☐ 고위험도	
24			1052-32	유방내분비외과	20070812		1		133	4.4	2162			☐ 위험도 ☐ 고위험도	
25			1052-42	간담체이식외과	20070806		4		96	3.4	1957		13	☐ 위험도 ☐ 고위험도	
26			1052-43	소화기외과	20070721		3	5	98	2.4	924			☐ 위험도 ☐ 고위험도	회신
27			1052-43	간담체이식외과	20070815		0		127	4.1	1707			☐ 위험도 ☐ 고위험도	
28			1052-43	간담체이식외과	20070731		2		102	3.7	1529	4.8	16.2	☐ 위험도 ☐ 고위험도	의뢰
29			1052-43	소화기외과	20070813		9		80	3.6	1152			☐ 위험도 ☐ 고위험도	

***** 데이터가 조회되었습니다. *****

Fig. 3. Screen for nutrition screening.

영양지원업무(ocs_nwin:w_nstmdi)

영양선별 영양불량 영양평가 모니터링 통계 프로그램관리권리 종료

영양평가(w_ons2054a:ONS2040a)

조회일자 20070305 ☐ 병 동 전체

Sort 1: ☒ 병 실 ☐ 환자번호 ☐ 환자명 ☐ 입 원 일

Sort2: ☒ 전체 ☐ 의뢰 ☐ 회신

조 회 종 료

No	환자번호	환자명	병 동	진 료 과	입원일자	주치의	의뢰일	진행상태	의뢰구분	위험도구분	입/퇴원상태
1			1002-01	신장내과	20070214		20070227	모니터링	의사직접의뢰	위험도	재원
2			1032-44	산부인과	20070212		20070227	회신	선별후 의뢰	위험도	재원
3			1041-22	성형외과	20070302		20070305	의뢰	의사직접의뢰	위험도	재원
4			1051-03	소화기외과	20070102		20070226	모니터링	의사직접의뢰	위험도	재원
5			1051-22	간담체이식외과	20070205		20070302	회신	의사직접의뢰	위험도	재원
6			1051-22	간담체이식외과	20070125		20070302	회신	의사직접의뢰	위험도	재원
7			1052-29	간담체이식외과	20070305		20070305	의뢰	의사직접의뢰	위험도	재원
8			1052-31	간담체이식외과	20061207		20070223	추적조사회신	의사직접의뢰	위험도	재원
9			1052-44	소화기외과	20070301		20070305	의뢰	선별후 의뢰	위험도	재원
10			1052-44	간담체이식외과	20070226		20070226	모니터링	의사직접의뢰	위험도	재원
11			1061-05	신장내과	20070223		20070227	회신	선별후 의뢰	위험도	재원
12			1061-20	신장내과	20070303		20070305	의뢰	선별후 의뢰	위험도	재원
13			1061-21	신장내과	20070228		20070302	회신	선별후 의뢰	위험도	재원
14			1061-21	신장내과	20070302		20070305	의뢰	선별후 의뢰	위험도	재원
15			1061-22	신장내과	20070214		20070221	회신	선별후 의뢰	위험도	재원
16			1062-43	간담체이식외과	20070131		20070305	의뢰	의사직접의뢰	위험도	재원
17			1071-03	소화기내과	20070225		20070227	회신	선별후 의뢰	위험도	재원
18			1072-31	호흡기알레르기내과	20070222		20070227	회신	선별후 의뢰	위험도	재원
19			1091-06	중양혈액내과	20070219		20070227	회신	선별후 의뢰	위험도	재원
20			2002-05	신경외과	20070222		20070227	회신	선별후 의뢰	위험도	재원
21			2002-05	신경과	20070215		20070302	의뢰	선별후 의뢰	위험도	재원
22			2033-12	신경외과	20070218		20070222	회신	선별후 의뢰	위험도	재원
23			2033-53	신경외과	20070216		20070221	회신	선별후 의뢰	위험도	재원
24			2033-59	신경외과	20070213		20070226	모니터링	선별후 의뢰	위험도	재원
25			2033-59	신경외과	20070222		20070227	회신	선별후 의뢰	위험도	재원

***** 데이터가 25 건 조회되었습니다. *****

Fig. 4. Screen for nutrition assessment.

RESULTS

The nutrition support program consists of nutrition support, ordering input and the adult nursing admission questionnaire. Nutrition support is used by the NST and ordering input can be used by the doctor.

1. The nutrition support

This program consists of these procedures in the following order: nutrition screening, assessment, malnutrition and monitoring. In each step we can find the information when we click the patient.

1) The nutrition screening

Fig. 3 shows the nutrition screening display. It shows patient identification number, name, room number, name of attending physician, diet, %IBW, albumin and TLC; The diet means days of ordered diet-NPO, tube feeding and liquid diet for 14 days from the present. %IBW is computed by the weight and height in the adult nursing admission questionnaire. Albumin, TLC,

UUN and prealbumin fields display the most recent value.

2) The malnutrition display

The malnutrition display shows all patients classified by results of screening. We can see here whether the physician has asked for a consultation, To ask for the consultation is decided by the doctor.

3) The nutrition assessment

Fig. 4 shows the nutrition assessment display. It can find both the patients identified for intervention via screening and also those identified by the attending physician. When you click assessment of details, you can see the patient's assessment screen (Fig. 5). It displays weight, height, biochemical data, diet and any order.

4) The monitoring

All patients who've had consultation can be found and monitored for 14 days from the request. The patient's information is deleted automatically in case of monitoring end or discharging within the monitoring period. The patient's information is shown when you click the details.

영양지원업무(ocs_nwin:w_nstmdi)

영양선별 영양분량 영양평가 모니터링 영양평가원면(w_ons2042a)

영양평가(w_ons2054a:ONS)

조회일자 20070301

입원일자 20061207

의뢰일자 20070223

조회 저장 출력 종료

계산하기 평가원료 평가취소

No	환자번호	환자명
1		
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환자정보	환자번호 진료과 진단명	환자명 병종 Postoperative intestinal obstruction	성별/나이 F / 49
신체계측	현재체중(kg) 평소체중(kg) 표준체중(kg)	신장(cm) (X)체중감소 (X표준체중)	MAC(cm) TSF(mm) MAMC(cm)
생화학 수치	Albumin(g/dl) Prealbumin(mg/dl)	UUN(g/day) TLC(cells/mm ³)	검사결과
영양상태	신체증후 ☐ 부종 ☐ 복수 ☐ 욕창 ☐ 비만	대사적 스트레스 ☐ 없음 ☒ 약간 ☐ 보통 ☐ 심함	영양상태 ☐ Adequate ☒ Mild Malnutrition ☐ Moderate Malnutrition ☐ Kwashiorkor ☐ Marasmus ☐ Protein-calorie Malnutrition
영양요구량	열량(kcal/day) 단백질(g/day) 단백질(g/day) NPC:N 수분(ml/day)	30 to 32 1.2 to 1.5 107.9 to 131.8 :1 2070	1455 to 1552 58 to 73 Nitrogen out g/g표준체중/day
현재 영양섭취량	열량(kcal) 단백질(g) 탄수화물(g) 지방(g)	208 5 45 1	영양/투약
	요구량	섭취량	X요구량

Fig. 5. Screen for personal nutrition assessment.

2. The ordering input

The results of the screening are shown through pop-ups on the ordering input screen of patients classified as malnourished and the ordering code is entered automatically with the attending physician choosing "OK". UUN and prealbumin, however, are entered automatically with ordering code in the case of high risk patients. A doctor can ask directly for a consultation. The nutrition support process is shown below the diagnosis section on the ordering input screen (Fig. 6A). When the physician clicks "Reply", he can check the result of the consultation (Fig. 6B).

DISCUSSION

The importance of early detection of malnutrition or being at risk of becoming malnourished has been identified recently.

The JACHO recommends that nutrition screening be completed within 24h of admission.¹ The hospital quality assessment of 2007⁹ recommends that a nutrition screening be executed within 48h of admission to receive nutritional treatment for patients with malnutrition or at risk of malnutrition.

Several screening tools, such as the Nutrition Risk Score (NRS-2002), Malnutrition Screening Tool (MST), SNAQ, the BAPEN 4 screening tool and more have been developed in recent years.^{3,6,16,17}

The NST of our hospital uses the adult nursing admission questionnaire which is a complex information unit, as nutrition screening tool for nursing of high quality and accessing generally the health being the basis step to solve the nursing problem performing the nursing process.¹⁰ It is easy to identify items related to nutrition and sum each item because the form uses check boxes. The score given to items of the screening tool refers to the modified SGA and PG-SGA which is based

ORDER

1. 처방정보 2. 진료정보 3. 입원/수술 4. 진단서 5. 소견서/제안서/진료의뢰서 6. 진원서 7. Viewer 8. 약제서비스 9. 퇴원환자요약 10. 입원환자영양관리 11. 방사선/영상의학 12. 진료(F12)

의사용 입원 처방입력 (w.oef0220a)

전처방일 20070225 - 처방일 20070225 - 병력정보 Order Sheet ID(병종()) 1day 투약

[처방] [기타] 입원본인부담면제 본인부담면제코드조회

Tag	상태	처방코드	보통	처방 Description	1회량	단위	회/일	방명	crf/E	급여	선택진료	예정일시	처방의	실시의	실시부서명종
처방 Z0999				● 기타 Order			1	1		Y	-	비선택	20637	1052	105231
처방 ZVS04				VITAL SIGN(4시간 간격으로)			1	1		-	-	비선택		1052	105231
처방 ZAA00				자 물			1	1		Y	-	보 100 비선택		1052	105231
점수 WDS5P				5% DS 500ml/PACK	1.00		1	1	P	Y	E	-	비선택	01	105231
점수 DHEPAD1				Hepadial 50mg/Tab	1.00		3	1	Y	-	-	비선택	0P	105231	
점수 DBESZYM				(비) Beszyme (종아)	1.00		3	1	T	-	-	비선택	0P	105231	
점수 DGANAT				Ganaton 50mg/Tab(종아)	1.00		3	1	T	-	-	비선택	0P	105231	
점수 DEMC				Erythro 250mg/Cap(종근당)	1.00		3	1	T	-	-	비선택	0P	105231	
점수 DMEXOL				Mexolon 5mg/Tab(종아)	1.00		3	1	T	-	-	비선택	0P	105231	
수납 XPU1NFU				INFUSION PUMP	1.00		1	1		-	-	비선택	70161	1052	105231
수납 HD26601				TUBE FEEDING(1일당)			1	1		-	-	비선택		1052	105231

MSI 전방상태 : 최신

암환자평가업력

상병코드

상병Freq

상병전체

처방정량

처방내역

Progression

특이사항

의사식사처방

수가코드

Slip선택

Set

Common

투약전 (A)

1052

ORDER

1. 처방정보 2. 진료정보 3. 입원/수술 4. 진단서 5. 소견서/제안서/진료의뢰서 6. 진원서 7. Viewer 8. 약제서비스 9. 퇴원환자요약 10. 입원환자영양관리 11. 방사선/영상의학 12. 진료(F12)

의사용 입원 처방입력 (w.oef0220a)

[처방] [기타]

추정 C240 Extrahepatic bile c

추정 K913 Postoperative inte

Tag 상태 처방코드 보통

처방 Z0999 ● 기

처방 ZVS04 VITAL

처방 ZAA00 자 물

점수 WDS5P 5% DS

점수 DHEPAD1 Hepad

점수 DBESZYM (비)

점수 DGANAT Ganat

점수 DEMC Eryth

점수 DMEXOL Mexol

수납 XPU1NFU INFUS

수납 HD26601 TUBE

영양평가결과지

영양평가 : 박동익

영양일자 : 20070223

환자명 : 환자번호 : 병동번호 : 1052 - 31

성 별 : F 나 이 : 69 신 장 : 152 cm 현재체중/표준체중 : 47 / kg

진 단 명 Postoperative intestinal obstruction

척도	수치	영양	관	비	관	수	상	하
체중감소	97	200	500	708	208	5	17	22
Albumin(g/dl)	2.5	3.4-5.8	10-20	<3				
TLC(cells/mm ³)	970	4000-10000	1000-1200	1100-1200				
Prealbumin(g/dl)	2.5	10-15	6-8	<3				

영양적 문제점

☐ Adequate ☒ Mild Malnutrition ☐ Moderate Malnutrition

☐ Kwashiorkor ☐ Marasmus ☐ Protein-Calorie Malnutrition

환자 영양 요구량

열 량(kcal/day) 1455

단 백 질(g/day) 58

수 분(ml/day) 2070

현재 섭취량

열 량(kcal/day) 208

단 백 질(g/day) 5

영양관찰내용

제 제 명 : 박동익

열 량 1500 kcal/day

단 백 질 75 g/day

시작종도 1.00

시작속도 50 ml/hr

목표종도 1.00

목표속도 100 ml/hr

종도종도 10-20 ml/12-24hr

소 견

1) 환자의 상태를 monitoring하며 요구량까지 300-300ml/day의 증량시킨다.

2) 관찰되는 영양적 "논쟁"은 CHO-PRO-FAT = 50:20:30로 protein 공급 및 glucose control에 효과적의 영양관리한다.

3) 식사양상이 나타나는 것으로 보아, 인공관 수 있는 장상태를 고려하여 환자의 적응도를 살펴 영양적의 농도와 volume를 목표까지 서서히 올려준다.

4) 영양요구량의 70% 이상이 oral = enteral route로 공급되면 TPN tapering을 권장한다.

5) 인공관 섭취가 적어도 필요량의 1/2에 도달할 때까지는 인공관을 병행하는 것이 바람직하다.

6) 계속 monitoring한다.

암환자평가업력

상병코드

상병Freq

상병전체

처방정량

처방내역

Progression

특이사항

의사식사처방

수가코드

Slip선택

Set

Common

투약전

1052

처방입력

점검목록

종 료(F12)

help

ctr-d:상병코드

ctr-f:상병

ctr-r:상병

(B)

Fig. 6. Reply for doctor order.

on the SGA and ESPEN guidelines. The criteria of malnutrition defines that score of 0~5 is adequate, 6~10 is moderate or suspected malnutrition and 11 or more is severe malnutrition by modified SGA. The nutrition screening using of the adult

nursing admission questionnaire is developed basing on the SGA. In their recent guidelines, the ASPEN board of directors stated that no screening system has been validated with respect to clinical outcome. They also suggested that, in the absence

of an outcome validated approach, a combination of clinical and biochemical parameters should be used to assess the presence of malnutrition. They recommend the use of the SGA.¹⁸

The adult nursing admission questionnaire has limitations; which are available as such initial nutrition screening because it was written once admission date; which are omitted among malnourished patients because the adult nursing admission questionnaire was written late in case of admitting in emergency. The plan to get more reliable information is also needed, not to use it in actuality and it becomes just formally. The previously documented adult nursing admission questionnaire is sometimes used when patients are re-admitted.

Although the adult nursing admission questionnaire has limitations, it has some advantages in executing nutrition screening. It makes all admitted patients screening object because it is contained in Guidelines for Hospital Evaluation and Medical Record and not only improves efficiency but also decreases patient's rejection because of avoiding duplicate questions. It is just thought to need a study assessing validity about how to identify malnourished patients using adult nursing assessment tool.

The nutrition screening parameters have an objective index (anthropometric data [% IBW or BMI], weight change, albumin, TLC, age) and subjective index (dietary intake, problem related diet).¹² We use an objective index (% IBW, TLC, ordered diet) with subjective index because subjective index may give inaccurate information to be written on a subjective judgment. The objective index has the advantage of getting objective and correct results but immediately reflects that the nutritional status of the patient is influenced by several factors beyond nutritional status such as drug-nutrient interaction and change of metabolic stress by stress or disease.¹⁹ Also the objective index reflect nutritional status during hospitalization. The height and weight are, however, written directly by the admitting nurse on vital sign sheet during hospitalization and at admission. The adult nursing assessment questionnaire adds the height and weight and the vital sheet including them is printed to avoid duplication. The program, which can use weight computerized during hospitalization, is needed after discussion with nursing department not to know a change of their weight because it was written once for admission. Various studies report that they should be evaluated adequacy with applying it in actual, because the validity is changed by patients and hospital's condition though they apply nutrition screening tool which

proves it in various studies.⁵ The validity and reliability that have not clearly proven but been used in this program, should be solved.

A study of the itemized nutrition screening tool is also needed for patients who are at high risk for malnutrition - the children, elderly, surgical patients and critically ill patients.

The doctors are notified of the results of nutrition screening through a pop-up message. We lead doctor's consultation and their interest of nutritional status. But 40% of malnourished patients request a doctor's consultation. This is caused by doctor's apathy of nutrition and it will be solved by their education of nutrition support and a positive publicity campaign.

It is expected that this program will execute nutrition screening rapidly using the adult nursing admission questionnaire providing early nutrition management through cooperation with various occupations. It can be used as a basis for various studies, which become effective nutrition treatments through positive nutrition management, adding statistics beyond steps of nutrition management including screening, assessment and monitoring. Some problems of the program still appear so that constant correction and supplementation are necessary.

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