Prevalence of Malnutrition and Nutritional Assessment in Abdominal-Surgical Patients; A Prospective Cross-Sectional Study

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Objective: *Nutritional intervention is important in abdominal-surgical patients. The primary objective was to determine the prevalence of malnutrition in abdominal-surgical patients. The secondary objectives were to determine the rate of nutritional assessment and the association of malnutrition to postoperative complications.*
Material and Method: *106 elective abdominal-surgical patients at Thammasat hospital from September 2008 to February 2010 were assessed preoperatively by independent research assistant using ESPEN criteria for preoperative nutritional support as diagnostic criteria. The rate of nutritional assessment that had been done to these 106 patients by their responsible physicians was also determined using medical records and patients' interview by research assistant. Severe malnutritional patients according to ESPEN criteria that were not been assessed preoperatively by their responsible physicians about nutritional status were compared between benign and malignant group. The association of malnutrition to postoperative complications was also analyzed with adjusting for other confounding factors.*
Results: *29 patients (27%) of 106 abdominal-surgical patients had malnutrition. The prevalence of malnutrition was significant higher in patient with malignancy (18 from 31; 58%) than in patient with benign diseases (11 from 75; 15%) with p-value less than 0.001. The rate of nutritional assessment by their responsible physicians (Benign 14 from 75; 19% vs. Malignant 24 from 31; 77%; $p < 0.001$) and severe malnutrition patients that had not been assessed by their responsible physicians (Benign 9 from 11; 82% vs. Malignant 2 from 18; 11%; $p < 0.001$) were significantly different. After adjusting for other confounding factors, malnutrition was significantly associated with postoperative complications with odds ratio of 3 and 95% CI of 1.1, and 8.4.*
Conclusion: *Malnutrition is common in abdominal-surgical patients. Routine preoperative nutritional assessment in this type of patients is recommended.*

Keywords: *Malnutrition, Preoperative, ESPEN, Surgery, Abdominal, Nutritional Assessment*

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Nutritional intervention is an important part in comprehensive surgical care[1]. The prevalence of malnutrition in surgical patients is varied depending on types of patients and definition used to define malnutrition[2-5]. Preoperative nutrition support in selected group of patients can reduce postoperative complications[6,7]. Although there are well established evidences of benefit of nutrition support, some of health care providers still lack awareness to assess and correct this problem[8-10]. Only 15% of medical staff did nutritional assessment in study from Amsterdam[8] in 2008. Similarly, about 70% of malnutrition patients were unrecognized and unmanaged in the present study from UK[9] in 2000 and less than 33% of hospitalized patient were assessed for nutritional status in study from Canada in 2006[10].

The authors' therefore conduct the prospective cohort study to assess the magnitude of these problems in gastrointestinal surgical patients with primary aim to determine the prevalence of patients whom need nutritional support preoperatively as indicated by ESPEN guideline[7]. The secondary aims

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were to determine the rate of nutritional assessment done preoperatively by responsible physicians and association of malnutrition to overall postoperative complications.

Material and Method

One-hundred and six patients whom underwent elective gastrointestinal operations for both benign and malignant diseases during September 2008 to February 2010 at Thammasat University Hospital were prospectively enrolled in the present study. The study was approved by ethical committee board of Faculty of medicine, Thammasat University.

Preoperative data collection

Preoperative baseline data were collected included characteristics of the patients, underlying diseases, laboratory data and preoperative nutrition support either enteral or parenteral routes. Then the patients were interviewed before operation by research-assisted nurse (BS) with semi-structured questionnaires about preoperative nutritional assessment by responsible physicians. The patients would be considered to have preoperative nutritional assessment if they had been asked by responsible physicians (included medical students, interns and staffs) about weight change, or change in eating habit during the past 2 weeks, or symptoms that interfere with eating, or had note in medical records (either OPD or IPD) about nutritional status. Then every patient was asked for answering the translated Thai PG-SGA questionnaires with helping and checking by research-assisted nurse (BS) for correct understanding.

Operative data and complications

Operative data and complications were recorded from the operative note included type of operation, postoperative diagnosis and intraoperative events that can cause postoperative complications. Complications were classified by objective criteria as major or minor and as infectious or non-infectious complications[11].

Classification of malnutrition

Malnutrition was classified according to criteria of severe malnutrition and also the indications for preoperative nutritional support by ESPEN guideline[7]. So the patients would be classified as malnutrition if they met one or more of the criteria for severe malnutrition. The criteria are 1) weight loss > 10-15% within 6 months, 2) BMI < 18.5 kg/m^2, 3) Subjective global assessment (SGA) grade C, or 4) serum albumin < 30 g/L (with no evidence of impairment of hepatic or renal function)[7]. In the present study, the authors used PG-SGA instead of SGA because PG-SGA is easier than SGA to use, also highly correlated with SGA, and have already been validated[11,12].

Statistical analysis

The characteristics of the patients were described as mean with SD or median with range according to the distribution of the data. The univariate analyses for possible associated variables for overall complications were done. The variables that had p-value of less than 0.10 would be included in the multivariate analysis. Then forward selection was done for multivariate analysis with p-value of less than 0.05 to be considered significant.

Results

Patients

There were 28 male (26%) and 78 female (74%) with a mean age of 58.4 years (SD 16 years). The patients' mean weight was 59 kg (SD 11 kg), the mean height was 160 cm (SD 8 cm) and the mean BMI of 23.3 kg/m^2 (SD 4.2 kg/m^2). Sixty eight patients (64%) underwent cholecystectomies, 12 patients (11%) underwent major upper GI surgery and hepatobiliary resection for malignancy, 18 (17%) colorectal resection for lower GI malignancy and 8 patients (8%) for other miscellaneous procedures (*e.g.* Aneurysmorrhaphy, Common bile duct exploration). That resulted in 75 operations (71%) for benign diseases and remaining 31 operations (29%) for malignancy.

The prevalence of malnutrition according to ESPEN guideline[7]

Twenty-nine patients (27%) met at least one of the criteria for nutritional support. From these 29 patients, 19 patients (66%) had albumin level less than 30 g/L, 16 patients (55%) had PG-SGA class C, 10 patients (34%) had BMI < 18.5 kg/m^2 and 9 patients (31%) had weight loss > 10% in previous 6 months. The prevalence of malnutrition was significant higher in patient with malignancy (58%) than in patient with benign diseases (15%) with p-value < 0.001 (Table 1).

Postoperative complications

Twenty-five complications occurred in 19 patients (18%) from total 106 patients. There were 2 deaths (2%) from postoperative pneumonia in one patient and postoperative pneumonia and myocardial

Table 1. The prevalence of malnutrition in patients with benign and malignant diseases

Malnutrition Classification	Diagnosis Classification		p-value*
	benign	malignant	
Yes	11 (14.67%)	18 (58.06%)	<0.001
No	64 (85.33%)	13 (41.94%)	
Total	75	31	

* Chi-square test

infarction in the other. The overall complications were significant higher in patients that had been classified as malnutrition by univariate analysis as detailed in Table 2.

Other possible associated variables for overall complications (included age, sex, diagnosis classification (benign or malignant), underlying disease (hypertension, diabetes) and preoperative nutrition support before operations) were included in the univariate analysis. Only diagnosis classification was marginally significant with overall complications with p-value 0.06 that was included in the multivariate analysis with the presence of malnutrition. After adjusted for other variables, malnutrition was only significant variables that associated with overall complications (p-value of 0.036) with odds ratio of 3 (95% CI: 1.1, 8.4).

Rate of nutritional assessment

Thirty-one patients (29%) had medical records about nutritional assessment before operations. Other 7 patients were considered to have nutritional assessment before operations without medical records after the interview. These resulted in total of 38 patients (36%) that had preoperative nutritional assessment. The rates of nutritional assessment in benign and malignant groups of patients were significantly difference (Benign 19% vs. Malignant 77%; $p < 0.001$). Eighty-two percent (9 from 11 patients) of malnutrition patients were missed in benign group compared to 11% (2 from 18 patients) in malignant group. These proportions were significantly different ($p < 0.001$, Fisher's exact test) (Table 3).

Discussion

The result of the present study emphasizes the important of malnutrition in abdominal surgical patients especially in malignancy group. Nowadays, there is still no gold standard criterion for diagnosis of malnutrition. In the present study we use diagnostic criteria for severe malnutrition which itself an indication for preoperative nutritional support, even if surgery has to be postponed, with grade A recommendation[1]. The results demonstrated that about one-quarter of the authors patients (27%) required an appropriate nutritional support prior to surgery.

The prevalence of malnutrition in malignancy group was clearly higher than that of benign group with $p < 0.001$ that corresponded to the results from Schiesser et al[2]. But we missed more numbers of malnutrition patients in benign group than that of malignant group (82% vs. 11%, $p < 0.001$). This occurred because only 19% of our patients with benign diseases had been assessed by their responding physicians. Thus reflects the attitude of physicians which underestimates the prevalence of malnutrition in benign diseases. The negative impact of malnutrition to postoperative complications in abdominal surgery for benign diseases should be further studied.

PG-SGA was validated to be used as nutrition screening tool in cancer patients[1,6,11] and also in other types of patients[13,14]. In present study, the authors use PG-SGA instead of SGA. Although this tool has not been validated in Thai so the authors' tried to solve this problem by using interviewer instead of let the patients do the questionnaires by themselves. Most of the interview and completion of PG-SGA questionnaires could be complete in 20 minutes. So PG-SGA is a simple tool to use for nutritional screening[3].

Since malnutrition is the potentially correctable factors preoperatively by appropriate nutritional support[2,7]. Early recognition of this problem and appropriate nutritional intervention result in better postoperative outcomes[1,6]. The prevalence of malnutrition in abdominal-surgical patients was high so the authors emphasize the necessity to include nutritional screening strategy into routine care of abdominal-surgical patients[9,10]. Nutritional screening

Table 2. Complication Classification

Complications	Malnutrition Classification		p-value*
	Yes (n = 29)	No (n = 77)	
Major infectious			
Pneumonia	3	2	
Major noninfectious			
Anastomotic leakage	1	1	
Wound dehiscence	2	2	
Myocardial infarction	1	0	
UGIB	0	1	
Minor infectious			
UTI	1	2	
Wound infection	5	4	
Total complications	13	12	
NO of patient with complications	9 (31%)	10 (13%)	0.03

* Chi-square test

Table 3. Rate of Nutritional Assessment and Missed Malnutrition Patients According to Diagnosis Classification

	Diagnosis Classification		p-value
	Benign (total n;%)	Malignant (total n;%)	
Rate of Preoperative Nutritional Assessment	14 (75; 19%)	24 (31; 77%)	< 0.001*
Rate of Malnutrition Patients that had not been assessed preoperatively	9 (11; 82%)	2 (18; 11%)	< 0.001**

* Chi-square test, ** Fisher's exact test

and further nutritional care should also be included into the medical records routinely to prevent subsequent medico-legal consequences in the future[1].

Potential conflicts of interest

None.

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ความชุกของภาวะทุพโภชนาการและการประเมินภาวะทุพโภชนาการในผู้ป่วยศัลยกรรมที่เข้ารับการผ่าตัดช่องท้อง

บุญยิ่ง ศิริบำรุงวงศ์, ใบบุญ ศรีธรรมา, กิตติชัย กุลธนปรีดา, ประกิตพันธุ์ ทมทิตชงค์, วีรยะ เภาเจริญ

วัตถุประสงค์*: วัตถุประสงค์หลัก เพื่อศึกษาความชุกของภาวะทุพโภชนาการในผู้ป่วยศัลยกรรม ที่เข้ารับการผ่าตัดช่องท้อง วัตถุประสงค์รอง เพื่อศึกษาอัตราการประเมินภาวะทุพโภชนาการในผู้ป่วยศัลยกรรม ที่เข้ารับการผ่าตัดช่องท้อง และผลกระทบของภาวะทุพโภชนาการต่ออัตราการเกิดภาวะแทรกซ้อนหลังผ่าตัด*

วัสดุและวิธีการ*: ผู้ป่วย 106 ราย ที่เข้ารับการผ่าตัดช่องท้อง ณ โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ ตั้งแต่ กันยายน พ.ศ. 2551 ถึง กุมภาพันธ์ พ.ศ. 2553 จะได้รับการประเมินภาวะทุพโภชนาการก่อนเข้ารับการผ่าตัด โดยผู้ช่วยวิจัย โดยใช้เกณฑ์ในการให้โภชนบำบัดของ ESPN เป็นเกณฑ์ในการวินิจฉัยภาวะทุพโภชนาการ อัตราการประเมินภาวะทุพโภชนาการ และผู้ป่วยทุพโภชนาการที่ไม่ได้รับการประเมินก่อนผ่าตัดจะถูกศึกษาและเปรียบเทียบระหว่างกลุ่มผู้ป่วยมะเร็ง และไม่ใช่มะเร็ง รวมถึงผลกระทบของภาวะทุพโภชนาการต่อภาวะแทรกซ้อนหลังผ่าตัด*

ผลการศึกษา*: พบภาวะทุพโภชนาการในผู้ป่วยทั้งหมด 29 คน (27%) ของผู้ป่วยที่เข้ารับการผ่าตัดศัลยกรรมทางช่องท้องทั้งหมดผู้ป่วย 19% ในกลุ่มที่ไม่ใช่มะเร็งได้รับการประเมินภาวะทุพโภชนาการก่อนผ่าตัด เทียบกับ 77% ในกลุ่มที่เป็นมะเร็งซึ่งพบว่ามีความแตกต่างกันอย่างมีนัยสำคัญที่ระดับนัยสำคัญน้อยกว่า 0.001 และพบว่าผู้ป่วยที่มีภาวะทุพโภชนาการ แต่ไม่ได้รับการประเมินภาวะทุพโภชนาการโดยแพทย์ผู้รับผิดชอบในกลุ่มผู้ป่วยที่ไม่ใช่มะเร็ง 82% และ 11% ในกลุ่มที่เป็นมะเร็ง ซึ่งมีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับนัยสำคัญน้อยกว่า 0.001 และพบว่าหลังจากปรับผลกระทบจากปัจจัยอื่นแล้ว ภาวะทุพโภชนาการมีผลกระทบต่อ ภาวะแทรกซ้อนหลังผ่าตัดอย่างมีนัยสำคัญและมีค่า odds ratio เท่ากับ 3 และมีค่าความเชื่อมั่นที่ 95% เท่ากับ 1.1 และ 8.4*

สรุป*: ภาวะทุพโภชนาการเป็นภาวะที่พบได้ทั่วไปในผู้ป่วยศัลยกรรมที่เข้ารับการผ่าตัดช่องท้อง การประเมินภาวะทุพโภชนาการก่อนเข้ารับการผ่าตัดในผู้ป่วยที่เข้ารับการผ่าตัดช่องท้องเป็นสิ่งที่ควรทำเป็นประจำ*