

Outcome 1 year after digestive surgery in malnourished, elderly patients, with an emphasis on quality of life analysis

Céline Zacharias, MD*
Thomas Zacharias, MD†

From the *Cabinet de médecine générale, Habsheim, and the †Service de chirurgie digestive et générale, Hôpital Emile Muller, Mulhouse, France

Accepted for publication
Jan. 19, 2012

Correspondence to:
T. Zacharias
Hôpital Emile Muller
20 rue du Dr Laennec
68070 Mulhouse Cedex
France
zachariast@ch-mulhouse.fr

DOI: 10.1503/cjs.025411

Background: Quality of life data after digestive surgery in malnourished, elderly patients are rarely reported. What can we expect as 1-year outcomes in these high-risk patients after digestive surgery?

Methods: We conducted a prospective observational study in a digestive surgery department in a tertiary, nonacademic hospital in Mulhouse, France. Malnourished, older patients (according to the Nutritional Risk Index) undergoing digestive surgery between November 2007 and December 2008 were included and followed up for 1 year. Quality of life was measured by the European Organization for Research and Treatment of Cancer QLQ-C30 questionnaire at the end of the study period.

Results: We included 37 patients with a median age of 76 (range 66–86) years in our study. The mean global health status and quality of life score in 17 of 24 living patients 1 year after surgery was 68.6 (standard deviation [SD] 12.4), and no difference with the score of a reference population 70.8 (SD 22.1) was observed ($p = 0.68$). In-hospital mortality was 11% and morbidity was 70%.

Conclusion: The present study suggests that despite high postoperative mortality and morbidity, an acceptable quality of life can be achieved in malnourished, elderly survivors of digestive surgery.

Contexte : Peu d'études ont analysé la qualité de vie chez les personnes âgées et dénutries après chirurgie digestive. Quels résultats peuvent être obtenus 1 an après chirurgie digestive chez ces patients à haut risque opératoire ?

Méthodes : Nous avons effectué une étude d'observation prospective dans le Service de chirurgie digestive au Centre hospitalier de Mulhouse, France. Les patients âgés et modérément ou sévèrement dénutris (selon le Nutritional Risk Index) soumis à une chirurgie digestive entre novembre 2007 et décembre 2008 ont été inclus et suivis pendant 1 an. La qualité de vie a été évaluée à l'aide du questionnaire de l'European Organization for Research and Treatment of Cancer QLQ-C30 à la fin du suivi.

Résultat : Nous avons inclus 37 patients avec un âge médian de 76 (66–88) ans dans notre étude. Chez 17 sur 24 patients vivants 1 an après l'opération le score moyen de qualité de vie était de 68.6 (écart-type [ET] 12.4) comparable à celui d'une population de référence 70.8 (ET 22.1; $p = 0.68$). La mortalité intra-hospitalière était de 11 % et la morbidité de 70 %.

Conclusion : Cette étude suggère que malgré une morbidité et mortalité élevée, les patients survivants, âgés et dénutris peuvent retrouver une qualité de vie acceptable 1 an après chirurgie digestive.

Malnutrition is a well-known source of perioperative morbidity and mortality. As early as 1936, Studley¹ reported an increase in postoperative mortality in malnourished patients after gastrectomy for ulcer. There is good evidence that short-term outcome in malnourished patients is poorer than that in well-nourished patients.^{2–5} Malnutrition is frequently observed in surgical patients,^{3–5} increases with age⁶ and is often present in patients with cancer.⁷ As life expectancy increases, malnutrition will be more frequently observed in surgical patients, leading to substantial morbidity.

Several studies have shown the value of nutritional intervention for reducing perioperative morbidity.^{3,8,9} However, long-term outcome data and especially

quality of life data after digestive surgery in malnourished elderly patients are very rare. Studies evaluating quality of life after surgery have been performed in patients with cancer.^{10,11} The impact of malnutrition has not been determined in these studies. On the other hand, some studies have evaluated the quality of life in malnourished patients either before or shortly after surgery,¹²⁻¹⁴ at a moment when the quality of life is biased by the underlying pathology and the perioperative morbidity. Therefore, the aim of the present study was to evaluate the outcome 1 year after digestive surgery in malnourished elderly patients, with an emphasis on quality of life analysis, and to compare these data with reference values for the general population.¹⁵

METHODS

This prospective observational study was performed in a single institution between November 2007 and December 2008, and participants were followed up until December 2009. Inclusion criteria were age older than 65 years, malnutrition defined according to the guidelines of the French Society of Digestive Surgery,¹⁶ weight loss of more than 10% of the usual weight within 6 months or more than 5% within 1 month; and a digestive surgery operation. All patients gave informed consent before the operation.

Nutritional therapy

Treatment of malnutrition was performed according to recent guidelines,^{16,17} severity of malnutrition, individual pathology and tolerance.

Outcomes and follow-up

The primary outcome was the quality of life measured by the European Organization for Research and Treatment of Cancer questionnaire (EORTC) QLQ-C30 1 year after the operation.^{18,19} This questionnaire was specifically developed for patients with cancer;^{10,11,13} however, it has been used for studying benign disease as well.^{20,21} The questionnaire comprises 30 items assessing 6 functional areas (physical, activities, emotional, cognitive, social and the global quality of life) and scales for 9 symptoms (tiredness, nausea and vomiting, pain, dyspnea, sleeplessness, loss of appetite, constipation, diarrhea and financial difficulties). A low score for the functional areas indicates impaired functional capacity and a low score for the symptom scales indicates absence or low impact from the symptoms. A linear transformation was applied to each score, as recommended by the EORTC, to obtain a value between 0 and 100.

Previous studies have shown that 3–6 months^{10,11,22} are needed to achieve the preoperative quality of life after major abdominal surgery. We further considered that some patients would have chemotherapy (usually for 6 months in the adjuvant setting starting within 2 months after surgery).

We wanted to limit the impact of the perioperative complications and possible chemotherapy-related morbidity on quality of life. Therefore, we chose the time point of 1 year after the operation for the quality of life study. The quality of life analysis was performed during a structured interview of 45–60 minutes' duration after the outpatient consultation; in our experience, elderly people had great difficulty in responding alone to the written questionnaire. Quality of life data were compared with the reference data of the general German population.¹⁵ Secondary outcomes were mortality and morbidity. Outcome data were recorded from follow-up consultations every 4 months for 1 year.

Statistical analyses

Results are expressed as means and standard deviations (SD) or as medians with ranges. The Fisher exact, Mann-Whitney *U* and Kruskal-Wallis tests were conducted. We used the *t* test to compare quality of life data with reference data. Results were considered to be significant at $p < 0.05$. All analyses were performed using StatView Software.

Table 1. Baseline characteristic of the 37 elderly and malnourished patients undergoing digestive surgery

Variable	Group; no. (%)*		<i>p</i> value
	Elective surgery, <i>n</i> = 27	Emergency surgery, <i>n</i> = 10	
Sex, no. female:male	14:13	7:3	0.46
Age, median (range) yr†	76 (66–85)	76 (66–88)	0.73
NRI, median (range)†	84.4 (70–95)	77 (73–91)	0.13
BMI, median (range)†	21.4 (14–28)	21.5 (15–25)	0.45
Major abdominal surgery	25 (92)	7 (70)	0.11
Cancer	20 (74)	4 (40)	0.12
Lymph node metastases	10 (50)	2 (50)	> 0.99
Distant metastases	6 (30)	2 (50)	0.58
Palliative surgery	3 (15)	2 (50)	0.18
Main symptom leading to diagnosis			
Obstruction	2	5	0.009
Peritonitis	0	4	0.003
Anemia/digestive bleeding	8	1	0.39
Jaundice/cholangitis	9	0	0.08
Isolated abdominal pain	3	0	0.55
Diarrhea	2	0	> 0.99
Procedure			
Colon/rectum	9 (33)	8 (80)	0.023
Small intestine	2 (7)	0	> 0.99
Stomach	3 (11)	1 (10)	> 0.99
Hepatobiliary	8 (30)	1 (10)	0.39
Pancreas	5 (19)	0	0.30
Nutritional therapy			
Preoperative	19 (70)	1 (10)	0.002
Postoperative	26 (96)	8 (80)	0.17

BMI = body mass index; NRI = Nutritional Risk Index.

*Unless otherwise indicated.

†Quantitative variables (†) were compared using the Mann-Whitney *U* test. Qualitative variables were compared using the Fisher exact test.

RESULTS

During the study period, 87 patients aged 65 years or older underwent digestive surgery, and 37 of them (21 women and 16 men) were malnourished and included in the study. Median age at the time of operation was 76 (range 66–88) years. Twenty-four patients had cancer, and 13 patients had benign disease. Ten patients underwent emergency surgery. Baseline characteristics of patients are presented in Table 1. Patients undergoing emergency surgery often presented with obstruction and peritonitis. They more frequently underwent colorectal procedures and were less likely to receive preoperative nutritional therapy than patients who did not have emergency surgery.

The performed surgical procedures and indications are shown in Table 2. All patients had a laparotomy, and 32 (86%) had major abdominal surgery.

All patients had moderate or severe malnutrition classified by the Nutritional Risk Index (NRI).^{3,16} Median weight loss was 11 (range 4–40) kg, and median relative weight loss was 16% (range 7%–37%). The median NRI was 82.5 (range 69.8–94.9), and according to this index, 19 (51%) patients were severely malnourished (NRI < 83.5), and 18 (49%) were moderately malnourished (NRI 83.5–97.5). We did not classify the patients according to the recent definition of cachexia,²³ as hand grip strength and upper arm circumference were not measured. Patient malnutrition was caused by pathology (65% cancer), related symptoms and comorbidity altering the nutritional status: depression in 4 patients, mild dementia in 2, chronic pancreatitis in 2, cirrhosis in 1, transient ischemic attack or stroke in 5 and diabetes in 8 patients. Nine patients had other malignancies, further increasing the nutritional risk (4 breast cancer, 2 kidney cancer, 2 prostate cancer, 1 lymphoma). Eleven patients were inpatients on the medicine ward before surgery. They had a poorer nutritional status than the

patients who were admitted directly from home (median NRI 80.4 v. 83.5).

Of the 27 patients undergoing an elective operation, 19 (70%) had preoperative nutritional interventions: 9 patients received immunonutrition with Oral-Impact (3 times daily for 7 d), 3 patients were given the standard oral formula Fortimel (2–3 times daily for 7 d), and parenteral nutrition was given to 7 patients (1875 mL/d of NuTRIflex Lipide G144/N8 for 7–20 [median 7] d). In the emergency surgery group, only 1 patient who was an inpatient on the medicine ward had parenteral nutrition preoperatively.

Thirty-four patients (92%) received postoperative nutritional therapy: parenteral nutrition in 10 patients, Fortimel in 6 and combined parenteral and enteral/oral nutrition in 18 patients. Parenteral nutritional therapy was applied for a median of 7 (range 2–28) days, enteral therapy via a nasojejunal feeding tube was given in 4 patients for 7 (range 7–11) days, and Fortimel was given until discharge.

The median hospital stay after the operation was 18 (range 6–108) days. Seventeen (46%) patients were admitted to the intensive care unit for a median of 4 (range 1–35) days.

Mortality

Four patients (11%) died in hospital. Causes were hemorrhagic shock 15 days after biliary and gastrojejunal bypass for metastatic pancreatic head ductal adenocarcinoma (distant lymph node metastases were discovered perioperatively; *n* = 1), stroke at day 4 after left colon resection for cancer (*n* = 1), terminal respiratory insufficiency in severe chronic obstructive lung disease 20 days after left colon resection for obstructing diverticulitis (*n* = 1) and terminal cachexia 3 months and 18 days after an operation for a gastroduodenal fistula (*n* = 1). A further 9 patients died within 8 months after the operation. One year after the operation,

Table 2. Indications and principal surgical procedures performed during laparotomy and in 37 elderly patients with moderate or severe malnutrition*

Organ	Procedure	Indication
Colon/rectum	1 total colectomy	1 cancer (1)
	7 left colectomy	3 cancer (1), 3 diverticulitis (2), 1 ischemic colitis (1)
	7 right colectomy	7 cancer (2)
	2 colostomy†	1 cancer, 1 benign stenosis (1)
Small intestine	2 resection and anastomosis	2 cancer
Stomach	1 total gastrectomy	1 cancer
	1 suture of ulcer†	1 duodenal ulcer (1)
Hepatobiliary	2 gastrojejunal bypass	1 gastroduodenal fistula, 1 pyloric stenosis
	2 cholecystectomy†	1 cancer, 1 cholecystitis (1)
	4 liver resection	3 cancer, 1 liver abscess with biliary fistula
Pancreas	3 biliodigestive anastomosis	1 cancer, 2 benign stenosis
	3 pancreatoduodenectomy	1 IPNP, 2 ductal adenocarcinoma
	2 biliary and gastrojejunal bypass	2 ductal adenocarcinoma

IPNP = intraductal papillary neoplasm of the pancreas.

*Thirty-two patients underwent major abdominal surgery. Emergency procedures were performed in 10 patients (indicated in italics).

†Five patients (f) had minor abdominal surgery.

24 (64%) patients were still alive. The survival rate at 1 year for patients with cancer was 54% (13 of 24) compared with 85% (11 of 13) for patients with benign disease. Patients undergoing emergency surgery had a 1-year survival rate of 80%, whereas those having elective surgery had a 1-year survival rate of 59% (Table 3).

Morbidity

In all, 48 perioperative complications occurred in 26 (70%) patients and are listed in Table 4. Seventeen of the 19 (89%) severely malnourished patients and 9 of the 18 (50%) moderately malnourished patients had complications ($p = 0.012$). Malnourished, elderly patients undergoing emergency surgery had a 100% complication rate, whereas those undergoing elective surgery had a complication rate of 59% ($p = 0.037$; Table 3).

Quality of life analysis

Seventeen of the 24 surviving patients (10 women and 7 men, 71%) with a median age of 74.5 (range 66–84) years answered the EORTC QLQ-C30 questionnaire 1 year after their operations. The remaining 7 patients did not accept to answer the quality of life questionnaire. Baseline characteristics of patients are presented in Table 5. Patients alive at 1 year with benign disease or who had emergency surgery were significantly less likely to respond to the quality of life questionnaire in this study (Table 5). However, there were no significant differences in the overall quality of life of patients with cancer versus those with benign disease (Table 3). Further analyses of factors influencing the quality of life were not performed because of the small number of patients available for analysis.

Comparison of quality of life data in the present study with a reference population¹⁵ of 2081 adult German participants (Table 6), showed that the patients in the present study had a significantly lower physical activity level and more often reported fatigue, diarrhea and constipation than the reference population. However, the mean global health status and quality of life score of the patients in the present study was not significantly different from the mean

score of the reference population (68.6 [SD 15.1] v. 70.8 [SD 22.1]; $p = 0.68$).

DISCUSSION

The present study suggests that malnourished, elderly patients undergoing digestive surgery had a high complication rate, and nearly one-third of patients died within 8 months after surgery. However, we found that patients who survive at least 1 year may achieve an acceptable quality of life that is comparable to that of the general population. To our knowledge, the present study is the first to

Table 4. Perioperative complications ($n = 48$) registered in 26 of 37 malnourished elderly patients undergoing digestive surgery

Complication	Type of complication	No.
Surgical	Biliary fistula	1
	Gastrocutaneous fistula	1*
	Hemoperitoneum	1*
	Incisional hernia	1*
	Right hepatic artery aneurysm	1†
Wound infection		5
Infections	Pneumonia	5
	Venous catheter infection	4
	Urinary infection	4
	Cholangitis	3
	Septic shock (peritonitis)	2
	Abdominal abscess	2
	Digestive candidiasis	1
	Miscellaneous	Renal insufficiency
	Stroke or transient ischemic attack	2
	Respiratory insufficiency	2
	Hypo/hyperkalemia	2
	Pulmonary embolism	1
	Pneumothorax	1
	Cardiac arrest with resuscitation	1
	Arrhythmia	1
	Hypoglycemic shock	1
	Urinary retention	1
	Pancreatitis	1
	Confusion	1
	Decubital ulcer	1

*Treated surgically.
†Treated with embolization.

Table 3. Main outcome data of the 37 elderly, malnourished patients undergoing digestive surgery according to presentation (elective v. emergency surgery) and pathology (cancer v. benign disease)

Variable	Presentation			Pathology		
	Elective surgery, $n = 27$	Emergency surgery, $n = 10$	p value	Cancer, $n = 24$	Benign disease, $n = 13$	p value
Patients with complications, no. (%)	16 (59)	10 (100)	0.037	16 (67)	10 (77)	0.71
Hospital stay, median (range) d*	18 (6–108)	21 (8–79)	0.77	17 (6–78)	22 (8–108)	0.25
Alive at 1 year, no. (%)	16 (59)	8 (80)	0.28	13 (54)	11 (85)	0.08
Responded to quality of life questionnaire, no. (%)	14 (52)	3 (30)	0.29	12 (50)	5 (38)	0.73
Global quality of life score, mean (SD)	68.4 (15.9)	69.4 (12.6)		69.6 (13.1)	66.6 (16.3)	0.83

BMI = body mass index; NRI = Nutritional Risk Index; SD = standard deviation.
Quantitative variables () were compared using the Mann-Whitney U test (for $n \geq 5$). Qualitative variables were compared using the Fisher exact test.

analyze the quality of life 1 year after digestive surgery in malnourished, elderly patients.

Limitations

The quality of life analysis should be regarded with caution as only 17 of the 37 included patients underwent quality of life analysis (overall response rate 46%). The other patients had died ($n = 13$) or did not accept to answer the quality of life questionnaire ($n = 7$). These “drop-outs” should be taken into account when designing a further trial including malnourished, elderly patients. The response rate of 71% among the living patients in this study was similar to a 72% response rate reported by Schwarz and Hinz¹⁵ in the outpatient setting. Other studies have reported response rates of 38%²¹–54%.¹¹ In the present study, patients alive at 1 year with benign disease or who had emergency surgery were significantly less likely to respond to the quality of life questionnaire, therefore a selection bias cannot be excluded. However, the effect may be rather small, as no difference in the overall quality of life was found in patients with cancer versus those with benign disease. Further analyses of factors influencing quality of life were not performed because of the small number of participants. As a consequence, it remains unclear whether the observed higher symptoms scores for fatigue, diarrhea and constipation and the lower physical activity level in our study population are a consequence of malnutrition or of other factors like age, sex or pathology. A limitation of the study was that quality of life was not studied at different time intervals. However, in this specific patient population, it was necessary to do the quality of life questionnaire during a structured interview of 45–60 minutes after the outpatient consultation, as elderly people had great difficulty in responding alone to the written questionnaire. Even in this restricted setting, 7 of 24 living patients did not

participate in the quality of life interview. With more frequent and repetitive interviews, we feared an even greater nonresponse rate.

We can only speculate about the quality of life in patients who died within 1 year of surgery. However, the small number of patients undergoing postoperative chemotherapy in this group (1 of 11) may indicate a poorer health status in these patients.

A shortcoming of the present study is the lack of a

Table 6. Comparison of quality of life (EORTC QLQ-C30) between elderly patients 1 year after digestive surgery who presented moderate or severe malnutrition at the time of surgery ($n = 17$), and a reference population ($n = 2081$)¹⁵

Variable	Group; mean (SD)		<i>p</i> value*
	Present study	Reference population	
Global health status and quality of life	68.6 (15.1)	70.8 (22.1)	0.68
Physical functions	74.1 (24.3)	90.1 (16.7)	< 0.001
Functional handicap	82.3 (25.3)	88.0 (22.9)	0.31
Emotional functions	79.4 (17.5)	78.7 (21.0)	0.86
Cognitive functions	90.2 (13.3)	91.2 (17.0)	0.81
Social functions	94.1 (10.1)	91.0 (19.4)	0.51
Fatigue	36.6 (20.7)	17.1 (22.0)	< 0.001
Nausea and vomiting	0.9 (4.0)	2.8 (9.9)	0.43
Pain	20.0 (20.0)	15.4 (24.4)	0.44
Dyspnea	11.7 (23.4)	8.1 (20.3)	0.47
Insomnia	23.5 (30.7)	16.4 (27.4)	0.29
Loss of appetite	9.8 (22.9)	5.4 (16.0)	0.26
Constipation	19.6 (23.7)	3.6 (13.7)	< 0.001
Diarrhea	17.6 (29.2)	2.8 (11.7)	< 0.001
Financial difficulties	0 (0)	6.0 (18.2)	

EORTC QLQ-C30 = European Organization for Research and Treatment of Cancer quality of life questionnaire;¹⁵ SD = standard deviation.
*A *t* test was performed to compare the mean values of the present study with the reference values.

Table 5. Characteristics of patients who answered the EORTC QLQ-C30 1 year after the operation ($n = 17$), the living patients ($n = 7$) who did not accept to answer the questionnaire and the patients who died within 1 year after the operation ($n = 13$)

Characteristic	Alive		Dead within 1 yr, $n = 13$	<i>p</i> value
	QLQ answered, $n = 17$	QLQ not answered, $n = 7$		
Sex, no. female:male	10:7	5:2	6:7	0.57
Age, median (range) yr†	74 (66–85)	75 (68–88)	78 (72–86)	0.24
NRI, median (range)†	82.5 (70–92)	78.1 (73–90)	84.4 (70–95)	0.48
BMI, median (range)†	21.4 (15–27)	21 (16–25)	21.6 (14–28)	0.62
Emergency surgery, no. (%)	3 (18)	5 (71)	2 (15)	0.023
Major abdominal surgery, no. (%)	15 (88)	6 (86)	11 (85)	> 0.99
Cancer, no. (%)	12 (71)	1 (14)	11 (85)	0.004
Lymph node metastases	6 (50)	0	6 (54)	0.84
Distant metastases	4 (33)	0	4 (36)	> 0.99
Palliative surgery	1 (8)	0	4 (36)	0.33
Postoperative chemotherapy, no. (%)	6 (50)	0	1 (9)	0.09
Patients with complications, no. (%)	11 (65)	6 (86)	9 (69)	0.66
Hospital stay, median (range) d*	16 (8–43)	22 (11–90)	20 (6–108)	0.23

BMI = body mass index; EORTC QLQ-C30 = European Organization for Research and Treatment of Cancer quality of life questionnaire;¹⁵ NRI = Nutritional Risk Index.
Quantitative variables () were compared using the Kruskal–Wallis test. Qualitative variables were compared using the Fisher exact test.

control group. As reference values for the general French population with the EORTC QLQ-C30 questionnaire were not available, a German reference population was chosen for geographical proximity (the study region is near the German border). The reference data for the quality of life were taken from a representative sample of the adult German population.¹⁵ As the aim of the present study was to evaluate whether long-term quality of life would be acceptable (comparable to the general population), we think this method was justified. Some other authors used reference quality of life data in their studies.^{20,21}

Comparison of the present results with literature data is limited, as only a few studies have analyzed the quality of life in malnourished patients after digestive surgery. In 2006, Gupta and colleagues¹³ studied the quality of life with the EORTC QLQ-C30 questionnaire in 58 patients with stage 3 and 4 colorectal cancer before any surgery or chemotherapy. Twenty-four patients were malnourished and had higher scores on the symptoms scale and lower scores on the functional scales. In the study by Larsson and colleagues,¹² which included 199 patients undergoing visceral and vascular surgery, a poorer quality of life was observed for 69 malnourished patients. However, the evaluation was performed before the operation. Only the study of Beattie and colleagues¹⁴ analyzed the quality of life in 65 malnourished patients undergoing digestive or vascular surgery postoperatively and reported an improved quality of life and nutritional status in patients receiving postoperative nutritional supplements. However, analysis of the quality of life was performed 10 weeks after the operation, and most of the included patients were only mildly or moderately malnourished.

The present study provides further evidence that severe malnutrition, defined by an NRI less than 83.5, was associated with an increased complication rate; this finding is similar to those reported by Schiesser and colleagues⁵ and Buzby and colleagues.²⁴ The perioperative mortality of 11% registered in the present study was similar to the rate of 10.6% reported in a large multicentre study of elderly patients (≥ 65 yr) undergoing major digestive surgery.²⁵ In the present study, malnourished, elderly patients undergoing emergency surgery had a 100% complication rate compared with a rate of 59% among those who had elective surgery. However, the 1-year survival rate in emergency surgery patients was 80%. Analysis of quality of life data in emergency surgery patients was very limited ($n = 3$), as these patients were unlikely to respond to the quality of life questionnaire. These findings may stimulate further study.

CONCLUSION

What were the implications of the results of this study for the surgical practice in our department? The quality of life, morbidity and mortality data are used to accurately counsel patients and families on the risk and benefit of digestive surgery. In our opinion, the 1-year outcome is rather

encouraging for this high-risk population. We do not use the data for patient selection, as all studied patients had a clear indication for surgery with no real alternative (or even failure) of medical treatment. A critical view on the perioperative nutritional therapy given during the present study may show some way for improvement. At present, we give systematically perioperative immunonutrition to patients undergoing elective surgery, and postoperatively we are more frequently providing enteral nutrition.

The present study suggests that despite high perioperative mortality and morbidity, malnourished, elderly survivors of digestive surgery can achieve an acceptable quality of life 1 year after surgery. However, the results of the present pilot study need confirmation in a larger trial including a control group for more detailed analysis.

Competing interests: None declared.

Contributors: Both authors contributed to study designed, acquired and analyzed data, wrote and reviewed the article, and approved its publication.

References

1. Studley HO. Percentage of weight loss: a basic indicator of surgical risk in patients with chronic peptic ulcer. *JAMA* 1936;106:458-60.
2. Correia MI, Waitzberg DL. The impact of malnutrition on morbidity, mortality, length of hospital stay and costs evaluated through a multivariate model analysis. *Clin Nutr* 2003;22:235-9.
3. Perioperative total parenteral nutrition in surgical patients. The Veterans Affairs Total Parenteral Nutrition Cooperative Study Group. *N Engl J Med* 1991;325:525-32.
4. Schiesser M, Müller S, Kirchhoff P, et al. Assessment of a novel screening score for nutritional risk in predicting complications in gastro-intestinal surgery. *Clin Nutr* 2008;27:565-70.
5. Schiesser M, Kirchhoff P, Müller MK, et al. The correlation of nutrition risk index, nutrition risk score, and bioimpedance analysis with postoperative complications in patients undergoing gastrointestinal surgery. *Surgery* 2009;145:519-26.
6. Constans T, Bacq Y, Brechot JF, et al. Protein-energy malnutrition in elderly medical patients. *J Am Geriatr Soc* 1992;40:263-8.
7. Pirlich M, Schutz T, Kemps M, et al. Prevalence of malnutrition in hospitalized medical patients: impact of underlying disease. *Dig Dis* 2003;21:245-51.
8. Bozzetti F, Braga M, Gianotti L, et al. Postoperative enteral versus parenteral nutrition in malnourished patients with gastrointestinal cancer: a randomized multicenter trial. *Lancet* 2001;358:1487-92.
9. Braga M, Gianotti L, Nespoli L, et al. Nutritional approach in malnourished surgical patients. A prospective randomized study. *Arch Surg* 2002;137:174-80.
10. Wiering B, Oyen WJ, Adang EM, et al. Long-term global quality of life in patients treated for colorectal liver metastases. *Br J Surg* 2011;98:565-71.
11. Schniewind B, Bestmann B, Kurdow R, et al. Bypass surgery versus

- palliative pancreaticoduodenectomy in patients with advanced ductal adenocarcinoma of the pancreatic head, with emphasis on quality of life analyses. *Ann Surg Oncol* 2006;13:1403-11.
12. Larsson J, Akerlind I, Permerth J, et al. The relation between nutritional state and quality of life in surgical patients. *Eur J Surg* 1994; 160:329-34.
 13. Gupta D, Lis CG, Granick J, et al. Malnutrition was associated with poor quality of life in colorectal cancer: a retrospective analysis. *J Clin Epidemiol* 2006;59:704-9.
 14. Beattie AH, Prach AT, Baxter JP, et al. A randomised controlled trial evaluating the use of enteral nutritional supplements postoperatively in malnourished surgical patients. *Gut* 2000;46:813-8.
 15. Schwarz R, Hinz A. Reference data for the quality of life questionnaire EORTC QLQ-C30 in the general German population. *Eur J Cancer* 2001;37:1345-51.
 16. Mariette C, Alves A, Benoist S, et al. Perioperative care in digestive surgery. Guidelines for the French Society of Digestive Surgery. *Ann Chir* 2005;130:108-24.
 17. Weimann A, Braga M, Harsanyi L, et al. ESPEN guidelines on enteral nutrition: surgery including organ transplantation. *Clin Nutr* 2006;25:224-44.
 18. Aaronson NK, Ahmedzai S, Bergmann B, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst* 1993;85:365-76.
 19. Fayers P, Bottomley A. Quality of life research within the EORTC — the EORTC QLQ-C. European Organization for Research and Treatment of Cancer. *Eur J Cancer* 2002;38(Suppl 4):S125-33.
 20. Müller MW, Friess H, Kleeff J, et al. Middle segmental pancreatic resection. An option to treat benign pancreatic body lesions. *Ann Surg* 2006;244:909-18.
 21. Vermeulen J, Gosselink MP, Busschbach JJ, et al. Avoiding or reversing Hartmann's procedure provides improved quality of life after perforated diverticulitis. *J Gastrointest Surg* 2010;14:651-7.
 22. Wu CW, Chiou JM, Ko FS, et al. Quality of life after curative gastrectomy for gastric cancer in a randomized controlled trial. *Br J Cancer* 2008;98:54-9.
 23. Evans WJ, Morley JE, Argilés J, et al. Cachexia: a new definition. *Clin Nutr* 2008;27:793-9.
 24. Buzby GP, Mullen JL, Matthews DC, et al. Prognostic nutritional index in gastrointestinal surgery. *Am J Surg* 1980;139:160-7.
 25. Duron JJ, Duron E, Dugue T, et al. Risk factors for mortality in major digestive surgery in the elderly: a multicenter prospective study. *Ann Surg* 2011;254:375-82.

How you can get involved in the CMA!

The CMA is committed to providing leadership for physicians and promoting the highest standard of health and health care for Canadians. To strengthen the association and be truly representative of all Canadian physicians the CMA needs to hear from members interested in serving in elected positions and on appointed committees and advisory groups. The CMA structure comprises both governing bodies and advisory bodies either elected by General Council or appointed by the CMA Board of Directors. The Board of Directors — elected by General Council — has provincial/territorial, resident and student representation, is responsible for the overall operation of the CMA and reports to General Council on issues of governance.

CMA committees advise the Board of Directors and make recommendations on specific issues of concern to physicians and the public. Five core committees mainly consist of regional, resident and student representation while other statutory and special committees and task forces consist of individuals with interest and expertise in subject-specific fields. Positions on one or more of these committees may become available in the coming year.

For further information on how you can get involved, please contact:

Jacqueline Ethier, Corporate and Governance Services
Canadian Medical Association
1867 Alta Vista Drive, Ottawa ON K1G 5W8
Fax 613 526-7570, Tel 800 663-7336 x2249
involved@cma.ca

By getting involved, you will have an opportunity to make a difference.

We hope to hear from you!

