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Risk for malnutrition in patients prior to vascular surgery

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ABSTRACT

Background: Malnutrition is an important risk factor for adverse post-operative outcomes. The prevalence of risk for malnutrition is unknown in patients prior to vascular surgery. We aimed to assess prevalence and associated factors of risk for malnutrition in this patient group.
Methods: Patients were assessed for risk for malnutrition by the Patient-Generated Subjective Global Assessment Short Form. Demographics and medical history were retrieved from the hospital registry. Uni- and multivariate analyses were performed to identify associated factors of risk for malnutrition.
Results: Of 236 patients, 57 (24%) were categorized as medium/high risk for malnutrition. In the multivariate analyses, current smoking ($P = 0.032$), female sex ($P = 0.031$), and being scheduled for amputation ($P = 0.001$) were significantly associated with medium/high risk for malnutrition.
Conclusions: A substantial proportion (24%) of patients prior to vascular surgery is at risk for malnutrition, specifically smokers, females and patients awaiting amputation. Knowledge of these associated factors may help to appoint patients for screening.

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1. Introduction

In surgical patients, malnutrition is an important risk factor for adverse post-operative outcome.[1] Patients with vascular disease requiring surgery may also be at risk for malnutrition when specific disease-related symptoms interfere with food intake. Symptoms such as pain, cramps and fatigue, as well as limitations in functioning, e.g. impairment in walking, are common among patients with vascular disease, and are reported to contribute to nutritional risk in this patient population.[2,3]

In the general hospital population, risk for malnutrition ranges from 15% to 24%.[4,5] Differences in prevalence may be explained by the use of different screening instruments and/or disease populations. The prevalence of risk for malnutrition in cardiac and general surgery patients is estimated at 19% and 24%, respectively.[1,6] The largest study reporting prevalence of risk for malnutrition in vascular surgery patients ($n = 133$) dates from 1984, and revealed a prevalence of 4%–18%, depending on severity of disease.[7] Risk for malnutrition differs largely between disease populations, and is associated with for instance older age, female sex, and comorbidity in patients aged 70 + in a general hospital

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population.[8,9] In a community-dwelling population aged 65+, risk for malnutrition has been associated with smoking, and comorbidities such as osteoporosis and cancer.[10]

Nutritional screening programs aim to detect patients at risk for malnutrition.[11] However, risk for malnutrition may be overlooked in vascular surgery patients as only 20%–38% of surgical departments in parts of Western Europe and USA perform nutritional screening perioperatively.[12,13] Commonly used screening instruments include two up to five parameters, such as unintentional weight loss, Body Mass Index (BMI), disease severity, and loss of appetite.[14] These instruments, however, do not provide sufficient insight into treatable nutrition impact symptoms, such as nausea, changes in taste, fatigue or pain. Neither do they screen for a decrease in food intake or activity. If mainly weight loss or Body Mass Index (BMI) is used for screening, recognition of factors that may cause future malnutrition may be delayed. Timely and full identification of patients at risk for malnutrition, followed by proactive and interdisciplinary interventions may improve clinical outcomes. In order to address the different domains of malnutrition risk, a more comprehensive tool is needed. The Patient-Generated Subjective Global Assessment Short Form (PG-SGA SF) is one of the few instruments covering all domains of the malnutrition definition and has demonstrated high specificity and sensitivity for assessing risk for malnutrition in cancer populations.[15–17]

However, no studies are available that have assessed prevalence of risk for malnutrition in patients prior to vascular surgery, and knowledge on the associated factors of risk for malnutrition is lacking. Therefore, in this study, we aimed to assess the prevalence and associated factors of risk for malnutrition in patients prior to vascular surgery by utilizing the PG-SGA SF.

2. Material and methods

2.1. Study design

In this observational cross-sectional study, all patients visiting the vascular surgery outpatient clinic at the University Medical Center Groningen (UMCG) in 2015 that were scheduled for surgery were assessed for risk for malnutrition by the Scored Patient-Generated Subjective Global Assessment Short Form (© FD Ottery 2005, 2006, 2015) (PG-SGA SF). Patients underwent surgery within three months after their first outpatient visit and study measurement. Usual care was provided.

For this study, the Medical Ethical Committee of the UMCG granted dispensation from the Dutch law regarding patient-based medical research (WMO) obligation (reference 2016/322). Patient data were processed according to the Declaration of Helsinki – Ethical principles for medical research involving human subjects.[18]

2.2. Measurements

To assess risk for malnutrition, patients completed the PG-SGA SF Dutch version 3.7 (with permission from the copyright holder) by themselves.[19] The PG-SGA SF includes four Boxes. Box 1 addresses the history of weight loss: percentage weight loss in the past month or past six months, and changes in weight in the past two weeks; Box 2 evaluates changes in food intake in the past month; Box 3 addresses presence of nutrition impact symptoms in the past two weeks; and Box 4 evaluates activities and function in the past month.[20] The scoring of the PG-SGA Short Form has been described in detail elsewhere.[21] In case of missing items in any Box, its Box score was taken as '0'. 'Medium risk for malnutrition' was defined as a total PG-SGA SF score of 4–8 points, since this corresponds to indication of the PG-SGA triage system for an intervention by a dietitian in conjunction with a nurse or physician. 'High risk for malnutrition' was defined as a PG-SGA SF score ≥9 points, as such is seen as critical need for improved symptom management and/or nutrient intervention options.[20] This classification of risk was considered appropriate as from a score of 4 points and higher the need for an intervention is present and screening for risk is aimed at identifying patients in need of an intervention.

Demographics, comorbidities, and type of scheduled surgery were retrieved from the electronic hospital registry. Current and historical smoking (yes/no) and current drinking habits (yes/no) were registered twice: it was asked by the nurse at the surgical ward and by the nurse at the pre-operative screening. Discrepancies were investigated by the physician involved in this study (LV). Packyears and amounts were not registered. Comorbidity was assessed using the Charlson Comorbidity Index (CCI), which predicts the 1-year mortality of a patient based on the coexisting medical conditions and age.[22] The self-reported PG-SGA SF data on current weight and length were used to calculate BMI (weight/[length*length]) that was subsequently categorized according to the WHO classification.[23]

2.3. Statistical analyses

Categorical variables were presented as frequencies and percentages. Continuous variables were presented as mean ± standard deviation (SD) for normally distributed variables, and as median with interquartile range (IQR) for skewed variables. Normality was tested by the Kolmogorov-Smirnov test. Based on the triage system of the PG-SGA, PG-SGA SF scores were dichotomized in two ways: 1) low risk (0–3 points) vs. medium/high risk (≥4 points) and 2) low/medium risk (0–8 points) vs. high risk (≥9 points).[24]

Univariate binary logistic regression analyses, Odds Ratios (OR) and 95% CI, were used to analyze associations between risk for malnutrition and the afore mentioned covariates (factors). A zero inflated model accounting for a relative large amount of zero scores was used to identify factors associated with PG-SGA SF scores.[25] Multivariate logistic regression with the minimum Akaike Information Criterion (AIC) was used to provide options for model selection by estimation of measure of fit.[26] Generalized Additive Modeling (GAM) was performed to explore unknown non-linear associations with risk for malnutrition.[27] Case wise deletion of data was performed to handle missing data. Two tailed P-values were used, with significance set at $P < 0.05$. Data were analyzed using IBM SPSS version 23.0 (SPSS Inc., Chicago, IL, USA) and R version 3.4.0 (R Core Team, 2017).

3. Results

In total, 236 patients were included in the analyses. Table 1 shows baseline characteristics of this group. Age ranged from 23 to 93 years, with a mean (SD) age of 68.3 ± 11.1 years. The majority of the patients was male (72%). More than half of the study population (54%) had a BMI ≥25 kg/m^2, indicating overweight or obesity. Fourteen patients had a missing score in one of the four Boxes of the PG-SGA SF. Five patients had a missing score in Box 1, six in Box 3, and another three in Box 4. Eleven of these had a total score of 0, one had a score of 1, one of 2, and one patient had a score of 6 points.

Fifty-seven patients were categorized as medium/high risk for malnutrition, resulting in a prevalence of risk for malnutrition of 24% (95% CI: 19 to 30). Forty-two patients (18%; 95% CI: 13 to 23) were at medium risk for malnutrition, and 15 patients (6%; 95% CI: 4 to 10) at high risk. In total, 97 patients (41%) had a score of zero. Median PG-SGA SF score of all patients was 1 (IQR: 0 to 3), and scores ranged from 0 to 18. Scores for history of weight loss (Box 1) ranged from 0 to 5; for changes in food intake (Box 2) from 0 to 4;

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