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Research Article

Malnutrition Rate in Stroke Patients on Admission

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Abstract

Objectives: Malnutrition is frequently observed in patients with acute stroke and its prevalance after stroke varies widely among published reports. Differences in the timing of assessment, stroke type, comorbid medical conditions, and stroke complications may have contributed to this large variability. This study is performed to investigate the prevalence of malnutrition, and its associated risk factors in stroke patients admitted to our stroke clinic.

Methods: A prospective design was used to measure the nutritional status and nutritional risk of stroke patients during hospitalisation between June 2016 and February 2017. Nutritional status was measured at admission. Also demographic data and information on clinical variables were collected. Demographic data were included the patient's age, gender, type of stroke and other comorbid disorders. Blood samples including concentrations of high-sensitivity C-reactive protein (CRP), serum albumin, serum creatinine, lipid profile and serum lymphocyte count were measured by routine methods. Nutritional status was measured using the Mini Nutritional Assessment (MNA); for elderly stroke patients (age older than 65). For stroke patients younger than 65 age, Nutrition Screening 2002 (NRS 2002) was used.

Results: 318 patients with acute stroke were assessed for their nutritional status at admission. There were 145 (45%) female and 173 (55%) male patients. Their mean age was 66.16±14,32. 66.1% of the patients elder than 65 years were malnourished. 12.2% of the patients younger than 65 years were found to be malnourished. We found no relationship between comorbidities and malnutrition, except hyperlipidemia. Nourished stroke patients older than 65 years had higher serum lipid levels than malnourished ones. We also found no relationship between malnutrition biomarkers and being malnourished.

Conclusion: In summary, malnutrition is frequently observed in patients with stroke. Early recognition of malnutrition is crucial but is hampered by the absence of valid markers of malnutrition. Work is needed in targeting the modifiable nutrition risk factors to prevent stroke.

Keywords: Comorbidities; malnutrition; stroke.

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The term "malnutrition" represents an important preventable complication of acute stroke and is used to describe a large number of nutritional abnormalities. Malnutrition is frequently observed in patients with acute stroke and its prevalance after stroke varies widely among published reports.[1]

Knowing the prevalence of malnutrition of patients with acute stroke at admission and during hospital stay gives insight in the importance of preventive nutritional interventions during hospitalization. Studies have shown that, at admission to the hospital, 16%-49% of patients with acute stroke were already malnourished.[2, 3]

Differences in the timing of assessment, stroke type, comorbid medical conditions, and stroke complications may have contributed to this large variability.[4, 5]

The aim of this study was to investigate the prevalence of

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malnutrition, and its associated risk factors in stroke patients residing in our stroke clinic.

Methods

A prospective design was used to measure the nutritional status and nutritional risk of patients during hospitalisation. The study took place on the stroke unit of our hospital between June 2016 and February 2017. It was approved by the local research ethics committee.

Participants

318 patients with the diagnosis of a stroke, defined by the World Health Organization as a clinical syndrome consisting of "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin" were included in the study.[6]

Data Collection

Nutritional status was measured at admission (t1=day 2-5). Also demographic data and information on clinical variables were collected. Demographic data were included the patient's age, gender, type of stroke and other comorbid disorders. Blood samples were collected in the morning. Concentrations of high-sensitivity C-reactive protein (CRP), serum albumin, serum creatinine, lipid profile and serum lymphocyte count were measured by routine methods.

Nutritional status was measured using the Mini Nutritional Assessment (MNA); for elderly stroke patients (age older than 65).[7]

The purpose of MNA is to detect the presence of undernutrition and the risk of undernutrition among the elderly in home-care programmes, nursing homes and hospitals. The MNA includes anthropometric measurements: body mass index (BMI), mid-arm circumference, calf circumference, weight loss, questions related to lifestyle, medication, and mobility, a dietary questionnaire and a subjective assessment (self-perception of health and nutrition) with a maximum score of 14 and scores of ≥12 indicating a satisfactory nutritional status. A screening score of ≤11 indicates possible malnutrition.[8]

For stroke patients younger than 65 age, Nutrition Screening 2002 (NRS 2002) was used.[9] The NRS consists of five items, of which one is the age of the patient, one the BMI, one the appetite of the patient, one is accidental weight loss, an one is the consideration of the severity of acute illness of the patient. The maximal score is 7. A score of 0 indicates patients without risk of malnutrition.[9]

Results

318 patients with acute stroke were assessed for their nutritional status at admission. There were 145 (45%) female and 173 (55%) male patients. Their mean age was 66.16±14.32. On admission 52% of the stroke patients were found to be malnourished. 66.1% of the patients elder than 65 years were malnourished. 12.2% of the patients younger than 65 years were found to be malnourished. Among patients screened by NRS 2002, men gender found to be malnourished than women and it was statistically important (p=0.03). The distribution of risk factors of stroke patients were summarised in Table I. Stroke patients having the comorbidity of hyperlipidemia were not malnourished (p=0.03). Our study showed no relation between malnutrition biomarkers and to be malnourished.

Discussion

Malnutrition is common among patients who suffer from a stroke. It affects the clinical course of stroke patients. Compared with nourished patients, malnourished patients need a longer length of hospital stay, have an increased rate of complications, such as infection, pressure ulcers, falls, and increased frequency of dysphagia and enteral feeding.[10] The prevalence of malnutrition after stroke varies widely among published reports. It is estimated that about fifth of patients with acute stroke are malnourished on admission. [1] In our study 52% of the stroke patients were malnour-

Table 1. Distribution of risk factors in malnouri shed subjects

	Malnouri shed subjects (MNA)	p	Malnourished subjects (NRS 2002)	p
Hypertension	110/236	0.87	4/82	1.0
Diabetes	57/236	0.32	3/82	0.68
Coronary artery disease	28/236	0.48	2/82	0.65
Stroke	25/236	0.85	1/82	1.0
Hyperlipidemia	19/236	0.03	1/82	0.48
Dementia	7/236	0.27	0	
Cancer	6/236	0.42	0	

ished. Differences in the timing of assessment, stroke type (ischemic versus hemorrhagic), comorbid medical conditions, and stroke complications may have contributed to this large variability.[4, 5] In the study male patients younger than 65 years of age were more likely malnourished. Although women are more susceptible than men to undernourishment, this result may be because they suffer stroke at an older age than men. In a study of Magnus et al.,[11] in the male participants the impact of malnutrition on Health Quality of Life (HRQoL) was stronger than in men. Research on body composition has shown that during weight loss, men loose more lean mass than fat mass, where as women loose more fat than lean mass. It is possible that a relatively higher reduction in lean body mass can partly explain the stronger impact of malnutrition in men than in women. On admission, the presence of chronic diseases is associated with increased risk of malnutrition.[12] Diabetes mellitus and a history of stroke increased the risk for malnutrition on admission by 58 and 71%, respectively.[4, 13]

Comorbidities were not a significant risk factor for malnutrition in our study. This finding is in agreement with that of a Swedish study showing that the BMI of 231 patients with dementia did not differ, regardless of whether they had no/mild or severe morbidities.[14] Among the 12 risk factors of malnutrition analysed statistically in Chai et al.[13] study, eight were shown not to be significant risk factors. These were a previous history of alcohol consumption, comorbidities, polypharmacy, diabetes mellitus, impaired functional status of daily living, impaired mobility, tube -feeding, and edentulism. Thus, the hypothesis that the risk of malnutrition would not be increased by these eight factors was accepted.

Establishing a patient's nutritional status is not always a straightforward task because there is no universally accepted definition of malnutrition or a gold standard for nutritional status assessment. Indicators of malnutrition include serum levels of albumin, prealbumin, and transferrin; total lymphocyte count; body weight and body mass index; triceps skinfold thickness; midarm muscle circumference.[4] Hepatic proteins such as albumin, prealbumin, and transferin are commonly used as markers to evaluate nutrition status. They are influenced by many non-nutrition factors. Mediators of inflammation have the largest effect on serum protein levels. They are all negative acute phase proteins and therefore decrease in the presence of inflammation regardless of premorbid nutrition status.[15] In our study we found no correlation between these markers and being malnourished. However well nourished stroke patients older than 65 years had higher serum lipid levels which were statistically important. In recent years, researchers pay more attention on the low plasma total cholesterol (TC) concentration. Foreign studies have shown that low plasma TC level is correlated with patient's nutritional status. TC is more sensitive to assess nutritional deficiency than low serum albumin level. There are two possible reasons. Firstly, half life of cholesterol is 8 days, while that of albumin is 16-20 days. Secondly, serum albumin level is affected by many factors, such as blood volume and renal function, while the influence of TC level is less than albumin.[16]

In summary, 166 of 318 stroke patients (52%) were found to be malnourished in our study. Most of malnourished patients were the elder ones. In the younger group male predominancy was detected. We found no relationship between comorbidities and malnutrition, except hyperlipidemia. Nourished stroke patients older than 65 years had higher serum lipid levels than malnourished ones. We also found no relationship between malnutrition biomarkers and being malnourished.

Malnutrition is frequently observed in patients with stroke and is a risk factor for adverse outcomes. Early recognition of malnutrition is crucial but is hampered by the absence of valid markers of malnutrition. Work is needed in targeting the modifiable nutrition risk factors to prevent stroke.

Disclosures

Ethics Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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