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Assessment of nutritional status of the patient with cancer of the stomach by means of selected methods of anthropometric, biochemical and immunological

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Streszczenie

Wstęp: Stan odżywienia jest to stan zdrowia, który wynika ze zwyczajowego spożycia żywności z wchłaniana oraz wykorzystania wchodzących w jej skład składników odżywczych czy nieodżywczych. Niedożywienie jest problem, z którym borykają się zespoły terapeutyczne na całym świecie. Stan ten dotyczy około od 20-50% pacjentów hospitalizowanych a u 30-90% chorych pogłębia się w trakcie leczenia szpitalnego.

Cel: Ocen stanu odżywienia chorego z rakiem żołądka za pomocą wybranych metod antropometrycznych, badań biochemicznych i immunologicznych.
Materiał i Metody: Chory przyjęty w oddział chirurgii w trybie planowym lat 64, rozpoznanie raka żołądka według klasyfikacji TNM typ T3N1MO w celu leczenia. Chory po przebytych trzech cyklach chemioterapii neoadiuwantowej.
Wyniki: Uwzględniając wyniki kwestionariusza NRS-2002, wywiad, badanie przedmiotowe, podmiotowe, pomiary antropometryczne, badania biochemiczne oraz immunologiczne można ocenić, że stan odżywienia chorego jest nieprawidłowy. Chory jest niedożywiony. Biorąc pod uwagę rekomendację ESPEN (Europan Society for Enteral and Paraenteral Nutrition) i stan odżywienia chorego niezbędnym stało się włączenie leczenia żywieniowego. U chorego zostało włączone leczenie żywieniowe parenteralne.
Wnioski: Niedożywienie jest stanem chorobowym rzadko rozpoznawanym, w konsekwencji którego dochodzi do wielu niebezpiecznych powikłań zrażającym zdrowiu a nawet życiu chorego. Wyróżnia się kilka rodzajów niedożywienia. Często u pacjentów z chorobą nowotworową zwłaszcza z nowotworami przewodu pokarmowego, w wyniku długotrwałego niedożywienia dochodzi do rozwoju kacheksji. Kacheksja stanowi zespół zaburzeń na skutek ogólnoustrojowej reakcji zapalnej będącej odpowiedzią na obecność choroby w organizmie. Rozpoznane niedożywienie powinno być leczone. Po identyfikacji chorego, zagrożonego niedożywieniem lub będącego w stanie chorobowym niedożywienia, wprowadza się leczenie żywieniowe. Ocena stanu odżywiania powinna należeć do podstawowych umiejętności każdego z członków zespołu terapeutycznego.

Słowa kluczowe: stan odżywienia, rak żołądka, ocena stanu odżywienia, badanie antropometryczne, badanie biochemiczne, badanie immunologiczne,

Abstract

Introduction: Nutritional status is a medical condition that results from the customary intake of food absorbed and the use of its component nutrients or non-nutrients. Malnutrition is a problem faced by therapeutic teams around the world. This condition affects approximately 20-50% of patients hospitalized au deepens 30-90% of patients during hospital treatment.

Aim: Assessment of nutritional status of a patient with gastric cancer using selected methods of anthropometric, biochemical and immunological research.

Material and methods: The patient admitted in the surgery ward elective 64 years, diagnosis of gastric cancer according to the TNM classification type T3N1MO for treatment. A patient with a history of three cycles of neoadjuvant chemotherapy.

Results: Taking into account the results of the questionnaire NRS-2002, interview, physical examination, symptoms, anthropometric measurements, biochemical and immunological studies can assess the nutritional status of the patient is not valid. The patient is malnourished. Taking into account the recommendation ESPEN (Europan Society for Paraenteral and enteral nutrition) and nutritional status of the patient has become necessary to incorporate nutritional therapy. The patient was included in parenteral nutritional therapy.

Conclusions: Malnutrition is a medical condition rarely recognized, in consequence of which comes to many dangerous health complications discouraging and even the life of the patient. There are several types of malnutrition. Often, patients with cancer, particularly cancer of the gastrointestinal tract, resulting in prolonged malnutrition, cachexia occurs. Cachexia is a syndrome due to systemic inflammatory response which is a response to the presence of the disease in the body. Recognized malnutrition should be treated. After identifying the patient at risk of malnutrition or who is in the disease state of malnutrition, are introduced nutritional therapy. Evaluation of nutrition should belong to the basic skills of each member of the therapeutic team.

Keywords: nutritional status, stomach cancer, assessment of nutritional status, anthropometric examination, biochemistry, immunological testing,

Admission

Malnutrition is a problem faced by therapeutic teams around the world. This condition affects approximately 20-50% of patients hospitalized au 30-90% of patients with exacerbated during hospitalization [1]. Nutritional status is a medical condition that results from the customary intake of food absorbed and the use of its component nutrients or non-nutrients [2]. Collection and processing of nutrients, which include; carbohydrates, proteins, fat, micronutrients and macronutrients, vitamins allows man for survival and proper functioning of the surrounding environment [3]. This condition may be modified by a number of factors affecting metabolic processes, in particular the pathologies associated with health, genetics, socio-economic conditions or related to physical activity and aging. Malnutrition a pathology resulting from a lack of coverage daily intake of nutrients and non-nutritive [1]. Malnutrition is a serious clinical problem of difficult to bridge, which refers cancer patients. Malnutrition is rarely recognized at the time of admission in hospital ward, if left untreated, leads to the development of the so-called. undernourished hospital are associated with a number of negative consequences, for example. progress shoulder proposed therapy or physiotherapy, undertaken in order to improve patient after surgery [1]. According to the International Statistical Classification of Diseases and Related Health Problems malnutrition is a disease that occurs, the term "malnutrition" having the symbol E40-E46.After identifying the patient at risk of malnutrition or who is in the disease state of malnutrition, are introduced nutritional treatment [2]. Nutritional therapy is via two routes, which are used as stand-alone therapeutic methods or in combination therapy, i.e. complementary to [3]. Introduced nutritional therapy can be dispensed by a natural way, passage of gastric contents which is called the digestive tract. enteral feeding (enteral) or by peripheral venous and / or the so-called central. Paraenteral nutrition (paraenteral) using the cardiovascular system [5].Malnutrition, which is a consequence of the destruction of the host organism to between 30 to 85% of patients with cancer has been recognized already in the state of generalized [6]. Type neoplastic disease severity and the age of the patient, determine the incidence of malnutrition and the degree of cachexia [7,15,16]. The greatest damage they cause malnutrition resulting from cancer, refers to a population of children and the elderly [8]. Neoplastic disease of the digestive system, including; cancer of the stomach, esophagus and pancreas, cancer of the head, neck, lung and prostate predisposes to the development of malnutrition and consequently to the escalating distress syndrome, which result from systemic inflammatory response, in response to the

presence of cancer in the host organism called cachexia [9,10]. Malnutrition mostly affects patients who suffer from gastric carcinoma from 60% to 70% of esophagus carcinoma 70% to 80%, pancreatic cancer from 30% to 40%, and colon cancer from 10% to 15% of patients [10]. Malnutrition rise to many serious complications: increased mortality, prolongation of hospitalization, the lack of progress in the proposed treatment, the increase in the cost of hospitalization [9]. Neoplastic disease, the symptoms, the proposed anti-cancer treatment, as well as the associated consequences, eg. Loss of appetite, anorexia, abnormal sense of taste and / or smell, diarrhea, nausea or vomiting are the cause of the development of malnutrition [10]. Scrupulously to know the patients at nutritional risk, ie. At risk of malnutrition, it is recommended that the assessment of nutritional status, in each case on admission to hospital ward [11,12]. Thanks to the efforts of the Polish Society of Paraenteral Nutrition, Metabolism and enteral (POLSPEN) from 1 January 2012. Every hospital is obliged to assess the nutritional status: "§ 5a. "1. Provider providing services in a mode planned hospitalization and hospitalization, subjected to all beneficiaries admitted to treatment, with the exception of hospital emergency department, screening assessment of nutritional status (SGA or NRS 2002- adults, on meshes of growth in children and adolescents), in accordance with the principles set out in "Standards parenteral nutrition and enteral nutrition" Polish Society of paraenteral and enteral nutrition, or, in the case of children, in accordance with the principles laid down by the Polish Society for Clinical Nutrition Children [13]. Beneficiaries who have been found on the basis of the assessment referred to in paragraph. 1, the increased risk associated with nutritional status, should receive nutritional assessment [13,14,15]. European Society for Clinical Nutrition Metabolic and (ESPEN) to the screening assessment of nutritional status is recommended to use the questionnaire: Subjective Global Assessment of nutritional status and SGA form a screening risk assessment of malnutrition in 2002 NRS I and II developed by ESPEN [16,17]. SGA and NRS questionnaires are used all over the world, so make it possible to compare the results of the population of different countries [18]. Nutritional assessment is an assessment, which consists of the evaluation of anthropometric, biochemical, immunological [19]. In the assessment of nutritional status used are simple methods, which include; interview and medical examination, information on foods eaten, anthropometric measurements, biochemical tests [20]. The first step in assessing the nutritional status of the patient is to collect detailed information on; the history of nutrition, socio-economic, medical history and current health status. [21] According to the fed state is used a plurality of standardized questionnaires, for example. SGA, NRS and thoroughly interviewed nursing and medical [22]. Ogólnolekarskie study is an examination that involves

detailed inspection of external parts of the body such as; hair, thyroid, eyes, lips, tongue, teeth, gums, skin, nails, neck ie. the thyroid and salivary glands, etc.. The results of this study are related to the characteristics of normal, should identify and detect any clinical signs of nutritional deficiency [23]. Patients with cancer and malnutrition in the present study may be characterized by symptoms such as; emaciation, keratosis of the epidermis, hair loss, seborrhea, brittle nails, reduction or total loss of subcutaneous tissue, inflammation: gingivitis, corners of the mouth, tongue, tooth decay, enlargement of the heart muscle, tachycardia at rest, exudates in the pleural cavity, dyspnea, ascites, generalized aches and pains , muscle atrophy and joint swelling. [24] The next step in the assessment of nutritional status are anthropometric which is to be measured and a numerical representation of results of the study nutritional status of the patient [25]. The World Health Organization recommends and uses anthropometric measurements not only to assess the nutritional status of individuals, but also to assess the health of the population and assessment of socio-economic situation in individual countries [26]. The most commonly used methods of anthropometric measurements, for assessing the nutritional status of people in health or illness include: height and body weight [27,30]. To assess body mass index most commonly used so-called Quetelet. BMI (ang. Body Mass Index) [28]. Anthropometric studies used methods are: evaluation of resources fat TSF (ang. Triceps Skin Fold Thickness) measurement arm circumference (MAC. Midarm Circumference), calculation of ratio of the arm OMR [29]. From biochemical and immunological eloquent indicators of the nutritional status of the albumin, transferrin, prealbumin, and the level of creatinine excretion, the total number of cells in 1 mm 3 of blood (CLL) [30,31,32]. To assess body mass index most commonly used so-called Quetelet. BMI (ang. Body Mass Index) [28]. Anthropometric studies used methods are: evaluation of resources fat TSF (ang. Triceps Skin Fold Thickness) measurement arm circumference (MAC. Midarm Circumference), calculation of ratio of the arm OMR [29]. From biochemical and immunological eloquent indicators of the nutritional status of the albumin, transferrin, prealbumin, and the level of creatinine excretion, the total number of cells in 1 mm 3 of blood (CLL) [30,31,32]. To assess body mass index most commonly used so-called Quetelet. BMI (ang. Body Mass Index) [28]. Anthropometric studies used methods are: evaluation of resources fat TSF (ang. Triceps Skin Fold Thickness) measurement arm circumference (MAC. Midarm Circumference), calculation of ratio of the arm OMR [29]. From biochemical and immunological eloquent indicators of the nutritional status of the albumin, transferrin, prealbumin, and the level of creatinine excretion, the total number of cells in 1 mm 3 of blood (CLL) [30,31,32]. calculation of the ratio of the arm OMR [29]. From biochemical and

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The aim is to assess the nutritional status of patients with gastric cancer using selected methods of anthropometric, biochemical and immunological research.

A case report

To the Department of General Surgery, Oncology and Endocrinology elective was adopted 64 year old male diagnosed with stomach cancer, according to the TNM classification T3N1MO type, in order to continue treatment. Past medical history oncological treatment in the form of three cycles of neoadjuvant chemotherapy.

The physical examination found:

Patient's general condition good physique normotypical, flushed skin, properly insulated, without pathological efflorescence. Dermal tissue developed properly. muscles and bone-joint properly developed. Palpable lymph nodes imperceptible soft abdomen, abdominal slight pain in mesogastrium feel resistance. Peristalsis heard. Not enlarged liver, spleen impalpable. Symptoms of peritoneal negative. Symptom Chełmiński absent. Symptom Goldfmama absent. Permanently sick medicines do not accept. From the interview conducted with patients it shows that in the period of 3-6 months, the patient has lost about 10 kg of body weight, excluding the weight loss, hunger strike. The patient complains of persistent ailments of the digestive tract in the form; heartburn, eating disorders, abdominal pain, weakness, mood depression, sleep disorders.

Physical examination revealed:

- ✓ Body weight 62 kg, height 168 cm, = BMI 21.98 kg / m2
- ✓ RR 140/90 mm Hg, heart rate 67 Volumetric / min
- ✓ The murmur of respiratory physiological, symmetrical,
- ✓ Keratosis skin, tooth decay,
- ✓ Generalized muscle pain,

- ✓ Edema of the lower limbs.
- ✓ Exertional dyspnea,

Laboratory tests:

- ✓ Hemoglobin 11.8 g / dl
- ✓ Total protein concentration of 5.60 g / dl (reference value 6.00-8.00 g / dl)
- ✓ Albumin concentration 2.95 g / dl (reference value 3,50-5,50 g / dl)
- ✓ White blood cell counts of 6.18 K / L (4,10-10,90 Reference Standard K / L), the total number of cells in CLL 1mm3 = 890.34.
- ✓ CRP 63.46 mg / l (standard reference 0,10-5,00 mg / l)
- ✓ Electrolytes: For 141 mEq K 4.20 mEq Cl 104.0 meq.

Anthropometry

- ✓ BMI 21.98 kg / m2
- ✓ TSF 1.3 cm
- ✓ MAC 19 cm
- ✓ OMR 14.92 cm
- ✓ Weight loss over 6 months 3 10 kg
- ✓ (NMC due weight) 68 kg
- ✓ Weight loss during the 6 MCE being 13, 88% of ideal body weight

The basic anthropometric survey, which allows for the assessment of nutritional status is the measurement of body weight. Another parameter is the BMI (Boody Mass Index) [33].

BMI = body weight (kg) / height (m2) [34].

Table 1. The standards for BMI.

Malnutrition	<18.5 kg / m2
Danger	18,5- 20 kg / m2
Standard	20-25 kg / m2
Overweight	25-30 kg / m2
Obesity	> 30 kg / m2

Source: own [34].

Given BMI as an index of nutritional status can be argued That the patient is properly nourished. Note, however, that the BMI as an indicator, is not reflected in their case; pregnant women, children, the elderly, and in many pathological conditions taking place within the body, eg. edema. The patient ranging BMI 21.98 kg / m2 is not a good indicator of the nutritional status because of the presence of edema of the lower extremities, which affect the body weight, do not necessarily reflect the actual state of nutrition. Another parameter reflecting the nutritional status of the patient, weight loss is within 3-6 months. Weight loss patient, shaped at the level of 13.88% indicating a state of severe malnutrition. Patient during hospitalization weighed 62 kg due difference between the weight and the current was 6 kg. Ideal body weight was calculated to Broca: ideal body weight = height (cm) -100 +/- 2 kg, as in the case of a patient could score 68 kg [35]. Measured for skin fold thickness over the triceps non-dominant leg, right leg and it was found TSF (ang. Triceps Skin Fold Thickness) 13mm [35]. The standard for men is 7.5-12.5 mm, 10-16,5mm among women [35]. Severe malnutrition is diagnosed; for men TSF> 7.5mm. Another indicator anthropometric, arm circumference is that patient measured tape midway between the appendage and the ulnar Raven stands. (MAC Midarm Circumference). The standard for women is 16-23cm, for men 18-25 cm [35]. MAC The patient was 19 cm. Formula: arm circumference (cm) -3.14 * skin-fold thickness of the fatty triceps (mm) calculated pointer perimeter muscle arm (OMR) [35]. Thanks to interpret the OMR protein nutritional status of the organism. The patient OMR = 0.9 cm, which indicates severe malnutrition protein patient (Tab.2).

Tabela.2 standards pointer arm circumference.

Nutritional status	Women	Men
good	23,2-20,9	25,3-22,8
light malnutrition	20,8-18,6	22,7-20,2
moderate malnutrition	18,5-16,2	20,1-17,7
severe malnutrition	<16.2	<17.7

Source: own study [35].

Biochemical studies performed in the patient became the basis for the diagnosis of protein-calorie malnutrition. The concentration of albumin in the patient's blood was 2.95 g / dl as reference standards according to malnutrition indicates the average degree (Table 3).

Table 3. Standard albumin concentration [g / dl] of concentration.

Nutritional status	Albumin g / dL
normal	3.5-5.0
malnutrition light	3.0-3.4
malnutrition average	2.1-2.9
severe malnutrition	<2.1
The half-life of albumin	21 days

Source: own study [21,35].

Malnutrition compromises the function of the immune system, which leads to a decrease in the lymphocyte and skin response to antigens [21]. The level of resistance is assessed on the basis of the total number of lymphocytes (CLL) 1mm3 in peripheral blood [35]. The total number of cells calculated from CLL lymphocytes * =% total white blood cell count / 100. CLL patient is 890.34 indicating a moderate degree of malnutrition (Table 3) [35].

Table 3. Standards for the total number of lymphocytes of CLL.

Nutritional status	CLL blood 1mm3
proper nutritional status	> 1500
malnutrition light	1200-1499
moderate malnutrition	800-1199
severe malnutrition	<800

Source: own study [35].

Screening nutritional assessment was performed using a standardized questionnaire Nutritional Screening 2002 Risik-NRS 2002. The patient received 3 points (weight loss> 5% within 3-6 months, or food intake 50-75% in the last week, chemotherapy) which indicates malnutrition and provides the basis to include nutritional therapy. Recommendation ESPEN (Europan Society for enteral nutrition and Paraenteral) indicate that the patient is severely malnourished is one in which:

- Weight loss exceeds 10-15% within 6 months or 5% over 3 months.
- BMI <18,5kg / m2.
- SGA indicates the degree of C

- The concentration of albumin in plasma is <30 g / l (excluding renal failure, liver) [21,22,23,24,35].

The main indications include nutritional support include malnutrition, which was established during the illness, the inability to meet the demand of daily nutrients resulting from the disease pathology taking place within the organism, multiple organ dysfunction syndrome [34,35].

The indication to include the nutritional treatment of the following conditions:

- ✓ No possibility of including oral diet for 7 days.
- ✓ The present threatening or malnutrition in the form of BMI <18.5 kg / m2 , Unintentional weight loss of> 10% within three to six months before the start of nutritional therapy.
- ✓ Inability to maintain the daily food intake of> 60% of the recommended standards for more than 10 days.
- ✓ Grade B and C scale or SGA score ≥3 points in a method of screening NRS scale 2002 [21,26,27,35].

A patient diagnosed with malnutrition should not, be subjected to a treatment operation, without having to compensate shortages. Proper nutrition status reduces the risk of complications in the postoperative period [33,34].

Due to the severe state of malnutrition in a patient enrolled nutritional therapy through central veins.

Indications for paraenteral therapy:

- Patient's condition prevents receive nutrients through the digestive tract as a result of unconsciousness or traumatic craniofacial, esophagus, stomach, intestines.
- Status after surgery and injuries of abdominal organs, mechanical and functional intestinal failure, fistulae, mechanical obstruction and paralytic, peritonitis.
- Psychiatric disorders and cancer.
- Nutrition dispensed through the digestive tract is not satisfying demand for nutrients.
- Cachexia, hiperkatabolizm, gastrointestinal cancer, chemotherapy, sepsis like. [21,22,23,24,25].

Discussion

Malnutrition is a medical condition rarely recognized, in consequence of which there is a lot of dangerous complications threatening health and even the life of the patient. There are several types of malnutrition [3,4,5,6,7]. In 2011 in Poland, the obligation to carry out the assessment of nutritional status, each of the patients admitted purpose of hospitalization, as referred to in the Regulation of the Minister of Health of 15 September 2011. A legal duty to act suitable screening assessment of nutritional status among patients allowed to reduce the population undernourished, but still a lot of research in the arena of the country pointing out that the action is inadequate. The most common errors committed in clinical practice in the area of assessment of the nutritional status of patients are errors in attaching too much weight to the BMI or overestimation of the role of albumin. Nutritional assessment is an assessment, which consists of the evaluation of anthropometric, biochemical, immunological. In the assessment of nutritional status used are simple methods, which include; interview and medical examination, information on foods eaten, anthropometric measurements, biochemical tests. The first step in assessing the nutritional status of the patient is to collect detailed information on; the history of nutrition, socio-economic, medical history and current health status. Assessment of nutritional status should be a basic skill for the entire therapeutic team: doctors, nurses, dietitians, physiotherapists, gave to it the ability to quickly diversify patients malnourished or at risk of malnutrition and avoid many complications, increase the costs of hospitalization or prolongation of her time. Taking into account the results of the questionnaire NRS-2002, interview, physical examination, symptoms, anthropometric measurements, biochemical and immunological studies can assess the nutritional status of the patient is not valid. The patient is malnourished. Taking into account the recommendation ESPEN (Europan Society for Paraenteral and Enteral Nutrition) and nutritional status of the patient has become necessary to incorporate nutritional therapy. The patient was included in paraenteral nutritional therapy. increase in the cost of hospitalization or prolongation of her time. Taking into account the results of the questionnaire NRS-2002, interview, physical examination, symptoms, anthropometric measurements, biochemical and immunological studies can assess the nutritional status of the patient is not valid. The patient is malnourished. Taking into account the recommendation ESPEN (Europan Society for Paraenteral and enteral nutrition) and nutritional status of the patient has become necessary to incorporate nutritional therapy. The patient was included in paraenteral nutritional therapy. increase in the cost of hospitalization or prolongation of her time. Taking into account the results of the

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Summary

According to the International Statistical Classification of Diseases and Related Health Problems malnutrition is a disease that occurs, the term "malnutrition" having the symbol E40-E46. Recognized malnutrition should be treated. After identifying the patient at risk of malnutrition or who is in the disease state of malnutrition, are introduced nutritional therapy. Evaluation of nutrition should belong to the basic skills of each member of the therapeutic team.

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