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The impact of nutritional status on the process of formation of pressure ulcers in a patient in intensive care after injury cerebro cranial

Wpływ stanu odżywienia na proces powstania odleżyn u pacjenta w oddziale Intensywnej Terapii po urazie mózgowo-czaszkowym

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Summary

Introduction: Pressure ulcers are chronic wounds of very serious social and economic problem. With advances in medicine and the extension of human life, every day they involve ever growing group of patients. Despite much progress in medicine and the progress in the techniques of cultivating chronic wounds, pressure sores are a problem, which for many years is a blemish on for many doctors and nurses.

Material and Methods: A 46 year old male, professional driver status. From the interview with the family that the patient smoked about 15 cigarettes a day, no alcohol, he ate irregularly, fed on due to the nature of the work. Height 183 cm, weight 87 kg at the hospitalization day. Patient underwent surgery, the right parietal craniotomy. Intracerebral hematoma has been removed, breaking raised removed invaginated compromise bone. At the time of adoption in the branch, he was unconscious, intubated connected to a ventilator to breath surrogate mode IPPV, under the influence of anesthetics. Sedation infusion of 2% Propofol, Nalpain.

Aim: The impact of the nutritional status of a patient with craniocerebral trauma wounds to the formation of bed sore.

Results: Taking into account the results of the questionnaire NRS-2002, the scale Norton, Braden, interview, physical examination, symptoms, anthropometric measurements, biochemical and immunological in the initial period and 30 days of hospitalization can be estimated that the nutritional status of the patient is abnormal, which significantly influences the risk bed sore wounds uprising.

Conclusions: The risk of complications such as chronic wounds-pressure ulcers, in the patient have been very large. This is related to the general state of the patient's diabetes type II, with baseline nutritional status, infections, hypercatabolism resulting from craniocerebral trauma. Back to the patient's health requires large amounts of protein and energy. The patient's condition at the time of adoption in the branch was very heavy, unconscious patient, the surrogate breath, undernourished.

Key words: chronic wound, bed sore, nutritional status, prevention

Admission

Decubitus wounds are a major problem, with which man is struggling for years. Along with their onset, significantly reduces the quality of life of the patient. There is pain and suffering, which contribute to impede and delay the rehabilitation process, moreover, the same treatment of pressure ulcers is long-term and generates huge financial costs. This situation leads to undertake a thorough analysis of the causes of pressure ulcers [1]. Bed sore wound, is both a serious clinical problem and care for many interdisciplinary teams in the division hospital, nursing homes, factories nursing and medical branches palliative like [2]. Bed sore of the Latin

language. "Decubitus" means damage to the skin and deeper tissues, which is limited. The consequence of bed sores is the death of tissue loss or necrosis of [3]. The International Society for the European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel (EPUA / NPUA) proposed a definition of bedsores, "bedsores is localized damage to the skin and / or deeper tissue, which usually appears on the bony prominence as a result of oppression and tear. Pressure ulcer is also linked to a number of favorable factors or unclear, the meaning of which should further be stated [4]. The patient immobilized, is the one which is a significant possibility samopielegnacynjne reduced or completely abolished [5]. Dysfunction associated with immobility makes it is dependent on other people in the field of activities of daily living, which include min. change of position or activities related to the toilet body. The patient, who for various reasons, require assistance in self-service should be under the strict supervision of a therapeutic team, which includes; doctor, nurse, physiotherapist, dietician, psychologist. A significant function in the care of patients with dysfunction in the form of immobilization plays a nurse [6]. The elements of care provided by nurses should be prevention antidecubital. Prevention of pressure ulcers are measures aimed at minimizing or totally overcome the risks of pressure sores [5,6]. In the prevention of pressure ulcers in a patient unconscious, deprived of capacity selfcare and it is important to using available resources and methods to take care of skins condition and nutritional status [7]. The activities prevention of pressure sores include: changing the patient's position according to individual needs at a minimum of two hours [8]. Lowthiana the use of the card, with which it is possible to monitor the frequency of position changes. Implementation of protective measures against contact with urine and faeces, the use of bed linen and personal. The skin of the patient, the recommended preparation is a soap about pH 5.5. The coatings must be oiled olive skin, conditioning agents intended for this example PC 30 sudocremem. The use of mattresses przeciwoleżynowych, among which are the most commonly used; zmiennociśnieniowe mattresses, helps to reduce oppression,

Pressure ulcers are chronic wounds of very serious social and economic problem. With advances in medicine and the extension of human life, every day they involve ever growing group of patients. Despite much progress in medicine and the progress in the techniques of cultivating chronic wounds, pressure sores are a problem, which for many years is a blemish on for many doctors and nurses. Analyzing a number of studies conducted on the subject within the bedsores it can be noted that Poland is the lack of knowledge, systematic and uniform procedures, effective methods, agents acting condescendingly and proper treatment, which take into account the human as a whole biopsychosocial. Bedsores I generate very high

costs burdening not only the state budget but also on the unit-person [9]. The overall cost of a patient's stay in hospital ward bed sore is about 140 zł per day, the treatment of chronic wounds is a long-term process involving several or even several months [10]. Chronic wounds in the form of bedsores thwarting activities related to financial outlays and the work unit binds to a therapeutic treatment; operating conservative and rehabilitation [11]. The quality of life of patients with decubitus wound is low, it is associated with ailments, which include; acute inflammation, pain, suffering, indirectly and / or directly and can lead to death of the patient [12]. Bed sore term was first used in 1420 years, it has been used by Hidausa [13]. The incidence of pressure ulcers in various medical institutions is different. This diversity stems primarily from the state of the patient, the type of disease or age. The formation of pressure ulcers are the most vulnerable patients who are chronically ill, immobile, elderly patients [13]. United Kingdom in one of the studies assessed the incidence of pressure ulcers. The study included 3000 patients, the incidence of chronic wounds in these patients ranged from 14.4% to 19% [14]. Pressure ulcers are a serious problem not only medical but also social and economic. This is due to the costs that are incurred by your institution in the course of a long-term process of wound healing bed sore. United States has presented a list of the annual cost of treatment, which implies that the cost of treating pressure sores przekrzyć \$ 7 billion, Britain 420 million pounds, while in Australia, \$ 350 million [14]. In the perspective of the expenditure budget by each of the countries in the process of treatment of bedsores is extremely important fact, the implementation of a unified system of prevention and treatment of chronic wounds. Decubitus wounds occur most wards neurosurgical, neurological intensive care. These are the places where the patient samopielegnacyjna capacity is limited or completely inefficient. Cranial cerebral trauma is another serious problem worldwide each carrying a cast of the consequences of various complications in the form, for example. Chronic wounds-bedsores. The consequence of injuries growth in the world is the increased mortality and disability. World statistics report that cranio-cerebral ranks third after-cardiovascular diseases, cancer cause of death [7]. Every year craniocerebral injuries is about 200-300 people per 100 000 thousand. [7,15]. Cranio-cerebral traumas, including: superficial injuries of the skin and bones of the skull, deep brain trauma, vascular and cranial nerves. Head injury is divided into primary and secondary. Patient care after craniocerebral trauma to multi-therapeutic treatment process requiring introduction of the appropriate care with the aim is to achieve the rapid recovery and to reduce the risk of complications which are decubitus [7]. The whole process of therapy and care of the patient after craniocerebral trauma should be included in a holistic model of care

of a patient who embrace the realm of biological, psychological and social [7]. Malnutrition is a serious problem in patients in intensive care units. Is the result, an increased demand for nutrients, the loss, hypercatabolic arising from the underlying disease which is cranial trauma; cerebral and treatment of pressure ulcers [16]. In 1985, the Netherlands introduced the first standards for the prevention and treatment of bedsores. In Europe, standards of prevention and treatment of wounds decubitus new were introduced in 1998. Risk factors of pressure sores can be divided into; Internal and external factors (Table 1).

Aim: The impact of the nutritional status of a patient with craniocerebral trauma wounds to the formation of bed sore.

Table 1. Risk factors of pressure sores [10].

Active internal	External factors
<p>Overall condition Nutritional status Lack of proper nutrition, resulting in inhibition of tissue repair mechanisms efficiency, reduced resistance of tissues and cells to injury.</p>	<p>Pressure The duration and size.</p>
<p>Type of construction ➤ <i>Malnutrition</i> Coating the skin with a small amount of the fat layer they are more likely to develop pressure ulcers as a result of increased pressure in eminence bone and tendons. ➤ <i>Obesity</i> Increased weight results in increased compression, which significantly impairs the blood supply to a compressed tissue is an increased risk of shearing forces as well as problems with the implementation of preventive measures.</p>	<p>Friction and shear forces</p>
<p>Vascular factors Atherosclerosis, diabetes, COPD, heart failure.</p>	<p><i>Condition of the skin damage caused by incontinence urine, feces</i></p>
<p>Neurological factors No feeling tension, oppression, pain, predisposing diseases include stroke, multiple sclerosis, etc.</p>	<p>Evil care (Long-term same position, wet, damp underwear, folded sheets, a low level of knowledge, bad technique to change the position), skin diseases (allergies, eczema);</p>
<p>Wasting diseases eg. cancer; cranio-cerebral like.</p>	<p>Low level of medical services (Przeciwodleżynowych lack of programs and special teams for the treatment of bedsores, lack of equipment, materials antidecubitus, facilities)</p>
<p>Incontinence of urine and stool Maceration of the skin, which to a large extent is exposed to trauma, moreover, can lead to wound infection;</p>	<p>Trauma, surgery, infection, moisture</p>
<p>Chronic systemic diseases, bone fractures. Edema, mental illness, hypoalbuminemia, age area. 75 years.</p>	<p>Dry skin, thin.</p>

Source: Goat M. *bedsores - occurrence, prevention and treatment. Rehab. Med. 2004, 8: 29-38 [10].*





The most commonly used scale in the assessment of bedsores is the scale of Torrance, which takes into account the depth, appearance and size of the wound (Table 2).

Table 2. Classification of pressure ulcers by Torrance [17].

The degree of pressure ulcers	Characteristics of pressure ulcers
I°	Fading due to compression redness, preservation and continuity of the skin microcirculation.
II°	Not fading redness, discoloration of the skin and the warmth of an inflammation, swelling, the possible presence of small blisters and erosions.
III°	Damage to the full-thickness skin wound can be covered with a yellow coating disintegrating tissues or thin scab.
IV°	Damage to the skin and subcutaneous tissue, coming to the fascia.
V°	Deep damage exceeding the fascia muscle, bone structures, joints and tendons.

Source: Torrance C. Pressure Sores: aethiology, treatment and prevention. London in 1983, Croom Helm [17].

Table 3. Classification by bedsores. EPUAP [18].

	The degree of pressure ulcers	Characteristic
I		<p>Undamaged skin, visible redness, usually placed over a bony prominence. In the case of heavily pigmented skin redness may not be visible, the only symptom may be a local change of the skin.</p>
II		<p>The loss of part of the thickness of the dermis, there is an open sore with red-pink bottom wounds without granulation tissue. You may receive a bladder filled plasma.</p>
III		<p>Full thickness skin loss. It can be seen the subcutaneous tissue, but the muscles and tendons are visible. Granulation can occur not hampering the assessment of the depth of the cavity. Visible undermining of the wound edges.</p>
IV		<p>Loss of full-thickness skin along with the unveiling of tendons, muscles and bones. The bottom of the wound can be completely covered with granulation tissue or necrosis. Very often there is undermining of the wound edges and penetrating tunnels.</p>

Source: Recommendations prevention and treatment of pressure ulcers. Polish Society for Wound Healing in 2010; 7: 79-106 [18].

A case report

Clinic of Anesthesiology and Intensive Care patient is admitted, after craniocerebral trauma as a result of a traffic accident. 46 year old male, man, professional driver status. From the interview with the family that the patient smoked about 15 cigarettes a day, no alcohol, he

eats irregularly fed on due to the nature of the work. Height 183 cm, weight 87 kg at day hospitalization. Patient underwent surgery, the right parietal craniotomy. Intracerebral hematoma has been removed, breaking raised removed invaginated compromise bone. Ill at the time of adoption in the branch, he was niewybudzony, intubated connected to a ventilator to breath surrogate mode IPPV, under the influence of anesthetics. Sedation infusion of 2% Propofol Nalpain. Coatings on numerous patient skin abrasions, skin wounds. Bladder Foley catheter, stomach tube. The patient in the intensive care unit stays of 36 days. At the moment the patient awakenon-verbal contact with tracheostomy for breathing oxygen self-assisted, immobilized in bed. Subjected to intensive rehabilitation-reactive steps. Lack of co-morbidities. During hospitalization, the patient was diagnosed with type II diabetes, after consultation with the Diabetologia included treatment. On day 26 of hospitalization sick from high fever 39,8°C to 40°C. After uptake of cultures from the respiratory tract and urinary tract, based on susceptibility, incorporated targeted antibiotic therapy. On the 11th day of hospitalization, despite the used bedsore prevention and nutrition in the area cross-tail appeared redness, fading due to compression according to the classification Torrence bedsore I.

Laboratory tests of the patient

Table 4. Results of laboratory tests in the initial period of hospitalization.

WBC	15,20	K / ul	4,10-10,80
LYM	1,0	-	0,60-3,40
LYM%	6,8	%	10,0-50,0
RBC	2,90	Mule	3,90-5,70
HGB	9,2	g / dl	13,0-17,2
HCT	28,2	%	37,0-49,5
Procalcitonin	0,15	ng / ml	0,00-0,50
Glucose	145	mg / dl	65-100
CRP	123,5	mg / l	0,10-5,0
CA ++	4,07	mEq	4,50-5,00
Phosphorous	3,00	mg / dl	2,50-4,80
Albumin	2,59	g / dl	3,50-5,00
total protein	5,70	g / dl	6,00-8,00
Lipase	38	U / L	7-60
Magnesium (Mg)	2,41	mg / dl	1,6-2,60
Sodium (Na +)	148	mEq	137-140
Potassium (K +)	4,10	mEq	3,50-5,20
Chlorides (CL)	110,0	mEq	97-107

Table 5. Results of laboratory tests on day 30 of hospitalization.

WBC	12,49	K / ul	4,10-10,80
LYM	1,62	-	0,60-3,40
LYM%	13,0	%	10,0-50,0
RBC	3,24	Mule	3,90-5,70
HGB	9,6	g / dl	13,0-17,2
HCT	30,5	%	37,0-49,5
Procalcitonin	0,17	Ng / ml	0,00-0,50
Glucose	157	mg / dl	65-100
CRP	72,53	mg / l	0,10-5,0
CA ++	4,27	mEq	4,50-5,00
Phosphorous	3,70	mg / dl	2,50-4,80
Albumin	2,64	g / dl	3,50-5,00
total protein	6,00	g / dl	6,00-8,00
Lipase	31	U / L	7-60
Magnesium (Mg)	2,12	mg / dl	1,6-2,60
Sodium (Na +)	140	mEq	137-140
Potassium (K +)	4,20	mEq	3,50-5,20
Chlorides (CL)	103,0	mEq	97-107

In order to assess the risk of pressure ulcers in a patient assesses the risk of bedsores using the Norton scale.

Table 6. Scale Norton [17,18].

Czynnik ryzyka		4	3	2	1
A	Stan fizyczny	Dobry	Dość dobry	Średni	Bardzo ciężki
B	Stan świadomości	Pełna przytomność i świadomość	Apatia	Zaburzenia świadomości	Stupor lub śpiączka
C	Aktywność (zdolność przemieszczania)	Chodzi samodzielnie	Chodzi z asystą	Porusza się tylko na wózku inwalidzkim	Stale pozostaje w łóżku
D	Stopień samodzielności przy zmianie pozycji	Pełna	Ograniczona	Bardzo ograniczona	Całkowita niesprawność
E	Czynność zwieraczy odbytu i cewki moczowej	Pełna sprawność zwieraczy	Sporadyczne moczenie się	Zazwyczaj nieotrzymanie moczu	Całkowite nieotrzymanie stolca

Norton scale (Tabela.6) identifies the following factors:

- 1) The physical condition of the patient.
- 2) Psychological state.
- 3) Physical activity.
- 4) Mobility.
- 5) Sphincter function assessment (urinary or faecal incontinence).

You can get up to 20 points The number of points below 14 indicates a risk of pressure ulcers [17,18].

Table 7. Evaluation of the risk of bedsores in the initial period of hospitalization in a patient using a scale Doreen Norton.

<i>The physical state</i>	<i>The mental state</i>	<i>Physical activity</i>	<i>Mobility</i>	<i>Sphincter function assessment</i>	<i>The sum of points obtained</i>
1 pt. Very heavy	1 pt. Coma	1 pt. Constantly remain in Bed	1 pt. Total disability	1 pt. Total urinary incontinence, faecal	5 points. High risk of developing pressure ulcers

Source: Own study.

Table 8. Evaluation of the risk of bedsores after 30 days of hospitalization by Doreen Norton scale.

<i>The physical state</i>	<i>The mental state</i>	<i>Physical activity</i>	<i>Mobility</i>	<i>Sphincter function assessment</i>	<i>The sum of points obtained</i>
2 points. Average	2 points. Disturbances of consciousness	1 pt. Constantly remain in bed	1 pt. Total disability	1 pt. Total urinary incontinence, faecal	7 points. High risk of developing pressure ulcers

Source: Own study.

The risk of bedsores after 30 days of hospitalization compared to the first days of hospital stay decreased patient. The result of points scored by Doreen Norton scale was 7. The risk of bedsores despite the 7 points received is very high.

Assessment of the risk of pressure ulcers in a patient, also made by Braden scale.

Braden Scale takes into account the following factors:

- 1) Sensory perception.
- 2) Skin moisture.
- 3) Mobility.
- 4) Nutritional status.
- 5) Friction.

Score below 15 indicates a risk of bedsores.

Table 9. Braden scale [19].

Czynnik ryzyka	4	3	2	1
Percepcja	Nieograniczona	Lekko ograniczona	Ograniczona	Całkowicie ograniczona
Wilgotność	Rzadko wilgotna	Okazyjnie wilgotna	Bardzo wilgotna	Stale wilgotna
Mobilność	Prawidłowa	Lekko ograniczona	Ograniczona	Całkowicie unieruchomiony
Aktywność	Chodzi często	Chodzi rzadko	Na wózku	Unieruchomiony
Stan odżywienia	Właściwy	Odpowiedni	Nieodpowiedni	Zły
Tarcie i siły ściskania		Nie występuje	Potencjalnie	Stale

Table 10. Assessment of the risk of bedsores by Braden scale in the first days of hospitalization.

<i>Perception</i>	<i>Humidity</i>	<i>Mobility</i>	<i>Activity</i>	<i>Nutritional status</i>	<i>Friction and shear</i>	<i>Total number of points</i>
1 pt. completely limited	1 pt. Constantly moist.	1pt. Completely limited.	1 pt. Immobile	2 points. Inadequate	2pts. Potentially	8 points.

Source: Own Study.

Table 11. Assessment of the risk of bedsores by Braden scale on day 30 of hospitalization.

<i>Perception</i>	<i>Humidity</i>	<i>Mobility</i>	<i>Activity</i>	<i>Nutritional status</i>	<i>Friction and shear</i>	<i>Total number of points</i>
2 points. Limited	1 pt. Constantly moist.	1pt. Completely limited.	1 pt. Immobile	2 points. Inadequate	2pts. Potentially	9 points.

Source: Own Study.

In the early days, and 30 days of hospitalization, the risk of bedsores according to the Braden scale, the patient was very large with the result of the first evaluation was 8 points, second 9 points, which indicates a high exposure to a wound bed sore patient. The patient was assessed nutritional status during the first days of hospitalization and 30 days of hospitalization. Screening nutritional assessment was performed using a standardized questionnaire Nutritional Risk Screening 2002 NRS-2002 [19]. The patient received 3 points (head injuries, bone marrow transplant, the patient in the Intensive Care unit) which indicates malnutrition and provides the basis to include nutritional therapy. The patient nutritional status was assessed by testing anthropometric measurements included: BMI (ang. Body Mass Index), Ideal body weight was calculated to Broca: ideal body weight = height (cm) - 100 +/- 2 kg [19 20], measured for skin fold thickness over the triceps TSF non-dominant leg (ang. Triceps Skin Fold thickness) [20]. The standard for men is 7.5-12.5 mm, among women 10-16, 5mm [20]. Severe malnutrition is diagnosed; for men TSF > 7.5mm. Another indicator anthropometric determined which is the circumference of the arm, the patient measured by the tape midway between the appendage and the ulnar Raven stands. (MAC Midarm Circumference). The standard for women is 16-23 cm for males 18-25 cm [20]. Formula: arm circumference (cm) * -3.14 skin-fold thickness of the fatty triceps (mm) calculated pointer perimeter muscle arm (OMR) [20,21]. Thanks to interpret the OMR protein nutritional status of the organism. (MAC Midarm Circumference). The standard for women is 16-23 cm for males 18-25 cm [20]. Formula: arm circumference (cm) * -3.14 skin-fold thickness of the fatty triceps (mm) calculated pointer perimeter muscle arm (OMR) [20,21]. Thanks to interpret the OMR protein nutritional status of the organism. (MAC Midarm Circumference). The standard for women is 16-23 cm for males 18-25 cm [20]. Formula: arm circumference (cm) * -3.14 skin-fold thickness of the fatty triceps (mm)

calculated pointer perimeter muscle arm (OMR) [20,21]. Thanks to interpret the OMR protein nutritional status of the organism.

Table 6. Standards for BMI.

Malnutrition	<18.5 kg / m ²
Danger	18,5- 20 kg / m ²
Standard	20-25 kg / m ²
Overweight	25-30 kg / m ²
Obesity	> 30 kg / m ²

Source: own study [21].

Tabela.7 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 [22].

Assessment of the nutritional status of the patient was made, also using biochemical and immunological in which the concentrations of albumin, total protein, total lymphocyte count (CLL).

Table 8. 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 [21,22].

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.

Table 10. Standards for the total number of lymphocytes of CLL.

Nutritional status	CLL blood 1mm ³
Proper nutritional status	> 1500
malnutrition light	1200-1499
moderate malnutrition	800-1199
severe malnutrition	<800

Source: own study [22].

Table 11. Assessment of nutritional status of the patient using anthropometric indicators, biochemical, immunologic, in the initial period of hospitalization.

Antropometry	biochemical studiem	Immunological
BMI: 25,98 kg / m ²	Albumin: 2,59 g / dl	LYM% = 6,8%
TSF 18 mm = 1,8 cm	Total Protein: 6,00 g / dl	WBC = 15,20 K / ul
MAC: 25 cm	CRP: 123,52 mg / l	CLL = 1033,6
OMR: 19,35cm	Procalcitonin: 0,15 ng / ml	
(NMC due in weight): 83 kg		
Body weight: 87		
Height: 183 cm = 1,83 m		

Taking into account the anthropometric indicators, the nutritional status of the patient during the initial period of hospitalization classifying the level of good. BMI amounting to 25.98 kg / m² of the patient in the first days of stay in the hospital is an indicator, providing the correct nutritional status of the patient. You have to remember, however, that BMI as a predictor of providing nutritional status, not always fulfills its role, eg. In pregnant women, patients with generalized edema or with metastatic malignancies. Measured for skin fold thickness over the triceps TSF non-dominant leg (ang. Triceps Skin Fold Thickness) 18 mm. The standard for men is 7.5-12.5 mm. Another indicator anthropometric determined which is the circumference of the arm, patient measured tape midway between the appendage and the ulnar Raven stands. (MAC Midarm Circumference) 25 cm. The standard for men is between 18-25 cm. Formula: arm circumference (cm) * -3.14 skin-fold thickness of the fatty triceps (mm) calculated pointer perimeter muscle arm (OMR) 19.35 cm. Thanks to interpret the

OMR protein nutritional status of the organism. According to the norms for OMR (Table 7.) the nutritional status of the patient qualify for the state of light malnutrition. In assessing the nutritional status of the patient taken into account, including biochemical indicators: total protein and albumin. In the well with the results of laboratory tests of blood, the concentration of total protein in a patient amounted to 6.00 g / dl, and the albumin 2.59 g / dl according to the standards (Table 8) demonstrates the average degree of malnutrition. Malnutrition is a condition that impairs the functioning of the immune system, so important in the assessment of nutritional status is the fact that the assessment of efficiency of the system. The patient total number of lymphocytes in the blood 1mm³ amounted to 1,033.6 reflecting the state of moderate malnutrition.

Nutrition patient in the subsequent days of stay is carried out by means of enteral and parenteral nutrition.

Table 12. Assessment of nutritional status using anthropometric, biochemical, immunologic, after 30 days of hospitalization.

Antropometry	biochemical studies	Immunological
BMI: 22,39 kg / m ²	Albumin: 2,64 g / dl	LYM% = 13%
TSF 15 mm = 1,5 cm	Total Protein: 6,00 g / dl	WBC = 12,49 K / ul
MAC: 19 cm	CRP: 72,53 mg / l	CLL = 1623,7
OMR: 14,29 cm	Procalcitonin: 0,17 ng / ml	
(NMC due in weight): 83 kg		
Body weight: 75 kg		
Height: 183 cm = 1,83 m		

With blood tests, performed on day 30 of hospitalization due to that patient's condition has improved, thanks to the entered enteralnemu nutrition and paraenteralnemu. Anthropometric parameters, suggested a loss of body mass: 22,39 kg/m², TSF: 15 mm, MAC: 19cm, OMR: 14,29 cm. Weight loss was associated with the general condition of the patient; increased catabolism, which was a result of high temperatures, ongoing inflammation and recovery. Biochemical and immunological indicators pointed to the improvement of nutritional status and immune system efficiency.

Summary

The risk of complications such as chronic wounds-pressure ulcers, the patient was and is very large. This is related to the general state of the patient's diabetes type II, with baseline nutritional status, infections, hypercatabolism resulting from craniocerebral trauma. Back to the patient's health requires large amounts of protein and energy. The patient's condition at the time of adoption in the branch was very heavy, unconscious patient, the surrogate breath, undernourished. As a result of the high temperatures, which were in response to injury and successively respiratory infection and urinary tract infections in the body has been to disrupt metabolic processes in the form of severity of the Cori cycle activity, increase the utilization of proteins, metabolism of carbohydrates and fats. The result of ongoing infection was severity of inflammatory reactions by the action of proinflammatory cytokines. Alignment homeostasis required intensity of catabolic processes eg. By mobilizing factor or fat mobilizing factor protein. The same infection and its effects as fever, increased demand for energy or protein. High exposure to the development of patient bedsores, also stemmed from the time of immobilization in bed, respiratory, urinary incontinence and bowel disorders in cardiovascular endurance.

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