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EMOTIONAL CONDITION OF PATIENTS SUBJECTED TO ENDOVASCULAR SURGERY DUE TO CHRONIC ISCHEMIA OF THE LOWER LIMBS

STAN EMOCJONALNY PACJENTÓW PODDANYCH LECZENIU WEWNĄTRZNACZYNIOWEMU Z POWODU PRZEWLEKŁEGO NIEDOKRWIENIA KOŃCZYN DOLNYCH

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Summary

Introduction. Emotional status of a patient who underwent a surgery is an important element in the recovery process. The aim of the study was to assess changes in positive and negative emotions in patients subjected to endovascular procedure due to chronic ischemia of the lower limbs and the determination of the factors affecting that process.

Materials and methods. 63 patients subjected to endovascular surgery due to chronic ischemia participated in the study. The study group included persons aged 46 to 87 (median 65 years). The following tools were used: a questionnaire on demographic and medical data, Larsen & Diener Affect Intensity Measure Scale, modified Charles Carver's MiniCOPE (situational version) Inventory of coping with stress measurement, Berlin social support scale and Multidimensional Health Locus of Control Scale. Medical data on the hospitalization time, type of anesthesia and the type of a surgery procedure was also used in the study.

Results. Statistically significant increase of the positive emotions intensity was observed in the studied group of patients Me=9 (min. 0, max. 23) before the surgery and Me=13 (min. 4, max. 27) after surgery and reduced level of negative emotions from Me=10 (min. 1, max. 24) to Me=3 (min. 0, max. 15).

Conclusions. In patients treated for chronic ischemia of the lower limbs an endovascular intervention (revascularization of lower limbs) decreased the negative emotions level and increased the positive ones. Health locus of control does not influence the emotional status change in the studied subjects. Patients with higher levels of perceived social, emotional and instrumental support are characterized by smaller increase of positive emotions intensity after endovascular surgery. Patients with lower levels of perceived instrumental support are characterized by smaller decrease of negative emotions intensity after endovascular surgery. Strategies used to cope with stress related to surgery do not affect the emotional condition change in persons subjected to endovascular surgery. Number of symptoms following endovascular surgery is a predictor of the level of negative emotions.

Streszczenie

Wstęp. Stan emocjonalny pacjenta poddanego zabiegowi operacyjnemu jest ważnym elementem procesu zdrowienia. Celem badania była ocena zmian emocji pozytywnych i negatywnych u pacjentów poddanych leczeniu wewnątrznaczyniowemu z powodu przewlekłego niedokrwienia kończyn dolnych oraz określenie czynników wpływających na ten proces.

Materiał i metody. W badaniu wzięły udział 63 osoby poddane zabiegowi wewnątrznaczyniowemu z powodu przewlekłego niedokrwienia. Badane osoby były w wieku od 46 do 87 lat, (mediana 65 lat). Zastosowano następujące narzędzia: ankietę dotyczącą danych demograficznych i medycznych, Skalę Emocji Larsena i Dienera, zmodyfikowany (wersja sytuacyjna) Inwentarz do

Pomiaru Radzenia Sobie ze Stresem Mini-COPE Charlesa Carvera, Berlińską Skalę Wsparcia Społecznego oraz Wielowymiarową Skalę Umiejscowienia Kontroli Zdrowia. W badaniu wykorzystano również dane medyczne dotyczące czasu hospitalizacji, rodzaju zastosowanego znieczulenia i rodzaju wykonanego zabiegu.

W y n i k i . W badanej grupie chorych stwierdzono znamienny statystycznie wzrost nasilenia emocji pozytywnych przed zabiegiem Me=9 (min. 0, max. 23) po zabiegu Me=13 (min. 4, max. 27) i zmniejszenie poziomu emocji negatywnych z from Me=10 (min. 1, max. 24) na Me=3 (min. 0, max. 15).

W n i o s k i . U pacjentów leczonych z powodu przewlekłego niedokrwienia kończyn dolnych zabieg wewnątrznaczyniowy (rewaskularyzacja kończyn dolnych) zmniejszył poziom emocji negatywnych i zwiększył pozytywnych. Umiejscowienie poczucia kontroli w sprawach zdrowotnych nie ma wpływu na zmianę stanu emocjonalnego badanych. Osoby badane o wyższym poziomie postrzeganego wsparcia społecznego emocjonalnego i instrumentalnego cechuje mniejszy wzrost nasilenia emocji pozytywnych po zabiegu wewnątrznaczyniowym. Osoby badane o niższym poziomie postrzeganego wsparcia instrumentalnego cechuje niższy spadek nasilenia emocji negatywnych po zabiegu wewnątrznaczyniowym. Stosowane strategie radzenia sobie ze stresem związanym z zabiegiem nie mają wpływu na zmianę stanu emocjonalnego osób poddanych zabiegowi wewnątrznaczyniowemu. Liczba objawów po zabiegu operacyjnym wewnątrznaczyniowym jest predyktorem poziomu emocji negatywnych.

Key words: a sense of control, strategies to cope with disease, negative emotions, positive emotions, social support
Słowa kluczowe: poczucie kontroli, strategie radzenia z chorobą, emocje negatywne, emocje pozytywne, wsparcie społeczne

INTRODUCTION

Atherosclerosis can be defined as a chronic inflammatory disease, the essence of which is a progressive reduction of the artery internal diameter by lipid, inflammatory and fiber deposits. The atherosclerosis development risk factors include: dyslipidaemia, arterial hypertension, obesity, diabetes, smoking, lack of physical activity, male gender and genetic predisposition. The atherosclerosis assumes diverse clinical manifestations and its most common forms are coronary artery disease, cerebral stroke and ischemia of lower limbs. The latter may assume three main clinical forms: acute ischemia of the limbs, intermittent claudication and critical ischemia of the limbs. The surgery plays an important role in each clinical form of the ischemia of lower limbs. More and more popular method of the lower limbs ischemia treatment is endovascular intervention consisting in restoration or improvement of the blood inflow into lower limbs by the transcutaneous access. The results of this treatment affect quite significantly the emotional condition of patients. As a result of cognitive assessment of the situation, both positive and negative emotions occur in patients. Emotion understood in such a way significantly affects goals and intentions of activities [1]. The clinical course of disease is associated with negative emotions. The hospitalization itself generates anxiousness about the health and life. Decreased sense of security is intensified also by an approaching surgery, postoperative pain and general anesthesia since the patient often bears in mind the fear that he/she "shall not wake up after surgery". In the case of a patient subjected to surgery, we deal with a double fear component, i.e. the fear of "unknown", related to the planned surgery and the fear "of pain". At the same time same surgery is seen as part of the treatment that can restore full fitness and reduce the ailment associated with the disease. The hope appears and thereby positive emotions occur. In this case the positive emotions, as a counterbalance to the negative emotions, are an important part of the treatment support process, they improve the thinking and attention processes, cause their decentralization and induce the tendency to pursue new experiences. Long-term experiencing of positive emotions increases personal resources, which can be used in the efficient handling of the difficulties, including a disease. The persistence of the positive effect favorably affects the functioning of the immune system [2]. Whereas when negative emotions prevail over the positive ones, this has a negative effect on the vital signs, the course of the surgery and the postoperative period. These emotions most often have an anxiety tinge. Therefore an important aspect of patient care in the perioperative period is the assessment of the factors that influence the change of the patient's emotional state toward the direction beneficial for the recovery process, and supporting those factors. In such cases one should take into account: the location of the sense of control (LOC, *health locus of control*) [3, 4], strategies to cope with the disease and social support. There are three dimensions of the LOC: first, when a person is convinced that his/her health is under control of his/her own activities and features of personality (so-called internal health locus of control, LOC); second, if, in his/her view, his/her health is the result of the impact

of other people, especially the medical staff and the third when health is perceived as a result of luck, chance and destiny (so-called external locus of control, LOC) [4]. When a person has the feeling of total control over his/her health, then his/her belief in the ability to take actions to improve his/her condition increases at the same time. Whereas a person's conviction that he/she has no control reduces motivation and causes abandonment of heath promoting behaviours and activities focused on other areas of life. Patients with internal [5] LOC shall assume full responsibility for their own health, treatment and rehabilitation and they more often engage in health promoting behaviours and take activities improving mental state, as compared to to subjects with external LOC; and they are more frequently able to apply more effective ways of coping with stress and also with disease [5]. The latter fall within the group of adaptive responses aimed at mobilization of a person in a situation perceived by him/her as a threating and difficult one. Among them there are strategies focused on emotions and the problem.

An important factor influencing the emotional condition of a patient is social support. This is a kind of interpersonal interaction that is created in a difficult situation and it’s associated with the transfer or exchange of emotions, information or material goods [6]. Depending on the content of that exchange, one can distinguish the following types of social support:

- emotional support, when the content includes sustaining and calming emotions that confirm positive attitude toward the person and expressing empathy,
- information support, involving exchange of information and experiences in order to improve the understanding of the problem, disease or life situation. This type of support may be helpful in understanding the sense of hard situations and their causes.
- instrumental support, which is a kind of instruction on and modeling of efficient remedial behavior,
- material support means financial or material help [6].

While as regards the functional aspects of the support, one can distinguish: a perceived support and a received support. The base of the perceived support is the belief in the possibility of obtaining assistance in difficulty, while the received support is the actual type and size of support obtained by the recipient [6]. The need for such social support is determined by many factors such as sex, age and social status. When this need is well developed, then active search for social support shall appear in a difficult situation. While in case of a low need for support, a person in need usually avoids social support. In the event of a disease, each of these attitudes will influence the diagnosis and treatment. The perceived and received support influence the self-assessment in the disease situation, its consequences and they may also be associated with the strategy of coping or can become a part of it. Unfortunately, the importance of good education, support and communication with a patient is often undervalued. Providing support to a patient by listening to his/her experiences builds patient's awareness that he/she is important and understood, which in turn increases the feeling of own safety. Research shows that the patient's feeling of support from the medical staff causes his/her better adaptation to the difficulties associated with the surgery and lowers the level of depression [7].

As stated above, in patients undergoing surgery treatment the level of positive and negative emotions may be modified by both the social support, the health locus of control as well as the strategies of coping with the disease. Previous studies on this group were focused on finding a connection between the health locus of control and an emotional condition of a patients, but they rarely concerned the impact of social support on the emotional condition of patients suffering from a chronic disease. Therefore authors performed a study the aim of which was to compare the intensification of the positive and negative emotions before and after endovascular surgery due to chronic ischemia of the lower limbs and the determination of the factors affecting the changes in their scope. There have been no studies on a similar subject concerning that group before.

PATIENTS AND METHODS

63 hospital patients subjected to endovascular surgery due to chronic ischemia from September to November 2014 participated in the study. The study group included persons aged 46 to 87 (Me=65) The following tools were used: a questionnaire on demographic and medical data, the Affect Intensity Measure Scale [8], modified Charles Carver's Mini-COPE (situational version) Inventory of coping with stress measurement [9], Berlin social support scale [10] and Multidimensional Health Locus of Control Scale

[11]. The survey on demographic and medical data consisted of questions concerning: sex, age, education, place of residence, professional situation and marital status, the symptoms of the disease. Data included in the medical documentation on the hospitalization time, type of anesthesia and the type of a therapy was also used in the study.

Each patient was assessed twice, on the date of admission and discharge from the hospital. Upon admission to the hospital, the sociodemographic and medical data related to a patient's condition was recorded, the level of positive and negative emotions was measured, signs of disease were defined, the health locus of control and strategies to cope with the disease as well as social support were specified. While on discharge from the hospital the intensity of negative emotions, positive emotions and signs of the disease were determined as well as medical data on endovascular procedure carried out was collected.

Measured end points: positive and negative emotions on admission to and discharge from the hospital as well as the magnitude of the difference (delta, Δ) between measurements.

BIOETHICS COMMITTEE

The study was carried out upon acceptance of the Bioethics Committee KB 450/2014. The study has been performed in line with the amended Declaration of Helsinki.

STATISTICAL ANALYSIS

The statistical analysis was performed with the use of a licensed version of SPSS (21,0, IBM) statistical software. The correlation module of rho-Spearman and the Wilcoxon test were used.

TEST RESULTS

The largest group among the studied subjects were people with vocational education, while the smallest group were people with higher education (Tab. I). Both the people with vocational education and the two other groups, i.e. people with secondary and elementary education are of similar size. The vast majority of studied subjects lived in cities, while persons living in countryside represented only 27% of the studied population. Subjects > 65 years old (mainly pensioners) predominated in the studied group. The vast majority of the patients was in a formal relationship (married), while the cohabiting persons constituted the smallest group. The most frequent symptoms of the disease occurring in the studied persons on the day of admission to the hospital were difficulties in walking and the pain. The studied subjects also reported chilling, numb and swelling of legs, dizziness, intermittent claudication, blurred vision and loss of feeling in a limb. The most frequent symptom of the disease occurring in the studied persons on the day of discharge from the hospital was pain. The studied patients also reported swelling, difficulty in walking, dizziness, intermittent claudication, numbness of limbs and other symptoms. The least frequent symptoms were: chilling of limbs, loss of feeling in the limb and blurred vision.

Tab. I. *Characteristics of the studied group*

Characteristics of the studied group		**Value**
Age (years)	Median	65 (min. 46, max 87)
Sex	Female	29 (46%)
	Male	34 (54%)
Professional status	I do not work, I am unemployed	7 (11%)
	I work	13 (21%)
	Pensioner	43 (68%)
Education	Primary	17 (27%)
	Vocational	19 (30%)
	Secondary	18 (29%)
	Higher	9 (14%)
Marital Status	Single	9 (14%)
	I am married	51 (81%)
	I cohabit	3 (5%)
Hospitalization time (days)	Median	3 (min. 2, max 15)

Values are expressed as the percentage or a median (range), where its mandatory.

In the studied group of patients with chronic ischemia of lower limbs caused by arteriosclerosis after endovascular intervention, a statistically significant increase of the intensification of the positive emotions and reduction in the level of negative emotions were noticed (Tab. (II). Then the Spearman correlation analysis was performed by checking for existence of the statistical relationship among the changes in positive and negative emotions before and after endovascular surgery and delta of those values and demographic and clinical variables, i.e.: sex, age and the number of symptoms associated with limb ischemia and the other systems, as well as the hospitalization time (Tab. III). It was only found that women were characterized by significantly higher level of negative emotions before the surgery than men. It was also

found that delta of the level of emotions change among women after the surgery was smaller and that people who had more symptoms after the intervention were also characterized by a higher level of negative emotions measured after the surgery (Tab. III).

Tab. II. *Emotion intensity level of a studied person before and after the operation*

Median	Before operation	After operation	P
Positive emotions	9 (min. 0, max 23)	13 (min. 4, max 27)	< 0.001
Negative emotions	10 (min. 1, max 24)	3 (min. 0, max 15)	<0.001
Δ Positive emotions	3 (min. -11, max 21)		0.021
Δ Negative emotions	7 (min. -20, max 8)		0.886

Values are expressed as the percentage or a median (range).

(Tab. III). The analysis of the correlation also showed the relationship between the number of symptoms of the disease from the first measurement and the strategies applied to cope with the disease. The more frequently emotion-oriented strategies were used and the less problem-oriented ones, the less symptoms were reported by patients before the surgery (Tab. III). It was also demonstrated that there is a relationship between the external health locus of control (impact of others) and the change in the number of signs of disease (Δ of the number of signs of disease) (Table III), which has been growing with the decrease of the external health locus of control. It was then examined whether there is a relationship between the controlled variables and the perceived social support as regards the need for support and search for support. It was found that there is a relationship between gender and seeking support (Tab. III). Women demonstrate more need to seek support.

Tab. III. *The rho-Spearman correlation coefficient between psychological variables and demographic and clinical parameters*

Variables		Sex		Age		Hospitalization time		Δ Number of disease signs	
		Correlation value	Significance level	Correlation value	Significance level	Correlation value	Significance level	Correlation value	Significance level
Positive emotions	Before operation	0.247	0.051	-0.041	0.749	0.152	0.234	-0.132	0.301
	After operation	0.192	0.131	-0.155	0.225	0.009	0.942	0.028	0.828
Negative emotions	Before operation	**-0.372**	**0.003**	0.012	0.924	-0.114	0.375	0.010	0.939
	After operation	-0.193	0.129	-0.161	0.209	-0.167	0.192	**0.292**	**0.020**
Strategies of coping with the disease	Focused on the problem	-0.151	0.238	0.246	0.052	**0.254**	**0.044**	-0.116	0.363
	Focused on emotions	-0.167	0.191	-0.027	0.836	-0.053	0.678	**-0.256**	**0.043**
Health locus of control (location of the feeling of control over health matters)	Internal control	-0.091	0.476	0.012	0.923	-0.148	0.247	0.057	0.657
	Impact of other people	0.047	0.712	0.007	0.958	0.002	0.990	**-0.256**	**0.043**
	Coincidence	-0.169	0.184	0.093	0.468	-0.189	0.138	0.154	0.229
Perceived social support	Instrumental	0.083	0.516	0.051	0.692	0.195	0.125	-0.080	0.535
	Emotional	0.026	0.842	0.190	0.136	0.170	0.183	-0.159	0.213
	Demand for support	-0.064	0.616	0.003	0.979	0.224	0.077	-0.184	0.149
	Searching for support	**-0.272**	**0.031**	0.054	0.672	0.154	0.227	-0.159	0.222

Values are expressed as Spearman's correlation coefficient of $p<0.05$.

The relationship between patient's hospitalization time and the type of strategies used for dealing with the disease was also found. The more frequently problem-oriented strategies were used and the less emotion-oriented ones, the longer the hospitalization time was

It was also shown that the higher level of perceived social, emotional and instrumental support, the smaller increase of positive emotions in studied subjects before and after endovascular surgery (Tab. IV). In turn, the

lower level of perceived instrumental support, the smaller reduction of negative emotions intensity in studied subjects before and after endovascular intervention (Tab. IV). The analysis of correlations showed that the greater number of symptoms of the disease was reported by patients after endovascular procedure, and also that higher level of negative emotions characterized them (Tab. III).

Tab. IV. *The rho-Spearman correlation coefficient between emotions and psychological variables*

Psychological variables		Emotion intensity variable before and after the endovascular operation			
		Δ Positive emotions		Δ Negative emotions	
		Correlation value	Significance level	Correlation value	Significance level
Strategies of coping with the disease	Focused on the problem	-0.10	0.435	-0.07	0.582
	Focused on emotions	0.09	0.480	-0.02	0.878
Health locus of control	Internal control	-0.04	0.744	0.22	0.082
	Impact of other people	0.01	0.957	0.05	0.684
	Coincidence	0.06	0.645	-0.04	0.747
Perceived social support	Instrumental	**-0.27**	**0.032**	**0.26**	**0.043**
	Emotional	**-0.25**	**0.048**	0.19	0.139
	Demand for support	-0.03	0.805	-0.06	0.652
	Searching for support	0.01	0.909	0.03	0.839

Values are expressed as Spearman's correlation coefficient of $p<0.05$.

DISCUSSION

The emotional condition is an important element determining the recovery process, while hospitalization and execution of surgery causes disturbance of an emotional balance. For these reasons patients with chronic limb ischemia were assessed for dynamics of changes in the intensity of positive and negative emotions associated with the endovascular surgery and its relationship with individual demographic, clinical and psychological factors. Among other things, it was also found that after the endovascular intervention the intensity of the positive emotions grew and the negative ones fell, while the degree of changes depended on the sex of a patient and, as regards negative emotions, it was higher in women (Tab. II, Tab. III). The level of negative emotions also determined the number of symptoms persisting after surgery and/or vice versa (Tab. III). Whereas no correlation was found in the course of the study between the intensity of positive and negative emotions and their change after endovascular surgery and the health locus of control (Tab. IV) and applied strategies of coping with the disease (Tab. IV). Similar results were obtained for patients suffering from Leśniowski-Crohn disease [12]. In the studied group the external health locus of control strongly prevailed, both as regards the impact of others and in case where the average values are comparable and definitely higher than in the case of internal control. This could be caused by the age of studied subjects. Both age and the fact that ill persons are subject of the study determines the parameter. The study on persons with the coronary artery disease and concomitant diseases showed stronger conviction about the effects of other people on own health [13]. Emerging health problems result in a change in the health locus in control from the internal to the external one. The own studies demonstrated that there is only one relationship between the external health locus of control (impact of others) and the change in the number of signs of disease (Δ of the number of signs of disease). The lower the external health locus of control (impact of others) the higher decrease in the number of signs of disease. Consequently, the stronger the internal conviction of patients that they have an effect on the process of treatment the faster the recovery. Similar results were found in the literature. The conviction of patients that they have no impact on their health is caused by the experience of their own acute disease [14, 15]. The obtained results also indicate to the relationship between sex of the studied subjects with seeking the support. Women demonstrate more need to seek support than men. As regards influence of gender on the emotion intensity change before and after the endovascular operation, it is also important. This change is smaller in women as compared to men. Both the emotional support understood as imparting the sedating and supporting emotions and the instrumental support were examined from the perspective of a patient. The authors sought the answer to the question: how does the support perceived by a patient influence the emotional condition. It was found out that the higher the level of perceived social, emotional and

instrumental support, the smaller the increase of positive emotions in studied subjects before and after the endovascular surgery. The greater the patient's feeling that there are persons ready to give him/her support, the higher the level of positive emotions before the endovascular surgery. This relationship explains why the increase of positive emotions in this case was smaller. The lower the level of perceived instrumental support, the smaller the decrease of negative emotions intensity in studied subjects before and after endovascular surgery. The level of negative emotions before the surgery was correlated with the perceived support also in this case. The study demonstrated that the instrumental support is regarded as higher than the emotional one, as confirmed by other studies [16]. Interestingly, no relationship was found between the applied strategies of coping with the disease and the emotional state of a patient. The literature provides the results of studies conducted among patients with diabetes for whom it has been demonstrated that coping strategies focused on emotional reactions positively correlated with the level of depression and anxiety [16]. While the problem-focused strategy of coping with disease caused reduction in the level of depression [16]. Own research did not show this relationship. Whereas it was found out that there is a relationship between a patient hospitalization time and the type of strategies used for dealing with the disease. The more frequently problem-focused strategies were used and the less emotion-focused ones, the longer the hospitalization time was (Tab. III).

The obtained results confirm also that there is a relationship between the number of symptoms of the disease from the first measurement and the strategies applied to cope with the disease. The more frequently emotion-focused strategies were used and the less problem-oriented ones, the less disease symptoms were reported by patients before the surgery. This may result from the fact that patients with strategies focusing on the emotions are busier with their own emotional state than with troubleshooting their health problems. Own studies showed that the greater the number of symptoms of the disease reported by patients after endovascular surgery, the stronger intensity of negative emotions characterized them. Experiencing the disease symptoms causes concern with the prognosis and effectiveness of the performed surgery, which explains the increase in negative emotions.

The study is characterized by some limitations that could have affected the strength of inference from the obtained results. The studied group was quite small, but this was due to the amount of endovascular operations carried out from the start of the research till its completion. The average age of patients was high. Some problems occurred with filling the questionnaires and understanding them. Researchers provided additional explanations which proved sufficient. However, this could not be avoided because the risk of vascular disease increases with age.

Summing up, the level of positive and negative emotions after intervention is mainly affected by perceived emotional and instrumental support as well as the number of accompanying symptoms of disease. The strategies used to cope with the disease or the health locus of control have proved to be of no significance. The very dynamics of the emotional state is noticeable. The level of positive emotions increased after the endovascular procedure. While the level of negative emotions decreased. Such dynamics is associated with the hazard posed by the surgery. In future studies other elements of received social support included in the Berlin Social Support Scale are worth considering i.e.: currently provided support, currently received support, buffering-and-protection support [17]. It follows from earlier studies that persons receiving greater social support show more planing as regards their activities and they focus their efforts on solution of problems as well as they positively perceive the world and actively seek support [16]. The results obtained in the studies of other authors confirm the impact of support received from medical staff on emotional condition of patients [18].

CONCLUSIONS

1. In patients treated for chronic ischemia of the lower limbs an endovascular treatment (revascularization of lower limbs) decreased the negative emotions level and increased the positive ones.
2. The external Health locus of control does not influence the change of emotional condition in patients subjected to endovascular intervention.
3. Patients with higher levels of perceived social, emotional and instrumental support are characterized by smaller increase of positive emotions intensity after endovascular surgery.

4. Patients with lower levels of perceived instrumental support are characterized by smaller decrease of negative emotions intensity after endovascular surgery.
5. Strategies used to cope with the disease do not affect the emotional condition change in persons subjected to endovascular therapy.
6. Number of symptoms following endovascular surgery is a predictor of the level of negative emotions.

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