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Review Article

Individual nursing improves self-management ability of renal failure hemodialysis patients

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Abstract: Objective: To explore the application value of individual nursing mode in hemodialysis patients with renal failure. Methods: Renal failure patients treated by hemodialysis in the department of nephrology of our hospital were collected and divided into two groups. Patients in the research group (n=146) received individual nursing intervention, while patients in the regular group (n=130) received routine nursing intervention. The self-management ability, renal function index (SCr, BUN) and quality of life of the two groups were compared. The renal function indexes of the two groups of patients before and after nursing intervention were recorded. Results: Before nursing intervention, there was no differences in the renal function indexes between the two groups of patients (P>0.05). After intervention, the levels of SCr and BUN decreased significantly in both groups (P<0.05), while the levels of SCr and BUN in the research group were slightly lower than those in the control group (P<0.05). The self-management ability and quality of life scores of both groups were improved, while the self-management ability score and quality of life score of the research group were higher than those of the regular group (P<0.05). Compared with the negative emotions of the two groups, the anxiety and depression of both groups were significantly reduced after nursing intervention (P<0.05), with more obvious effects in the research group. The nursing satisfaction of the two groups was calculated, and the satisfaction of the research group was higher than that of the regular group (93.83% VS 85.38%, P<0.05). Conclusion: For hemodialysis patients with renal failure, individual nursing intervention has better application effects than regular nursing in reducing negative emotions, improving self-management ability, and improving quality of life.

Keywords: Individual nursing, renal failure, hemodialysis, self-management

Introduction

Renal failure is the end stage of various renal diseases. When the renal function and structure of patients are damaged, metabolin in the body cannot be excreted in time, leading to disturbed water-electrolyte and acid-base balance, and changed urine volume and urine quality [1]. In recent years, people's living standard has been improved with the development of social and economic level. At the same time, the risk of hypertension and diabetes in patients has increased, which in turn gives rise to an increase in the incidence of renal failure [2]. According to statistics, about 8.5 million people worldwide die of kidney and urethra diseases every year, and the incidence of chronic renal failure has increased by about 8% every year [3, 4]. Chronic renal failure has become a chronic disease that cannot be ignored clinically. It often leads to the loss of many organ functions. Therefore, long-term management and planning are needed to control its physical signs by improving its lifestyle and formulate some measures to prevent side effects.

Hemodialysis is a common method for clinical treatment of renal failure. Patients with renal failure need long-term hemodialysis treatment, which is costly. In addition to various clinical discomforts, the negative emotions of patients are more serious, and patients will suffer from complications of different degrees during treatment, resulting in low compliance rate and poor quality of life, further affecting the treatment effect [5, 6]. At present, the conventional nursing mode can no longer meet the requirements of contemporary clinical treatment, so it is

extremely important to find a nursing mode that can cooperate with treatment to the greatest extent [7, 8]. Individual nursing is the process of developing a care plan based on the patient's priorities and social environment. It is of great importance to provide high-quality and patient-centered nursing [9]. Previous studies have shown that individual nursing can reduce the relapse of inflammatory bowel disease patients and improve their quality of life [10]. And in the follow-up care of cancer, individual nursing intervention mode can greatly meet the needs of patients and help patients improve their ability to manage their health [11]. However, there is few research on individual nursing mode in hemodialysis of renal failure.

This study mainly explores the application value of individual nursing intervention mode in hemodialysis of renal failure by observing the renal function, self-management ability and multiple quality scores of patients during hemodialysis of renal failure, and comparing the different intervention effects of individual nursing and regular nursing mode.

Methods

General data

A total of 276 cases of renal failure patients treated by hemodialysis in the department of nephrology of Qingdao Municipal Hospital were collected and divided into a research group and a regular group according to different nursing methods. The research group (n=146) was intervened by individual nursing mode, with the age of 56.38±8.01 years, including 78 males and 68 females, with course of disease of 3.41±1.91 years. The regular group (n=130) was intervened by conventional nursing mode, with an age of 57.09±7.89 years, including 69 males and 61 females, with course of disease of 3.58±1.76 years. This study was approved by the Ethics Committee of Qingdao Municipal Hospital, and was in accordance with Helsinki Declaration. All subjects were given a detailed description of the experimental contents. All subjects agreed and signed a complete informed consent.

Inclusion criteria: Patients accompanied by family members at the time of admission. Patients confirmed as renal failure by imaging and laboratory tests [12]; patients with the ability to communicate normally; patients with consciousness.

Exclusion criteria: Patients combined with other malignant tumor diseases or autoimmune diseases; patients with severe defects in liver or gallbladder functions; patients with incomplete clinical data; patients unwilling to accept follow-up; patients with poor compliance.

Nursing intervention

Regular group: Regular nursing scheme was adopted (including observation of disease condition, diet guidance, etc.). Nursing staff should pay close attention to the changes of patients' physical signs during hospitalization, ensure the cleanness, comfort and tidiness of the ward at all times, maintain proper ventilation, and create a good environment for the patients.

Research group: Individual nursing scheme was adopted. (1) Psychological intervention: First, personal files were established, and patients' psychological state were carefully evaluated according to the actual situation and personality characteristics of patients in accordance with the differences of patients' lifestyles, educational and cultural backgrounds, family situations, etc. Nursing staff should pay close attention to the emotional changes of patients at all times, patiently and gently channel patients, relieve their bad emotions, and if necessary, cooperate with psychologists for intervention to improve the self-healing confidence and compliance of patients. (2) Dietary intervention: according to the patients' personal physical quality, a reasonable and healthy diet plan was formulated to encourage patients to eat foods rich in vitamins, high quality protein, high energy and low fat, eliminate the intake of fried, spicy and other foods, reduce the intake of pickled foods, and carry out necessary dietary care according to the actual situation of the body needs, nutritional status, exercise and other conditions. (3) Internal fistula nursing: Nursing staff were assigned to assist patients and their families in daily cleaning of patients' skin, explain the purpose and matters need attention of fistulation to patients, require them to wear loose clothes at an early stage, regularly check the anastomosis after operation, and prevent complications such as infection and swelling. (4) Health education: a special nursing team was set up with all nursing

staff having professional knowledge. They have mastered the key points and matters needing attention in dialysis nursing process. They were assigned to preach disease knowledge, drug knowledge, health care knowledge and other aspects to patients and their families from time to time, to introduce knowledge of hemodialysis treatment, to correct patients' wrong cognition of disease, to explain possible complications, matters needing attention, successful treatment cases and other aspects to patients to increase their treatment confidence. (5) Dialysis nursing: Special nursing staff were arranged to introduce the process of patients undergoing dialysis treatment for the first time. Before dialysis, they were assigned to replace the related items of patients, measure and record various data. And they should accompany patients with poor health and older age. The process they carry out strictly respects the privacy rights of patients. They should pay close attention to the patients' conditions when the dialysis is started, and record them every one hour. Patients were told to inform the nursing staff in time if they feel uncomfortable in the treatment process so as to timely handle and adjust the condition. After dialysis is completed, the patient shall be observed and cannot leave the treatment room until the vital signs are stable, no bleeding, and no adverse reactions occurring. And the patient and his/her family shall be instructed to carry out the following related maintenance.

Outcome measures

The serum of patients was collected before and after nursing intervention, and the renal function indexes including serum creatinine (Scr) and urea nitrogen (BUN) were detected by BK-500 automatic biochemical analyzer. After nursing, the self-management behavior of patients was evaluated, including self-nursing, emotional handling, problem solving, etc. The higher the score was, the stronger the self-management ability was [13]. The emotional changes of the two groups of patients before and after nursing intervention were observed, the self-rating anxiety scale (SAS) and self-rating depression scale (SDS) [14] were used. The more obvious the symptoms of anxiety and depression were, the higher the score was. QLQ-C30 [15] life scale (including role function (RF), physical function (PF), cognitive function (CF), emotional function (EF), and social function (SF)) was used to detect the quality of life of the two groups before and after treatment. The nursing satisfaction of each group was counted.

Statistical treatment

SPSS20.0 (IBM Corp, Armonk, NY, USA) was used for statistical analysis. The counting data was expressed by n (%). Chi-square test was used for inter-group comparison. The measurement data was expressed by mean standard deviation (x±sd). The comparison between the two groups was conducted by t test. The comparison between the two groups before and after intervention was conducted by repeated measurement analysis of variance. LSD-t test was applied for post-event analysis. The difference was statistically significant with $P<0.05$.

Results

Comparison of general data

The general clinical data of the two groups of patients were collected, as shown in **Table 1**. There was no remarkable difference in terms of gender, average age, body mass index (BMI), marital status, employment status, course of disease, whether drinking or smoking, and disease type between the research group and the regular group ($P>0.05$), suggesting that patients in the two groups were comparable.

Comparison of renal function indexes between the two groups before and after nursing

The levels of renal function indexes SCr and BUN before and after the nursing intervention of the two groups were recorded, as shown in **Figure 1**. Before the nursing intervention, there was no significant difference in renal function indexes between the research group and the regular group ($P>0.05$). After the intervention, the levels of SCr and BUN in the two groups were significantly reduced ($P<0.05$), while the levels of SCr and BUN in the research group were slightly lower than those in the regular group, with statistical significance ($P<0.05$).

Comparison of self-management ability scores between two groups of patients

The scores of self-management ability of the two groups of patients were collected, as shown in **Table 2**. It was found that there was no sig-

Table 1. Comparison of general data (x±sd)/n [%]

	Research group (n=146)	Regular group (n=130)	X^2/t	P
Gender			0.003	0.954
Male	78 (53.42)	69 (53.08)		
Female	68 (46.58)	61 (46.92)		
Average age (years)	56.38±8.01	57.09±7.89	0.740	0.460
BMI (kg/m^2)	24.18±4.01	24.01±3.98	0.353	0.725
Marital status and			0.434	0.932
Married	110 (75.34)	102 (78.46)		
Unmarried	3 (2.06)	2 (1.54)		
Diverse	17 (11.64)	14 (10.77)		
Widowed	16 (10.96)	12 (9.23)		
Employment status			0.415	0.519
In work	64 (43.84)	52 (40.00)		
Out of work	82 (56.16)	78 (60.00)		
Course of disease (year)	3.41±1.91	3.58±1.76	0.766	0.445
Smoking			0.057	0.811
Yes	53 (36.30)	49 (37.69)		
No	93 (63.70)	81 (62.31)		
Drinking			0.094	0.760
Yes	58 (39.73)	54 (41.54)		
No	88 (60.27)	76 (58.46)		
Disease type			0.647	0.886
Chronic glomerulonephritis	76 (58.46)	73 (56.15)		
Hypertensive nephropathy	35 (23.97)	30 (23.08)		
Chronic pyelonephritis	22 (15.07)	18 (13.85)		
Diabetic Nephropathy	13 (8.90)	9 (6.92)		

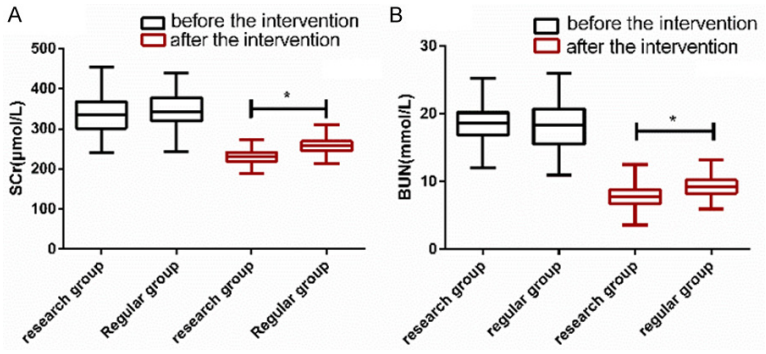

Figure 1. Comparison of renal function indexes between the two groups before and after nursing. A. Comparison of renal SCr levels before and after intervention between the two groups. B. Comparison of BUN level before and after intervention between the two groups. Notes: * represents comparison between the two groups, *P<0.05.

nificant difference in the scores and total scores of the three aspects of self-management ability before nursing intervention between the research group and the regular group (P>0.05), while the scores of self-management ability (self-care, emotional processing, problem solving) and total score of the patients in the research group were significantly higher than those in the regular group (P<0.05).

Comparison of SDS and SAS scores between the two groups

In this study the scores of adverse emotions in the two groups were counted, as shown in **Figure 2**. Before the intervention, both groups showed serious adverse emotions. After the intervention, the anxiety and depression of the two groups were alleviated, and the SDS and SAS scores were decreased (P<0.05). The SDS and

Table 2. Comparison of self-management ability scores between two groups of patients

	Self-care	Emotional processing	Problem solving	Total score
Research group (n=146)				
Before intervention	9.08±1.13	8.12±1.34	10.09±0.76	27.29±0.84
After intervention	17.47±0.87	15.34±0.98	16.78±1.03	49.59±1.13
t	71.08	51.16	63.15	184.70
P	<0.05	<0.05	<0.05	<0.05
Regular group (n=130)				
Before intervention	9.13±1.09	8.13±1.42	10.12±0.89	27.38±0.91
After intervention	14.86±0.92*	13.31±1.03*	14.24±0.92*	42.41±1.21*
t	45.81	35.68	36.70	117.50
P	<0.05	<0.05	<0.05	<0.05

Note: *indicates the comparison with research group after intervention, P<0.05.

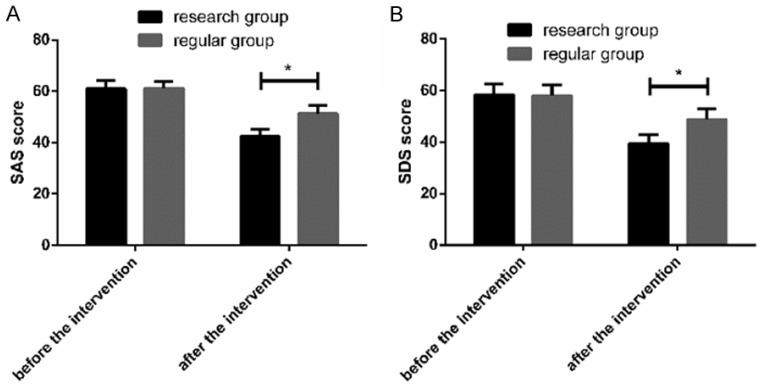

Figure 2. Comparison of SDS and SAS scores between the two groups. A. Comparison of SAS scores between the two groups before and after intervention. B. Comparison of SDS scores between the two groups before and after intervention. Notes: * represents comparison between the two groups, *P<0.05.

SAS scores of the regular group were higher than those of the research group (P<0.05).

Quality of life score of two groups of patients

According to the QLQ-C30 quality of life test results, as shown in **Figure 3**, it could be seen that there was no difference in the quality of life between the two groups before the intervention. After intervention, however, the quality of life of the two groups was improved, and the quality of life score of the research group was higher than that of the regular group in terms of PF, RF, EF, CF and SF and the total quality of life score, with statistically significant difference (P<0.05).

Investigation of nursing satisfaction

The nursing satisfaction of the two groups of patients was collected and investigated, as shown in **Table 3**. In the research group, there were 94 patients with great satisfaction, 43 patients with satisfaction, and 9 patients with dissatisfaction. In the regular group, there were 69 patients with great satisfaction, 42 patients with satisfaction, and 19 with dissatisfaction. The nursing satisfaction degree in the research group was higher than that in the regular group (93.83% VS 85.38%), and the difference was statistically significant (P<0.05).

Discussion

Renal failure is a serious threat to the life and health of patients, with poor prognosis [16]. Maintaining hemodialysis is the most effective kidney replacement method for patients with chronic renal failure. With the development of dialysis technology, more and more people are receiving dialysis treatment [17]. However, the hemodialysis treatment process is relatively long, leading to the generation of negative emotions, which can inhibit the patients' neuroendocrine and immune axis functions, thus affecting their compliance. Self-management is one of the effective methods of chronic disease management at present, which can improve patients' awareness of compliance with doctors and have a good effect on the treatment, stability and outcome of kidney failure, and can effectively improve the quality of life of patients receiving hemodialysis [18]. Therefore, how to improve the self-management ability of patients

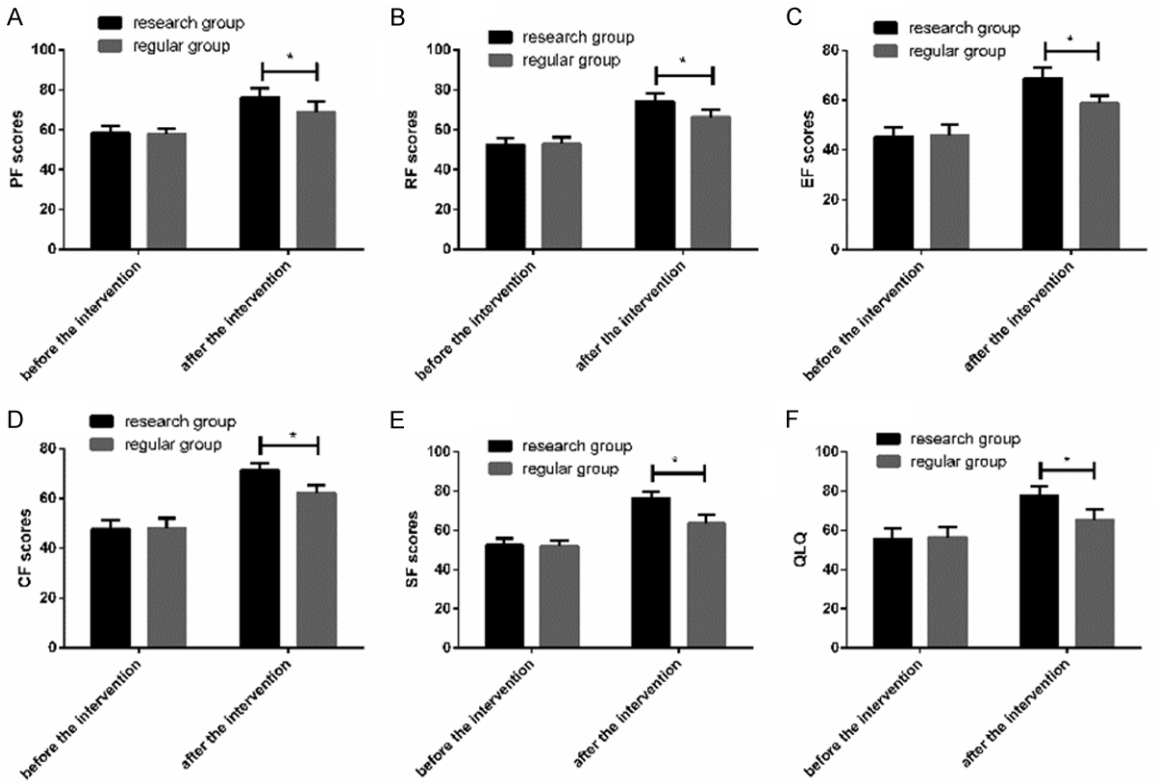

Figure 3. Quality of life score of two groups of patients. A. Comparison of PF scores before and after intervention. B. Comparison of RF scores between the two groups before and after intervention. C. Comparison of EF scores between the two groups before and after intervention. D. Comparison of CF scores between the two groups before and after intervention. E. Comparison of SF scores between the two groups before and after intervention. F. Comparison of the total score life between the two groups before and after intervention. Note: * represents comparison between the two groups, *P<0.05.

Table 3. Nursing satisfaction of the two groups

	great satisfaction	satisfaction	dissatisfaction	degree of satisfaction
Research group (n=146)	94 (64.38)	43 (29.45)	9 (6.17)	137 (93.83)
Regular group (n=130)	69 (53.08)	42 (32.30)	19 (14.62)	111 (85.38)
X^2				5.388
t				0.020

has positive effects on the treatment of renal failure hemodialysis.

At this stage, the needs and functions of nursing are continuously expanding. The conventional nursing mode is mainly aimed at clinical basic nursing and ensuring the normal operation of clinical diagnosis, treatment and nursing activities. And the individual nursing intervention is based on it. Through systematic assessment of patients' health problems, individual nursing plans are formulated according to patients' specific conditions and requirements, and a good foundation is laid for improving patients' quality of life and smooth recovery in cooperation with multiple specialties at different levels. SCr and BUN are commonly used indicators for renal function detection, and the serum Scr and BUN levels of patients gradually increase with the progress of the disease [19]. Therefore, this study first compared the influence of regular nursing and individual nursing intervention mode on renal function of renal failure patients. The results showed that the levels of SCr and BUN could be reduced by the aid of nursing intervention mode during hemodialysis treatment, while the levels of SCr and BUN in patients with individual nursing inter-

vention were slightly lower than those in the regular group, with statistically significant difference (P<0.05). It is speculated that individual nursing can delay the deterioration of renal function in patients with chronic kidney disease. Previous studies have suggested that the cooperation mode between specialist nurses and primary health care doctors can improve the risk management of patients with chronic kidney disease, and delay the progress of the disease [20]. In combination with this study, we believe that the reason may be that long-term standardized treatment has greatly controlled the disease, and the individual nursing model has developed detailed dialysis treatment and nursing procedures, supplemented by a reasonable diet and lifestyle habits, which can effectively improve the outcome of the disease. Since self-management is essential in renal failure [21], we scored the patients' self-management ability. The results showed that the scores after self-management were improved after nursing intervention, while the scores of patients' self-management ability (self-care, emotional processing, problem solving) and total scores of individual nursing intervention were significantly higher than those of regular nursing. It is suggested that individual nursing guidance could greatly improve patients' self-care and problem-solving ability. CUI et al.'s research [22] put forward that structured education for patients with chronic heart failure led by nurses can improve the self-management ability of patients and reduce the occurrence of readmission of patients due to heart failure. In combination with the conclusion, the reasons may be that the application of nursing provides the patients with correct knowledge and theoretical guidance, regular education and propaganda improve their understanding of the disease, and reasonable schedule and diet help them develop good habit, thus preventing the occurrence of complications.

As the coping ability and psychological defense ability of the elderly population gradually decrease with the increase of age, coupled with long-term treatment, emotional fluctuation is extremely easy to occur [23]. A large number of studies at home and abroad have shown that nursing intervention can significantly reduce the occurrence of adverse emotions. For example, the research of Davidson et al. [24] showed that cognitive behavioral nursing for insomnia patients can improve their sleep conditions and emotions. Shi et al.'s research [25] found that family nursing intervention mode can significantly reduce anxiety and depression of patients with nasopharyngeal carcinoma after radiotherapy and chemotherapy. Moreover, many literatures have shown that anxiety and depression are easily generated in renal failure patients who have received hemodialysis for a long time, and the generation of negative emotions will affect the stability and recovery of the patient's condition [26]. This study found that nursing has certain effect in relieving the adverse mood of renal failure hemodialysis. The individual nursing model is to formulate different intervention methods according to the patients' personalities, educational backgrounds, etc., and always pay attention to the patients' emotional changes, patiently and gently guide the patients to eliminate their bad emotions. When necessary, psychological professional counseling staff will be combined for intervention, which is highly targeted and professional. Therefore, the SDS and SAS scores of patients were significantly reduced after the intervention, and their effects were better than nursing alone. At present, individual nursing service mode has been continuously proved in the literature to be helpful in maintaining mental health, mood and quality of life of patients with chronic diseases [27]. In this study, QLQ-C30 score was used to evaluate the quality of life of patients. The results showed that the scores of RF, PF, CF, EF and SF of patients treated with individual nursing mode were higher than those of regular nursing, which could effectively improve the living standard and the prognosis of patients. Considering that individual nursing might improve the self-management ability of patients from multiple aspects, it is easy to understand why it improves the treatment effect and the quality of life of patients. Finally, we collected and investigated the nursing satisfaction of the two groups of patients. The results showed that the patients' satisfaction after individual nursing intervention was better. This suggests that the application of individual nursing in hemodialysis treatment of renal failure can effectively improve the nursing relationship, reduce the occurrence of risks such as disputes and complaints of nursing staff, improve the doctor-patient relationship, and bring better medical experience to patients. This also shows patients' approve of

individual nursing mode, which provides a strong basis for the application and promotion of individual nursing in the future clinical practice.

This study comprehensively explores the application value of individual nursing mode in hemodialysis treatment of renal failure, but there are still some limitations. For example, no investigation has been made on the long-term prognosis of patients, no comparison has been made on the occurrence of complications of patients, and there are many influencing factors on the recovery of patients. In future studies, the research on the influencing factors of treatment recovery can be strengthened in order to better improve the poor prognosis of patients.

To sum up, for hemodialysis patients with renal failure, individual nursing intervention has better application effect in reducing negative emotions, improving self-management ability, and improving quality of life than conventional nursing.

Disclosure of conflict of interest

None.

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