

# Application of Clinical Care Pathway in Perioperative Patients with Autologous Arteriovenous Fistula Balloon Expansion

Zhihua Deng\*, Ru Xie\*, Bo Hu, Shenling Hu, Yingxue Zhong#, Yu Chen#

Department of Nephrology, The First Affiliated Hospital of Jinan University, Guangzhou, China  
Email: 278908587@qq.com, #1139795771@qq.com

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## Abstract

[Objective] To explore the effect of clinical care pathways in perioperative patients with autologous arteriovenous fistula balloon expansion. [Method] 202 patients undergoing autologous arteriovenous fistula from July 2021 to June 2022 were randomly divided into a control group (101 cases) and an observation group (101 cases) to compare the incidence rates of postoperative complications, hospitalization days, hospitalization expenses, knowledge of self-management of arteriovenous fistula and nursing satisfaction. [Results] In the observation group, the incidence of arteriovenous fistula was higher than that of the control group, and the hospitalization days and hospitalization costs were lower than that of the control group. The difference between the two groups was statistically significant ( $P < 0.05$ ). [Conclusion] The application of the clinical nursing path to intervene in patients with autologous arteriovenous fistula balloon dilation can reduce the incidence of postoperative complications, shorten the hospital length of time, reduce hospitalization costs and improve patient satisfaction, which is clinical promotion significance.

## Keywords

Clinical Care Path, Autologous Arteriovenous Fistula Balloon Expansion, Perioperative Period

## 1. Introduction

Hemodialysis is one of the important methods to treat patients with end-stage kidney disease, and sufficient blood flow of vascular access is an important factor in ensuring the adequacy of hemodialysis effect [1]. Whether adequate blood

\*Co-first author.

#Co-corresponding author.

flow is an important factor affecting the effect of dialysis. Progress in hemodialysis and vascular access technology significantly prolong the cycle of chronic hemodialysis in patients. Arteriovenous fistula is the lifeline of hemodialysis patients, surgery in the wrist, forearm middle or anterior elbow fistula is the most ideal and long-term vascular access, the pathway can be repeated puncture, low probability of complications, and sufficient radial artery or brachial artery flow is necessary for success, medium to large closed arm shallow vein is critical for immediate and long-term patency, choose the appropriate fistula rate of primary patency is usually more than 5 years and 10 years [2] [3]. However, due to the influence of aging and vascular disease degeneration, middle-aged and elderly patients with long-term blood cardiopulmonary bypass dialysis and extensive use of heparin, resulting in the risk of inflammation, vascular damage and thrombosis, only 15% of patients with chronic renal failure are suitable for arteriovenous fistula (autologous) vascular access [4] [5]. At present, the problems of autologous arteriovenous fistula stenosis or thrombosis are mainly solved by internal fistula repair, catheter thrombectomy, urokinase thrombectomy, surgical open thrombectomy, balloon dilation and other techniques, but all have certain limitations [6]-[8]. Balloon dilatation is a common clinical technique to relieve autologous arteriovenous fistula stenosis or thrombosis, which can maintain the integrity of the vascular anatomy and minimize the damage to the blood vessels caused by the operation [9] [10]. At the same time, perioperative care is another important factor for the success of the operation, and good perioperative care is conducive to reducing the incidence of complications. The clinical nursing pathway is a standard formulated from the perspective of nursing staff according to evidence-based nursing and clinical pathways. The treatment, nursing measures and service process implemented for specific patients can significantly improve the nursing effect in the perioperative period [11]. However, its application in the balloon expansion of arteriovenous fistula is still rare. In order to further explore the application value of the clinical nursing pathway in perioperative patients with arteriovenous fistula balloon dilation, our department implemented a clinical nursing pathway during the perioperative care of arteriovenous fistula balloon dilation, which is reported below.

## 2. Data and Methods

### 2.1. Object

Selected 202 patients from July 2021 to June 2022 due to stenosis or occlusion by July 2022 were randomly divided into control group and observation group, with 101 patients in each group. In the control group, 53 males and 48 females, with mean age of  $60.3 \pm 13.2$  years, educational level: 88 cases below and 13 cases above middle school; in the observation group, 50 males and 51 women, with mean age of  $57.8 \pm 13.0$  years, educational level: 86 cases below and 15 cases above middle school. Inclusion criteria: all patients with autologous stenosis or blockage and balloon distension of arteriovenous fistula; exclusion criteria: pa-

tients with mental disorders, heart failure and hyperkalemia. As shown in **Table 1**, there was no statistical difference ( $P > 0.05$ ) in terms of age, gender, or educational level, which was comparable.

**Table 1.** Comparison of the general data between the two patient groups.

Constituencies	Number of examples	gender		Average age (Y)	Education	
		male	female		Secondary school and below	Secondary school or above
<b>Observation group</b>	101	50	51	57.8 ± 13.0	86	15
<b>Control group</b>	101	53	48	60.3 ± 13.2	88	13
<b>Statistical value P</b>	>0.05	>0.05	>0.05	>0.05	>0.05	

## 2.2. Methods

Control group take arteriovenous fistula balloon expansion of perioperative routine care, such as: responsibility nurse is mainly admission mission, perform the doctor's advice, improve the preoperative examination and preoperative preparation, postoperative monitoring of patients with arteriovenous fistula murmur, physical red light treatment, observation without bleeding, hematoma, infection, symptoms of patients with arteriovenous fistula self management knowledge mission.

Patients in the observation group were treated by the clinical care pathway. The Clinical care pathway table is as follows:

Patients in the observation group were treated by the clinical care pathway. On the first day of hospital admission, Introduce patients to the hospitalization environment, hospitalization related precautions, doctors and nurses in charge, Let the patient feel a sense of belonging, Establish a good nurse-patient relationship, To reduce the strangeness of patients coming to the hospital; Check the patient's internal fistula tremor, the time of occurrence, Understand the psychological status of the patient, According on the psychological status of the patient, Introduce patients to the case of patients with successful surgery, To reduce the psychological burden of the patients, Inform patients of adequate preoperative examinations, To the cooperation of patients, In the process of taking care for the patients, Inhere patients about self-management of arteriovenous fistula, For the knowledge points that patients do not understand. The next day, continue to improve the related examination, such as vascular colour to exceed, the doctor evaluates the patient's vascular condition, marking, open operation doctor, the nurse according to operation doctor to patients simple operation process and how to cooperate, inform patients and their families of anesthesia and possible adverse reactions after anesthesia. Inform the patient in the process of anesthesia, there may be some pain, immediately inform and remind the patient, relieve the patient to eliminate some restless mood, prevent

vasospasm caused by tension, and affect the patient's operation. Clean the skin before surgery, clean the limbs of the fistula side three times with soapy water, and trim the nails to reduce the risk of surgical infection. Day 3, the patient underwent the surgery, Patients were closely monitored for vital signs changes after surgery, Timely monitoring of internal fistula and tremor, Monitor the internal fistula tremor once hourly, A total of 6 times, The internal fistula tremor will be monitored in each shift later; And observe whether the surgical incision is bleeding, hematoma, subcutaneous congestion and other complications, Whether the tightness of the dressing dressing is appropriate, Limb swelling, etc.; Active care for the patient's pain profile, To administer pain medications if necessary, Avoid the pain from affecting the patient's sleep quality; At the first 24 h after the surgery, Keep the arm wound dressing on the internal fistulous side dry and clean, Reduce the risk of infection in the surgical incision; A dialysis was scheduled for the patient on the day after the procedure, Education on self-management of internal fistula, Use Jiang Huili [11] The compiled self-management scale of autologous arteriovenous fistula in maintenance hemodialysis patients evaluated the self-management knowledge of internal fistula, understood the patients' self-management knowledge of internal fistula, and taught the contents that were not mastered. Inform the patients to master the relevant knowledge of internal fistula, and conduct the internal fistula self-care is very important to protect the function of internal fistula [12] [13]; To observe whether the patients had subcutaneous hemorrhage and oral mucosal hemorrhage after using anticoagulant drugs, treated the patients with physical red light after surgery, and prepared before discharge, and assessed the self-management knowledge of arteriovenous fistula. On the fourth day, attention was paid to observing the occurrence of postoperative complications, monitoring the tremor of internal fistula, and still preparing for discharge. When the patient was discharged, the self-management knowledge of arteriovenous fistula was assessed, and the patient's family was informed to participate in the management and maintenance of arteriovenous fistula. To avoid complications due to bad habits and physical diseases, medical staff should be in patients with blood pressure, blood sugar, blood lipid condition periodic management, to delay the internal fistula vascular intimal hyperplasia, reduce vascular toughness, reduce internal fistula stenosis, acute embolism, aneurysm, acute heart failure and other related complications. Guide the patient to conduct monthly B ultrasound examination of arteriovenous fistula; blood calcium and phosphorus. For patients, smokers should be advised to quit smoking.

## **2.3. Effect Evaluation**

### **2.3.1. Observation Indicators**

Compare the five parameters of the two groups: 1) Relevant knowledge mastery; 2) average hospital days; 3) Satisfaction. 4) Complication rate; 5) Hospitalization day and hospitalization expenses.

### 2.3.2. Judgment Criteria

1) Knowledge of relevant knowledge: The self-management scale of autologous arteriovenous fistula compiled by Jiang Huili [13] was used to test the score. Patients with the higher the score, the better the knowledge effect. 2) Nursing satisfaction questionnaire: Taking the nursing work satisfaction questionnaire formulated by the First Affiliated Hospital of Jinan University, the nursing satisfaction is divided into four levels: very satisfaction: 95 - 100 points, satisfaction: 90 - 94 points, general: 80 - 89 points, dissatisfaction: 80 points below. 3) Complication rate: count patient presence of complications and calculate complication morbidity; 4) hospitalization days and hospitalization costs: count patient hospitalization days and hospitalization costs and calculate the average.

### 2.4. Statistical Analysis

Statistical analysis of the data was performed using the SPSS27.0 software. The count data describe the frequency and composition ratio; the data conforming to normal distribution are represented by the mean and standard deviation; the measurement data with biased distribution is described by the median (inter-quartile spacing); the measurement data are t test and the count data line  $\chi^2$  test. If  $P < 0.05$ , the difference is statistically significant.

## 3. Results

Five parameters between the two groups: 1) knowledge mastery; 2) average hospital days; 3) satisfaction. 4) Complication rate; 5) hospitalization days and hospitalization costs. The results are presented in **Table 2** and **Table 3**. In the observation group of the clinical care route of arteriovenous fistula, the observation indicators were significantly better than that of the control group, the complication rate of the observation group was 0%, significantly lower than the 9.9% rate of the control group, and there were no complications such as blockage, fever, bleeding and stenosis.

**Table 2.** Evaluation of the effect.

Constituencies	Score for mastery of relevant knowledge	Mean length of hospital stay (d)	Satisfaction			Hospitalization expenses (RMB)	
			dissatisfied	average	satisfied		very satisfied
Observation group	72.9 ± 5.4	4.9 ± 1.2	3	1	6	91	17664 ± 3754
Control group	59.9 ± 7.0	6.1 ± 3.9	2	6	22	10	23498 ± 12636
Statistical value P	<0.05	<0.05			<0.05		<0.05

**Table 3.** Complication rates.

Constituencies	Complication rate	Complications and number of people				
		blockage	fever	bleeds	narrow	other
Observation group	72.9 ± 5.4	0	0	0	0	0
Control group	59.9 ± 7.0	3	1	1	2	3
Statistical value P	<0.05			<0.05		

## 4. Discuss and Conclusions

In recent years, the incidence of chronic kidney disease has been increasing, posing a serious threat to human health and life [14]. Vascular access is the life-line of maintenance hemodialysis patients. For long-term hemodialysis patients, autologous arteriovenous fistula is the first choice, but the service life of autologous arteriovenous fistula is also limited, and stenosis or blockage may occur in the process of use, which may affect its dialysis effect. At present, arteriovenous fistula balloon expansion is the treatment of autologous arteriovenous fistula stenosis or blockage, this study through the preoperative, intraoperative, and postoperative periods of the nursing path, to evaluate the physical and mental condition of patients, timely find patients or possible problems, put forward targeted nursing measures [15] In order to improve the curative effect and reduce the risk of surgery.

The results of this study show the incidence of complications, cognition of arteriovenous fistula, average hospitalization days, hospitalization costs and patient satisfaction  $P$  are less than 0.05. Use clinical nursing path nursing to intervene for patients with autologous arteriovenous fistula balloon expansion, and there are preset clear nursing measures every day. The nursing work is purposeful and planned, so the effectiveness of nursing work is effectively guaranteed [16] [17]. It reduces the incidence of postoperative complications in patients with autologous arteriovenous fistula balloon expansion, improves the awareness rate of self-management knowledge of arteriovenous fistula, improves the quality of life of patients, extends the life of patients, reduces the burden of patients and society, and has clinical promotion significance.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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