

## Application of PICC Health Education Album to Patients in the Catheterization Period

Zhang Zhenxiang<sup>1</sup>, Wang Yanli<sup>2</sup>, Zheng Wei<sup>2</sup>, Li Junling<sup>2</sup>, Xu Hui<sup>1</sup>, Zhao Yanli<sup>1</sup>, Wang Xueying<sup>1</sup>, Huang Caihui<sup>1</sup>,  
Chen Jing<sup>1</sup>, Zhang Weihong<sup>1</sup>

<sup>1</sup>The Nursing College of Zhengzhou University, Zhengzhou, Henan 450052, China.

<sup>2</sup>The Second Affiliated Hospital of Zhengzhou University, Zhengzhou, Henan 450052, China.

[Zhangzx6666@126.com](mailto:Zhangzx6666@126.com)

**【Abstract】** Objective: To popularize the related knowledge of PICC and improve self-care abilities of patients in the catheterization period. Methods: 256 patients received health education by three-day training, questionnaire and follow-up consultation. The patients were randomly divided into the experimental group (n=128) and the control group (n=128). Health education album was used in the experimental group, while common PICC publicity materials were used in the control group. The incidence of PICC complications and indwelling time were analyzed. Results: The complications incidence of the experimental group is 11.72%, which is significantly lower than 24.22% of the control group ( $P < 0.01$ ). The average service time of the catheter of the experimental group is longer than that of the control group ( $P < 0.05$ ). Conclusions: Application of PICC health education album in patients can reduce the incidence of complications significantly and prolong the indwelling time of the catheter.

[Zhang Zhenxiang, Wang Yanli, Zheng Wei, Li Junling, Xu Hui, Zhao Yanli, Wang Xueying, Huang Caihui, Chen Jing, Zhang Weihong. **Application of PICC Health Education Album to Patients in the Catheterization Period.** Life Sci J 2012;9(1):87-90] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 15

**【Key words】** : Catheterization; Central Venous; Health Education; Complication

Peripherally inserted central catheter (PICC) is a kind of technology to establish an intravenous access by a peripherally inserted central venous catheter <sup>[1]</sup>. PICC has been widely used in clinical practice with safe, reliable, easy operation, a catheter success rate, etc. Especially those with chronic diseases require long-term treatment of venous access <sup>[2]</sup>. However, complications, such as mechanical phlebitis, catheter infection, catheter blockage, venous thrombosis, infection, etc., may still occur, affecting the treatment effect <sup>[3]</sup>. The contents and methods of health education to the patients in the catheterization period can greatly influence the solution to this problem. To popularize the PICC-related knowledge, reduce complications and improve the service time of the catheter, our department reformed and designed PICC health education album, implemented standard health education by the responsible nurses, and have achieved better effects. This study is reported below.

### 1. Objects and Methods

#### 1.1 Objects

256 hospitalized patients with indwelling PICC catheters were recruited between May, 2005 and March, 2008 for the study. The patients were randomly divided into the experimental group (n=128) and the control group (n=128). The experimental group: 78 males, 50 females, aged 18 to 87, 96 tumor cases, 32 blood diseases cases. The control group: 77 males, 61 females, aged 16 to 85, 90 cancer cases, 38 blood diseases cases. Among the 256 cases, there were

178 basilic vein cases, 59 median cubital vein cases, and 19 cephalic vein cases. There were totally 151 right arm puncture cases and 105 left arm puncture cases. The same type of catheters was used in the two groups and the catheters were all fixed with 3M transparent film. During the catheterization period, all the dressings were changed twice a week. Statistically, there was no significant difference between the two groups in age, gender, illness and intubation positions, etc. ( $P > 0.05$ ).

#### 1.2 Method

Health education album was used in the experimental group, while common PICC publicity materials were used in the control group. Two groups were all educated by 3 days training, questionnaire and follow-up consultation.

##### 1.2.1 Design of PICC Health Education Album

PICC health education album was designed following these four principles below: ① being practical. This is the first principle for the design of the PICC health education album, for the album is the main tool of doing health education to PICC catheter patients. The design should emphasize on being practical, so that patients would like to read it and were able to understand it. And then patients would use the knowledge contained in the album in their daily treatment, care and life. ② being patient/family-oriented. PICC health education album is designed for catheter patients and those who are

interested or have the intention of catheterization. Its purpose is to improve the service time of the catheter and reduce complications. Therefore, the overall style, degree of difficulty and reading volume of the album should be designed according to physical and mental conditions, and the receptive ability of patients in order to facilitate the popularization and promotion of PICC knowledge. ③ being innovative. In addition to conventional textual content, a large number of instance pictures were inserted into the album, which made the album easy to understand and full of the artistic beauty. ④ being educational. At the end of each chapter of the album, exercises, including sentence completion multiple choices, etc., were specially designed to help the reader better grasp the knowledge.

### **1.2.2 Specifications of PICC Health Education Album**

Specifications: 16 mo, 32 pages, 4 chapters including the introduction, puncture, hospital care and home care.

#### **1.2.2.1 Introduction (Chapter 1)**

This chapter covered the structure, materials, principles, catheterization methods and process, superiority, necessity and possible complications of the PICC catheter, so that patients and their families could have a comprehensive and correct understanding of PICC.

#### **1.2.2.2 Puncture (Chapter 2)**

This chapter covered the preparatory work that the doctors, nurses, patients and their families should do before the puncture, such as assessment of the patient's condition, course of treatment, overall body condition and venous conditions, prescription given by the doctor, the informed consent form, selection of appropriate catheters, etc. The puncture process was also covered, including informing the nurse if something uncomfortable happened, no moving of the body at will, no touching of the sterile area and sterile stuff, cooperating with the nurse, etc. These following were also covered: undergoing X-ray after the puncture, doing required exercise, reporting body and puncture side limb conditions objectively and normal ooze blood.

#### **1.2.2.3 Hospital Care (Chapter 3)**

This chapter is the core part of the album, introducing the PICC catheter care in the hospital. ① pressure bandage is required within 24h after catheterization to prevent the puncture point from bleeding, during which the nurses must observe the blood circulation of bandaged limbs closely. If the

patient feels the bandage is too loose or too tight, he should promptly inform the nurse to get appropriate treatment. ②Patients should be guided and assisted to do appropriate arm-relieving circular exercise after 24h to increase the catheter compliance, promote blood circulation, and reduce the incidence of thrombosis.③Heavy lifting and strenuous exercise by the punctured arm are not allowed to prevent catheter extrusion and displacement. Stillness is also not promoted. The patient can engage in normal daily work, household chores and physical activity, but swimming, bath, heavy blow to and long-time press on the puncture point should be avoided. Patients can shower with the catheter, but the puncture point should be wrapped in plastic wrap. Patients should get dried timely after the shower and check the wound dressing. If the dressing is wet, curling or loose, it should be replaced timely, for it is necessary to maintain the dressing clean, dry, and secure. Patients should dress or undress gently. When dressing, dress the punctured arm first, and vice versa. ④Patients should also be taught to do self-observation. Local pain, redness, bleeding, back-flow of blood, arm swelling, loose joints, ect. should be reported to nurses promptly. ⑤ During patients' stay in the hospital, patients and families should be trained to master PICC nursing knowledge and simple operations, such as changing the dressing, washing the catheter, sterilizing the catheter, fixing the catheter, observe the condition of the catheter and the puncture point, etc, to lay a foundation for the PICC home care.

#### **1.2.2.4 Home Care (Chapter 4)**

This chapter is an important part of the album, for most cancer patients will go home between chemotherapy sessions and thus the PICC management level of the hospital directly affects the incidence of complications and the service time of the catheter. ① The importance of care outside the hospital should be emphasized to improve the compliance of patients and their families. Patients should be told to have better nutrition, keep a happy and optimistic mood, do appropriate activities and sports, pay attention to personal and family sanitation, and avoid going to crowded public places and various infection factors.②The catheter should be carefully maintained. Patients should live by the standards of the hospital to protect the puncture point and the catheter. Patients and their families should come back to the hospital twice a week to wash the catheter, change the dressing etc. If patients can't return to hospital, the local hospital should be contacted for help. If the back-flow of blood, drainage, joints' falling off are present, patients should contact the medical staff to get professional guidance and help.

### 1.2.3 Application Methods of PICC Health Education Album

#### 1.2.3.1 Verbal Explanation with the Album before Catheterization

Using PICC health education album, nurses should educate patients and their families that have reading ability. Full-time nurses explain the puncture process to patients. During the explanation, patients' depression period and professional terms should be avoided. Health education should be carried out step by step to let patients develop their understanding in a progressive way. Nurses should answer the questions raised by patients and their families carefully and patiently until they understand and are willing to cooperate.

#### 1.2.3.2 3- day Training Method and Questionnaire Method

A training cycle includes education, correction and guidance, and assessment. On the same day after the catheterization, full-time nurses would explain the hospital care chapter of the health education album with easy language step by step. On the second day, patients and their families would be asked questions to test their mastery of the knowledge and guidance would be provided if necessary. On the third day, a questionnaire based on the exercises at the end of the chapters of the album would be carried out to test their mastery of the knowledge. Before the discharge, a questionnaire would be carried out again after 14-21 day of the catheterization. It is required that patients' awareness rate of PICC knowledge be more than 80%. Many later opportunities would also be used to organize patients to review the knowledge and learn the fourth chapter of the album.

#### 1.2.3.3 Follow-up counseling and Telephone Interview

When in the hospital, patients can study repeatedly the hospital care and home care chapters in the health education album. Responsible nurses can be counseled during the treatment and care. Before the discharge, nurses should reconfirm the PICC knowledge of patients and their families, and write the important points into the patients' manual for their

later use. After the discharge, weekly telephone interview would be carried out by responsible nurses to understand patients' health conditions. Questions raised by patients about PICC catheter maintenance would be answered by nurses during the telephone interview and professional guidance could also be provided.

### 1.3 Evaluation Methods and Indicators

A patient satisfaction survey was carried out. The questionnaire was designed according to the literature<sup>[6]</sup> and features of the hospital. A pre-survey was carried out in 10 patients and then the questionnaire was modified for formal use. The survey mainly covered patients' understanding of PICC, patients' feelings, situations of their catheters, patients' concerns and evaluation of the nurses. The judgment criterion of PICC complications is the occurrence of phlebitis, local infection, catheter blockage, partial thrombosis, and catheter prolapse during and after the catheterization.

### 1.4 Statistical Analysis

The software SPSS 10.0 and contingency table methods were adopted during the statistical analysis. X<sup>2</sup> test was adopted for the incidence of complications, t test for the indwelling time of the catheter.

## 2 Results

### 2.1 PICC Health Education Album Questionnaire

PICC health education album appealed to the majority of patients and their families, because it is innovative, illustrated and easy to understand. The experimental group showed great enthusiasm in the learning process of PICC-related nursing knowledge, their awareness rate in the questionnaire being 80% (102/128).

### 2.2 The incidence of complications

As is shown in Table 1, statistically, the complication incidence of the experimental group (11.72%) is significantly lower ( $P=0.009$ ) than that of the control group (24.22%).

**Table 1.** Comparison of the Incidence of Complications between the Experimental Group and the Control Group [n(%)]

group	n	phlebitis	catheter infection	catheter blockage	partial thrombosis	catheter extrusion	total
Experimental group	128	8 (6.25)	3 (2.34)	2 (1.56)	1 (0.78)	1 (0.78)	15 (11.72)
control group	128	17 (13.28)	6 (4.69)	3 (2.34)	2 (1.56)	3 (1.56)	31 (24.22)
<i>Value of X<sup>2</sup></i>		3.591	1.036	0.024	0.337	1.016	6.784
<i>Value of P</i>		0.058	0.039	0.652	0.561	0.313	0.009

### 2.3 Indwelling Time of the Catheter

Indwelling time of the catheter of the experimental group was 14-387 d, mean (172.18 ~ 9.29) d; Indwelling time of the catheter of the control group was 15-134 d, mean (103.56 ~ 7.87) d. The difference was statistically significant ( $P=0.018$ ).

### 3. Discussions

PICC has been used in the clinical practice for many years, and its technology is becoming more and more mature day by day. Some patients would go home with a catheter between chemotherapy sessions, so the correct care after the catheterization is very important<sup>[7]</sup>. But complications and accidents always happen after the catheterization, especially in the home care stage, which shortens the service time of the catheter<sup>[8]</sup>. Health education album which was easy to understand was used to do professional knowledge training in the experimental group. The survey showed that this method greatly improved patients' compliance and satisfaction rate, increased their self-care ability, reduced complications and extended the service time of the catheter. Fan Ruixia and others<sup>[9]</sup> believe that patients' lack of self-care ability is related to the health education methods in the period of catheterization. The study of An Zhijie<sup>[5]</sup> showed the application of home care album in the health education of patients with catheter had remarkable achievements. Self-care ability of patients had been greatly improved and the problem ratio decreased significantly. Yap et al<sup>[10]</sup> reported that certain measures, such as health education, can reduce the incidence of complications.

The PICC health education album we designed was practical, patient/family-oriented, innovative, educational and illustrated. The implementation of systematic and standard health education with album effectively improved patient's compliance and self-care ability, significantly reduced the incidence of complications and extended the service time of the catheter, which showed the superiority and practicality of health education album.

### Acknowledgements:

The authors would like to acknowledge the work was supported by Henan Province Science and Technology Agency (No. 092300410223; 102102310121).

### Corresponding Author:

Dr. Zhang Weihong  
School of Nursing, Zhengzhou University  
Zhengzhou, Henan 450052, China.  
E-mail: [zwhong306@zzu.edu.cn](mailto:zwhong306@zzu.edu.cn)

### References:

- [1] Yuan Ling, Ye Huihua, Ye Ming-Chi, etc. Cause Analysis and Nursing of Complications caused by PICC Catheter Displacement in Tumor Patients [J]. Journal of Nurses Training, 2004, 19 (2):178-179.
- [2] Islam S, Loewenthal MR, Hofman GR. Use of Peripherally Inserted Central Catheters in the Management of Recalcitrant Maxillofacial Infection [J]. J Oral Maxil Surg, 2008, 66(2):330-335.
- [3] Wu Hongjuan, Chen Xuefeng, ZhangMeiying, etc. Main Complications and Related Factors of Cancer Patients with Indwelling PICC Catheter[J]. Chinese Journal of Nursing, 2008;43(2):134-135.
- [4] Chen Mingfang, Wang Li, Chen Shuqiao, etc. Health Guidance to Cancer Patients with Peripherally Inserted Central Venous Catheter (PICC) after Discharge [J]. Harbin Medical Journal.2008,28 (2):65.
- [5] An Zhijie, Chen Peng, Hou Jing. The Application and Experience of Home Care Ablum in Patients with Indwelling PICC Catheter [J]. Journal of Nursing Administration. 2008,8 (5):44-45.
- [6] Li Chuanhua, Li Aimin, Wu Fenglian. Assessment of Effects of Standard Health Education in Patients with Indwelling PICC Catheter [J]. Journal of Medical Forum, 2008. 29 (5):115-116.
- [7] Huang Yingxun. Anatomical Observation of Superior Vena Cava and Its Major Tributaries [J]. Health Vocational Education, 2004,22 (12):103.
- [8] Liang Jing, Liu Yu. Research on Nurses' Mastery of Peripheral Central Venous Catheter Knowledge [J]. Journal of Nursing Administration, 2004,4 (8):9-10.
- [9] Fanrui Xia, Zhang Hongmei, Liu Hong. Problems and Countermeasures in PICC Catheterization [J] Chinese Journal of Misdiagnostics, 2008, 8 (20):4887-4888.
- [10] Yap YS, Karapetis C, Lerose S, et al. Reducing the Risk of Peripherally Inserted Central Catheter Line Complications in The oncology Setting[J]. Eur J Cancer Care(En ), 2006,5(4):342—347.