



Application Analysis of Linkage Nursing Management Model in PICC Management of Pediatric Hematological Tumor Chemotherapy

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Abstract

Objective: To explore the effect of applying the linked nursing management model in PICC management of pediatric hematological tumor chemotherapy. **Methods:** From January 2023 to January 2024, 90 children with hematologic tumors receiving chemotherapy with PICC were randomly divided into 2 groups with 45 cases in each group. The control group received conventional management mode and the observation group received linkage nursing management mode. The management effects of the two groups were compared. **Results:** In terms of complications, the observation group was lower than the control group, and the difference between the groups was significant ($P < 0.05$); in terms of PICC catheterization time, the observation group was longer than the control group, and the difference between the groups was significant ($P < 0.05$). **Conclusion:** The application of the linked nursing management model in PICC management of pediatric hematological tumor chemotherapy can reduce complications and prolong catheterization time, and is worthy of recommendation.

Keywords

Linked nursing management model; Pediatrics; Hematological tumors; Chemotherapy; PICC management

Peripherally inserted central catheters (PICCs) have the advantages of low infection rate, small incision, safety, and convenience, and are widely used in clinical tumor chemotherapy, especially for critically ill patients [1]. Children are indeed in a special period of growth and development. Compared with adults, their blood vessels are relatively thin, their skin is more delicate than that of adults, and they are more susceptible to injury and infection. In addition, children have poor restraint ability. Their hyperactivity and curiosity may lead to complications such as accidental extubation, affecting the treatment process and increasing unnecessary medical burden. In order to ensure the safety, effectiveness and long-term use of the catheter during the catheterization period, it is necessary to combine effective management measures [2]. The linkage nursing management model is a comprehensive nursing management method that emphasizes close cooperation and coordination between medical institutions, communities, different nursing teams and patient families, optimizes processes, provides treatment guidance to patients in a new model, meets the diverse nursing service needs of patients, and further improves the quality of nursing work [3]. To this end, 90 children with hematological tumors who received PICC chemotherapy were selected as the sample of this study to further explore the application results of the linkage nursing management model during the catheterization period of children. The specific report is as follows.

1. Materials and methods

1.1 Study subjects

From January 2023 to January 2024, 90 children with hematological tumors who received PICC chemotherapy were randomly divided into 2 groups, 45 in each group. The control group had 25 males and 20 females, aged 6 months to 12 years, with an average age of (6.39 ± 0.37) years. The observation group had 24 males and 21 females, aged 7 months to 13 years, with an average age of (6.58 ± 0.46) years. The general data of the two groups were compared ($P > 0.05$). This study was approved by the ethics committee of our hospital, and the parents of the children voluntarily participated in the study after knowing the purpose, method, and possible complications of the operation.

Inclusion criteria: (1) stable condition; (2) complete data; (3) able to accept follow-up.

Exclusion criteria: (1) expected survival time less than three months; (2) patients who dropped out midway.

1.2 Treatment

The control group received routine management. On the day the children were discharged from the hospital, health education was provided to their parents, with emphasis on the maintenance methods of storage and keeping the puncture site clean and dry. They were instructed to master the response methods for emergencies. If the catheter was dislocated, they should go to a nearby hospital for treatment in time. Children should rest during the PICC catheterization period.

The observation group adopted a linkage nursing management model.

- (1) Establishment of a management team: Pediatric departments in hospitals, communities, and primary care units should jointly define cooperation goals, establish cooperative relationships, collect the medical history and basic information of children, and establish management files.
- (2) Improve the skills of community nursing staff. Organize community nursing staff to participate in training, focusing on explaining the theoretical knowledge of PICC placement (definition of PICC placement, catheter characteristics, indications and contraindications) and related nursing operation skills such as catheter maintenance. Through simulation experiments, further improve the professional skills of nursing staff.
- (3) Strengthen the safety maintenance of PICC catheters by parents of sick children. Invite pediatric experts or senior doctors to provide relevant theoretical knowledge training in the community and through remote teaching, including: basic knowledge of PICC, medication guidance, dietary guidance, daily care, etc. Patiently answer any questions raised by parents of sick children.
- (4) PICC catheterization care content: ① Before catheterization. The disease and the toxic side effects of chemotherapy drugs not only have a great impact on the child's physiology, but also easily cause the child to cry and reduce his or her cooperation. Carry out individualized psychological counseling according to the age characteristics of the child. For infants and young children, use games and other methods to alleviate the child's sense of rejection and fear. For older children, use more praiseful language to give the child more encouragement and affirmation so that he or she can actively cooperate with the treatment. Use simple and easy-to-understand language to explain the disease-related knowledge and the purpose and advantages of catheterization to the child's parents, listen patiently to the child's parents' speeches, respond with a smile at the right time, build a good nurse-patient relationship, and obtain the cooperation of the patient and his or her parents. ② During catheterization. It is necessary to closely observe the child's breathing and expression. For older children, you can divert their attention by choosing topics that the child is more interested in, and encourage the child to share his or her own thoughts and feelings to reduce the child's tension. For infants and young children, you can help them relax by playing cartoons and soothing music. When performing puncture and catheterization, the nursing staff should make the puncture action gentle and accurate, and reasonably adjust the angle of the needle sheath according to the specific situation of the child and the vascular conditions to improve the success rate of one-time puncture and catheterization. ③ After catheterization. The frequency of dressing change is once / 24 h, and the puncture site is carefully checked for abnormal conditions such as redness, swelling, pain, exudation, etc. If abnormal conditions such as nodules and lumps occur, hydrocolloid excipients should be used for protection to avoid phlebitis. ④ Actively deal with complications. When the patient is suspected of concurrent infection, blood samples should be collected from the patient and blood culture should be performed immediately. If the infection is more serious, it is necessary to consider removing

the catheter, and give the child individualized antibiotics for treatment according to the blood culture results; when the catheter is blocked, urokinase should be used for thrombolysis as soon as possible, and the child's reaction and symptoms should be closely observed to restore the patency of the catheter; nursing staff should remain vigilant and regularly observe the patient's puncture site, especially 3 days after PICC puncture and catheterization, increase the frequency of ward rounds, and if pain, redness, swelling, etc. are found at the puncture site, apply Hirudo to relieve the patient's symptoms. In the early stages of phlebitis, if circumstances permit, the tube should not be removed as much as possible.

1.3 Evaluation criteria

The incidence of phlebitis, catheter-related infection, catheter dislocation, blockage, and venous thrombosis was compared between the two groups. In addition, the PICC placement time was compared between the two groups.

1.4 Statistical methods

This expression is fixed: SPSS 26.0 statistical software was used for data analysis. The measurement data (including PICC catheterization time) that conformed to the normal distribution were expressed as $\bar{x} \pm s$, and the inter-group comparison was performed using the t test; the enumeration data (including complications) were expressed as n (%), and the inter-group comparison was performed using the test. $P < 0.05$ was considered statistically significant.

2. Results

2.1 Complications analysis

The incidence of complications in the observation group was lower than that in the control group, and the difference between the groups was significant ($P < 0.05$). See Table 1.

Table 1. Compare the incidence of complications between the two groups [n (%)]

Group (number of cases)	Phlebitis	Catheter-related infection	Blocked duct	Catheter prolapse	Venous thrombosis	Overall incidence
Control group (n = 45)	2	1	4	3	1	11 (24.44)
Observation group (n = 45)	0	1	0	1	0	2 (4.44)
<i>t</i>						7.316
<i>P</i>						<0.05

2.2 Analysis of PICC catheterization time

The PICC catheterization time of the patients in the observation group was (114.43 ± 9.82) days, which was longer than that of the control group (83.64 ± 8.28) days. The difference between the groups was significant ($P < 0.05$).

3. Discussion

The good biocompatibility and corrosion resistance of PICC catheters can ensure the safe use of chemotherapy drugs. For patients who need long-term chemotherapy, PICC catheters can avoid the pain of frequent punctures [4], while reducing the risk of infection, greatly reducing the pain and inconvenience of children. Although PICC catheters have brought many conveniences to children who need long-term intravenous infusions and shortened the pain time for children, as a central venous catheterization procedure, if improperly operated or poorly managed, it is prone to complications such as catheter dislocation, catheter blockage, and infection [5].

The hospital-community-based linkage nursing management model is to integrate the resource advantages of hospitals and communities as an organic whole, realize the sharing of medical resources [6], and emphasize the continuity of services, so as to provide children with continuous, personalized and comprehensive health services, ensure that children can receive appropriate care at different stages of treatment, and further improve the quality of medical services [7]. The results of this study showed that the incidence of complications was lower after the implementation

of the linkage management model, and the PICC catheterization time of children was significantly extended. The linkage nursing management model promoted communication and cooperation between medical institutions, and jointly formulated and implemented personalized nursing plans for children. At the same time, it focused on the professional skills training of community nursing staff, improved their nursing skills and knowledge level, ensured that children received high-quality nursing services, and to a certain extent reduced complications caused by improper nursing. At the same time, under the linkage nursing management model, health records were established to achieve information sharing, ensuring that children could receive continuous nursing services after discharge, such as catheter maintenance and complication treatment. We should also strengthen communication with parents and children, stabilize the mentality of children, improve the cognitive ability and self-care ability of family members, and enable them to better understand and cooperate with medical care. The linkage management model can timely detect and deal with the risks that patients may have, and actively prevent and deal with complications. In the management of PICCs for pediatric hematological tumor chemotherapy, the implementation of the linkage management model can reduce the incidence of complications and prolong the PICC catheterization time of children [8].

In summary, the linkage management model promotes cooperation among different medical institutions, helps reduce complications in PICC management for pediatric hematological malignancy chemotherapy, prolongs catheterization time, and ensures that children receive the best medical services. It is a method worthy of promotion and application.

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