Analysis of quality control group of departments on improving effect of PICC maintenance quality in outpatient children with tumor

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To explore the clinical effect of quality control group of departments on improving PICC maintenance quality in outpatient children with tumor. Methods: A total of 4100 children with tumor who were treated in our outpatient department of intravenous therapy from January to December 2020 were divided into observation group (July to December 2020: after the establishment of quality control department) and control group (January to June 2020: before the establishment of quality control group of departments). In the control group, conventional PICC treatment management and maintenance measures were used. In the observation group, quality control group was used to manage, and moreover, the PICC maintenance quality, the incidence rate of PICC-related risk events and the level of PICC maintenance knowledge and satisfaction evaluation were compared between the two groups. Results: (1) Comparing the PICC maintenance quality between the two groups, the rate of absence of PICC maintenance during the course of tumor management in the observation group (1.14%) was significantly lower than that in the control group (4.00%), and there was significant difference in the PICC maintenance quality between the two groups (P<0.05). (2) Comparing the relative indexes of children with tumor: Before intervention, there was no significant difference in the relative indexes of children with tumor (PICC maintenance knowledge level) between the two groups (P>0.05), but after intervention, the relative indexes of children with tumor (PICC maintenance knowledge level, and service evaluation recognition degree) in the observation group were significantly higher than that in the control group (P<0.05). (3) Comparing the probability of PICC-related risk events between the two groups: In the course of tumor management, PICC-related complications were observed in the observation group (3.59%, 3.18%), which were significantly lower than those in the control group (11.95%, 11.37%) (P<0.05). Conclusion: The application of quality control group of departments in the management of PICC in outpatient children with tumor has obvious clinical effect. It can effectively improve the level of maintenance knowledge and service satisfaction of family members, optimize the quality of maintenance, reduce the rate of lack of maintenance and risk related to PICC, and is worthy of being popularized in clinical practice.

Keywords: Quality control group of departments; Outpatient children with tumor; PICC; Maintenance quality
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PICC is the venous catheter which is inserted into the center through peripheral puncture. It is mainly made of silica gel and has the advantages of soft, good elasticity and less vascular irritation. It can establish reliable venous access for children and can

maintain high-quality treatment of middle-term and long-term intravenous infusion to ensure the safety of infusion [1-3]. PICC catheter insertion technique is gradually widely used in children with clinical tumor chemotherapy in China, but PICC is very easy to develop related complications and aggravate the patient's condition. Therefore, in order to ensure the treatment safety of children, it is necessary to deeply study the prevention and treatment measures of complications. Continuous updating of vascular access devices has been shown to reduce PICC-related complications, and it is therefore necessary to improve the PICC maintenance quality [4-5]. The quality control work of the department is to optimize the nursing workflow and control the nursing risks. However, the quality control group of departments can manage the PICC maintenance process by analyzing the actual maintenance problems, with targeting and professionalism. Based on this, this study will analyze the clinical effect of quality control group of departments on improving the PICC maintenance quality in outpatient children with tumor. The study results are as follows:

DATA AND METHODS

General data

A total of 4100 children with tumor who were treated in outpatient PICC center from January to December 2020 were divided into observation group (July to December 2020: after the establishment of quality control department) and control group (January to June 2020: before the establishment of quality control group of departments). In the observation group, there were 2200 cases with sex ratio (male / female) 1340/860, the age and average age ranged from 2 months to 15 years (9.43 ± 2.11); in the control group, there were 1900 cases with sex ratio (male / female)1120/780, the age and mean age ranged from 3 months to 14 years (9.48 ± 2.03). The difference of baseline data between the two groups was small (P>0.05).

Inclusion criteria: (1) The children met the relevant tumor diagnosis criteria in "Tumor Diagnosis"[6]; (2) The patients received PICC puncture in our hospital for the first time; (3) The family members of the children signed the informed consent form.

Exclusion criteria: (1) Patients with contraindications to PICC catheter insertion, such as catheter-related infection, poor body quality and allergy to catheter materials; (2) Patients requiring vascular surgery during catheter insertion; (3) Patients with previous radiotherapy at puncture site; (4) Patients with early kidney disease or receiving dialysis therapy.

Methods

Control group: Prior to the establishment of quality control group of departments, follow the routine treatment management and maintenance measures of PICC, including standard operation in accordance with relevant standards and requirements for drug change and dressing change of PICC catheter.

For the observation group, the quality control group of departments shall be used to strengthen the management, and the operation is as follows:

① Set up the quality control group of department: The members of the group are composed of the head nurse with solid theoretical knowledge, skillful professional skills and strong sense of responsibility, and the head nurse is the person in charge of the outpatient department of intravenous therapy. The quality control group of departments shall be responsible for analyzing the maintenance operation process and the causes of complications of PICC, formulating quality control countermeasures and evaluation criteria, proposing rectification suggestions, strictly managing PICC specialist, and further standardizing the maintenance and treatment operation. The specific content includes formulating and implementing member training plan, formulating quality control evaluation criteria, conducting quality control assessment regularly, publicizing the results regularly, and improving the quality continuously.

② Specific operation procedures and quality control of PICC maintenance: first, strengthen member training, and conduct standard training for the professional operation of quality control group of department. The training contents include

theory, actual operation, treatment of complications and response measures. It is necessary to conduct centralized training each month, and implement updated PICC maintenance procedures. Second, standard PICC maintenance operation procedure shall be established according to the discussion results. The dressing shall be replaced 24h after puncture, and the dressing shall be changed every 7d. The condition of dressing shall be closely observed in daily life, and it shall be replaced at any time in case of loosening or dampness, and include rationality of venous access, normalization of catheter insertion method, experience of catheter insertion for children, nursing record, safety event report, emergency plan for adverse reaction and health education. The third is quality control assessment. The clinical catheter nurse shall regularly monitor the placement of the child's catheter, detect whether there is blood leakage, exudate and swelling at the puncture point, and take the initiative to timely make preventive nursing. For the quality control problems during daily examination, it is necessary to timely feed back to the head nurse; it is necessary to observe the PICC maintenance of the child every week, including the operation standardization and maintenance deficiency of clinical nurse; random inspection shall be conducted on the child by the random responsible person on a monthly basis. Examine the accuracy of clinical nurses' maintenance operation and the writing quality of nursing medical records, and make summary and statistical analysis on the incidence rate of overall maintenance missing events and PICC-related risk events, so as to formulate the next quality control main research topic. Every quarter, it is necessary to publicize the control results of PICC maintenance quality, feedback the quality improvement of maintenance, discuss the existing problems and causes of PICC maintenance, propose effective improvement plans, track the implementation results of improvement plans and continuously improve the quality of PICC maintenance.

Observation criteria

The main results were as follows: (1) Comparing the PICC maintenance quality between the two groups: the quality index was evaluated by the incidence of maintenance loss, and the higher the rate of maintenance loss was, the worse the quality of maintenance is. The events of maintenance loss include failure to flush the tube on time, loosened dressing without replacement or contamination without treatment, blood exudate without treatment, etc.

(2) Comparing PICC maintenance knowledge level and satisfaction evaluation between family members of the two groups: Maintenance knowledge level evaluation was self-designed according to the PICC daily management information scale by Zhang Lili [7], which was filled out by family members and collected on the spot. The scale consists of three dimensions: knowledge, attitude, and behavior (8, 4 and 9 items, respectively). Each item is rated by a 5-point scale with a full score of 105. The higher the score is, the higher the family's PICC maintenance knowledge level will be. The self-made evaluation questionnaire of our hospital was used to evaluate the satisfaction, including etiquette (20 points), nursing service attitude (40 points) and professional skills (40 points). A percentage system is set up, the higher the score, the higher the family members' evaluation of the nursing service.

(3) Comparing the incidence rate of PICC-related risk events between the two groups: The risk events include complications and adverse reactions; the complications include catheter-related blood stream infection, phlebitis and local redness and swelling; the adverse reactions include catheter blocking (PICC cannot be pushed in or the injection speed is extremely slow), early extubation and catheter misplacement.

Statistical methods

The study data of children with tumor were included into SPSS23.0 software for analysis. The measurement data (PICC maintenance knowledge level and satisfaction) were compared by t test, the knowledge level and satisfaction were expressed by ($\bar{x} \pm s$), the count data (maintenance quality and

risk events) were analyzed by $\chi 2$ test, the incidence rate and maintenance loss rate were expressed by rate (%), and the difference was statistically significant ($P<0.05$).

RESULTS

Comparison of PICC maintenance quality between children with tumor in the two groups

The rate of absence of PICC maintenance during the course of tumor management in the observation group (1.14%) was significantly lower than that in the control group (4.00%), and there was significant difference in the PICC maintenance quality between the two groups ($P<0.05$). See Table 1.

Comparison of correlation index between family members of children with tumor in the two groups

Before intervention, there was no significant difference in the relative indexes of children with tumor (PICC maintenance knowledge level) between the two groups ($P>0.05$), but after intervention, the relative indexes of children with tumor (PICC maintenance knowledge level, and service evaluation recognition degree) in the observation group were significantly higher than that in the control group ($P<0.05$). See Table 2.

Comparison of PICC-related risk event rates in children with tumor in both groups

The PICC-related complications occurred in the children with tumor in the observation group (3.59%, 3.18%) were significantly lower than those in the control group (11.95%, 11.37%) ($P<0.05$). See Table 3.

DISCUSSION

The incidence of cancer is increasing year by year due to factors such as lifestyle and environmental pollution. Chemotherapy is a common means of clinical treatment, but for children, it is very easy to develop vascular stimulation intolerance and aggravate the adverse reactions of chemotherapeutic drugs. Therefore, PICC catheter placement is used in clinical practice to reduce the possibility of chemotherapeutic drugs stimula ting blood vessels. It is also clinically proved that PICC plays an important role in rescuing critically ill children, monitoring and administering parenteral nutrition therapy, tumor chemotherapy, etc., and this treatment can be remained for a long time, reducing the stimulation of drugs to blood vessels, but this method is easy to develop related complications and aggravate disease burden [8-10]. Relevant studies concluded that daily maintenance and standard maintenance of PICC can reduce the risk of related complications [11-12]. Therefore, this study applies the quality control group of departments to PICC management for outpatient children with tumor, further standardize the maintenance operation, and obtain the results that the quality control group of departments can improve the PICC maintenance quality.

Quality control group of departments is based on systematic, scientific and advanced nursing concept to carry out PICC maintenance nursing management, directly control to all PICC maintenance related nursing staff, train the enthusiasm, professionalism and responsibility of nursing staff, improve the safety consciousness of nursing staff and give full play to the maximum efficacy of nursing staff [13]. After the establishment of the quality control group of departments, the whole nursing staff is required to participate. The head nurse is the person in charge of the outpatient department for venous therapy, and the head nurse has the ability to detect the obvious and hidden problems from the macroscopic point of view, and put forward the effective plan in time, so as to urge the quality control management for the rapid implementation, while the members of the group participate in the problem discussion, implementation and inspection of the whole process, so that they can fully recognize their own deficiencies, which can not only significantly improve the nursing ability of nursing staff, but also improve the motivation and initiative of nursing staff [16].

The results of this study showed that the rate of loss of PICC maintenance during the management of children with tumor in the observation group (1.14%) was significantly lower than that in the control group (4.00%) ($P<0.05$). The reason is

that after the quality control group of departments is established, all the members of the team shall participate in the maintenance management, implementation and monitoring process, find out the potential problems in maintenance operation, propose targeted and effective scheme for improvement, trace the results of improvement, improve the quality of maintenance, eliminate the hidden hazards of nursing safety and reduce the loss rate of maintenance [14-15]. The level of family members' PICC maintenance knowledge in the observation group was significantly higher than that in the control group, and the degree of family members' evaluation of PICC maintenance quality in the observation group was higher than that in the control group ($P<0.05$). The reason is that the establishment of quality control group of departments is beneficial to the construction of nursing department and the improvement of comprehensive quality of nursing staff, among which the satisfaction of the children's family is one of the important directions of the quality control of the department. A series of effective nursing measures are adopted to improve the satisfaction evaluation of the department, with the patient as the center, to improve the satisfaction of the children's family. At the same time, the family members of the child patient, as the main caregiver of the child patient, need to participate in the PICC maintenance process together with the nursing staff. Therefore, the nursing staff can establish further close contact with the family members through strengthening health education, gradually permeate and affect the cognition of the family members to the disease, and then ensure that the maintenance quality is further improved. The PICC-related complications occurred in the children with tumor in the observation group (3.59%, 3.18%) were significantly lower than those in the control group (11.95%, 11.37%) ($P<0.05$). The reason is that the quality control group of departments can promote scientific management, fully mobilize the enthusiasm of nursing staff, consciously improve the monitoring and nursing behavior and quality consciousness, properly carry out the prevention of PICC complications, timely find out the adverse signs of PICC and intervene, then comprehensively reduce the nursing risk events and improve the PICC maintenance quality.

In conclusion, the application of quality control group of departments in the management of PICC in outpatient children with tumor has obvious clinical effect. It can effectively improve the level of maintenance knowledge and service satisfaction of family members, optimize the quality of maintenance, reduce the rate of lack of maintenance and risk related to PICC, and is worthy of being popularized in clinical practice.

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Tables

Table 1.
Comparison of PICC maintenance quality in children with tumor [n, (%)]

Group	Number of cases	Not flushing the tubing on time	Dressing loosened without changing	Oozing blood exudate not treated	Contamination of dressing not handled	Maintenance deficiency rate
Observation group	2200	10（0.45）	9（0.41）	2（0.09）	4（0.18）	25（1.14）
Control group	1900	26（1.37）	27（1.42）	11（0.58）	12（0.63）	76（4.00）
χ^2	-	-	-	-	-	34.796
P	-	-	-	-	-	0.001

Table 2.
Comparison of family members of children with tumor in the two groups ($\bar{x} \pm s$)

Group	Number of cases	Maintenanceknowledge level (total score)		Degree of satisfaction
		Before intervention	After intervention	
Observation group	2200	65.69±3.21	90.37±7.65	85.43±6.67
Control group	1900	65.78±3.10	78.42±5.16	76.52±5.14
t	-	0.922	58.757	48.142
P	-	0.356	0.001	0.001

Table 3.
Probability of PICC-related risk events in children with tumors in both groups [n, (%)]

Group	Number of cases	Complication			Total incidence	Adverse reaction			Total incidence
		Catheter related bloodstream infection	Crush injury	Local redness and swelling		Pipe plugging	Premature extubation	Catheter misplacement	
Observation group	2200	0（0）	55（2.5）	24（1.09）	79（3.59）	5（0.23）	0（0）	65（2.95）	70（3.18）
Control group	1900	2（0.1）	175（9.21）	50（2.63）	227（11.95）	23（1.21）	2（0.1）	191（10.05）	216（11.37）
χ^2	-	-	-	-	103.083	-	-	-	105.298
P	-	-	-	-	0.001	-	-	-	0.001