

Original Article

Experiences of patients with abnormal extubation of PICC tubes: a qualitative study

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Abstract: Objective: To explore the experiences of patients with abnormal extubation of PICC tubes. Methods: Using phenomenological research methods, 15 cases of patients with abnormal extubation of PICC tubes were enrolled in semi-structured interviews. Data were analyzed by Nancy's phenomenological procedure. Results: After abnormal extubation, patients exhibited conflicting complicated mood which combined negative experience and positive experience. Negative experience was mainly for complaint, helpless, worry and fear. Positive experience was mainly for relief and peace of mind. Conclusions: Patients with abnormal extubation often possessed negative experience. So nursing staff should be suggested to communicate with patients before extubation in order to reduce the dispute between nurses and patients. At the same time, we should summarize and analyze the reasons and factors for abnormal extubation, and take targeted intervention measures in clinical to ensure the safety and effectiveness of PICC extubation.

Keywords: Peripherally inserted central catheter, abnormal extubation, experience, qualitative study

Introduction

Peripherally inserted central catheter (PICC) is mainly used in patients who need long-term infusion, transfusion of blood products, chemotherapy and total parenteral nutrition. The retention time of PICC can be up to 12 months [1], but some studies have shown that the indwelling time of PICC could be up to 1 year and 11 months [2]; in fact, due to various reasons, the extubation of PICC tubes is often performed ahead of the required indwelling time for treatment, which is called PICC abnormal extubation [3]. Studies have shown [4, 5] that because of PICC complications, the rate of PICC abnormal extubation in cancer patients was between 32.8% and 40.7%. Abnormal extubation can not only increase the physical and mental suffering and economic burden on patients, but also lead to disputes between nurses and patients. At present, the domestic research on PICC abnormal extubation [6-8] are mostly concerned its causes and preventive treatment, lacking of psychological research in patients with abnormal extubation;

therefore, this study used phenomenological approach to deeply understand real-life experience of the patients with abnormal extubation.

Subjects and methods

Subjects

Using a purposive sampling method, 15 patients with abnormal extubation of PICC between October 2012 and November 2013 in a hospital of A level in the third grade in Jinan City, Shandong Province were included. In the sampling process, representative samples were selected based on the different extubated reasons. When new themes was no longer present in the interview, saturation of data achieved [9]. Basic information of interviewees were shown in **Table 1**.

Methods

Data collection: Phenomenological approach in qualitative research and semi-structured interviews were used to collect data. Patients in line

Abnormal extubation of PICC tubes

Table 1. Basic information of interviewees were shown

Subjects	Gender	Age (years)	Marital status	Education level	Occupation	Disease diagnosis	Indwelling time	Extubated reason	Catheter type	Catheter lumen diameter	Medical category
A	Male	78	Married	Junior college	Retired	Gastric Cancer	43 days	Catheter blockage	Three-way valve type	4 Fr	Hospitalized
B	Female	18	Unmarried	High school	Student	Ovarian Cancer	6 months	Catheter-related infection	Three-way valve type	4 Fr	Outpatient
C	Male	51	married	Junior college	Worker	Breast cancer	4 months	Catheter-related infection	Three-way valve type	4 Fr	Outpatient
D	Male	68	Married	Junior college	Retired	Lung Cancer	2 months	Catheter blockage	Distal end opening	4 Fr	Outpatient
E	Female	62	Married	High school	Retired	Breast cancer	3 months	Deep venous thromboembolism	Three-way valve type	4 Fr	Hospitalized
F	Female	68	Married	Primary school	Farmer	Breast cancer	2 months	Maintenance inconveniently	Three-way valve type	4 Fr	Outpatient
G	Male	35	Divorced	Undergraduate	Freelancer	Colorectal cancer	6 months	Entry medical examination	Three-way valve type	4 Fr	Outpatient
H	Male	42	Married	High school	Worker	Hepatic carcinoma	3 months	Catheter blockage	Three-way valve type	4 Fr	Hospitalized
I	Male	14	Unmarried	Junior high school	Student	Leukemia	7 days	Exudation in Puncture point	Three-way valve type	4 Fr	Hospitalized
J	Male	63	Married	Specialized Secondary School	Retired	Lymphoma	7 months	Catheter breakage	Three-way valve type	4 Fr	Outpatient
K	Female	16	Unmarried	Junior high school	Student	Leukemia	2 months	Catheter prolapse	Distal end opening	3 Fr	Outpatient
L	Male	45	Married	Junior high school	Farmer	Gastric cancer	56 days	Catheter breakage	Three-way valve type	4 Fr	Outpatient
M	Female	76	Widowed	Junior high school	Retired	Hepatic carcinoma	5 months	Catheter prolapse	Three-way valve type	4 Fr	Hospitalized
N	Female	52	Married	Undergraduate	Retired	Lymphoma	4 months	Suspected catheter-related infection	Three-way valve type	4 Fr	Hospitalized
O	Male	80	Married	Junior high school	Farmer	Colon Cancer	2 months	Abandon treatment	Three-way valve type	4 Fr	Hospitalized

with the inclusion criteria were informed consent. The pre-interview of one patient was performed, and based on this interview, the final interview outline was adjusted. Interviews were around the following aspects: ① Extubation reasons; ② The worried and concerned aspects after intubation; ③ Psychological feelings after extubation. Recording was performed throughout interviews. Interview time was between 30 and 60 minutes. Recordings were transferred into transcripts within 24 hours after interviews. Outpatients were interviewed within 2 h after extubation in the independent office of the hospital; Hospitalized patients were interviewed immediately after extubation in their ward.

Data analysis: After verbatim transcription of interview recordings, data were analyzed by seven-step analysis method of Nancy phenomenology [10]. Then, the researchers integrated the data in a certain order and theme, and interspersed with their own understanding and reflection, in order to ensure that there was a certain inherent relevance among the eventual themes.

Ethical Issues: Following the principle of informed consent, the patients were informed the detailed description of the purpose and methods of the present study prior to the interview; they also were informed that they can terminate and exit the interview at any time, and it would have no impact on their treatment to terminate and abandon the interview. It should be ensured that the obtained information were processed anonymously and only used for this study; recordings and text data should be destroyed in time at the end of the analysis.

Results

The interview data of the 15 patients with abnormal extubation were repeatedly compared and generalized; the results showed that patients with abnormal extubation presented two conflicting themes- negative experience and positive experience after catheter removal.

Theme 1 unplanned extubation in patients with a negative experience

Complaint: In this study, the patients with shorter indwelling time expressed more complaints. Case A: "Why the other people intubating had no problem but I had problems? Is not

it that my tube was different from theirs? Is not it that you flushed their tubes and did not flush my tube timely? At last time, there was a new nurse did not flush my tube; it is certainly your responsibility". Case C: "I always come for dressing on time and have often been very attentive; even taking a bath, I did not let the film wet; why would I be infected". Case D: "I have also washed the tube on time, how unfair it would be to block the tube!"

Helpless

5 patients feel helpless for abandoning the catheter. Case B considered extubation due to the infection in puncture point, the unobvious effect after treatment and fears of catheter-related infections. "This happens and we had no way; just pull it. Be careful for the next intubation." Case D often cough, and the chest pressure increased, resulting in the counter-flow of blood to the PICC catheter and thrombotic blockage. "Before catheterization, the nurse had told me that tube blockage is more likely to occur for me, so I have mentally prepared. But it is incredible that the problem happened in just two months; it is a little unacceptable; in addition to blame myself, I have no alternative". Case N had unexplained fever; The doctor suspected catheter-related infections and removed the catheter in advance. "The decision of doctors is certainly good for me, and now the fever cannot be explained; that is likely to be related to the tube. I have no idea; just follow the doctor's advice." Case L received chemotherapy in local hospital; non-resistant high-pressure PICC was used for intensive CT, leading to pipe rupture. "No alternative way; now the situation is not suitable for intubation; in case the tube broke off in the body, it must be very troublesome; pull it." The local township hospital was reluctant to maintain the catheter fearing to take risks, so the biggest problem the patient facing was the maintenance of catheter after discharge. Case F: "quickly remove my tubes, I did not want to continue to use them. Although the tube is well in chemotherapy, the maintenance is really inconvenient at home."

Worry: The majority of patients in this study have shown concern. The concern of patients with abnormal extubation is mainly from two aspects; at first, concern for the occurrence of the same situation again. Three patients expressed the worry to face the same situation.

Case A received long-term infusion of fat emulsion agent, resulting in catheter blockage. "I do not care about the cost of catheter and the pain, but I fear that there will be the same problem in the next intubation; if the tubes were blocked again, would you have a better way to solve this problem?" Case H: "chemotherapy was only performed three times, what about the following chemotherapy? Intubation would be performed again, but would such a situation happen in next time (after intubation)?" Secondly, worry about additional cost of the next intubation. 4 patients expressed concern on the cost of re-catheterization. Case L: "I have spent a lot of money and bear a lot of debt; the intubation is not cheap and cannot be reimbursed by medicare; the burden is too heavy." Case N: "I did not want to receive catheterization; it costs too much; I cannot afford it. But the families suggested to use it; they do not want me to suffer too much, but it had a problem in a month, and there have been a lot of waiting-to-do treatments, hey. (The sound is reduced) I do not want to receive intubation again, cannot increase the burden of family," case M: "I decided not to receive treatment, and do not want to drag down my child; my daughter has spent a lot of money..... with a so filial daughter, it is worthy to live up to now."

Fear: In the interviews, three patients expressed fear on the abnormal situations and Legacy arising from extubation. Case L: "Now I'm also afraid that if the tubes were broken off on the inside, I really do not know how to do it's my fault; the nurse told me not to use the catheter in strengthening CT, but I was too careless. Fortunately, there was no big problem." Skin redness, swelling, pain, and increased skin temperature were observed in the punctured arm of case E after three months of intubation; It was confirmed as thrombosis by color Doppler. "Will it leave sequelae after extubation, ah, this will not affect the activity of my right arm and it will not hurt, right?" Case I: "Last night the doctor told me that the tube might have to be pulled out. I was afraid for one night and cannot sleep. I was worried about that the tube would be broken during extubation."

Theme II: unplanned extubation in patients with a positive experience

Relief: 4 patients represented that early extubation was a relief for them. The removed

their "heart disease". Case D: "elimination of extubation is good. Just get relaxed. This was a nervous period, With the tube I did not dare take activities. Just take advantage of this opportunity to have a good rest and take some activities. Case G resigned the original work during the treatment. Before the treatment end, the case G had begun to recruit a new job. Body examination should be taken after the interview due to medical needs, so he took the early extubation. "I'm looking for a new job, and I will go for medical examination tomorrow. Anyway the treatment is also coming to an end, Pull it out. After pulling the tube out, I am really excited, and I can begin my new life! Case N: "I think it is not bad to pull the tube out. After all, I have been with the tube for a half a year. Now I pull up, and I am very happy, anyway I can take a bath."

Confidence: In the interview, three patients expressed their assurance when the catheter were completely pulled out and his hanging heart get down. Case L: "I was really very worried about that the catheter would be broken inside during the extubation time. When I found that the pulled out catheter was complete, I was assured."

Case J: "I was really afraid that the tube would be broken for it was a long time since it was planted. When I found that the pulled out tube was complete, I was at ease. Psychology was suddenly at ease. Case E: "thanks to my early discovery, it was not a big problem the doctor said there was no problem, and I am assured."

Discussion

Take specific measures to reduce the incidence of unplanned extubation

Abnormal extubation is that due to all the reasons leading to the catheter lost its function, with the pre-treatment going on, but the catheter had to be pulled out including accidental negligence extubation [3]. Li Xixi's [3] studies have shown PICC risk factors included abnormal extubation, catheter blockage, catheter-related infections, phlebitis, puncture site bleeding, duct damaged or broken, liquid leakage, ectopic catheter, catheter prolapse or accidental extubation, cardiovascular complications, abandon treatment. In this study, PICC abnormal extubation factors, in addition to maintaining inconvenient, covered most of the

above risk factors. It mainly based on catheter-related infections and catheter blockage, which was consistent with JiaHong's study [6].

Nurses should make full understand that extubation may be caused by abnormal reasons in daily use and maintenance of patients with PICC tube. They should note that a variety of potential risk factors were existed. Effective interventions should be taken in order to reduce abnormal extubation rates, suffering and economic loss. The health care workers should take different interventions for patients with different complications. In the prevention of catheter-related infections, nurses should strengthen the concept of aseptic technique and disinfect puncture site strictly. The damaged wet loose foil should be replaced in time. Generally, viscous elastic and breathable foil should be selected because it is easy to observe transparent dressing and it can effectively block foreign bacteria and prevent from infection. Close attention should be paid to observe the changes on the patient's temperature when the tube was set. Abnormal phenomenon should be dealt in time. Zhao Ting's [11] studies have shown that record daily drip and set up three early warning mechanism allow nurses to maintain catheter importance in psychological. Adjust the times of flushing pipe according to dropping speed according and the difficult of flushing pipe, and we can reduce the incidence of catheter blockage. Therefore there is a need to strengthen the nurses' knowledge in preventing blockage of the tube. Realizing the importance of punching sealed tube, we should improve nurses' accountability. At the same time, we should also note the drug-drug interactions. Different drugs can produce particles with each other during the infusion. These particles adhered to the duct wall. If the tube is not timely punched in a long time, cumulative effect will lead the tube blocked. Conduit opening method and lumen diameter of catheter were also factors for catheter blockage. Distal end opening catheter under the circumstance of coughing, constipation and other factors that leading to increased intrathoracic pressure will easily result in blood refluxing. If the tube were not flushed in time, the blood attached to the wall of the conduit will be piled and will cause catheter blockage; with different diameter of catheter lumen, the smaller the lumen diameter is, the higher rate the chance

of blocking will be. Therefore, nurses should understand different types, open manner and specifications of catheters in order to flush the tube reasonably. As for the abnormal extubation caused by prolapse, special attention should be paid in confusion or agitation adults or the elderly. Constraints can be given to patients when necessary; At the same time, relevant education should be taken to the families with tube children in order to avoid that the catheter were pull out while children were playing with the exposed part of the catheter. Gu Yanyan [12] found that the use of "five in one" health education can reduce the incidence of complications during PICC with pipe and improve patients' satisfaction. Through patient-families-Nurse joint participation, home care guidance should be told to the family members with patients. Under the maintenance of technical mastery, we can improve the care quality for patients with PICC pipe. In addition to these interventions, we may also employ specialist trained nurses [13], personalized quality management [14], health education illustration card [15], the implementation of self-management education [16] and other measures to reduce the rate of unplanned extubation.

Focus on patients' psychological feelings with non-normal extubated tube, and remiss patients' negative emotions

PICC catheters were served as lifeline for treatment, which has a very important role in the healing process. Complications resulted in abnormal extubation were prone to anxiety, fear and other emotions, which will affect patient's confidence in the knowledge and care in the re-tube process. Patients will be the primary target during hospitalization. Exchanges between patients and patients may influence other patients' clinical decision-making. In particular, the exchange of negative experience from other patients may cause abnormal fear, extubation and excessive worry. To alleviate these negative emotions for patients, promote the nurse-patient relationship, necessary care and support were needed to solve the problems in patients with non-normal extubation. With this regard, nurses should understand the emotional reactions of patients with abnormal extubation, and give emotional support to patients in a time. The nurse should explain the reasons for extubation patiently for patients

and take preventive measures. When in a bad mood, they can look for others to talk and negative emotions cannot be piled up in psychological in order to avoid a vicious cycle; at the same time, we can describe the success stories about patients with pipe, enhance patients' confidence in re-tube and catheter maintenance, eliminate the psychological barriers with the best attitude to cooperate with medical treatment. Studies have shown that the more social support the patients acquired, the fewer negative emotions the patients will experience. Individual and group counseling, case demonstrations and other methods were recommended for patients to improve patients' susceptibility to social support, and mobilize the initiative for the patient. Making full use of social support, and it will improve emotional state [17]. Jiang qianjin hold [18] that comprehensive psychological intervention can effectively increase the patient's positive emotions and significantly eliminate fear, nervousness and other emotions caused by adverse psychological stimulation. At the same time, the patient can face the disease with a more positive and optimistic attitude. Therefore, comprehensive psychological care should be taken according to the times that patients with a pipe, complications that may occur during the tube, how to deal with complications, abnormal extubation factors etc. Enhance the confidence of patients with pipe during catheter care, improve the quality of care during catheter tube treatment and reduce the incidence of catheter complications, thereby we can reduce patients' negative experience generated by abnormal extubation.

Conclusion

Through 15 cases of patients with abnormal extubation interviews, we explored the abnormal extubated patients' psychological feeling and draw two conflicted themes. The results showed that patients with abnormal extubation were mainly based on negative experience, indicating that medical staff should pay more attention to the patients' psychological change, do some targeted interventions for patients, remiss patients' negative emotions, and improve patients' satisfaction. However, this study also had some limitations. Firstly, this study was a qualitative research. Research from the individual patients' psychological feelings were not suitable to be applied in the entire

population; secondly, gathering information and analyzing process will inevitably be influenced by subjective factors.

Disclosure of conflict of interest

None.

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