

Research on the Causes and Nursing Interventions of Extravasation During Intravenous Infusion

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Abstract: Intravenous infusion, a common clinical drug treatment method, is widely used in the treatment of various diseases. Due to the invasive nature of puncture during intravenous infusion, patients may inevitably experience resistance and tension when facing nursing staff performing infusion procedures. Additionally, the complexity of the nursing staff's work and the impact of the infusion therapy environment can exacerbate the tension between nurses and patients, leading to risks such as drug leakage and needlestick injuries. This article focuses on the factors influencing extravasation during intravenous infusion and elaborates on how high-quality nursing interventions can reduce the incidence of adverse events during intravenous infusion. These interventions aim to improve patient satisfaction with intravenous infusion nursing care and ensure the safety of intravenous infusion procedures.

Keywords: Intravenous infusion; Reasons for external leakage; Nursing intervention

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1. Reasons for extravasation during intravenous infusion

1.1. Improper operation by nursing staff

Venous puncture is the first step in implementing intravenous infusion. If nursing staff do not master standardized operating methods and proficient techniques, it may cause venous injury to patients, reducing the success rate of puncture and leading to extravasation. This issue is primarily due to the lack of a regular training mechanism for nursing staff's job skills in some hospitals. Some personnel may not participate in professional and strict pre-job training before performing intravenous infusion, resulting in their inability to provide effective intervention measures in the event of drug leakage, thereby affecting patient health and safety^[1].

1.2. The impact of the patient's constitution and condition

The patient's condition and physical state are also important factors affecting extravasation during intravenous infusion. Firstly, due to the decline of tissue function, elderly patients may experience varying degrees of

arteriosclerosis in their blood vessels. The resulting vascular wall stenosis can affect the patency of venous return. Additionally, intravenous infusion requires patients to maintain a relatively fixed position for a period of time, which elderly patients find difficult, increasing the likelihood of drug leakage due to movement. Secondly, pediatric patients, who have a strong perception of pain and often experience emotional instability during infusion, make venipuncture more challenging, and parents often have higher expectations for nursing care. Thirdly, conditions such as inflammation or swelling at the infusion site can also lead to extravasation of medication ^[2,3].

1.3. The influence of external environment, materials, and tools

An unfamiliar environment can trigger negative emotions in patients, increasing the risk of drug leakage. Additionally, quality issues with materials such as dressings and infusion tubes can lead to extravasation. Problems such as air leakage or obstruction in the infusion pipeline can result in poor intravenous infusion and negatively impact the patient's health ^[4].

2. Strategies for preventing extravasation during intravenous infusion

2.1. Strengthen health knowledge education and address negative psychology

Implementing targeted intravenous infusion health education based on the needs of patients can help reduce confusion and misdirection in nursing work, and improve patients' awareness of self-care. Currently, clinical health education in China mainly focuses on disease nursing and does not prioritize health education in basic nursing practices. Due to the numerous steps and long duration of intravenous infusion therapy, patients inevitably face various demands during the infusion process. Additionally, some patients neglect infusion safety, lack a correct understanding of their diseases and medication, and possess insufficient health and medical knowledge, which can easily cause drug leakage during infusion, thereby affecting the infusion outcome ^[5,6]. Therefore, timely and accurate dissemination of health knowledge is crucial for the psychological well-being and health care of patients.

With the continuous improvement of China's medical service level, traditional methods of health education are no longer sufficient to meet patients' needs. Therefore, clinical nursing work must prioritize and innovate health education, helping patients establish health awareness, thereby reducing the risk of extravasation of intravenous infusion, ensuring the quality of nursing care for intravenous infusion, and allowing patients to maintain stable psychological emotions during treatment.

Nursing staff can promote health knowledge to intravenous infusion patients through the following channels to provide timely and effective nursing interventions. Firstly, language education should be combined with exemplary education. Nursing staff should use a gentle and humble attitude, as well as appropriate language, to provide oral and demonstration guidance for different patients before performing venipuncture procedures. For example, lifting the bottle to the toilet and adjusting the infusion speed during infusion can easily cause drug leakage, affecting the treatment outcome. Therefore, in response to patients' bad habits, nursing staff can promote the therapeutic effects of drugs and provide simple drug knowledge during the operation process, encouraging patients to consciously and actively cooperate with the nursing staff's work. At the same time, nursing staff can demonstrate simple intravenous infusion techniques to patients, helping them understand methods to protect blood vessels, effectively reducing the risk of drug leakage, and improving their self-protection ability ^[7].

Secondly, electronic education can be utilized. By using electronic devices in the infusion room to repeatedly play health education programs and relaxed, soft music, patients can regulate the negative emotions caused by prolonged infusion and better grasp health knowledge.

Finally, text education should be innovated. Nursing staff can create exquisite health education prescriptions, produce manuals on the causes, prevention and treatment measures, self-care methods, and more for various common diseases, and give them to patients and their caregivers as gifts.

2.2. Improve the nurse-patient relationship during infusion and provide high-quality nursing care

Strengthening the professional training and moral education of nursing staff is an effective measure to improve the nurse-patient relationship during intravenous infusion, which helps provide high-quality nursing services to patients in routine nursing management and ensures the smooth progress of intravenous infusion.

Firstly, implement comprehensive training to improve the professional skills of nursing staff. In clinical nursing work, the head nurse can lead skilled nursing staff to establish a specialized nursing training team. This team can regularly conduct centralized training sessions, focusing on enhancing operational abilities^[8]. Through specialized vocational skills training, nursing staff can be guided to proficiently master venipuncture methods, select appropriate puncture sites, and regulate puncture angles, which can effectively improve their service level and reduce the impact of external adverse factors on drug extravasation. For instance, choosing to perform intravenous infusion punctures in areas with sparse nerve distribution, such as the styloid process of the ulna and radius, can effectively alleviate patients' pain. Additionally, improving the operational level of nursing staff can increase the success rate of intravenous infusion puncture, allowing patients to maintain a relatively relaxed state during the infusion process and avoid issues such as bleeding at the puncture site and drug leakage.

Secondly, standardize and optimize the nursing process. Standardizing and optimizing the nursing process plays a crucial role in addressing repeated occurrences of puncture failure, venous leakage, blood return, and needle detachment during intravenous infusion in patients. On one hand, standardize the working mode of intravenous infusion. After completing the morning handover and ward round, nursing staff should prepare for intravenous infusion, such as using physiological saline to flush the catheter to confirm the safety and patency of the infusion tube and intravenous catheter. If extravasation occurs due to poor patency of the indwelling needle or damage to the infusion tube, nursing staff should promptly communicate with the patient and their family and provide relevant explanations. On the other hand, improve inspection work. To reduce the risk of extravasation during intravenous infusion, nursing staff should conduct regular patrols to monitor the patient's condition at regular intervals. Nursing staff should also pay timely attention to the input of fluids to promptly remove needles for patients when necessary.

Finally, implement humanized services and strengthen the professional ethics of nursing staff. Mastering good communication skills is a key aspect of providing humanized services for nursing staff and demonstrates a patient-centered nursing philosophy. This enables nursing staff to offer better service to patients during intravenous infusion puncture and provides positive emotional support to patients, allowing nursing staff to deliver appropriate humanistic care in their work^[9].

2.3. Establish a sound risk management mechanism and strengthen quality control

Establishing a robust risk management mechanism in clinical nursing within hospitals can help control the quality of intravenous infusion and improve the work quality and service level of nursing staff. Firstly, establish a risk management team to comprehensively assess and evaluate the operational skills and nursing quality of nursing staff. Specifically, the risk management team can implement risk supervision for intravenous infusion according to the PDCA model and develop a refined risk assessment manual. By refining the various stages and operational processes of intravenous infusion, it is possible to effectively evaluate whether nursing staff

explain relevant infusion matters to patients, verify medication before puncture, and ensure successful puncture. This strengthens the quality supervision of intravenous infusion extravasation and reduces the risk of drug extravasation ^[10].

Secondly, enhance the safety awareness of nursing staff. All nursing operations in intravenous infusion require nursing staff to complete them manually. Therefore, it is very important to strengthen the safety awareness of nursing staff and encourage them to pay attention to disinfection work during the operation process. In this regard, hospitals should improve their infection management system, standardize the intravenous operation techniques of medical staff, and require them to cut off the source of infection by performing proper disinfection. At the same time, the risk management team should integrate infection testing into comprehensive inspection work and standardize the reward and punishment system for intravenous infusion on this basis. This approach will help continuously improve the work literacy and responsibilities of nursing staff, enhance the intervention efficiency of nursing staff regarding intravenous infusion extravasation, and effectively protect the life and health of patients ^[11,12].

Finally, strengthen the management of intravenous infusion equipment and drug management. In nursing work, if nursing staff fail to store drugs as required and do not manage infusion equipment properly, it may increase the risk of extravasation of intravenous infusion and affect the effectiveness of intravenous infusion treatment for patients. Nursing staff should focus on three areas: cleaning the clean area, operating the biological safety cabinet, and managing the horizontal layer table. Effectively managing infusion equipment and drugs can reduce the impact of external factors on venous infusion extravasation. If drug leakage occurs, nursing staff should document and summarize the leakage event within the prescribed time to jointly explore and identify the causes and contributing factors within the team. In summary, the risk group management model, as an effective intervention nursing measure for intravenous infusion extravasation, can effectively identify safety hazards during the implementation of intravenous infusion by nursing staff and analyze the factors leading to drug extravasation. Strengthening the supervision of nursing staff's operational behavior can minimize the risk of intravenous infusion leakage caused by improper operation and provide patients with safety assurances for intravenous infusion ^[13].

2.4. Strengthen the management of the infusion environment and create a warm atmosphere

Nursing staff should pay attention to the management of the infusion environment when performing intravenous infusion operations on patients. By reducing the interference of an unfamiliar environment, creating a warm and comfortable setting, and minimizing drug leakage caused by external factors, they can significantly enhance patient comfort. Firstly, nursing staff should maintain the hygiene of the infusion site to meet patients' requirements for environmental comfort. They should open windows for ventilation at prescribed times and strictly disinfect the floor and facilities of the infusion room according to standards. This ensures a clean, tidy, and hygienic infusion environment, effectively preventing cross-infection. Secondly, meeting the basic needs of patients is crucial. Providing water dispensers and disposable paper cups and setting up health knowledge bulletin boards in the infusion room can help patients establish health awareness and meet their diverse needs during infusion. Thirdly, placing flowers, green plants, etc., in infusion rooms and corridors can create a green and warm treatment environment, helping patients maintain a good mood and positive mentality during infusion ^[14,15].

3. Conclusion

Currently, to reduce the risk of extravasation during intravenous infusion in clinical practice in China, intravenous indwelling needles have been widely used for infusion treatment. This greatly improves the safety

of intravenous infusion. Normally, medical staff need to complete ward rounds and treatment for hospitalized patients in the morning. However, some nursing staff, due to lack of work experience and unskilled operational skills, are prone to exacerbating the risk of extravasation during busy and tense nursing work. In this regard, hospitals should strengthen the training of nursing staff, promote their deep understanding of the factors that induce extravasation, and adopt targeted nursing interventions to ensure the safety of patients' infusions.

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