Case Report

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Innovation in Intravenous Therapy for a Case of Budd-Chiari Syndrome with Exfoliative Dermatitis

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ABSTRACT

Intravenous infusion therapy is an essential means for the treatment of all clinical diseases. Se-lecting an appropriate intravenous therapy plan can help patients receive rapid and effective treatment, promoting disease recovery. Central venous access devices (CVADs) mainly include central venous catheters, peripherally inserted central catheters, and infusion ports, which can be used for drug infusion, nutritional support, blood sampling, etc., providing patients with a long-term and safe route of administration. Peripherally inserted central catheters are commonly used in clinical infusion therapy due to their convenience, protection of peripheral veins, safety and effectiveness, and low maintenance costs. They are widely applied in patients requiring in-travenous infusion and have achieved good results. This paper shares the intravenous therapy plan and innovations in the treatment of a patient with Budd-Chiari syndrome complicated by exfo-liative dermatitis. Moreover, this method is not limited to the application of this disease. Practice has shown that the innovations mentioned in this paper are applicable to this disease as well as other conditions accompanied by exfoliative dermatitis or surface wounds with exudates that are not conducive to the fixation of surface dressings and catheters.

Abbreviations: Budd-Chiari Syndrome; Exfoliative Dermatitis; Intravenous Therapy; Central Venous Access Devices; Intravenous Infusion Therapy

Introduction

Intravenous infusion therapy is an essential means for the treatment of all clinical diseases. With the continuous improvement of clinical nursing levels, higher requirements are also put forward for intravenous therapy nursing. "In-travenous Therapy Nursing Technical Operation Standards" is the first industry standard in the field of intravenous therapy nursing in China, which puts forward the basic requirements for the technical operation of intravenous therapy nursing. Through continuous learning and training, the quality of intravenous therapy nursing in China can be im-proved [1] (pp. 245-249). Selecting an appropriate intravenous therapy plan can help patients receive rapid and effective treatment, promoting disease recovery [2] (p. 1698). Central venous access devices (CVADs) mainly include central venous catheters, peripherally inserted central catheters, and infusion ports. They can be used for drug infusion, nutrition-al support, blood sample collection, etc., providing patients with a long-term and safe route of administration [3] (p. 2634). Peripherally inserted central catheters are commonly used in clinical infusion therapy due to their convenience, protection of peripheral veins, safety and effectiveness, and low maintenance costs. They are widely applied in patients requiring intravenous infusion and those undergoing multi-course chemotherapy for malignant tumors, achieving good application effects [4] (pp. 112-113). This paper shares the intravenous therapy plan and innovations in the treatment of a patient with Budd-Chiari syndrome complicated by exfoliative dermatitis, including the fixation of femoral vein cath-eterization and the gradual selection and replacement of dressings, enabling the patient to receive timely and effective treatment and promoting recovery. The report is as follows.

Materials and Methods

General Information

Patient Zhu, female, 67 years old, married. She was admitted to the hospital at 10:42 on February 10, 2021, due to "abdominal distension and poor appetite for over a month, and desquamation of the skin all over the body for one week". Admission diagnoses: Budd-Chiari syndrome, exfoliative dermatitis, hypertension level 3 (high risk), type 2 dia-betes mellitus, pulmonary nodules, renal cysts, cholecystitis, abdominal ascites, pericardial effusion.

Chief Complaint

Abdominal distension and poor appetite for over a month, desquamation of the skin all over the body for one week.

Medical History

The patient had lower limb pain one month ago, followed by itchy skin and large patches of bright red rash. Ab-dominal distension occurred more than ten days ago. She went to a local hospital for treatment. Enhanced CT showed liver cirrhosis, portal vein enlargement, a large amount of fluid in the abdomen and pelvis, congestion in the liver? Mild abnormal liver function. The local hospital gave liver protection and diuretic treatment and discharged her after the abdominal distension improved. To seek further treatment, she came to our hospital. Further reading of the CT images showed unclear hepatic veins and unclear inferior vena cava liver segment, which were consistent with the diagnosis of Budd-Chiari syndrome, and she was admitted to our department for treatment. During the course of the disease, there were no cough or expectoration, no abdominal pain or diarrhea, normal urine and feces, and no significant weight loss recently. She has been diagnosed with "hypertension and type 2 diabetes" for over a month and has been taking "nifedipine sustained-release tablets, gliclazide sustained-release tablets, and acarbose capsules (Baixi)" to control blood pressure and blood sugar. The patient and her family members denied having traveled to or passed through areas affected by the novel coronavirus pneumonia (COVID-19) within 14 days, denied having a history of overseas travel, and denied having contact with people from the above-mentioned groups. They also denied having fever or cold symptoms recently, and denied having contact with people who have fever or cold.

Physical Examination

Body temperature: 37.8 ℃, heart rate: 100, respiration: 20, blood pressure: 163 / 82 mmHg. Clear consciousness, stable respiration, relevant answers, clear articulation, cooperative physical examination, no jaundice of the skin and mu-cous membranes all over the body, extensive erythema infiltration with desquamation all over the body. No bleeding points, superficial lymph nodes throughout the body: not enlarged, soft neck, no resistance, no distension of the jugular veins, trachea in the middle, normal chest shape, clear sounds on percussion of both lungs, symmetric bilateral respiratory movements. Clear breath sounds in both lungs, no dry or wet rales heard in both lungs, 100 times/minute, regular rhythm, not heard, flat abdomen, no tenderness on palpitation, no rebound pain, liver not palpable below the costal margin, spleen not palpable below the costal margin, no edema, pathological signs negative.

Auxiliary Examinations

Portal vein imaging CTV showed liver cirrhosis, splenomegaly, a small amount of ascites; heterogeneous density of liver parenchyma, suggesting combination with clinical indicators, cholecystitis, bilateral renal cysts, splenic cysts, no abnormalities seen in portal vein CTV. (From Yangzhong People's Hospital, February 10, 2021): No novel coronavirus nucleic acid detected. Chest CT showed increased, thickened and blurred pulmonary markings; small nodules in the upper lobes of both lungs, slightly larger than before (January 16, 2021), considering a high possibility of infection, suggesting re-examination after treatment; multiple small lymph nodes in the mediastinum and both axillary fossae, simi-lar to before; heterogeneous density in both lobes of the thyroid gland, with calcification in the right lobe, suggesting ultrasound examination; liver cirrhosis, splenomegaly, ascites basically absorbed compared to before (November 11, 2021); heterogeneous density of liver parenchyma, suggesting correlation with clinical indicators; cholecystitis; bilateral renal cysts; possible splenic cysts.

Phased Diagnosis, Treatment, and Nursing Care

Phase One (Skin Rash Period) as shown in Figure 1. At this stage, intravenous indwelling needles could meet the current needs. With psychological counseling, the patient had a good acceptance and the treatment effect was satisfactory.

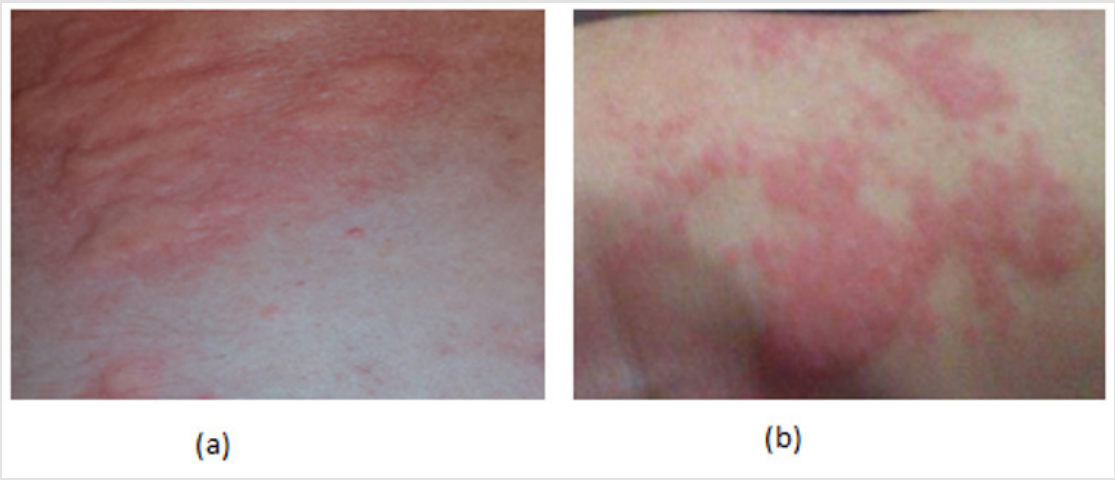

Figure 1: The first phase of the skin rash period:
(a) One month ago, after excluding contraindications upon admission, the patient was administered anticoagulant therapy with 4000IU of enoxaparin sodium twice daily and 1.5mg of warfarin once daily. The patient developed a rash and had a maximum body temperature of 40°C. Allergic reactions and infections could not be ruled out, so piperacillin was given for anti-infection, and methylprednisolone was used to control inflammatory immune responses.
(b) After the patient's temperature improved, they were transferred to a local hospital for continued treatment. Anticoagulation, hormones, anti-infection, and diuretic treatments were continued, leading to improvement before discharge.

Nursing Diagnoses and Measures

- Fever: Related to the body's inflammatory response and immune response. Nursing measures: Administer anti-inflammatory and antibacterial drugs on time and in the right dose as per medical advice; monitor vital signs and use antipyretic drugs as soon as possible to prevent other complications caused by high fever.

- Specific skin changes: Related to the skin's immune response mechanism. Nursing measures: Instruct the patient not to scratch or clean the skin with any chemical preparations.

- Anxiety: Related to the further worsening of the disease and concerns about prognosis. Nursing measures: Provide psychological counseling, build up the patient's resistance to the disease, encourage the patient to follow medical advice and nursing measures, and explain relevant knowledge about the disease and successful cases. Phase Two (Skin Exudation Period) as shown in Figure 2. Risk factor assessment for consultation: The patient was admitted due to exfoliative dermatitis, a severe systemic disease. Severe infection and even hemodynamic changes can be fatal. Assessment level: Critically ill. Diagnosis and treatment plan: 1. Various examinations: Routine blood tests, biochemistry, infection indicators, myocardial enzyme spectrum, heart failure indicators, etc. Treatment plan (including alternative treatment plans): Control blood pressure and blood sugar, protect the liver, protect the stomach, give hormone shock therapy, and provide symptomatic support treatment with intravenous human immunoglobulin. Nurse the local skin and eyes. Maintain water and electrolyte balance, and use linezolid for anti-infection.

- First Difficulty in Nursing Care. At this stage, intravenous indwelling needles could no longer meet the patient's treatment needs. Considering the patient's advanced age and poorer vascular conditions than before, our nursing team consulted with the hospital's intravenous therapy specialist group and proposed: Perform femoral vein catheterization for the patient to ensure the smooth progress of treatment.

- Second Difficulty in Nursing Care. There was a possibility of unplanned extubation, related to the patient's excessive surface exudation, making it impossible to fix the catheter with traditional dressings. Replacing sterile gauze dressings every 2 hours still could not meet the patient's needs. And when the patient turned over, the gauze would in-evitably fall off, exposing the femoral vein puncture catheterization, which could easily lead to catheter removal and increased infection. Nursing measures: After consultation with our hospital's intravenous therapy team and discussion by our nursing quality control team, it was proposed as shown in Figure 3. The innovation lies in: Abandoning the traditional catheter dressing coverage method and using a circular bandaging method for the puncture site to prevent catheter slippage.

Figure 2: The second phase of skin exudation period: One month later, the patient developed large areas of skin exudation accompanied by desquamation.

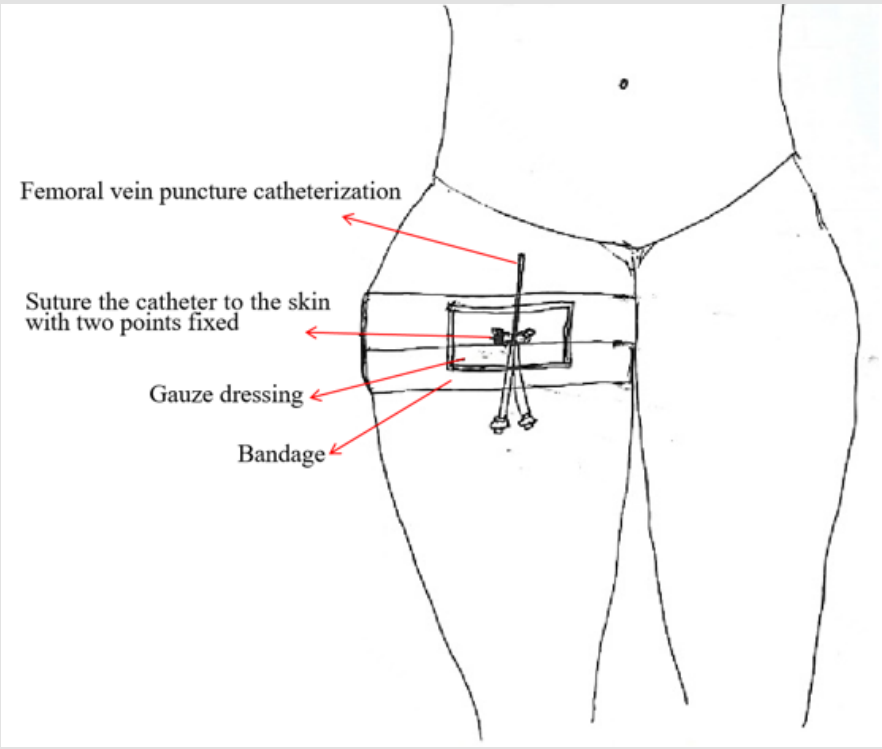

Figure 3: Use a surgical distal suture method to fix the catheter to solve the problem of difficulty in fixing and easy catheter removal. Suture the catheter to the skin with two points fixed, and then replace the gauze dressing in a timely manner later, disinfect the wound surface, and circularly bandage the right femoral vein and surrounding skin tissues. Use powder spray and sterile gauze to promote local surface drying.

Other Nursing Diagnoses and Measures as follows:

- Difficult healing of skin integrity damage related to continuous exudation of inflammatory substances from the skin, a large number of blisters appearing and breaking down, and inevitable pressure ulcers. Nursing measures: Clean the broken wound surface with physiological saline, and then use a powder spray dressing (Dermulin spray) to pro-mote surface liquid absorption and drying; expose the skin as much as possible; do not clean it yourself; the responsible nurse should drain part of the blisters and disinfect the wound surface to prevent further infection; turn over on time, and for existing pressure injuries, do not use any adhesive dressings, only give powder spray dressing to relieve sacral pressure injuries; change the bed unit daily and disinfect the patient's activity area.

- Fever: Related to the body's continuous infection and formation of inflammatory substances. Nursing measures: Use anti-infection drugs as per medical advice, transfuse fluids in a timely manner, and give antipyretic drugs if necessary; monitor vital signs.

- Risk of potential septic shock: Related to the patient's severe infection, advanced age, continuous high fever, and poor body immunity. Nursing measures: Monitor vital signs and changes in consciousness; take medicines on time as per medical advice; record urine volume changes and feedback in a timely manner.

Phase Three (Skin Exudation Relief Accompanied by Massive Desquamation) as shown in Figure 4. Take medicines as per medical advice; expose the skin as much as possible; do not clean it yourself; turn over on time, and for existing pressure injuries, do not use any adhesive dressings, only give powder spray dressing as shown in Figure 4; relieve sacral pressure injuries; change the bed unit daily and disinfect the patient's activity area.

Figure 4: The third phase of the skin rash period:
(a) Treatment has entered a consolidation and stable period.
(b) The patient's temperature has dropped, inflammatory factors have receded, and they are in a recovery phase, consolidate treatment.
(c) Nursing diagnoses and measures: Skin integrity damage accompanied by infection related to poor body immunity and wound infection during desquamation.

Discussion

Conservative Treatment Nursing Group

When selecting intravenous catheterization, femoral vein catheterization is superior to jugular vein catheterization, superior vena cava catheterization, PICC, and PORT, which is determined by the patient's specific condition. At that time, the patient had obvious symptoms of infection and required frequent, large-volume, and rapid fluid therapy at any time, and a better fixation method was needed to prevent the catheter from slipping. Since the skin tissue around the femoral vein catheter is easier to suture and fix, and the limb wrapping and winding are more convenient, it became the best choice for intravenous catheterization in this case.

Wound Care Group

The patient's severe condition, advanced age, and poor assistance with defecation and urination in bed can easily make the dressings and bandages wet or cause secondary pressure injuries due to differences in wrapping tightness. It is necessary to avoid these problems when providing living assistance. If the dressings are found to be wet, they should be replaced in a timely manner under sterile conditions, with moderate circular bandaging, neither too loose nor too tight. Timely replacement of wet dressings promotes the healing of stage II pressure injuries in the sacrococcygeal area; other parts should be as much as possible avoided from secondary injuries, and the skin should be exposed as much as possible; do not wash or treat by oneself; the responsible nurse should perform partial blister drainage and disinfect the wound surface to prevent further infection; supervise regular turning over, and no adhesive dressings can be used for existing pressure injuries, only powder spray dressings should be given to alleviate pressure injuries in the sacrococcygeal area.

Medical Group

The patient has a severe condition, is advanced in age, and has been bedridden for a long time. Femoral vein catheterization is an invasive procedure, and catheter maintenance needs to be timely, accurate, and standardized. The patient requires professional nursing guidance, such as ankle pump exercises, active turning over, passive limb movements, etc. Otherwise, it is easy to cause deep vein thrombosis, leading to embolism in the heart, brain, and lung vessels, which needs to be prevented. It is necessary to regularly check the activity of the catheterized lower limb and leg circumference, and promptly correct early thrombi. At the same time, anti-infection treatment and maintenance of fluid balance should be carried out to achieve better therapeutic effects.

Conclusion

Timely adjustments of conservative treatment methods are essential at different stages of disease progression. To a certain extent, an excellent conservative treatment plan can promote the therapeutic effect of the disease. In special dis-ease environments like those reported in this case, such as when there is a need for conservative treatments due to large-area skin ulcers, scalds, burns, etc., innovative adjustments to the conservative treatment plan are necessary. These adjustments can secure more valuable treatment time for the patient and achieve good therapeutic effects.

Author Contributions

Wen Shi wrote the main manuscript text and carried out diagnosis and nursing care. All authors re-viewed the manuscript.

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Institutional Review Board Statement

The study was conducted and approved by the Nanjing Second Hospital.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patient to publish this paper.

Data Availability Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of Interest

There are no known conflicts of interest associated with this publication.

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