Clinical Observation on the Efficacy of Topical Pibaijin Herbal Cream Combined with Modified Transparent Film Dressing Change for Contact Dermatitis Complicated by PICC Catheterization (Postprint)

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Abstract

Objective: To investigate the efficacy of topical Pibaijin herbal cream combined with modified transparent film dressing changes in the treatment of contact dermatitis complicating peripherally inserted central catheter (PICC). Methods: Seventy-three patients with contact dermatitis following PICC placement admitted to our department from October 2019 to October 2021 were enrolled and allocated to a study group (n=42) and a control group (n=31). The control group received topical dexamethasone plus gentamicin combined with modified transparent film dressing changes, while the study group received topical Pibaijin herbal cream combined with modified transparent film dressing changes. Observed parameters included time to itch resolution, time to dermatitis resolution, catheter dislodgement, skin hyperpigmentation, patient comfort during catheter carriage, and catheter retention status. Results: Compared with the control group, the study group exhibited shorter time to itch resolution and dermatitis resolution, as well as a lower incidence of skin hyperpigmentation, with statistically significant differences ($P<0.01$). The study group demonstrated higher comfort levels during catheter carriage and a lower incidence of unplanned catheter removal, with statistically significant differences compared to the control group ($P<0.01$). Conclusion: The application of topical Pibaijin herbal cream combined with modified transparent film dressing changes can effectively treat contact dermatitis complicating PICC catheterization, reduce the rates of catheter dislodgement and skin hyperpigmentation, and improve patient comfort during catheter carriage.

Full Text

Preamble

Effect of Pibaijin Herbal Cream Combined with Modified Transparent Dressing in the Treatment of Contact Dermatitis After PICC Catheterization

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Abstract

Objective To investigate the effect of Pibaijin herbal cream combined with modified transparent dressing in the treatment of contact dermatitis following peripherally inserted central catheter (PICC) catheterization.

Methods Patients with contact dermatitis after PICC catheterization admitted to our department between October and October were selected and divided into an experimental group (n=) and a control group (n=). The experimental group received Pibaijin herbal cream combined with modified transparent dressing, while the control group received dexamethasone plus gentamicin combined with modified transparent dressing. Itching disappearance time, dermatitis resolution time, unplanned catheter withdrawal, skin pigmentation, patient comfort with catheter in situ, and catheter retention were observed and compared between the two groups.

Results Compared with the control group, the experimental group showed significantly shorter itching disappearance time and dermatitis resolution time, lower skin pigmentation rate, higher patient comfort, and lower rate of unplanned catheter withdrawal (P<).

Conclusion Pibaijin herbal cream combined with modified transparent dressing effectively treats contact dermatitis after PICC catheterization, reduces unplanned catheter withdrawal and skin pigmentation rates, and improves patient comfort.

Keywords: Pibaijin herbal cream; transparent dressing; peripherally inserted central catheter; contact dermatitis

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Introduction

Peripherally inserted central catheter (PICC) is a commonly used nursing technique for medium- to long-term intravenous infusion, particularly in chemotherapy patients. However, clinical application often involves complications including local bleeding, catheter infection, catheter occlusion, venous thrombosis, and medical adhesive-related skin injury, which increase patient pain, treatment costs, and affect treatment protocols.

Contact dermatitis is one of the most common medical adhesive-related skin injuries, representing an inflammatory reaction occurring at or beyond the contact site after single or multiple exposures to exogenous substances. Clinical manifestations include abnormal erythema, vesicles, bullae, erosion, or skin tearing. Due to intrinsic and extrinsic factors such as gender, allergic constitution, catheter type, dressing type, disinfectant type, and season, some patients are particularly susceptible to contact dermatitis, with incidence rates reaching up to % in PICC patients using transparent dressings. If contact is repeated or managed improperly, it may progress to subacute or chronic dermatitis, affecting both quality of life and treatment outcomes.

Conventional treatment typically involves topical application of anti-allergic steroid ointment covered with sterile gauze. While gauze offers good breathability, it envelops the catheter site, causing inconvenience, hindering observation of dermatitis treatment, and potentially leading to catheter dislodgement if improperly secured. Additionally, frequent dressing changes increase patient burden and nursing workload while repeated use of disinfectants irritates skin and prolongs dermatitis resolution. Gauze also adheres to exudate from ruptured dermatitis, causing re-injury during removal.

Pibaijin herbal cream, extracted from multiple Chinese medicinal herbs including Galla chinensis, Gleditsia sinensis, Pseudolarix amabilis, Typhonium giganteum, and others, is gentle and non-irritating with antipruritic and antibacterial properties effective against various bacteria and fungi. It is suitable for dermatitis, eczema, tinea, and other skin conditions. No previous studies have reported using Pibaijin herbal cream combined with modified transparent dressing for PICC-related contact dermatitis. This study compared the clinical efficacy of this approach versus dexamethasone plus gentamicin combined with transparent dressing.

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1. Materials and Methods

1.1 Study Population

Patients with PICC catheterization complicated by contact dermatitis admitted to our department between October and October were enrolled.

Inclusion criteria: (1) Confirmed diagnosis of contact dermatitis after PICC

catheterization; (2) Receiving catheter maintenance at our hospital; (3) Signed informed consent.

Exclusion criteria: (1) Pre-existing skin diseases such as rashes or eczema; (2) Poor self-care ability, poor nutritional status, or systemic failure in advanced cancer; (3) Other contraindications for PICC; (4) Refusal to sign informed consent or withdrawal during the study.

A total of patients were selected and divided into study and control groups based on inclusion/exclusion criteria. The study group included males and females, while the control group included males and females. There were no statistically significant differences in gender, age, or total catheterization days between groups (P>). However, the average hospitalization time per admission was significantly shorter in the study group compared to the control group (P<). This study was approved by the institutional ethics review committee.

1.2 Intervention Methods

Control group: For patients with rashes and exudate, povidone-iodine was used for circular cleaning and disinfection centered on the puncture site (same range as PICC dressing change). After drying, saline was used for central disinfection, followed by topical application of gentamicin injection and dexamethasone injection using sterile cotton swabs. After drying, IV transparent dressing was fixed in an "S" or "U" shape, avoiding severe rash areas based on external catheter length. The catheter tail was reinforced with paper tape.

Study group: For patients with rashes and exudate, povidone-iodine was used for circular cleaning and disinfection (diameter $\geq$ cm, extending to arm edges). After drying, saline was used for central disinfection. IV transparent dressing was then fixed in an "S" or "U" shape, avoiding severe rash areas based on external catheter length. The catheter tail was reinforced with paper tape. Exposed rashes were treated with Pibaijin cream. Local observation and health education were strengthened; dressing changes were performed if exudate was present under the dressing, otherwise repeated every d using the same method.

During subsequent dressing changes, if rashes on previously exposed skin had resolved, the catheter position was moved to the previously exposed area before reapplying the dressing, allowing the previous dressing site to be exposed and treated with Pibaijin cream.

1.3 Outcome Measures

Baseline clinical data collected included gender, age, hospitalization frequency, length of stay per admission, total catheterization days, and disease season. Primary outcomes compared between groups included dermatitis resolution, itching disappearance, catheter dislodgement, skin pigmentation, catheter retention, itching disappearance time, and dermatitis resolution time. Patient comfort evaluations for both treatment methods were also assessed.

Evaluation criteria for dermatitis resolution: Complete disappearance of clinical symptoms and signs, including local redness, swelling, heat, and itching; resolution of papules and scattered millet-like rashes; cessation of vesicle exudate with visible pink granulation tissue formation; no scarring or pigmentation.

Criteria for treatment plan completion: Itching disappearance, 90% resolution of rashes, 消退 of redness at rash sites, no exudate, and no new rashes.

1.4 Statistical Methods

SPSS software was used for analysis. Categorical variables (gender, itching disappearance, dermatitis resolution, catheter dislodgement, skin pigmentation, comfort level, catheter retention) were expressed as percentages (%) and compared using ^{2} test. Continuous variables (age, hospitalization frequency, length of stay, total catheterization days, dermatitis resolution time, itching disappearance time) were expressed as mean ± standard deviation (x ± s). Normally distributed data were analyzed using t-test, while non-normally distributed data used Mann-Whitney U test. Statistical significance was set at P<.

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2. Results

2.1 Baseline Characteristics

Baseline comparisons between groups are shown in . No significant differences were found in gender, age, or total catheterization days between study and control groups (P>). However, the study group had significantly shorter average hospitalization time per admission (P<).

2.2 Treatment Outcomes

Comparison of treatment effects between groups is presented in . No statistically significant differences were observed in dermatitis resolution or catheter dislodgement rates between groups (P>). However, significant differences were found in itching disappearance, comfort level, catheter retention, skin pigmentation, itching disappearance time, and dermatitis resolution time (P<).

The study group demonstrated significantly shorter dermatitis resolution time (d) compared with the control group (d) (P<). Overall, patients in the study group showed higher comfort levels, shorter itching disappearance and dermatitis resolution times, less skin pigmentation, and all completed planned treatment. In contrast, % of patients in the control group failed to complete treatment, some had unresolved dermatitis with persistent itching, % developed skin pigmentation, and % reported low comfort levels. [Figure 2: see original paper] illustrates the post-dressing-change effects in both groups.

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3. Discussion

Compared with other vascular access routes, PICC offers advantages including lower surgical trauma, reduced bleeding and bloodstream infection risk, less drug extravasation, flow rate independence from patient position, and longer dwell times. Furthermore, PICC effectively reduces risks of procedure-related complications (pneumothorax, hemothorax, accidental arterial puncture) while decreasing treatment costs and improving nursing quality. As PICC use increases among cancer patients receiving chemotherapy, identifying complications and risk factors becomes critical for ensuring patient safety.

PICC catheterization requires weekly dressing maintenance at the insertion site. Repeated exposure to topical antiseptic solutions and medical adhesives, coupled with removal of adhesive dressings, strips loose epidermal cells and even removes the stratum corneum, altering skin barrier function, increasing transepidermal water loss, and causing skin breakdown. Additionally, chemotherapy and/or radiation therapy make tumor patients' skin more vulnerable to infection and contact dermatitis, directly affecting treatment efficacy and quality of life.

Numerous factors influence PICC-related contact dermatitis. Endogenous factors include gender, allergic constitution, and internal environment changes. Studies show patients with drug allergy histories have higher contact dermatitis incidence rates. Chemotherapy also causes insomnia, mental stress, emotional changes, and endocrine dysfunction, all of which can trigger or aggravate dermatitis. This study did not collect data on drug allergy history, sweating status, or insomnia, which should be addressed in future research.

Extrinsic factors include season, disinfectant type, catheter type, and dressing type. Higher temperatures in summer and autumn increase sweating, and some dressings have poor breathability, leading to sweat accumulation and frequent dressing changes that increase dermatitis incidence. Moist local skin promotes bacterial growth, making disinfectant and dressing selection crucial. Chlorhexidine, a commonly used effective disinfectant, contains alcohol that irritates sensitive skin and alcohol-allergic patients. This study used povidone-iodine, which is alcohol-free, provides broad-spectrum antimicrobial activity, and forms a visible protective film on the skin surface, reducing irritation while inhibiting bacteria—making it optimal for skin disinfection.

Catheters are foreign bodies that cause skin reactions through repeated friction at the puncture site. Mei et al. demonstrated that catheter material correlates with contact dermatitis incidence (P<), with % of patients using silicone catheters developing dermatitis versus % using polyurethane catheters. This study used PowerPICC catheters, a new-generation valved, pressure-injectable PICC that simplifies maintenance, tolerates high-pressure injections, requires only saline flushes during intermittent periods (no heparin lock), and supports enhanced CT/MRI scans up to psi. Its "one tube, multiple functions" design enables multi-pathway infusion and hemodynamic monitoring while avoiding CVC-related complications.

Conventional treatment for PICC-related contact dermatitis uses anti-allergic steroid ointment with sterile gauze coverage. While breathable, gauze envelops the catheter site, causing inconvenience, hindering observation, and risking catheter dislodgement. Frequent changes increase patient burden and nursing workload while repeated disinfectant use irritates skin and prolongs resolution. Gauze also adheres to exudate, causing re-injury during removal. Transparent dressings are ultra-thin, improving comfort and clinical observation with d change cycles that reduce pain and workload. However, standard transparent dressings have poor breathability and cause allergies. This study used IV transparent dressing (Smith & Nephew), which provides antimicrobial barrier and waterproof protection with high extensibility and conformability. Its moisture vapor transmission rate is times higher than other transparent film dressings, with minimal allergenicity, reduced adhesive residue, and less pain during removal. Compared to M transparent dressing, IV significantly reduces allergy incidence and total dressing changes while improving comfort and reducing nursing workload.

Dexamethasone (a glucocorticoid) and gentamicin (an aminoglycoside antibiotic) have anti-inflammatory and anti-allergic effects suitable for various skin conditions. Multiple studies have demonstrated their efficacy, alone or combined, in treating PICC-related contact dermatitis, eczema, and puncture site infections. Therefore, this study used dexamethasone plus gentamicin as the control to compare with Pibaijin.

Pibaijin herbal cream is a traditional Chinese medicine preparation whose active ingredients include extracts from Galla chinensis, Gleditsia sinensis, Pseudolarix amabilis, Typhonium giganteum, Phellodendron amurense, Stemona sessilifolia, Smilax glabra, and other herbs. It inhibits Staphylococcus aureus, Candida albicans, and Escherichia coli, effectively treating various dermatitis, eczema, and fungal skin conditions while relieving dryness and itching. Its natural herbal composition, free of hormones, makes it suitable for sensitive skin in cancer patients. In this study, exposed skin formed scabs within hours of Pibaijin application, with redness 消退 and patient-reported itching disappearance. Compared with the dexamethasone-gentamicin group, itching disappearance and dermatitis resolution times were significantly shorter, skin pigmentation was markedly reduced, and patient satisfaction with the dressing method and attention to catheter site skin improved.

In summary, Pibaijin herbal cream combined with modified transparent dressing effectively treats PICC-related contact dermatitis with shorter healing time, no skin pigmentation, improved patient comfort, and reduced unplanned catheter removal, warranting clinical promotion.

Conflict of Interest Statement: The authors declare no conflicts of interest.

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Note: Figure translations are in progress. See original paper for figures.