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Multidisciplinary Collaborative and Refined Nursing for a Patient with Severe Toxic Epidermal Necrolysis

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Abstract: This paper summarizes the nursing experience of a 75-year-old patient who developed exfoliative dermatitis-type drug eruption induced by cold medicine and progressed to toxic epidermal necrolysis (TEN). The core nursing measures included (1) Establishing a multidisciplinary team and implementing bundled care led by trauma specialist nurses; (2) Precise wound management using the "three-stage debridement method" and silver ion dressings; (3) Implementing multimodal analgesia based on dynamic pain assessment; (4) Strengthening fluid, electrolyte, and nutritional management; and (5) Providing individualized psychological support. After 14 days of treatment and nursing, the patient's wounds were completely epithelialized, infection indicators returned to normal, pain was effectively controlled, and the patient was discharged successfully. No serious complications were observed during the 6-month follow-up. For elderly critically ill patients with TEN, constructing a systematic nursing model based on multidisciplinary collaboration and centered on trauma care is crucial for improving patient outcomes.

Keywords: Toxic epidermal necrolysis; Exfoliative dermatitis-type drug eruption; Multidisciplinary collaboration; Critical care nursing; Wound management

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1. Introduction

Toxic epidermal necrolysis (TEN), as the ultimate critical manifestation of drug eruptions, continuously challenges the limits of clinical care with its high mortality rate and complex nursing requirements. Although international consensus guidelines have underscored the centrality of supportive care, translating universal recommendations into efficient and precise nursing pathways tailored to vulnerable elderly patients remains a challenge in clinical practice [1]. This paper reports a case of an elderly patient with rapidly progressing TEN induced by cold medicine, demonstrating the practical efficacy of a bundled nursing approach led by trauma specialist nurses and deeply

integrated with multidisciplinary collaboration.

2. Clinical data

2.1. Case overview

A 75-year-old female patient was admitted to the emergency department with a 3-day history of erythema, blisters, and extensive epidermal desquamation across her entire body following the oral administration of cold medication. Three days prior to admission, she had a clear history of taking cold medicine. The skin lesions initially appeared on the hands and feet and rapidly spread to cover over 90% of her body surface area, accompanied by high fever and severe pain.

2.1.1. Past medical history

40-year history of hypertension; a long-standing history of rheumatoid arthritis, for which she had been taking immunosuppressants regularly; and a history of chronic bronchitis for many years.

2.1.2. Physical examination upon admission

T 37.6°C, P 110 beats/min, R 20 breaths/min, BP 152/85 mmHg. BMI 18.4 kg/m². Dermatological examination: diffuse dark red patches across the body, with numerous flaccid blisters, bullae, and widespread epidermal desquamation. Positive Nikolsky's sign. Significant serous exudate from eroded areas with marked tenderness. Erosions visible on the oral mucosa.

2.2. Auxiliary examinations

2.2.1. Laboratory tests

PCT 2.19 ng/mL, CRP 296.2 mg/L, neutrophil percentage 85.2%. Red blood cell counts 2.98×10^{12}/L, hemoglobin 91 g/L, potassium 2.7 mmol/L, albumin < 30 g/L.

2.2.2. Imaging studies

Chest CT indicated infection in the lower lobes of both lungs.

2.3. Treatment and outcome

The patient was transferred to the ICU for treatment of septicemia on the second day after admission. Core treatments included: immediate discontinuation of the suspected allergenic drug and intravenous administration of hydroprednisone; empirical anti-infective therapy; specialized wound management; and systemic supportive care. Following treatment, the patient's condition was rapidly controlled. On the third day after transfer to the ICU, the procalcitonin (PCT) level decreased to 0.57 ng/mL. On the seventh day, the patient was transferred back to the dermatology ward and was discharged in improved condition on the 14th day. No long-term sequelae were observed during the 6-month follow-up.

3. Nursing assessment and intervention

For this critically ill TEN patient with a high risk of complications, this study has established a multidisciplinary

team (MDT) and implemented an evidence-based bundled nursing strategy. The core of nursing practice focused on wound management, infection prevention and control, systemic functional support, and patient comfort, as detailed below.

3.1. MDT collaboration and holistic nursing management

An MDT team comprising dermatologists, critical care physicians, specialist nurses, clinical pharmacists, nutritionists, and rehabilitation therapists was formed. Daily joint rounds were conducted to collaboratively determine treatment plans. The charge nurse coordinated the development of a "TEN Bundled Nursing Protocol", which integrated the following core elements: (1) precise wound care and sterile isolation; (2) systemic functional support and maintenance of internal environment stability; (3) multimodal analgesia and comfort-oriented care; and (4) individualized nutrition and psychological support. This framework ensured the proactive, systematic, and consistent delivery of nursing care.

3.2. Precision nursing for wound and infection management

As wounds represent the primary portal of infection and a key focus of care in TEN patients, the team abandoned traditional aggressive debridement methods and adopted a gentle "three-stage debridement approach". First, the wound was irrigated with a large volume of warm normal saline to soften and remove loosened necrotic epidermis. Second, sterile iodophor solution was applied using a "rolling ball" technique for gentle disinfection, minimizing physical trauma to newly formed epithelium. Finally, sterile scissors were used to precisely excise fully detached necrotic tissue.

3.2.1. Dressing selection and application

After debridement, a double-layer dressing consisting of "silver ion dressing + non-adhesive gauze" was applied. The silver ion dressing directly covers all the eroded areas, leveraging its broad-spectrum antibacterial properties and ability to absorb exudate to effectively control local bacterial load. The outer layer was secured with soft, non-adhesive gauze, ensuring breathability while minimizing secondary injury and pain during dressing changes. All procedures were performed under strict aseptic technique.

3.2.2. Environmental isolation and monitoring

The patient was placed in a single-room negative-pressure ward and subjected to contact isolation. The environment was disinfected daily using an air disinfection machine. The wound was closely monitored, with daily records kept of changes in its area, color, characteristics of exudate, and odor. This has provided intuitive evidence for doctors to assess the status of infection control.

3.3. Supportive nursing for systemic functions

TEN can lead to dysfunction in multiple systemic systems, and systemic support is the cornerstone for maintaining stable vital signs.

3.3.1. Fluid management and electrolyte balance

An accurate 24-hour fluid intake and output record sheet was established, with summaries and analyses conducted at each shift. The infusion rate and crystalloid-to-colloid ratio were dynamically adjusted based on the

patient's central venous pressure, blood pressure, urine output, and skin turgor. For issues such as hypokalemia and hypocalcemia, electrolyte solutions were administered at a constant rate through a deep venous access as prescribed, with electrolyte levels monitored every 4 hours until stable.

3.3.2. Liver function maintenance

Considering the patient's advanced age, long-term use of immunosuppressants, and potential risk of liver injury, the team closely observes for jaundice of the skin and sclera and dynamically monitors liver function indicators. When administering medications, preference was given to regimens with minimal impact on the liver, avoiding known hepatotoxic drugs.

3.3.3. Respiratory support and airway care

Given the patient's chronic bronchitis and pulmonary infection, the team provides nasal cannula oxygen to maintain SpO_2 above 95%. Airway humidification was enhanced, and the patient was assisted in effective coughing and deep breathing. Oral care was performed with sodium bicarbonate solution to prevent fungal infections and maintain airway patency.

3.4. Multimodal analgesia and comfort care

Pain is the most distressing symptom for patients with TEN. The team employs a multimodal analgesia approach, combining pharmacological and non-pharmacological interventions.

3.4.1. Pain assessment

Systematic pain assessments were conducted every 4 hours using the Numerical Rating Scale (NRS), with dynamic assessments particularly performed before, during, and after dressing changes.

3.4.2. Pharmacological interventions

Pregabalin was administered orally as prescribed to control neuropathic background pain. Short-acting analgesics were preemptively given before procedural pain, such as dressing changes, to manage anticipated pain.

3.4.3. Non-pharmacological interventions

The ward environment was kept quiet with an appropriate room temperature. A specially designed burn support bed was used to prevent direct contact between bedding and the wound. Patients were assisted into comfortable positions and regularly repositioned along the axis. Thirty minutes before dressing changes, cold compresses were applied to non-injured areas near the wound to divert attention and reduce pain sensitivity. During procedures, attention was diverted through verbal communication and playing soothing music.

3.5. Individualized nutrition and psychological support

The patient presented with hypoproteinemia and malnutrition upon admission. In addition to parenteral nutrition support, the team successfully established a jejunal feeding tube within 48 hours of admission, initiating early enteral nutrition. Based on the patient's energy expenditure and protein requirements, a dietitian formulated a high-protein, high-vitamin nutritional regimen. Daily monitoring of gastric residual volume was conducted to assess feeding tolerance, ensuring the smooth implementation of nutritional support and providing a material foundation

for wound healing.

Faced with the sudden onset of a severe illness and changes in physical appearance, the patient exhibited significant anxiety and fear. The team implemented the following measures.

(1) Establishing a trusting relationship

Proactive communication was initiated, using empathetic language to understand the patient's distress.

(2) Cognitive intervention

The disease process and the purposes of various treatments were explained in layman's terms to help rebuild a sense of control.

(3) Enhancing social support

While strictly adhering to infection control protocols, family members were encouraged to provide emotional support through video calls and other means.

Through systematic psychological interventions, the patient's level of cooperation significantly improved, creating a positive psychological environment for recovery.

4. Discussion

Toxic epidermal necrolysis (TEN) is a life-threatening, severe dermatological condition, and its management is a complex undertaking that involves multiple systems and stages. The successful treatment of a 75-year-old patient in this case depended not only on timely medical diagnosis but also on a systematic, meticulous, and compassionate nursing management system. Based on this case, this paper delves deeply into the critical aspects of nursing care.

4.1. Multidisciplinary collaboration and specialist nurse leadership: Laying the foundation for efficient treatment

The treatment of TEN cannot be accomplished by a single department alone; this study fully demonstrates the core value of the multidisciplinary team (MDT) model. By leveraging resources from multiple disciplines, the MDT optimizes decision-making processes ranging from anti-infective strategies and immunomodulatory regimens to nutritional support [1]. Critically, within the MDT framework, the "Specialized Wound Care Team", led by wound ostomy continence nurses, plays a pivotal role. This team was responsible not only for performing complex wound debridement and dressing selection but also for wound assessment, fine-tuning treatment plans, and providing feedback on outcomes, ensuring continuity and expertise in wound management. This model of "medical decision-making with nursing-led execution" elevates the role of specialized nursing from mere order execution to that of a problem solver and manager for specific nursing challenges [2]. This represents a key distinction from routine basic nursing and a core element in enhancing nursing quality and patient outcomes.

4.2. Addressing both physical and psychological needs: Recognizing the dual suffering of elderly ten patients

Advanced age is one of the risk factors for poor prognosis in TEN, necessitating particular attention to both physiological and psychological dimensions during nursing care. Physiologically, elderly patients exhibit heightened pain sensitivity and reduced tolerance, often accompanied by cognitive and communicative impairments. In this case, we employed a "baseline analgesia + breakthrough pain control" strategy, combined

with dynamic assessment using multiple tools such as the Numerical Rating Scale (NRS), Behavioral Pain Scale (BPS), and Critical-Care Pain Observation Tool (CPOT), effectively achieving personalized and precise pain management. This approach helps avoid stress responses and complications caused by pain itself [3,4]. Psychologically, the body image disturbances resulting from extensive skin lesions can be devastating to patients, often triggering severe anxiety, depression, and even treatment refusal [4]. We constructed a safe psychological environment for patients by establishing a therapeutic trust relationship, employing open communication techniques, and actively mobilizing the family support system. This intervention, which places equal emphasis on "technical skills" and "empathy", effectively fills the psychological void often overlooked in critical care. It serves as an intrinsic driving force for promoting active patient cooperation and achieving holistic recovery.

4.3. Precision infection control amidst barrier failure: Safeguarding the last line of defense for life

The skin is the most crucial physical barrier of the human body. The widespread failure of this barrier in patients with TEN renders them nearly equivalent to a "massive open wound", with infection posing the most direct and lethal threat [5,6]. Therefore, the significance of the "environment-wound-personnel" trinity infection control measures adopted in this case cannot be overstated. The use of protective isolation and sterile laminar flow wards cuts off exogenous infection pathways; wound management based on the "three-stage debridement method" aims to control endogenous sources of infection; and strict adherence to hand hygiene and sterile procedures serves as a critical link connecting all aspects to prevent cross-infection. Our practice closely aligns with the standardized procedures recommended in the literature, with an added emphasis on thorough and consistent execution. This approach successfully kept infection indicators within safe limits, thereby winning precious time for subsequent treatment [6].

4.4. Systematic homeostasis support: The foundation for maintaining organ function

Faced with continuous loss of body fluids, proteins, and electrolytes due to extensive exudation over the entire body surface, maintaining internal environmental stability is central to preventing shock and multiple organ failure (MOF) [3]. The nursing focus in this case was on precise fluid management, timely albumin supplementation, and electrolyte correction. By closely monitoring central venous pressure (CVP), hourly urine output, and daily weight, we fine-tuned fluid replacement protocols to ensure effective tissue perfusion while avoiding excessive volume overload. Simultaneously, dynamic supplementation based on serum albumin and electrolyte levels provided the necessary material foundation for wound repair. This series of systematic supportive measures directly counteracts the core pathophysiological processes of TEN, serving as the fundamental guarantee to help patients navigate through the acute critical phase and create conditions for tissue regeneration.

5. Conclusion

The successful treatment of an elderly patient with TEN demonstrates that a comprehensive nursing model, framed by multidisciplinary collaboration, centered on trauma specialist nursing, and incorporating precise infection control and systematic support, can effectively improve patient prognosis. Future nursing practices should focus on transforming such experiences into standardized nursing pathways and enhancing specialized training for nurses to provide high-quality nursing services for complex and critically ill patients.

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Disclosure statement

The authors declare no conflict of interest.

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