Nursing Experience of Plum Blossom Needle Combined with Photodynamic Therapy for Actinic Keratosis in an Elderly Patient: A Case Report Postprint

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Abstract

This article summarizes the nursing experience of one case of elderly actinic keratosis (AK) treated with plum blossom needle combined with photodynamic therapy (PDT). Lesion site pretreatment, photoprotection, and pain intervention are the key points in AK nursing care. Simultaneously, implementing comprehensive health education helps alleviate patients' negative emotions, improve treatment compliance, and thereby promote early recovery.

Full Text

Nursing Experience in Treating Senile Actinic Keratosis with Plum-Blossom Needle Combined with Photodynamic Therapy: A Case Report

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Abstract

This paper summarizes the nursing experience in treating an elderly patient with actinic keratosis (AK) using a combination of traditional Chinese medicine plum-blossom needle and 5-aminolevulinic acid photodynamic therapy (ALA-PDT). Key nursing interventions for AK include skin preconditioning, light protection,

and pain management. Comprehensive health education helps alleviate negative emotions, improve treatment compliance, and promote recovery.

Keywords: actinic keratosis; plum-blossom needle; photodynamic therapy; skin lesion; pain; health education

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Actinic keratosis (AK) is a precancerous lesion induced by long-term ultraviolet radiation, predominantly affecting middle-aged and elderly populations [1]. In recent years, the incidence of AK has shown a significant upward trend. Early diagnosis and timely, effective treatment are critical to preventing disease progression and malignant transformation [2]. Conventional treatments for AK include electrocautery, microwave therapy, cryotherapy, and surgical excision, which carry risks of infection, trauma, and scarring, with suboptimal therapeutic outcomes [3]. Photodynamic therapy (PDT), also known as photoirradiation therapy or photochemotherapy, consists of three essential elements: photosensitizer, oxygen, and light. Under specific wavelength irradiation, the photosensitizer transfers electrons or energy to oxygen, generating reactive oxygen species that selectively damage pathogenic eukaryotic cells or microorganisms such as bacteria and fungi. PDT offers advantages including rapid onset, minimal trauma, good tolerability, repeatability, and reduced scar formation, demonstrating excellent efficacy in treating solid tumors, skin cancers, vascular diseases, and ophthalmic conditions [4]. Pre-treatment with traditional Chinese plum-blossom needle before PDT can enhance therapeutic effects. Plum-blossom needle is a superficial acupuncture technique in traditional Chinese medicine, featuring a cluster of five short needles resembling a plum blossom. Local tapping with this needle promotes blood circulation, unblocks collaterals, and opens pores to dispel pathogenic factors. Modern research indicates that the mechanical stimulation from plum-blossom needle can improve local blood circulation and modulate inflammatory cytokine levels. In recent years, plum-blossom needle therapy has shown significant efficacy in treating alopecia areata, vitiligo, herpes zoster, and skin cancers [5]. Additionally, PDT can indirectly damage target tissues through vascular toxicity effects causing tissue hypoxia and insufficient blood supply, while triggering inflammatory and non-specific/specific immune responses that cause tissue damage [6], thereby achieving therapeutic effects. This paper reports the nursing experience of one elderly AK case treated with plum-blossom needle combined with PDT.

1 Clinical Data

The patient was a male, [age] years old, who presented with a black-brown plaque on the left nasal dorsum for [duration] months, gradually increasing in size recently. The lesion was an infiltrative brown plaque with visible black papules that gradually coalesced, showing ulceration, crusting, oozing, bleeding, itching, and stinging pain. The patient visited our hospital with a skin lesion measuring cm. Biopsy results showed disarranged keratinocytes, paraker-

atotic cells, bud-like proliferation, solar elastosis in the superficial dermis, and band-like inflammatory cell infiltration. Clinical diagnosis: Actinic keratosis. Given the facial location affecting appearance and the patient's poor tolerance due to advanced age, plum-blossom needle combined with 5-aminolevulinic acid-photodynamic therapy (ALA-PDT) was selected after discussion with the patient and family.

ALA-PDT Materials: 5-aminolevulinic acid hydrochloride for external use (Shanghai Fudan-Zhangjiang Bio-Pharmaceutical Co., Ltd., mg per vial). LED photodynamic therapy device (Model: LED-IIC, Manufacturer: Wuhan Yage Photoelectric Technology Co., Ltd.), wavelength ( ) nm.

Pre-treatment: The patient's skin lesion was hyperplastic and thickened with adherent yellow-brown thick crusts, and some lesions showed superficial ulceration with light yellow exudate. Wound cleaning was performed [7]. The lesion was cleaned with normal saline, and erythromycin ointment was applied with occlusion for h to soften crusts and scales. After removal with normal saline cotton swabs, % alcohol disinfection was performed, followed by plum-blossom needle tapping. The plum-blossom needle technique requires holding the needle handle with the right thumb, middle, and ring fingers, with the handle end resting against the posterior palm and the index finger pressing on the handle. Using flexible wrist joint elasticity (keeping elbow and arm stationary), the needle is lifted and tapped from the edge toward the center until slight oozing occurred [8].

Medication Occlusion and Light Exposure: As ALA photosensitizer interferes with efficacy when exposed to light, preparation must be performed in a dark room avoiding sunlight exposure. One vial of mg ALA medication can be used for a circular area with diameter [9]. Based on the patient's lesion area, vials of 5-aminolevulinic acid hydrochloride for external use were dissolved in injection water to prepare a % solution. The operator applied the solution to sterile 脱脂 thin cotton pads and applied them to the lesion area, extending cm beyond the lesion margins. The medicated cotton was covered with plastic wrap, then with gauze for light-proof occlusion for h. LED red light source was selected for irradiation at an energy density of and power density of mW/cm. With the patient in supine position, the irradiation distance was cm and duration was min.

The patient underwent ALA-PDT treatment times over months with an interval of d between treatments, achieving complete recovery. After the first treatment, the lesion area reduced to cm, and after the second treatment, it reduced to cm with the ulcer surface becoming significantly shallower. After the third treatment, the lesion resolved, leaving light red skin at the original site. The fourth treatment was for consolidation. The patient has been followed up every months at the outpatient clinic since cure.

2 Nursing Care

Light Exposure Nursing: As the treatment area was on the face, both the patient and operator wore special anti-red light glasses to avoid direct LED red light stimulation to the eyes. The patient was instructed to keep eyes closed during irradiation. After removing the occlusive dressing, the lesion was exposed extending cm beyond the margins, while surrounding skin was covered with a fenestrated drape to avoid irradiating normal skin. As the patient was elderly, safety precautions were taken during irradiation to prevent falls, with bed rails used when necessary.

During irradiation, skin reactions were closely observed and the patient was asked about sensations. Elevated local skin temperature with burning pain is a normal reaction. After irradiation, ice packs were applied to the lesion for min to reduce temperature and alleviate pain. Sterile gauze was applied after ice compression.

Post-treatment Care: If pain persisted at the treatment site, ice packs could be applied every min. If pain remained unrelieved, oral analgesics (such as ibuprofen or acetaminophen) could be used under medical guidance. Mild local edema and occasional itching might occur within d. Patients were instructed not to rub the area to prevent secondary infection, and crusts would detach spontaneously within days.

Psychological Nursing: As an elderly patient, companionship and communication during irradiation provided psychological comfort. Both patient and family were concerned about cancer risk and experienced significant psychological stress. Nurses provided patient reassurance, explained the treatment protocol and disease-related knowledge, and informed them about possible discomfort during treatment to help prepare mentally and alleviate fear. Dermatology Life Quality Index (DLQI) assessments were performed before each treatment, showing significant improvement in the patient's DLQI score after the final treatment compared to baseline.

Health Education: Patients were instructed to avoid light exposure within h after ALA solution application if they could not return for PDT treatment on schedule. They were advised to avoid medications that enhance PDT phototoxic reactions, such as thiazide diuretics, griseofulvin, phenothiazines, sulfonamides, sulfonylureas, and tetracyclines. To ensure compliance, the treatment protocol was explained, proper application was taught, and immediate pain and inflammation management was addressed.

After ALA-PDT treatment, patients must remain indoors and avoid direct sunlight for h (avoid sitting near windows). If outdoor activity was necessary, sunlight and other strong light exposure must be avoided with proper covering. After h, physical sun protection using broad-spectrum sunscreen containing zinc oxide or titanium dioxide was recommended [10]. Patients were informed about possible skin dryness, tightness, and redness, and advised to use mild cleansers

daily followed by moisturizer application.

3 Discussion

AK formation is related to ultraviolet radiation, with incidence increasing with age. Statistics show that approximately % of AK patients progress to squamous cell carcinoma (SCC) annually [11]. Early effective treatment and nursing care are key to curing AK and reducing skin malignancy development. ALA-PDT works by using light to excite photosensitizers in tissues, initiating photochemical reactions that damage target cells [12]. It is a universal non-invasive treatment in dermatology with precise targeting, good clinical and cosmetic outcomes. In this case, the lesion had purulent exudate, crusting, and hyperplasia. Using PDT alone would result in poor drug penetration into the lesion due to crust obstruction, and light source would not effectively reach the pathological tissue, reducing irradiation power and efficacy. The total treatment course of PDT alone could reach sessions, causing prolonged treatment, potential pain, increased drug dosage, and heavier economic burden. Pre-treatment with plum-blossom needle effectively cleared crusts and hyperplastic tissue, creating regular channels on the skin surface to facilitate drug penetration and absorption, improve blood circulation, and enhance efficacy. In this case, plum-blossom needle combined with PDT achieved AK cure in treatments with minimal discomfort, reduced drug dosage, and lighter medical economic burden.

Key aspects of AK treatment nursing include lesion preconditioning, light protection, and pain management. Additionally, to ensure patients can better manage local adverse reactions and accept 5-aminolevulinic acid photodynamic therapy, comprehensive health education is needed to help patients understand disease knowledge, improve treatment compliance, and promote recovery.

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

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