

Characteristics and Treatment Principles of Wound in Elderly Patients with the 3rd and 4th Stage Pressure Injury

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Abstract

Pressure injury is a common complication associated with active disorders, chronic diseases in elderly bedridden patients. Period 1 and 2 of pressure injury can be controlled and reversed usually through the standard prophylaxis, overall assessment, timely detection and correct disposal, elimination of etiological risk factors, while period 3, 4 and non-staging, deep tissue injury period remains the focused concerns and difficult for clinical treatment. In principle, the latter two periods are similar to phases 3, 4 in terms of mechanism and treatment. Therefore, this paper reviews the characteristics of wounds and management principles of pressure ulcer wounds in the 3rd and 4th stages that are difficult to heal, based on our experiences and practices.

Keywords: Cytokine; Integrated Medicine; Physical Therapy; Pressure Injury; Wet Therapy

Introduction

Pressure injury or pressure sores, is a skin and deep soft tissue injury caused by prolonged bedridden or prolonged unchanging positions in certain parts of the body and characterized as persistent pressure-induced ischemia and hypoxia in the skin soft tissue of the bone protrusion [1]. Pressure injuries are a common complication in active disorders and chronic diseases in elderly bedridden patients [2]. Epidemiological investigation shows that pressure injury is one of the major causes of chronic refractory wound in hospitalized patients in China. Along with aging population in China, the incidences of cardiovascular & cerebrovascular diseases, diabetes mellitus and tumors are increasing. Due to the impact of excessive underlying diseases and improper nursing care and other reasons, the incidence of pressure injury in the elderly is also increasing and remains higher [3]. At present, about 35% of all hospitalized patients are over 60 years old in China with the incidence of pressure injury in the elderly maintained at 40% - 60% [4]. Because of the compromised functions of organs and systems in elderly patients, the activity and aerobic metabolic ability are obviously undermined, and the pressure injury often develops to

stage 3 or stage 4. The elderly patients with stage 3 and 4 pressure injuries often have serious underlying diseases. Most of the wounds are complicated with severe infections, and the conditions of the wounds are complex and difficult to treat. Even if the success rate of surgical interventions is not high, it often becomes a difficult clinical issue to deal with [5].

Staging and Characteristics of Pressure Injury

Pressure injury can be classified into different stages according to the degree of skin and soft tissue damage and the pathophysiological characteristics of the wound. In February 2007, the National Pressure Ulcer Expert Group (NPUAP) of the United States released a new staging system for pressure injury [6]. At the Chicago Expert Meeting in April 2016, the NPUAP Staging Update Note was presented [7]. It added the non-staging and deep tissue damage period on the basis of the original four stages, which is of certain reference significance for clinical treatment and efficacy evaluation.

Phase 1: Local skin is intact, the compressed skin appears, indelible erythema, no ulceration and blisters.

Phase 2: The lesion involves dermis, skin ulcer is superficial, and lesion in the bottom is dry pink wound, with no necrosis and infection.

Phase 3: Full-thickness skin is necrotic or absent, subcutaneous soft tissue and fat revisable and often associated with infection, muscle and bone are not exposed.

Phase 4: Wound with skin, subcutaneous fat, muscle and surrounding supporting structures, tendon or muscle are exposed. Wound is covered with black necrotic tissue, often with sinus tract and lacuna, and it may be complicated with necrotizing fasciitis and osteomyelitis.

Non-staging: The wound is covered by yellow, brown, grey and black necrotic rotten flesh or scab. Only when the base of the wound is exposed thoroughly can the staging be determined.

Deep tissue injury stage: The damage and necrosis of subcutaneous multi-layered tissues are mainly caused by continuous mechanical pressure, shear force and friction. Dark red, brown or purple changes occur in local skin, or dark wound bed and hyperemic blisters are exposed separately from epidermis. The skin may be intact or incomplete. Because of the factors such as long-term bed rest, skin and body sensory retardation, weakening of motor and activity ability, and not being found in time, the elderly patients often suffer from this type of atypical injury. The clinical manifestations of skin and wounds vary greatly, often resulting in delayed, inadequate or excessive treatment worthy of attentions.

The stages of pressure injury are the result of the duration, intensity of pressure and the changes of skin and soft tissue environment in the compressed area [8]. Defining the stages of pressure injury has certain guiding value for diagnosis and treatment planning, evaluating the overall condition of patients, evaluating the curative effect and judging the prognosis. Stage 1 and 2 pressure injuries in elderly patients are often controlled and reversed by standardized nursing prophylaxis and holistic assessment, timely detection and correct treatment, elimination of etiological and risk factors [9]. The more common stages are stage 3 and 4 of senile pressure injury and the stages of non-staging and deep tissue injury are the focus and remain difficult for clinical treatment.

Characteristics of Pressure Ulcers in the Elderly

Coexistence of multiple diseases and disorders: Pressure sores in the elderly are often accompanied by complex and serious underlying diseases and dysfunction [9] with hidden, atypical features and rapid development. Old patients with pressure ulcers have thinner dermis, less subcutaneous fat, poor tissue tolerance, impaired sensory function and limited mobility. As consequences, wounds often develop rapidly to stage 3 or 4. Pressure sore wounds in the elderly are often complicated by repeated infections [10] with a long course of disease and difficulties of repair. Significantly decreased activity of life: elderly patients with pressure ulcers were mostly bedridden for long time, with limited activity, motor dysfunction, significantly decreased systemic and local oxygen uptake [11]. The tolerance to various stimuli is obviously declining with difficulties to tolerate traumatic surgical stimuli and some invasive therapies [12]. It also becomes difficult to achieve self-repair of pressure sores in the elderly groups and less responsive

to various therapies and rehabilitation interventions. It is difficult to address the primary causes by underlying diseases and deliver treatment of pressure ulcers. Even if cured, it is susceptible to recur.

Principles of Wound Management in Elderly Patients

The elderly patients with stage 3 and 4 pressure injuries often have serious underlying diseases, and it is difficult to initiate the normal healing process because of various systemic and local reasons. During attention to systemic factors and management of primary diseases, we must address the inducing factors and primary causes of pressure injury in elderly patients, return to the pathophysiological basis of injury in elderly patients and follow the basic guidelines of chronic wound treatment. Special attention should be paid to the pathophysiological characteristics of the elderly patients themselves, and minimally invasive or non-invasive wound treatment regimens should be preferential options as possible, such as proper and mild wound bed treatment, timely and soft coverage of modern dressings, the integrated application of various biological, physical factors, energy medicine, rehabilitation medicine, exercise therapy and proper selection of progressive non-invasive flexible wound closure methods [13-16]. All in all, prophylaxis lays the foundation and serves as key link in the treatment of pressure sores in the elderly. Attention should be paid to the comprehensive assessment and treatment of underlying diseases. Enteral nutritional support should be strengthened in a balanced manner. According to the characteristics of pressure ulcers in the elderly, various comprehensive therapies are selected for different parts, types and periods of pressure ulcers [17].

Application of Rehabilitation Medical Principles in Pressure Ulcers in the Elderly

Old patients with pressure ulcer often exhibit progressive functional deterioration in multiple organs and systems. Pressure ulcer is often inducing factor or the manifestation of end-stage failure. Besides routine debridement [18], dressing modifications and wound treatment, comprehensive intervention of rehabilitation medicine is also necessary. A comprehensive balance should be achieved both at tissue & organ level and individual & social participation level with individualized rehabilitation therapy emphasized.

Rehabilitation at Tissue and Organ Level

Applications of various physical factors are recommended to improve local blood circulation of wound, control infection and relieve pain. It is also imperative to strengthen the rehabilitation exercise of cardiopulmonary function to enhance the ability of systemic oxygen uptake. Exercise therapy is prescribed to enhance muscle strength and joint range of motion, overcome muscular atrophy and oligomyosis, improve systemic and local aerobic capacity and eventually provide conditions for rehabilitations at individual level [19-22].

Rehabilitation Training at Individual Level to Improve Activities of Daily Life

The following recommendations should be followed as: proper management of urination, pelvic floor muscle and bladder training, management of Urethra. Prevent Waste Use Syndrome. Improve feeding, swallowing and digestive function, reduce mistaken inhalation and improve nutritional status.

Rehabilitation at social participation level to improve the patients' quality of life

It is recommended to assess, control and relieve pain, train and improve transfer ability, improve mental status, and correct cognitive impairment, as well as emotional disorders. In clinical practice, we should establish the concept of integrated medicine to integrate clinical medicine, rehabilitation medicine, energy medicine, regenerative medicine, molecular biology, tissue engineering, nutrition, nursing, modern new dressing technique, minimally invasive surgery and other means to provide patients with personalized rehabilitation therapies.

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