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OVERVIEW OF PRESSURE ULCERS: PATHOPHYSIOLOGY, EPIDEMIOLOGY, RISK FACTORS, PRESENTATION AND TREATMENT

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SUMMARY

Introduction: *Skin alterations or lesions called pressure ulcers (PUs) encompass localized areas of ischemia with subsequent tissue necrosis, which are generated by prolonged compression, shear or friction of soft tissues between bony prominences and the external surface.*

Objective: *to detail current information related to pressure ulcers pathophysiology, epidemiology, risk factors, presentation and treatment.*

Methodology: *a total of 24 articles were analyzed in this review, including review and original articles, as well as clinical cases, of which 17 bibliographies were used because the other articles were not relevant to this study. The sources of information were PubMed, Google Scholar and Cochrane; the terms used to search for information in Spanish, Portuguese and English were: pressure ulcers, skin lesions, decubitus ulcers.*

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Results: *The creation of pressure ulcers is multifactorial. The prevalence of pressure ulcers reported globally according to WHO is around 5 to 12%. Despite increased attention to prevention over the last 20 years, the prevalence of pressure ulcers has remained virtually unchanged, yet the related values of care continue to increase. Two-thirds of ulcers occur in people over 70 years of age.*
Conclusions: *due to the high prevalence worldwide, especially in patients over 70 years of age, the recognition, presentation and pathophysiology of pressure ulcers should be clearly understood, with the aim of preventing their occurrence. Prevention consists of maintaining and improving tissue tolerance and adequate offloading. Both internal and external factors have to be evaluated because they play a major role in pressure ulcer formation. Special attention should be paid to epidemiological risk groups. Proper hydration, together with adequate nutrition are essential in the treatment of this condition, in addition to close monitoring and corresponding wound management.*
Key words: *ulcers, pressure, lesions, skin, decubitus.*

INTRODUCTION

In the past, pressure ulcers were considered an inevitable consequence of being sick and bedridden. It is now known that this is not the case; pressure ulcers have come to be seen as an indicator of the quality of care provided by health personnel, which is why they occupy a notable place in the political agenda, as well as in the health agenda(1).

Skin alterations or lesions called pressure ulcers (PU) encompass localized areas of ischemia with subsequent tissue necrosis, which are generated by prolonged compression, shearing or friction of soft tissues between bony prominences and the external surface(2,3).
The appearance of PUs in hospitalized individuals constitutes a notable health problem, because, in addition to showing physical discomfort in the affected individual, it increases the treatment values, especially in the context of intensive care, increases the hospitalization time, as well as there is an increased risk of generating extra complications such as the need for corrective surgery, increasing the mortality rate(4,5).

In this study we will focus on providing an overview of pressure ulcers, especially their pathophysiology, epidemiology, risk factors, presentation and treatment.

METHODOLOGY

A total of 24 articles were analyzed in this review, including review and original articles, as well as cases and clinical trials, of which 17 bibliographies were used because the information collected was not important enough to be included in this study. The sources of information were Cochrane, PubMed and Google Scholar; the terms used to search for information in Spanish, Portuguese and English were: pressure ulcers, skin lesions, decubitus ulcers.

The choice of bibliography exposes elements related to pressure ulcers; in addition to this factor, pathophysiology, epidemiology, risk factors, presentation and treatment of the condition are presented.

DEVELOPMENT

Concept

A pressure ulcer also called decubitus ulcer is a wound that forms in the upper layers of the skin as a consequence of sustained pressure exerted externally, which subsequently extends both radially and into deeper tissue layers(6).

Pathophysiology

The creation of decubitus ulcers is multifactorial, however, these ulcers present a directionality to present as a consequence of ischemia and necrosis. Tissues can carry an abnormal amount of external pressure, however, constant pressure maintained for a prolonged period of time is the root cause. The external pressure must be greater than the arterial capillary pressure of 32 mm Hg to impede blood flow, and the pressure must be greater than the venous capillary closing pressure of 8 to 12 mm Hg to impede venous blood return. Sustaining a pressure above these numbers generates ischemia and tissue necrosis. This significant pressure may be due to compression by a firm mattress, hospital bed rails or any hard area in direct contact with the affected individual(7).

There are studies linking the pathophysiology of COVID-19 and the development of pressure ulcers. The research group assigned the proinflammatory cytokines interleukin-6 and tumor necrosis factor-alpha, numerous in individuals with COVID-19, as contributors to the occurrence and maintenance of inflammation following cell death and the creation of a pressure ulcer. Friction from skin rubbing against surfaces such as clothing or bedding can also develop ulcers by contributing to breaks in the surface layers of the skin. Moisture can cause new ulcers and worsen pre-existing ulcers through tissue degradation and maceration(8).

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Figure 1. Pressure ulcers of the foot and ankle.

Source: The Authors.

Epidemiology

Pressure ulcers are considered a major health problem in all regions of the world, affecting many individuals worldwide every year. The World Health Organization (WHO) reports that 1 out of every 10 patients living in industrialized countries presents these adverse events while being treated in health care facilities; this inadequate behavior in the quality of the individual being treated results in increased medical expenses for hospitalization, nosocomial infections, in addition to the disability it generates. There are data that in several countries present an average value between 6,000 million and 29,000 million dollars per year. The prevalence of pressure ulcers reported globally according to the WHO is around 5 to 12%, more specifically in America around 7%(9).

Some other bibliographies show that the prevalence was 12.9%. The most representative sociodemographic characteristic related to the origin of ulcers in individuals is the level of education of the caregiver. In addition, there is evidence of the connection of certain variables of the patient's state of health with the appearance of pressure ulcers(10).

Even though it is possible to prevent most cases, pressure ulcers remain a significant burden for the patient and society as a whole. There is data that approximately 3 million adults in the United States are affected annually. Despite increased attention to prevention over the past 20 years, the prevalence of pressure ulcers has remained virtually unchanged, yet the related values of care continue to increase(11).

Sacral decubitus ulcers usually occur in older individuals. Incontinent, paralyzed or debilitated individuals are more prone to develop them. Individuals with normal sensory status, mobility and mental status are less likely to form these ulcers because their regular physiological feedback system leads to periodic changes in physical position. As mentioned before, older individuals are more likely to present sacral decubitus ulcers, the literature shows that two thirds of ulcers occur in people older than 70 years, as well as some studies showing that about 83% of hospitalized patients formed ulcers within 5 days after hospitalization(7).

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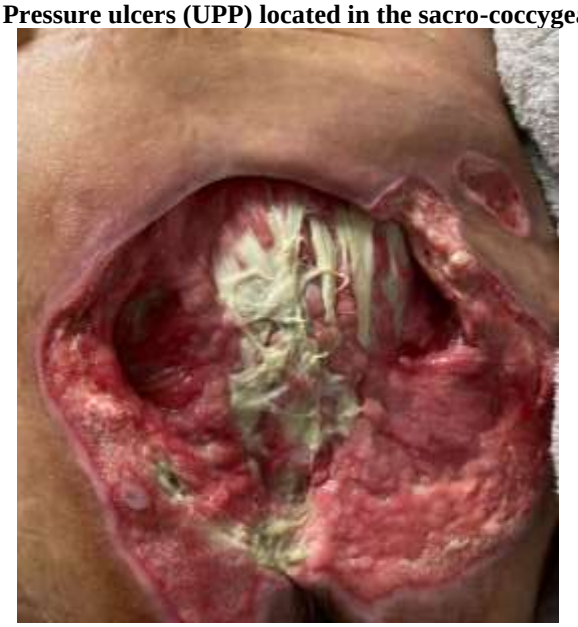
Figure 2. Pressure ulcers (UPP) located in the sacro-coccygeal region.



Source: The Authors.

Risk Factors

The formation of pressure sores is complex and multifactorial. Several external as well as internal factors coincide to generate these ulcers. Internal factors such as malnutrition, endothelial dysfunction and anemia can accelerate the evolution of tissue damage. External factors such as pressure, shear force, prolonged friction and humidity can trigger tissue deformation and ischemia(6,12).

In a meta-analysis involving 19,363 individuals admitted to intensive care units, the risk factors that appeared as the most important predictors of pressure ulcer development were: length of stay in the ICU, diabetes, age, MAP time <60-70 mmHg, intermittent hemodialysis or continuous veno-venous hemofiltration therapy, turning, vasopressor support, sedation, mechanical ventilation and its duration(13).

Reduced mobility, poor nutritional status, skin moisture and loss of sensory perception stand out as the most common risk factors, as well as advanced age, cognitive impairment and comorbid conditions that affect tissue healing. The pressure maintained on the tissues can generate occlusion of the capillary bed, reducing the amount of oxygen in the area, as time progresses the ischemic tissue accumulates toxic metabolites, which in the future generates ulceration and necrosis of the tissue. Immobility of only two hours in a bedridden or post-surgical individual is enough to create the basis for a pressure ulcer. The alteration of the nervous regulatory mechanisms in charge of controlling the local blood flow is also to some extent responsible for the constitution of these ulcers(7,12,14).

Individuals with the conditions described below are predisposed to pressure ulcers:

- Dehydration.
- Malnutrition.
- Hypotension.
- Cardiovascular disease.
- Neurological disease.
- Surgical patients.
- Prolonged anesthesia.

Presentation

In individuals with unaltered sensation, mobility and mental state, prolonged pressure causes discomfort and pain, resulting in a change in body position. However, most individuals with pressure ulcers do not have these characteristics. The clinical manifestations may be different for each body site because the skin, soft tissues and muscles resist external pressure differently. The most common anatomical sites are the sacrum, ischial tuberosity and greater trochanter, although they can also be found in places such as the occiput, scapula, heel, lateral malleolus, elbow, shoulder and even the ear. The muscle can become ischemic and necrotic before skin breakdown occurs, which can be difficult to discern on medical ectoscopy, weakening the diagnosis as to the depth or extent of the ulcer. It is therefore emphasized that a complete medical history, together with a proper overall assessment of the individual at risk, is essential when assessing aspects of the wound, it is essential to keep in mind the risk assessment tools to reduce the risk of pressure ulcer incidence, for which several risk assessment scales can be used, such as the following: Waterlow, Norton and Braden(7,11).

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Figure 3. Trochanteric pressure ulcers.

Source: The Authors.

Treatment

Before describing the multiple treatments for pressure ulcers, it is crucial to clarify that preventive intervention is the best treatment. Prevention consists of maintaining and improving tissue tolerance and adequate offloading. This could be obtained through excellent skin care, turning schedules, support surfaces, proper hydration, adequate nutrition and pressure dispersion cushions. The skin should be clean and dry. Proper hydration, accompanied by adequate nutrition are essential, nutritional supplements help benefit individuals with limited oral intake. Redistribution of pressure can be achieved by means of beds and chairs designed to avoid direct pressure on areas of anatomical risk. Studies show that turning every 4 hours on a viscoelastic foam mattress or surface generates fewer pressure ulcers than turning less frequently, in the case of 2 hours, on a standard mattress. Support surfaces should be adopted according to the level of risk, ulcer stage, mobility, patient comfort and microclimate control requirements. Following the formation of a pressure ulcer, the anatomical area involved should be actively offloaded, ensuring adequate drainage, and if infection is present, devitalized tissue should be debrided and proper wound care should be provided. Pressure should be redistributed through active positioning of the individual, special bandages, immersion beds and reconditioning of prostheses for unloading. In case of abscess, it should be drained. Temporary application of silver sulfadiazine, iodine, hydrogen peroxide or Dakin solution is recommended in case of suspected infection, bearing in mind that they may delay wound healing in the long term. Antibiotics should only be an alternative when there is significant cellulitis or systemic signs of infection. On the contrary, when there is exposed bone in sacral decubitus ulcers, studies report a low incidence of osteomyelitis(7,15,16).

Mechanical debridement may be required to get rid of devitalized tissue and biofilms that do not allow adequate wound healing. It should not be indicated in cases of dry eschar without fluctuations or secretion of purulent material. Dressings can be used differently, always taking into account the stage of the ulcer, the infection and the presence of exudate. However, there are studies that support the use of silicone foam dressings as well as Allevyn Life silicone adhesive dressings for any pressure ulcer with a Braden score of 14 or less(7,17).

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Figure 4. Pressure ulcers on the foot and ankle, in the process of treatment.

Source: The Authors.

CONCLUSIONS

Due to the high prevalence of pressure ulcers worldwide, especially in patients over 70 years of age, the recognition, presentation and pathophysiology of pressure ulcers should be clearly understood, with the aim of preventing their occurrence. Prevention consists of maintaining and improving tissue tolerance and adequate offloading. Both internal and external factors have to be evaluated because they play a major role in pressure ulcer formation. Special attention should be paid to epidemiological risk groups. Proper hydration and adequate nutrition are essential in the treatment of this condition, in addition to close monitoring and corresponding wound management.

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Conflict of Interest Statement

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