PRESSURE SORES IN INTENSIVE CARE UNIT

An Essay Submitted for partial fulfillment of master degree in Intensive care medicine

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قرح الفراش في وحدة العناية المركزة

مقال مقدم

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It is concluded that the pressure ulcer is an area of localized damage to the skin and under lying tissue. Pressure ulcers are a serious medical problem that can affect a patient in any health care setting. Pressure ulcers typically occur among patients who can't move or have lost sensation and result from prolonged periods of immobility Pressure ulcers constitute an important cause of morbidity particularly amongst frail elderly and physically disabled patients. The presence of pressure ulcers often makes the patient's medical care more complicated and reduces the patient's quality of life.

Pressure ulcers are caused by sustained mechanical loading; without a mechanical loading no pressure ulcer will develop. External loading of the tissues leads to a no uniform internal stress and strain state. This internal mechanical state depends on the magnitude of the applied loading, type of external loading (pressure, shear, friction), and the mechanical and geometrical properties of the tissues. In addition, the time of exposure to mechanical loading also plays an important role in the development of tissue damage. On the other hand, the ability of the tissue to withstand mechanical loading determines whether a certain loading will lead to the development of an ulcer or not. Both the mechanical loading and patient susceptibility are influenced by intrinsic and extrinsic factors. Intrinsic factors are related to the individual, e.g. with age, mobility, weight, posture, incontinence and nutritional state. Extrinsic factors are related to the environment, e.g. with nursing, the contact surface, nutrition, and the temperature and humidity of the environment. In clinical practice, these risk factors are used in risk assessment scales to identify patients at risk of developing pressure ulcers.

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بسم الله الرحمن الرحيم

" رب قد آتيتني من الملك وعلمتني من تأويل الأحاديث"

صدق الله العظيم

Table of Contents

List of Figures

List of Abbreviations

PU	pressure ulcer
RH	Reactive Hyperemia
TPP	tissue perfusion pressure
APACHE	Acute Physiology and Chronic health Evaluation
USA	United states of America
NPUAP	National Pressure Ulcer Advisory Panel
Tc	Technetium
PUR	pressure ulcer risk
SURE	Skin Ulcer Risk Evaluation
CURS	The Cornell Ulcer Risk Score
ICU	Intensive care unit
EPUAP	The European Pressure Ulcer Advisory Panel
BMI	Body Mass Index
AHCPR	The Agency for Health Care Policy and Research
pH	Potenz Hydrogen
SCI	Spinal cord injury
HVMS	high voltage monophasic stimulation
DNA	Deoxyribonucleic acid
ATP	Adenosine tri phosphate
RNA	Ribnucleic Acid

List of Tables

Introduction

The pressure sores are also known as bedsores and decubits ulcers and defined as an area of localized damage to the skin, muscle and underlying tissue, caused by shear, friction or unrelieved pressure, usually over bony prominences ***(TAN, 2001).***

Pressure sores represent a common but preventable condition seen most often in high- risk populations' such as elderly persons and those with physical impairments. the epidemiology of pressure sore varies considerably by clinical settings, with the incidence rates ranging from 0.4% to 38% in acute care, 2.2% to 23.9% in long term care, 0% to 17% in home care the development of pressure sores can interfere with recovery, may complicated by pain and infection, and can contribute to excesses in hospital length of stay. The presence of pressure sores is a marker of poor overall prognosis and may contribute to pre mature mortality in some patient ***(Madhuri, 2006).***

Pressure sores first appear as reddened areas that don't Blanche when you touch them. Most sores then continue to open and become deeper wounds. Nurses and doctors will describe pressure sores by their depth. Stage I is just some redness. Stage II is some skin loss that looks like a blister or abrasion. Stage III is when the sore has extended through the skin down to the muscle. In stage IV the wounds extend through the muscle to bone ***(Santa, 2006)***.

The pressure sores are more likely to occur in those who are seriously ill, are neurologically compromised (i.e. individuals with spinal cord injuries), have impaired mobility who are immobile suffer from impaired nutrition, obesity, poor posture or use equipment such as seating or beds whish don't provide appropriate pressure relief ***(NHS, 2008).***

The pressure sores result from impairment of blood flow and mechanical stress to the skin and tissue over a bony area that has under pressure for long a prolonged period .Other important cause are horizontal forces working in parallel to the skin surface, which make upper layers of tissue move over the lower layers. Excessive exposure to the moisture such as sweat, blood, urine or faeces, skin maceration, accumulation of anaerobic products stimulated by emotional stress ***(Katarzyna, 2005).***

The pressure sores can be prevented by careful and frequent skin assessments; frequent repositioning, managing moisture and maximizing nutritional support are common interventions for prevention of pressure sores. Progressive mobility techniques and repositioning techniques used to prevent pressure sores ***(Irene, 2010).***

Nutritional supplementations, including carbohydrates, fats and protein, may decrease the incidence of pressure sores in high risk patients.Arginine and vitamin A are also important in the wound healing process .the modulation of nitric oxide, together with growth factors, may serve as a key therapy ***(Pierre ,2002).***

Chapter 1

Definition and Pathophysiology

- **Anatomy and function of the skin:**

The skin structure composed of the 3 layers of skin: the epidermis, dermis, and subcutaneous tissue. Shown in figure (1)

- **Epidermis:**

The epidermis is the outer layer of skin. The thickness of the epidermis varies in palms and soles at 1.5 mm. It is the thinnest on the eyelids at .0.5 mm and the thickest on the palms and soles at 1.5 mm. The weight of the human's skin about 11 kg. The skin is the largest human organ. The epidermis is contiguous with the mucous membranes and the lining of the ear canal, consists of live, continuous dividing cells covered on the surface by dead cells that were originally deeper in the dermis but were pushed upward by the newly developing. This external layer is replaced every 3-4 weeks .The dead cells contain keratin an insoluble fibrous protein that forms the outer barrier of the skin and the capacity to repel pathogens and prevent excessive fluid loss from the body. The melanocytes are the special cells of the epidermis that are involved in producing the pigment melanin which colors the skin and hair ***(Smeltzer etal, 2000)*.**