



EDITORIAL

Classification of Wounds: Know before Research and Clinical Practice

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ABSTRACT

Cutaneous wounds are known as the damages and injuries on the skin. Knowing the type of wound is very important before any kind of treatment or therapy being applied. Each type of wound is different from other due to the different structure, biology and pathophysiology, therefore, a kind of treatment for one wound cannot be specified for others. Considering the importance of types of wounds, these wounds are classified into different categories because of their different pathobiology. This manuscript would be a great piece of knowledge for the tissue engineer to develop specific skin substitute for specific wound which might help for the development of appropriate treatment strategies.

Key words: Cutaneous wounds, Chronic wounds, Acute wounds, Healing

Introduction

Cutaneous wounds are defined as damaging skin integrity because of some external or internal factors. External factors are also termed as environmental factors damaging the skin e.g. accidental injuries, whereas internal factors are caused by de-regulations in metabolic pathways e.g. diabetic wounds etc. There are wide ranges of cutaneous wounds, which are named based on their causes.

Generally they are classified as chronic wounds like skin ulcers and acute wounds like knife cuts. Chronic wounds are the wounds caused by metabolic disorders. These wounds take a lot of time to heal in contrast to acute wounds which heal in a balanced and short period of time. Chronic wounds lack a balance in the production and degradation of cells and ECM, e.g., collagen. Generally, these wounds are classified into three categories:

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(1) venous/vascular ulcers, (2) diabetic ulcers, and (3) pressure ulcers. Another category is also included in chronic wounds called as ischemic wounds [1, 2].

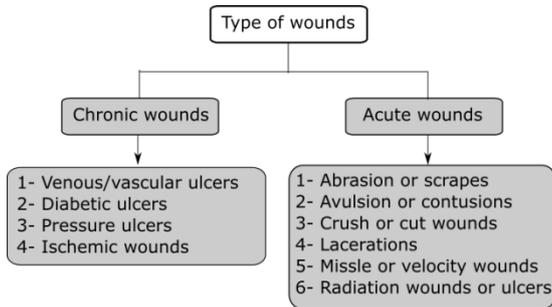


Figure 1: Types of wounds.

Chronic Wounds

Chronic wounds are the wounds caused by metabolic disorders. These wounds take a lot of time to heal in contrast to acute wounds which heal in a balanced and short period of time. Chronic wounds lack a balance in the production and degradation of cells and ECM, e.g., collagen. Generally, these wounds are classified into three categories: (1) venous/vascular ulcers, (2) diabetic ulcers, and (3) pressure ulcers. Another category is also included in chronic wounds called as ischemic wounds [1, 2].

Venous/Vascular Ulcers (also known as stasis ulcers or dermatitis) are chronic form of wounds occurring in the lower extremity (i.e. legs) and account for more than 70% of chronic wounds [3, 4]. Inflammatory processes involving leukocyte activation, endothelial damage, platelet aggregation, and intracellular edema are main causes of V/V Ulcers, which happen usually in old age because of obese conditions, previous injuries or deep venous thrombosis [5, 6].

Diabetic Wounds/Ulcers are another form of chronic wounds which are caused because of diabetic conditions [1, 2]. The main mechanism involved in these wounds, is that in diabetic condition, immune system is compromised and neuropathic conditions happen. In both of these conditions, a small injury on the skin remains unnoticed because of neuropathy and compromised immune system, body fails to

prevent infections and a small wound would become a chronic wound.

Pressure Ulcers is the third form of chronic wounds, which occur normally in people having paralytic conditions. Because of immobility of body in paralysis, tissues become ischemic as pressure on the tissue becomes greater than in capillaries, and blood flow gets restricted in specific tissues mostly muscles.

Ischemic Wounds are another type of chronic wounds caused by the restriction of blood supply to the tissues resulting in the shortage of oxygen and glucose required for cellular metabolism [7].

Acute Wounds

Wounds which are caused by environmental factors involving a traumatic injury are called acute wounds. These wounds have a precise and accurate balance of production and degradation of cells and ECM, and thus heal in an ordered way. Acute wounds are classified into many categories based on the type of environmental factors involved in injury. Generally, acute wounds are classified into two categories: (1) Traumatic Wounds and (2) Surgical Wounds. The following six categories of acute traumatic or surgical wounds have been found in the literature [8-10]:

1. Abrasions or Scrapes are kind of wounds when a rough surface is rubbed with skin causing friction, for example ropeburns, and skinned knees. [11].
2. Avulsions or Contusions are wounds that are caused by a forcible strike on body or pulling away of a part of body. Breaking of bones by striking an instrument like ball, injuries caused by explosions, animal bites, loss of a permanent tooth, nail or earlobe are some examples of such kind of wounds [12, 13].
3. Crush or Cut Wounds occur when a heavy object falls on a person resulting in crushing of a part of the body or slicing the body structures with a sharp instrument. Road injuries, surgical injuries and home based injuries are included in this category [14, 15]. Puncturing of skin with nails or knives are also included in this category [16]. These kind of wounds may be superficial or deep damaging the epidermis or internal structures

(dermis and part of hypoderm) of the body, respectively.

4. Lacerations are also called tearing of body structures. These kinds of wounds need a tremendous force against the body.

These are caused by both internal or external factors like childbirth or punching body, respectively [17-19].

5. Missile or Velocity Wounds are caused when a high speed object like a bullet enters the body. Gunshot wounds or ballistic trauma are examples of velocity wounds [20, 21].
6. Radiation Wounds or Ulcers are wounds caused by the acute or chronic effects of ionizing radiation. The injury may involve the skin, underlying soft tissues, and even deep structures such as bone [22, 23].

Conclusion

As already stated, wounds may belong to either chronic or acute categories. Wound healing is a complex type of biological process involving proliferation, differentiation, reprogramming, trans/de-differentiation, recruitment, migration, and apoptosis of a number of cells (keratinocytes, fibroblasts, endothelial cells, nerve cells, stem cells and so on) to regenerate a damaged multi-layered tissue. Wound healing or more specifically, the cutaneous wound healing is a complex cellular and molecular mechanism responsible to regenerate the broken integrity of the skin, which is the largest organ of the body and the most important part of integumentary system.

Conflict of interest

There are no conflict of interest declarations.

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