



An Overview on Pressure Ulcers: Prevention and Management

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Pressure ulcers are significant and painful side effects that might indicate a lack of care. The formation of a pressure ulcer is a major complication of reduced mobility. And since over 65-year-olds are the fastest-growing sector of the population in many developed countries, it imposes the risk of increasing disease incidences. There are also higher rates of obesity, diabetes, and cardiovascular disease, which also increase the risk. There are many causes that can contribute to the formation of pressure ulcers; tissue ischemia is the most prevalent route to ulceration. Pressure ulcer prevention generally begins with an examination to determine who is most vulnerable to pressure ulcers, such as the elderly, the immobile, or individuals with a spinal cord injury. Wound dressings, debridement, physical therapy, antibiotics, and antimicrobials are all possible therapeutic options for pressure ulcers. Interventions such as mobilization, positioning, and repositioning, as well as support surfaces, are utilized in conjunction with other wound care methods. In this review we'll be looking at prevention and management of pressure ulcers.

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1. INTRODUCTION

Pressure ulcers are significant and painful side effects that might indicate a lack of care. We now know that they occur when an area of skin and the tissues beneath it are injured as a result of being placed under enough pressure to disrupt blood flow. The effects are proportional to the size and duration of the pressure, and they can happen quickly in some cases, such as when pressure is applied on exposed bony prominences like the heels or sacrum [1].

Pressure ulcer prevention generally begins with an examination to determine who is most vulnerable to pressure ulcers, such as the elderly, the immobile, or individuals with a spinal cord injury [2]. The most frequent method of assessment is to use particular pressure area risk ratings (for example, the Braden or Waterlow scales for predicting pressure sore risk or the Glamorgan scale for paediatric pressure ulcers) [1].

Wound dressings, debridement, physical therapy, antibiotics, and antimicrobials are all possible therapeutic options for pressure ulcers. Interventions such as mobilization, positioning, and repositioning, as well as support surfaces, are utilized in conjunction with other wound care methods [3].

A nutritional evaluation is generally performed in order to treat nutritional deficits. In certain individuals, surgical treatments for debridement or skin flap covering may be necessary. Vascular surgical intervention may be done if impaired circulation is a contributing cause. If infection is a contributing component in the ulcer's persistence or is causing systemic disease or cellulitis, it can be treated. In both secondary and primary care, there is a lack of uniformity in the approach to pressure ulcer prevention and treatment and management of existing pressure ulcers. Guidance is needed to rationalise the techniques utilised for pressure ulcer prevention, treatment, and care, and to ensure that practise is based on the best available evidence [4].

Wound care specialists must be aware of how to prevent and treat pressure ulcers. To properly cure their wounds, these individuals will require a lengthy course of therapy. the biomedical burden is enormous, and healthcare spending on

this issue is only expected to increase. Because of the new penalties for pressure ulcers developed in hospitals, we need to learn more about the causes and how to prevent them [5].

The phrase "pressure sores" is frequently used in the UK, although pressure injuries that aren't open wounds (such as blisters and non-blanching erythema) aren't genuine sores, but rather "pressure damage," and are nonetheless classified as pressure ulcers. The phrase "pressure ulcers" is commonly used in the United States and other countries, and the European Pressure Ulcer Advisory Panel has adopted it as the European term. They're also known as 'bedsores' and 'decubitus ulcers,' however these terms are no longer often used because the ulcers aren't caused by lying or being in bed. The regions that cover the bony structures, such as the occiput, trochanters, sacrum, malleoli, and heel, are particularly vulnerable to pressure sores [3].

Pressure ulcers are still a serious health issue that affects over 3 million individuals. Pressure ulcers were reported in 280,000 hospital stays in 1993, while 455,000 ulcers were reported 11 years later. According to the Healthcare Cost and Utilization Project (HCUP), there was a 63 percent rise in pressure ulcers from 1993 to 2003, but only an 11 percent increase in overall hospitalizations. Pressure ulcers are expensive, costing an average of \$37,800 each stay. Pressure ulcers, along with failure to rescue and postoperative respiratory failure, were among the most common complications in the fourth annual HealthGrades Patient Safety in American Hospitals Study, which examined records from approximately 5,000 hospitals from 2003 to 2005. Pressure ulcers are anticipated to become more common as the population ages, care becomes more dispersed, and nurses become scarce [6].

Prevalence: And since over 65-year-olds are the fastest-growing sector of the population in many developed countries, it imposes the risk of increasing disease incidences. There are also higher rates of obesity, diabetes, and cardiovascular disease, which also increase the risk. As a result of this confluence of causes, more individuals are need assistance with activities of daily living as a result of decreasing mobility [4]. The formation of a pressure ulcer is

a major complication of reduced mobility. The treatment for pressure ulcers is time-consuming and expensive, putting a strain on the healthcare system. Pressure ulcers cost an estimated \$11 billion each year in the United States, with a single lesion costing anything from \$500 to \$70,000 [5]. Despite the availability of a variety of novel dressings and therapies for the treatment of pressure ulcers, none has been shown to offer a substantial advantage over the others. The fundamental concepts of keeping the wound clean and effectively perfused remain the cornerstones of treatment. Finding ways to reduce the occurrence of pressure ulcers in vulnerable patients would be a key priority for novel treatments, especially given the possibility for reimbursement penalties for patients who do acquire a pressure ulcer [3].

Etiology: Many variables can contribute to the formation of pressure ulcers, however tissue ischemia is the most prevalent route to ulceration [7]. The tissues can only withstand pressures of about 30-32 mm hg on the arterial side for a short period of time. When pressure rises even slightly beyond this capillary filling pressure, microcirculatory blockage occurs, resulting in ischaemia, tissue death, and ulceration [8].

When a high amount of pressure is applied to a small region of skin over an extended length of time, pressure ulcers can form. They can also happen if you apply less pressure for a longer length of time [9]. The soft tissues are squeezed and/or sheared between the skeleton and a support, such as a bed or chair while the person is sitting or laying, or something is pushing into the body, such as a shoe, a prosthesis, a surgical appliance, or clothes elastic, causing tissue distortion. Blood veins inside the deformed tissue are squeezed, angulated, or stretched out of their normal shape, preventing blood flow [10]. These blood arteries supply tissues that become ischemic. Tissue distortion obstructs lymphatic flow as well as blood flow, resulting in a buildup of metabolic waste products, proteins, and enzymes in the afflicted tissue. This, too, may exacerbate tissue injury [11].

Evaluation and prevention:For many years, it has been widely acknowledged that pressure ulcers are frequently avoidable. Unfortunately, there is a lot of diversity in the NHS's approach to pressure ulcer prevention, as well as the treatment and management of existing pressure ulcers, in both secondary and basic care. As a result, advice is required to rationalise the

techniques employed for pressure ulcer prevention and to ensure that practise is based on the best available evidence. According to domain 5 of the NHS outcome Framework 2013/2014, every patient has the right to expect safe treatment, which includes the avoidance of preventable pressure ulcers [12].

Adults 'at risk' and at 'high risk' of developing a pressure ulcer: For the purposes of this guideline, persons who receive care from the NHS or are commissioned by the NHS are classified as:

- People who are assessed to be at risk of getting a pressure ulcer after a formal assessment utilising clinical judgement or a risk assessment tool.
- People who are 'at high risk' of developing a pressure ulcer have multiple risk factors (for example, significantly limited mobility, nutritional deficiency, inability to reposition themselves, a neurological condition, or significant cognitive impairmentb) identified during a risk assessment with or without a validated scale [3].

There are a variety of techniques for formally measuring an individual's level of risk, according to the GDG. There were numerous risk assessment scales available in addition to clinical judgement, but there was only minimal data to determine whether technique of risk assessment was a more accurate predictor of later risk than clinical judgement. Furthermore, the GDG pointed out that various instruments have varying criteria for identifying individuals who are at risk, as well as those who are at high or very high risk, which healthcare professionals frequently adjust for their own usage [13]. As a result, the GDG did not believe it was possible to develop recommendations based on the categories outlined in a specific risk assessment scale, and instead chose to create the above two categories to help distinguish between those at risk of developing a pressure ulcer and those with additional individual factors that may put them at a higher risk of developing a pressure ulcer [2].

'At risk' and 'at high risk' of getting a pressure ulcer include newborns, babies, children, and young people:

- 'At-risk' refers to newborns, infants, adolescents, or teenagers who are assessed to be at risk of developing a

pressure ulcer after a formal examination using clinical judgement or a risk assessment method. Each neonate, baby, child, or young person's specific risk factors should be considered by healthcare experts, who should formally determine whether they are at danger [14].

- 'at high risk' for a pressure ulcer: Multiple risk factors (for example, significantly limited mobility, risk of nutritional deficiency, inability to reposition themselves, a neurological condition, or significant cognitive impairment) are usually identified during risk assessment with or without a validated scale in neonates, infants, children, and young people at high risk. Those who have had or are now suffering from a pressure ulcer are also regarded to be at high risk [15].

It is known that the guidelines for adults differ from those for neonates, babies, children, and adolescents. Due to the considerable variations in the ways and places by which younger people might acquire pressure ulcers, the GDG decided to formulate recommendations based on the Delphi consensus results rather than extrapolating from data in adult populations. However, the GDG recognises that some of the recommendations created for adults may be applicable to neonates, babies, children, and young people, and that healthcare providers may choose to consider these guidelines' concepts while treating these groups [1].

2. TREATMENT

2.1 Relief from Pressure

Offloading pressure from the wound site is the initial stage in treatment. All of the techniques outlined for preventing pressure ulcers can also be used to treat them. For bedridden individuals, this involves adhering to a tight repositioning schedule. If not currently in use, any measures to pad the region of the pressure ulcer should be implemented [16]. Some patients may require specialised beds in addition to the conventional onlays and cushions to help reduce pressure. Air is commonly used in these beds to continuously alter pressure points in a number of ways. Even with these beds, patients must be moved on a frequent basis. Patients who use prostheses may need to be without them for a while to allow healing to take place [3]. Any patient who develops a pressure ulcer while wearing a prosthesis should have it adjusted once it heals

to avoid future complications. Patients who are wheelchair-bound may need to have their movement restricted in order to recover. The wheelchair, like a prosthesis, should be re-evaluated for optimum fit [17].

2.2 Infection Prevention

Determining if there is evidence of an infection that has not been effectively treated is an essential aspect of the first examination of a pressure ulcer. The existence of erythema or fluctuation around the pressure ulcer should be checked. Crepitus is more concerning and should require a thorough examination for the risk of a necrotizing soft tissue infection [2]. If the patient's source control is found to be ineffective, he or she should be brought to the operating room for proper abscess drainage and debridement. Some surgeons choose to treat the wound using antiseptics such as povidone iodine, silver sulfadiazine, hydrogen peroxide, or Dakin's solution that are administered locally (sodium hypochlorite). According to the idea, these topical medicines destroy germs in the pressure ulcer, allowing for faster healing. If these solutions are utilised, they should only be used for a limited period of time since their cytotoxic effects might slow wound healing in the long run [18].

Debridement: In the treatment of pressure ulcers, devitalized tissue and biofilm must be removed, as well as abscess drainage. When there is a lot of necrotic tissue, debridement in the operating room allows for a more decisive treatment. Following that, debridements may be handled more simply at the bedside. There are times when extensive debridement isn't necessary or appropriate. The eschar can be kept in situ if it is dry with no purulence or fluctuation and just little erythema. Debridement should be done with caution if there is minimal subcutaneous tissue under the eschar, as in the case of the heel. Tissue should be resected until healthy bleeding tissue is found during surgical debridement. Because the amount of necrosis can be difficult to determine after the initial presentation, multiple debridements are frequently required [19].

Wound dressings: The dressings used at different phases of wound healing are specialised for each step; in fact, there is a wide spectrum of dressings available to help with wound healing at various stages. Non-absorbent, absorbent, debriding, self-adhering, and a variety

of other terms are used to describe them. The most appropriate dressing must be determined since it is ultimately determined by the site/type of ulcer, whether the patient will be treated in a hospital or at home, personal choice, and the expense to the patient [3].

Pressure ulcers are treated with specialized dressings and bandages to protect and speed up the healing process. These are some of the dressings [20,21]:

- Dressings made of hydrocolloid: These have a unique gel in them that promotes the development of new skin cells in the ulcer while keeping the surrounding healthy skin dry.
- Dressings made of alginate: These are produced from seaweed, which includes salt and calcium, both of which have been shown to hasten the healing process. Honey-impregnated alginate dressings have been shown to heal pressure ulcers completely.
- Dressings made of nano silver: Silver's antimicrobial properties are used to clear the ulcer.
- Ointments and creams: Topical treatments, such as creams and ointments, are commonly used to prevent additional tissue damage and speed up the healing process.

Antibiotics: Antibiotics are not required for all pressure sores. Antibiotics are typically used to treat a pressure ulcer that has become infected and to prevent the infection from spreading. If there is a tissue infection, antibiotics are required to treat the infection; however, antibiotics alone will not clean up the ulcer unless the ulcer is fully debrided and only viable tissues are left. Antibiotics are a supplement to surgical debridement, not a replacement [6].

Antibiotics used topically should be avoided since they might lead to antibiotic resistance and allergies. Antiseptic cream can be used topically on pressure ulcers to kill any germs that may be present.

Wound healing with negative pressure: Negative pressure wound therapy (NPWT) uses a foam dressing that can be customized to fit the patient's wound and is covered with a transparent film to allow a vacuum to be created in the wound when the foam is connected to a suction device through tubing. The predominant

idea is that the vacuum allows the cells in the wound bed to perceive a mechanical force, which speeds wound healing in chronic wounds. Mechanical pressures cause fibroblasts to proliferate, resulting in faster healing. The suction removes fluid on a continual basis, making it excellent for wounds with a lot of exudate. The wound must be thoroughly debrided before using the NPWT device. The foam dressing conforms easily to wounds with irregular shapes, tunnelling, and undermining. NPWT is beneficial for preventing further wound infection due to the clear layer necessary for the vacuum to hold. NPWT has no benefit over other dressings in randomised controlled studies. Its usage is determined by its characteristics, just like any other dressing. NPWT can easily treat wounds with a lot of exudate. It has been proven to be beneficial in wounds near faeces, where its seal avoids wound infection. Uncorrected coagulopathy, exposed critical organs, and big vessels are all contraindications to using NPWT. To reduce discomfort when removing the foam dressing and suctioning over the wound bed, a nonadherent dressing can be put beneath it [22,23].

2.3 Surgery for Reconstruction

Although the majority of pressure ulcers will heal with debridement and conservative therapies surgery may be necessary to speed up the healing process. It's worth noting that patients with slow-healing wounds should be evaluated first to see why the wound isn't healing properly, since the same causes might lead to surgical reconstruction failure. Coverage can be achieved using a number of methods ranging from a basic skin transplant to pedicled or, in rare cases, microvascular flaps. A wound that is free of purulence, well-granulated, and well-protected from soilage is a good candidate for surgical reconstruction [24].

3. CONCLUSION

Pressure ulcers are still a serious health issue with more and more population entering the high-risk criteria, which overall increase the overall burden on the health care system. Prevention is the best method for managing the disease the first step proper prevention and treatment is well-established assessment. Using of high risk and low risk assessment helps preventing the disease by taking care of the most vulnerable individuals.

There are many treatment options with Wound dressings, debridement, physical therapy, antibiotics, and antimicrobials are all possible therapeutic options for pressure ulcers. Interventions such as mobilization, positioning, and repositioning, as well as support surfaces, are utilized in conjunction with other wound care methods

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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