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A Concise Textbook of Critical Care for NURSES

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JAYPEE

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7 Chapter

Pressure Sores

Monica Bharadwaj

Learning Objectives

- Describe pressure ulcer, prevalence and risk assessment.
- Explain pressure ulcer assessment scale.
- Identify the various stages of pressure ulcer and their symptoms.
- Recognize the complications associated with pressure ulcer.
- Discuss the treatment for pressure ulcer.
- Determine the nursing aspect for the prevention of ulcer.

Introduction

Pressure ulcers (PUs) is a localized area of tissue necrosis that tends to develop when soft tissue is compressed between a bony prominence and an external surface for a prolonged period.

Pressure ulcers occurs most commonly over bony prominences, the most common sites being the sacrum, coccyx, heels and ear. Compression of the soft tissues over the bony prominence causes decreased perfusion of the skin, and in the space between the skin surface and bone. Arterial compression prevents the local supply of oxygen and decreased venous return leads to accumulation of metabolic wastes. The products of metabolism produce a reflex vasodilatation response. The vasodilatory response contributes to local oedema, further compressing the arterioles and increasing oedema and ischemia in the affected region. Ultimately, this cycle results in the necrosis of the tissue that is seen as a PU.[1]

Pressure ulcer is considered an adverse event because it is an injury that can be prevented, thus making it an indicator of nursing care quality.[2] Studies have reported an association between PUs and increased morbidity and mortality. PUs can also lead to serious infectious complications, like sepsis thus prolonging the duration of a hospital stay.[3]

Prevalence

The National Pressure Ulcer Advisory Panel (NPUAP) says the incidence ranges from 0.4% to 38% in hospitals.[4] In a recent study done in Ethiopia, from among 216 patients admitted to intensive care unit (ICU), 25 developed pressure ulcers, yielding a cumulative incidence of 11.57%.[5]

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Risk Assessment

The identification of risk factors associated with PU development is the first step in effective prevention. Risk assessment must be carried out by health care staff trained to recognize the risk factors that contribute to the development of pressure ulcers and know how to initiate appropriate preventative measures. The critical elements of the development of pressure ulcer are the duration and intensity of pressure, tissue tolerance of the skin to pressure, friction, and shear. Thus, the risk factors for the development of pressure ulcers can be classified as intrinsic to patients' condition or those un related to patient called extrinsic factors.

There is no single factor that can account for PU risk in the ICU; rather there is a complex interplay of factors that can increase the probability of PU development.

Intrinsic Factors

- Reduced mobility
- Sensory impairment
- Reduced level of consciousness
- Acute illness
- Chronic long-term or terminal illness
- Medication (infusion of sedatives)
- Pain
- Cognition
- Nutrition
- Extremes of age
- Body weight
- Incontinence
- Dehydration

Extrinsic Factors

External influences that cause skin distortion:

- Pressure
- Shear
- Friction

The most common risk factors for pressure sores include:

- Immobility—bed bound for long time
- Bladder or Bowels incontinence
- Poor nutritional intake or dehydration
- Loss of physical sensation (paraplegia due to spinal injury)
- Lack of blood flow (hemodynamic instability, diabetes and peripheral vascular disease)
- Thin or weakened skin (steroid therapy, plaster cast)

Pressure Ulcers Assessment Scale

Many hospitals around the world have adopted risk assessment tools to evaluate patients at risk for developing pressure ulcers. A Cochrane review found only 2 RCTs and concluded that there is no reliable evidence to suggest that the use of structured, systematic pressure ulcer risk assessment tools reduces the incidence of pressure ulcers.[6]

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A recent meta-analysis which looked into the evidence for efficacy of these scales in predicting the risk of pressure ulcers in patients admitted to ICU subdivided the scales into two broad categories: the 'generalists', which are applicable to the entire hospital, and the 'specifics', which are directed to ICU patients. Among the scale specific to ICU population were CALCULATE (Critical Care Pressure Ulcer Assessment Tool made Easy), COMHON index (Nutrition and Hemodynamic Oxygenation of Conscious Mobility), Cubbin and Jackson scale, EVARUCI (Escala de Valoración Actual del riesgo de desarrollar Úlceras por presión en Cuidados Intensivos), and RAPS-ICU.[7]

The most commonly used Braden scale composes six subscales: (i) sensory perception; (ii) moisture; (iii) activity; (iv) mobility; (v) nutrition, and (vi) friction/shear, each denoted by a score corresponding to the severity of the condition **(Table 7.1)**. The total score ranges from six to twenty-three points, the lower the result, the higher the risk of developing pressure ulcer. The limitation of this scale is that it overestimates the risk of pressure ulcers in critically ill patients.[8]

The more recently developed CALCULATE score, consists of eight risk factors, each one has a point, and the total score is utilized to predict the risk of pressure ulcer. The higher the result, the higher the risk of developing pressure ulcer. A prospective cohort study compared the CALCULATE scale with the Braden scale and concluded that CALCULATE has better predictive power in evaluating the risk of developing pressure ulcers in ICU patients, besides being user friendly.[9]

Pressure Ulcers Stages and Symptoms

There are four stages of pressure sores from mild to severe **(Fig. 7.1)**:

- Stage I "is intact skin with non-blanchable redness of a localized area".
- Stage II "is "Partial thickness loss of dermis presenting as a shallow open ulcer with a red or pink wound bed, without slough".
- Stage III is full thickness tissue loss where subcutaneous fat may be visible, but bone, tendon or muscles are not exposed.
- Stage IV is full thickness tissue loss with exposed bone, tendon or muscle.

Two additional stages are recognized by the NPUAP. Unstageable which is full thickness tissue loss in which actual depth of the ulcer is completely obscured by slough and suspected

Table 7.1: Braden scale.

Score	*Sensory perception*	*Moisture*	*Activity confined to bed*	*Mobility*	*Nutrition*	*Friction*
1	Completely limited	Very moist	Confined to bed	Completely immobile	Very poor	Maximum assistance
2	Very limited	Occasionally	Confined to chair	Very limited	Probably inadequate	Minimum assistance
3	Slightly limited	Rarely	Occasionally walks	Slightly change of position	Adequate	Maintains good position
4	No impairment	Never	No limitation	No limitation	Excellent	

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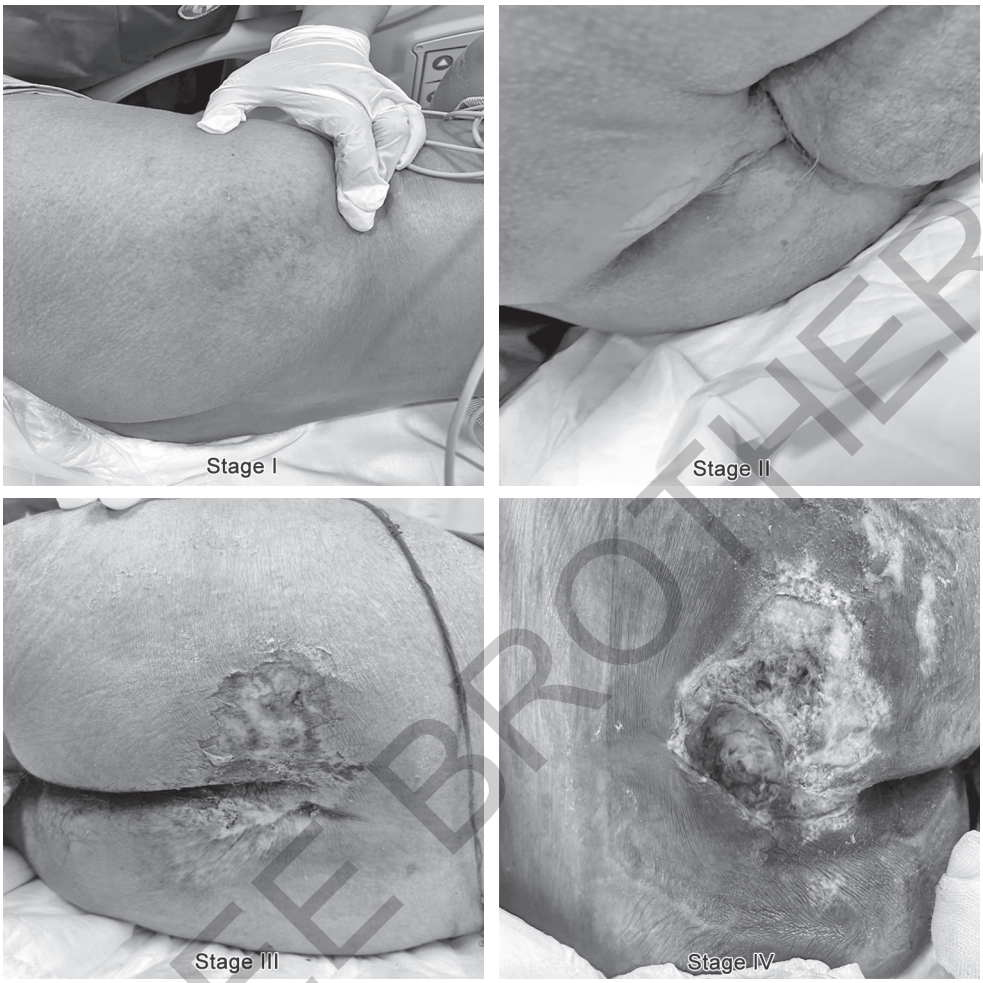

Fig. 7.1: Stages of pressure sores (*For color version, see Plate 1*).

deep tissue injury which is of unknown depth with a purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear.

Pressure Sores Complications

When left untreated, pressure sores can lead to infections. Open wounds can lead to bacterial infections like cellulitis. If left untreated, infections can lead to generalized sepsis, which carries a high mortality.

The PUSH tool provides a valid measure of pressure ulcer healing over time and accurately differentiates a healing from a nonhealing ulcer **(Table 7.2)**. It is a clinically practical, evidence-based tool for tracking changes in pressure ulcer status when applied at weekly intervals.[10]

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Table 7.2: Push tool for staging.

Area (cm^2)	**0** 0	**1** < 0.3	**2** 0.3–0.6	3 0.7–1.0	**4** 1.1–2.0	**5** 2.1–3.0	**Sub-score**
		6 3.1–4.0	**7** 4.1–8.0	**8** 8.1–12.0	9 12.1–24.0	**10** >24.0	
Amount of exudate	**0** None	**1** Light	**2** Moderate	**3** Heavy			**Sub-score**
Tissue type	**0** Closed	**1** Epithelial tissue	**2** Granulation tissue	**3** Slough	**4** Necrotic tissue		**Sub-score**
							Total score

Pressure Sores Treatment

The first and most important thing to do with any pressure sore is to relieve the pressure. Frequently change position or use foam pads, pillows, or mattresses. Wipe the skin sore with mild soap and water/bed bath and dry it gently. Provide good nutrition and avoid dehydration. For Stage II ulcers, after cleaning cover the ulcer with films, gauze, gel, foam, or medicated dressings. For Stage III and Stage IV ulcers debridement is required and the surgeons need to be involved.

Nursing Aspect in Prevention of Pressure Ulcers

- Nursing management need to ensure the emphasis on pressure ulcer prevention as one of the key performance indicators, and all nurses must be trained on pressure ulcer prevention.
- Hospitals must establish protocols and multidisciplinary teams for optimal pressure ulcer care.
- Patients and families to be encouraged to participate to the best degree possible in the care of and prevention of a patient's skin breakdown.
- Monitoring of pressure ulcer incidents is highly encouraged as it is a significant nursing key performance indicator.
- Ensure no patient develops pressure ulcer/injury unless the patient's medical condition shows that the pressure sores were unavoidable because of intrinsic factor, comorbidity, e.g., neurological disorder, circulatory disorders, reduced mobility.
- Pressure ulcer risk assessment with Braden scale and a skin assessment is mandatory for all patients upon admission.
- Pressure reliving and redistributing devices that can handle intrinsic risk factors like shear, friction and microclimate need to be provided to patients on PU risk.
- The registered nurse completing the baseline admission assessment will perform a pressure injury/ulcer risk assessment by using Braden scale. Upon admission, upon transfer from unit/ward to another, when a change in patient's condition occurs, when a patient go for any procedure that requires them not to move for more than two hours, OR whenever it requires.

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- Develop and implement a care plan based on assessment indicating/reflecting patient's individual needs for prevention of pressure injury.
- Any patient considered at a risk of pressure ulcer development Braden score less than 16, will have a written pressure ulcer prevention care plan including positioning schedule with a frequent skin inspection every shift, pressure relieving equipment, nutritional requirement, pain management and continence management.
- Patients going for procedures lasting more than 2 hours, including surgeries are to be considered at risk for pressure injury development, therefore pressure injury prevention precautions to be implemented.
- Reposition all individuals (who at risk of pressure injuries) turn at least every 2 hours, unless contraindicated.
- **Skin care bundle:** Skin checks every shift and with each turn, Protect the skin from moisture and keep the skin clean and appropriately hydrated. Cleansing the skin promptly after episodes of incontinence.
- Avoiding use of alkaline soaps and cleansers and vigorously rubbing skin that is at risk of pressure injury.
- Use a soft silicone multi-layered foam dressing to protect the high-risk pressure points for individuals at risk of pressure injuries.
- Provide pressure redistribution mattress for individuals at risk of pressure injuries.

Medical adhesive-related skin injury (MARSI) is prevalent, under-recognized and preventable, and can occur in any patient group or setting. When superficial layers of skin are removed by medical adhesive, it not only affects skin integrity, but causes pain, increases risk of infection, and potentially increases wound size and delays healing, all of which reduce patient quality of life. The presence of one or more intrinsic or extrinsic factors increases the risk that MARSI will occur when medical adhesives are used.[11] Prevention can be implemented during skin preparation, selecting appropriate medical adhesives, and its removal. There is a need to increase the awareness of MARSI among health providers.

Incontinence-associated dermatitis (IAD) poses a major healthcare challenge. It is difficult to treat and is a well-documented risk factor for pressure ulcer development. It is a skin inflammation caused by exposure to urine or stool. Traditionally, IAD has received little attention as a distinct disorder. Prevention is based on avoiding or minimizing exposure to stool or urine. This needs to be combined with gentle cleansing, moisturizing cream, or a skin protecting adhesive. In addition, treatment of specific infections such as candidiasis, and diversion of incontinent urine or stool may need to be done.[12]

Summary and Conclusion

Patients in an intensive care unit (ICU) are particularly vulnerable to develop pressure sores, because of severity of illness and being bedridden for long periods. Nurses are responsible for providing safe prevention of PUs in ICU patients, but most ICUs have poor adherence to pressure ulcer prevention guidelines. Insufficient knowledge and skills in PU prevention can increase or exacerbate the chances of developing PUs, so nurses need regular training in this area. Improving nurses' knowledge of PU prevention not only improves the quality of PU care, but also reduces the length of hospital stay and the number of patients suffering from pressure ulcers.[13]

Accordingly, providing the necessary training to nurses and allocating part of the curriculum of nursing students to the principles of PU prevention can be helpful.

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Test Your Knowledge

1. Which of the following is the most common site for pressure ulcers to develop?
   a. Hands
   b. Elbows
   c. Sacrum
   d. Knees

2. What causes the tissue necrosis seen in pressure ulcers?
   a. Excessive friction and shear
   b. Arterial compression and decreased venous return
   c. Bacterial infection
   d Increased blood flow to the area

3. What is the prevalence range for pressure ulcers in hospital settings, according to the National Pressure Ulcer Advisory Panel (NPUAP)?
   a. 0.4–38%
   b. 5–25%

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c. 15–45%
d 1–50%

4. What does a Braden Scale score of 6 indicate?
a. High risk of developing pressure ulcers
b. Low risk of developing pressure ulcers
c. No risk of developing pressure ulcers
d Moderate risk of developing pressure ulcers

5. Which stage of pressure ulcer is characterized by partial thickness loss of dermis, with a red or pink wound bed?
a. Stage I
b. Stage II
c. Stage III
d Stage IV

6. Which of the following is a common complication of untreated pressure ulcers?
a. Sepsis
b. Pain relief
c. Enhanced mobility
d Improved circulation

7. What does the PUSH tool primarily measure in relation to pressure ulcers?
a. Severity of pain
b. Rate of healing or non-healing of pressure ulcers
c. Duration of the patient's hospital stay
d The patient's risk of developing pressure ulcers

8. Which of the following is the most appropriate method for protecting high-risk pressure points for individuals at risk of pressure injuries?
a. Using a hard bandage
b. Using a soft silicone multi-layered foam dressing
c. Applying ice packs
d Leaving the area exposed to air

9. What is a common consequence of medical adhesive-related skin injury (MARSI)?
a. Decreased wound size
b. Increased risk of infection
c. Improved skin healing
d Increased blood circulation

10. What is an important aspect of preventing and treating IAD?
a. Avoiding all forms of skin cleansing
b. Minimizing exposure to stool or urine and using moisturizing cream
c. Applying harsh soaps and scrubbing the affected area
d Not treating underlying infections like candidiasis

ANSWER KEY

1. c	2. b	3. a	4. a	5. b	6. a	7. b	8. b
9. b	10. b						

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