

Pressure Ulcers in Individuals Receiving Palliative Care: A National Pressure Ulcer Advisory Panel White Paper[©]

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and the National Pressure Ulcer Advisory Panel

INTRODUCTION

About 300 million individuals, or 3% of the world's population, need palliative or end-of-life care each year.¹ Palliative care is designed to provide relief from suffering and enhance the quality of both the living and dying processes for the patient and family,² while neither hastening nor prolonging death.³ Many professionals concur that pressure ulcers (PrUs) occurring at the end of life are often not preventable and that efforts to prevent them are complicated because of the patient's frail condition.⁴⁻⁹ Many professionals also agree that it may be impossible to eradicate PrUs in the terminally ill because of the multiple risk factors and comorbid conditions.^{6,10-17} PrU development, however, can decrease quality of life physically, emotionally, socially, and mentally.¹⁸⁻²⁰ A systematic review of research on PrUs and quality of life²¹ reported that PrUs had significant impact in all aspects of life.

Usual care of a PrU is designed to promote healing; however, healing or closing the ulcer in patients receiving palliative care is often improbable. Therefore, the focus of care is better directed to reduce or eliminate pain, odor, and infection and allow for an environment that can promote ulcer closure, as well as improve self-image to help prevent social isolation. Healthcare providers also need to advocate for and develop products that control complications and deliver symptomatic relief to promote a desirable quality of life of the patient and family.^{2,22}

The purpose of this white paper is to review and summarize the current scientific evidence for prevention and care of a PrU in a palliative care patient. Although randomized controlled studies are few, a moderately sufficient informed clinical consensus, as well as less rigorous scientific studies, does exist to support a variety of care approaches for the palliative individual with a PrU. Gaps in the literature will be identified, and current recommendations for practice will also be reviewed. The recommendations presented are those included in the 2009 National Pressure Ulcer Advisory

Panel (NPUAP)–European Pressure Ulcer Advisory Panel (EPUAP) International Pressure Ulcer Prevention and Treatment Guidelines.²³

DEVELOPMENT PROCESS FOR RECOMMENDATIONS

The recommendations in this paper are taken from the 2009 NPUAP-EPUAP Pressure Ulcer Treatment Guidelines.²³ The guidelines were developed following a systematic, comprehensive review of the peer-reviewed and published research on PrU prevention and treatment from 1998 through January 2008, as well as supplemental searches. Evidence tables from previous guidelines were reviewed to identify relevant studies published before 1998. Studies meeting inclusion criteria were reviewed for quality, summarized in evidence tables, and classified according to their level of evidence using a schema developed by Sackett (Table 1).²⁴

STRENGTH OF EVIDENCE SUPPORTING EACH RECOMMENDATION

Once the recommendation was made, the cumulative strength of evidence supporting each recommendation was rated according to the following criteria:

A—Recommendation supported by direct scientific evidence from properly designed and implemented controlled trials on PrUs in humans providing statistical results that consistently support the recommendation (Sackett level I studies).

B—Recommendation supported by direct scientific evidence from properly designed and implemented clinical series in humans providing statistical results that consistently support the recommendation (Sackett levels II, III, IV, V studies).

C—Recommendation supported by expert opinion or indirect evidence (eg, studies in animal models and/or other types of chronic wounds).

More detailed information on the NPUAP-EPUAP guideline development methodology has been previously published.²⁵

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Table 1.

SACKETT LEVEL OF EVIDENCE RATING SYSTEM FOR INDIVIDUAL STUDIES

Level	
I	Large randomized trial with clear-cut results (and low risk of error)
II	Small randomized trial with uncertain results (and moderate to high risk of error)
III	Nonrandomized trial with concurrent or contemporaneous controls
IV	Nonrandomized trial with historical controls
V	Case series with no controls; specify number of subjects

Adapted from Sackett.²⁴**PRESSURE ULCER RISK**

Individuals with advanced or terminal disease are at significant risk for soft tissue ulceration.^{9,14,26-30} Significant PrUs can develop and reach Stages III and IV.³¹ In 1 study, the majority of PrUs in a hospice sample occurred in the 2 weeks before death,³² not unexpected as body systems physiologically begin to shut down 10 to 14 days prior to death.³³ A variety of risk factors exist that place the palliative care individual at increased risk for both PrU development and nonhealing. Although the risk profile is not unique when compared with other patient groups, the ability to mediate the risk is often limited. Reifsnyder et al³⁴ studied 980 hospice patients and found that, while 62.3% had a cancer diagnosis, those with a noncancer diagnosis were more likely to develop a PrU.

Advanced Age. Increasing age has been found to be significantly associated with PrU development in hospice patients.^{14,35} The skin of older patients is drier, fragile, and easily injured,^{14,27} and injured skin is more vulnerable to ulceration. The epidermis thins and cell turnover slows, with cell loss occurring more rapidly than cell replacement.³⁶ Protective function of the epidermis is compromised. In addition, temperature control is lessened with the loss of sweat glands, and collagen renewal deteriorates with age.³⁷ Emollients are helpful for dry skin.^{38,39}

Protein-Calorie Malnutrition. Older individuals are at risk for protein-calorie malnutrition, with the prevalence for older adults in long-term care ranging from 50% to 85%, as compared with 40% to 60% in acute care.^{40,41} Even if malnutrition is not formally diagnosed, lean body mass was associated with PrU development in a group of 98 hospice patients.¹⁴ Catabolism is also common in this patient group, a consequence of a constellation of cachexia, weakness, debilitation, weight loss, and muscle atrophy. The loss of body fat reserves reduces the natural padding over bones, increasing the vulnerability to pressure and soft tissue breakdown.

Inadequate nutrition is associated with PrU development.^{14,31,35,42,43} A large, retrospective cohort study of 2420

adult nursing home residents, with a stay of 14 or more days, and with a risk of developing a PrU, documented that an unintentional weight loss at any body mass index increased the chance of developing a PrU by 147%.⁴³ A state of compromised nutrition, such as unintentional weight loss, undernutrition, protein energy malnutrition, and dehydration deficits, is also a known risk factor for PrU development.^{44,45} Other nutritional indicators predictive of PrU development include anemia, low serum albumin, and weight loss.⁴⁶⁻⁵² Although serum albumin levels have long been used clinically, they are a poor indicator of visceral protein status related to albumin's long half-life (12-21 days) and numerous factors that decrease albumin levels even in the presence of adequate protein intake.

Stress creates a hypermetabolic state. Further, hypermetabolism develops when inadequate nutrition is associated with severe illness and/or infection, which are not uncommon concomitant conditions in a palliative care individual. Cytokines are stress-response proteins produced following tissue injury. Cytokines contribute to metabolic and gastrointestinal changes, including anorexia and malaise, and consequent malnutrition, muscle wasting, decreased nitrogen retention, and decreased albumin synthesis.⁵³ Catabolism also slows all tissue-repair processes from cell proliferation and migration to collagen deposition.⁵⁴

Immobility. Individuals receiving palliative care progressively become less active, and their immobility increases nearer to their time of death. Immobility is a well-known factor associated with PrU development.^{6,11,31,35,42,47,55-59} In a study of 98 Swedish hospice patients, the lack of physical activity and mobility were significantly associated with PrU development.¹⁴ The risk of PrU development is compounded when the patient is older and has concurrent illnesses that impair mobility or activity.¹⁴ An additional component in immobility is seen when some individuals in pain often wish to not move or refuse to move because of fear of pain or dyspnea.⁶⁰

Friction and Shear. Friction is the "resistance to motion in a parallel direction relative to the common boundary of 2 surfaces."⁶¹ Friction can cause injury to the individual's skin from movement of the skin on the bed linens. Friction injuries can also develop in individuals who are in pain but are not able to process the meaning of the sensation of pain (eg, those with confusion or dementia). Rubbing the heels on the bed is a commonly seen friction injury, which can quickly lead to tissue damage on the heels.

Shear stress is the "force per unit area exerted parallel to the plane of interest," whereas shear strain is the "distortion or deformation of tissue as a result of shear stress."⁶¹ Friction is necessary for shear to occur, and shear forces can damage the skin internally, which is likely to occur when the

individual must sit up in bed due to dyspnea and then slides down in bed. Dyspnea is further associated with tissue hypoxia, creating a higher risk of tissue injury. As time in a chair, and eventually a bed, increases, both friction and shear become more significant risk factors.

Exposure to Moisture. Moisture can arise from excess perspiration, wound exudates, urine, and/or feces. Sweat is not caustic but can cause skin injury. Sweat between skin folds creates a warm moist environment and promotes growth of several forms of bacteria and yeast.⁶² Moisture is one of the subscales on the Braden and the Hunters Hill–Marie Curie Center Risk Assessment Scales. Given that the patient’s state of health deteriorates as the disease progresses, it is important to assess for risk factors often, beginning at admission and with each significant change in condition.

Normal skin pH is acidic at 4 to 6.5, which helps protect the skin against microorganism invasion.⁶³ Frequent use of soap can alter skin pH to an alkaline state, leaving it more vulnerable to microorganism invasion. Skin that is water logged from continual wetness is more easily subjected to breakdown, injured by friction, permeable to irritating substances, and able to be colonized by microorganisms than normal skin,^{2,55,64–67} as well as PrU deterioration.^{14,32} Exposure to urine or diarrhea damages the skin and increases the risk of PrUs. Urine is absorbed by keratinocytes (outermost layer of skin), and when these cells are softened, they cannot provide protection from pressure injury. Urine contains urea, and ammonia can damage the skin. In an incontinent individual with a urinary tract infection, urine will also be alkaline and injurious to the skin.

Diarrhea strips the outer layer of skin, and the exposed dermis cannot tolerate pressure. Diarrheal fluids are caustic and can damage the skin quickly. When urine is present in combination with feces, which contain bacteria and harsh gastrointestinal tract enzymes, the damage can be even quicker and more severe. In addition to this chemical irritation, the mechanical irritation from cleaning the individual can compound the damage. Fecal incontinence is reported to be 25% in hospice patients³² and 30% in a French study of 1000 nursing home residents.⁶⁸ Although a number of factors are responsible for fecal incontinence in the frail older adult, poor mobility is a problem in patients receiving palliative care as they become more and more confined to bed, which in turn can contribute to functional and other forms of incontinence.

Recommendations

1.1. Assess the risk for new PrU development at the time of admission and on a regular basis in the patient receiving palliative care by using a validated risk assessment tool (strength of evidence = C).

1.2. Use the Hunters Hill–Marie Curie Center Risk Assessment Tool, specific to the patient receiving palliative care, or a general screening tool, such as the Braden Scale, Norton Scale, or other age-appropriate tool, in conjunction with clinical judgment for the adult individual (strength of evidence = C).

RISK REDUCTION

Pressure Redistribution. Turning redistributes pressure so that tissues can be perfused; it is the cornerstone of PrU prevention. However, in the terminally ill individual, “turning may be harmful or even scary to some patients, while offering immeasurable comfort to others.”² Many patients receiving palliative care prefer a single position for comfort, and turning and positioning may serve only to increase pain, discomfort, and distress.^{2,30,55,60,69}

Comfort is best managed by keeping the patient’s pain controlled without extreme sedation.⁷⁰ Use of opiates and/or sedatives to control pain allows for more frequent position changes with minimal pain. However, if the patient becomes too sedated, there will be a decrease in spontaneous movements. Therefore, finding the proper balance of opiates and nonopiates for pain management without suppression of spontaneous movement is crucial. Increasing immobility is expected as the patient becomes more ill, yet it is important to keep the skin intact for as long as possible. This can be accomplished by placing the palliative care individual on a low-air-loss mattress to provide a dry and cooler microclimate and desirable pressure redistribution. These upscale devices reduce the need for frequent turning and reduce the risk of PrU development. However, patients on any pressure redistribution surface still require turning.

For those individuals who are actively dying, prevention and treatment of a PrU may be superseded by the need to promote comfort by minimizing turning and repositioning and allowing the patient to determine frequency of turning and choice of position.^{14,30,55,60,69}

Patients who are in pain do not wish to move, so families may not wish to move them. Nonetheless, repositioning as possible and in accordance with the individual’s wishes remains a high priority for symptomatic management.² Many individuals have a “position of comfort,” which they prefer. As possible, these wishes are to be honored.

Recommendations

1.0. Reposition and turn the individual at periodic intervals, in accordance with the individual’s wishes and tolerance (strength of evidence = C).

1.1. Establish a flexible repositioning schedule based on support surface in use and needs and individual preferences and tolerance (strength of evidence = C).⁷¹

1.2. Premedicate the individual 20 to 30 minutes prior to a scheduled position change for individuals with significant pain on movement (strength of evidence = C).

1.3. Observe individual choices in turning, including whether he/she has a “position of comfort,” after explaining the rationale for turning (strength of evidence = C).^{7,60}

1.3.1. Comfort is of primary importance and may supersede prevention and wound care for individuals who are actively dying or have conditions causing them to have a single position of comfort (strength of evidence = C).

1.4. Consider changing the support surface to improve pressure redistribution and comfort. (strength of evidence = C).

1.5. Strive to reposition the individual receiving palliative care at least every 4 hours on a pressure-redistributing mattress as consistent with the individual’s goals (strength of evidence = A) and every 2 hours on a non-pressure-redistributing mattress and document. Individualize the turn and reposition schedule according to the individual’s clinical status and combination of comorbid conditions, as medically feasible (strength of evidence = C).⁷²⁻⁷⁴

1.6. General Care

1.6.1. Protect the sacrum, elbows, heels, and greater trochanters, which are particularly vulnerable to pressure and shear.

1.6.2. Use positioning devices, such as foam or pillows, as necessary to prevent direct contact of bony prominences and to avoid having the individual lie directly on the PrU (unless this is the position of least discomfort, per individual preference) (strength of evidence = C).^{42,71,75}

1.6.3. Use heel protectors and/or suspend the length of the leg over a pillow or folded blanket to float heels (strength of evidence = B).^{75,76}

1.6.4. Use a chair cushion that redistributes pressure on the bony prominences and increase comfort for the individual who is seated (strength of evidence = C).^{42,75}

1.7. Skin Care

1.7.1. Maintain skin integrity to the extent possible (strength of evidence = C).

1.7.2. Apply skin emollients per manufacturer’s directions to maintain adequate skin moisture and prevent dryness (strength of evidence = C).

1.7.3. Minimize the potential adverse effects of incontinence on skin.

NUTRITION AND HYDRATION

Even today, very little research is available identifying specific strategies for nutrition in the frail older adult patient.² Although it is known that adequate fluid intake and maintenance of serum protein levels are important for wound healing, this is not always an achievable goal in the frail older adult or individual at the end of life.² Further, inflam-

matory conditions reduce serum proteins, and using them as the only marker of nutrition provides neither an adequate nor accurate picture. Measurement of actual oral intake through nutrient intake studies or monitoring body weight provides more reliable data from which to make clinical decisions. Maintenance of adequate hydration is important.^{7,77,78} Well-hydrated skin is healthier skin and thus less vulnerable to breakdown. The frail individual and/or the individual at the end of life is less independent, and often, the ability to drink voluntarily is significantly impaired.

Making the environment conducive to eating is also important. When the individual is trying to eat, any unpleasant odors should be controlled (including body wastes). Many individuals consume more food when they socialize with others; if possible, family or friends should be encouraged to visit during mealtime. If the individual is short of breath, convert the oxygen to nasal cannula, provide oral care before eating, and offer up to 6 small meals a day. Carbohydrate-dense foods should be minimized because they produce carbon dioxide; fatty foods should be encouraged instead. If stomatitis is present, use mouthwash to reduce pain with eating and serve foods that are mild and cool. If the individual has chosen not to make PrU healing a priority, dietary restrictions for disease management should be lifted and the diet liberalized. Small, frequent meals and snacks can be offered, and the individual can be allowed to consume food and fluids in the types and amounts desired.² Nutritional guidelines for prevention of PrUs were published in 2009.⁷⁹

Recommendations

1.0. Strive to maintain adequate nutrition and hydration compatible with the individual’s condition and wishes.^{80,81}

Adequate nutritional support is often not attainable when the individual is unable or refuses to eat related to certain disease states. (strength of evidence = C).²

1.1. Allow the individual to ingest fluids and foods of choice (strength of evidence = C).^{2,42,81}

1.2. Offer nutritional protein supplements when ulcer healing is the goal.

1.3. Offer several small meals per day.

1.4. Provide oral care to reduce pain and improve taste.

PATIENT ASSESSMENT

A holistic assessment is needed of the individual and the PrU(s), designed to realistically appraise the efficacy and cost-effectiveness of achieving PrU closure, including cost of treatment, as well as cost of suffering.² Healing a PrU requires, at the very least, adequate nutritional intake, pressure redistribution, and local ulcer care. When a nutritional screen identifies a nutritional problem or weight loss or a PrU, refer

the individual to a registered dietitian for a nutritional assessment and care plan including nutritional interventions appropriate to the patient's wishes and condition. Patients who are terminally ill often are catabolic and dehydrated, have central and tissue hypoxia, and have impaired mobility. All of these conditions impede PrU healing.^{9,16,27,30,81-84}

Setting Goals. Healing is sometimes, but not always, possible^{22,81,83}; yet occasionally, some wounds do heal in the days or weeks preceding death.²² Masaki et al⁷⁰ found no statistically significant difference for time for a PrU to heal, or survival time following development of a PrU, between patients with and patients without cancer. On the other hand, McNees and Meneses,⁸⁵ from a pool of 36,000 wound assessments, matched 18 patients with cancer and 18 patients without cancer who had a chronic wound (preponderance of PrUs) and found a statistically significant difference in healing between groups (cancer = 44% healed, no cancer = 78%; $P = .018$) and no significant difference in time to healing ($P = .625$). The researchers also found that patients with cancer who had wounds that healed had significantly more risk factors ($P < .001$) than those whose wounds did not heal (2.78 vs 1.50). Patients with cancer and wounds that did not heal had more risk factors than those with cancer whose wounds did heal (6.46 vs 2.78). In addition, once the PrU becomes a chronic and nonhealing open wound, it remains in an inflammatory state, further impairing the potential to heal.⁸⁶

Realistic expectations must be communicated to and from the individual and family. Healing a Stage II PrU may require only weeks; however, closure of a Stage III or IV PrU requires much more time and effort. Not all individuals receiving palliative care will have enough "living time" left to heal some PrUs. Uncomplicated full-thickness PrUs generally close in weeks to months with proper nutrition, pressure redistribution, and local ulcer care. Because of the time needed to heal, it is also imperative that the individual and family have input into the plan of care for the prevention and treatment of the ulcers. The philosophy of palliative care, to prioritize relief from suffering and provide for an optimal quality of life, should drive both setting goals for care and interventions to meet those goals.² It is crucial to permit nonhealing of an ulcer to be a realistic goal. Given that healing may not be possible, careful consideration needs to be placed on what interventions are appropriate, because most treatments are likely painful, distressing, or expensive in terms of time and dollars.^{16,22,26,27,60,82} A review of the literature on the quality of life in patients with PrUs²¹ concluded that persistent pain is very common in older adults, and the pain arises from several different sources.

For an individual with a progressing illness and facing inevitable death, goals for wound care may change from

cure to comfort and from life extending to preservation of dignity.^{87,88} "Not providing treatment to aid wound healing or ending wound treatment to aid wound healing may be not only what the patient wants, but what can or should be done for the patient to be free from pain and other distressing symptoms before they die."²² It is up to each patient to determine the point at which palliative care supersedes curative-focused treatment.²

Recommendations

- 1.0.** Set treatment goals consistent with the values and goals of the individual, while considering the family input (strength of evidence = C).^{42,89}
- 1.1.** Set a goal to enhance quality of life, even if the PrU cannot be healed or treatment does not lead to closure/healing (strength of evidence = C).
- 1.2.** Assess the impact of the PrU on quality of life of the individual and his/her family (strength of evidence = C).^{2,21,22}
- 1.3.** Assess the individual initially and with any significant change in condition to reevaluate the plan of care (strength of evidence = C).

PRESSURE ULCER ASSESSMENT

A thorough PrU assessment includes physical characteristics, such as stage, location, size, wound bed and periwound condition, and odor and exudate,^{75,90} as well as factors placing the patient at risk.^{4,6,11,31,32,35,56-58,91} PrU assessments are designed to help guide treatment decisions to facilitate closure and healing. Healing is seldom the goal for these individuals receiving hospice or palliative care,²² and therefore, there is no purpose to frequently measuring the wound size or deterioration because no plans to intervene will be derived in these measurements. It is important to monitor the ulcer to continue to meet the goals of comfort and reduction in ulcer pain and wound symptoms. Evaluating the ulcer at intervals in conjunction with dressing changes is appropriate. The ulcer will likely worsen as death nears, and less frequent assessment is appropriate to minimize the pain when the dressing has to be removed and the individual has to roll over in bed and hold the position long enough for the measurements to be taken.

Recommendations

- 1.0.** Assess the PrU initially and with each dressing change, but at least weekly (unless the individual is actively dying), and document findings (strength of evidence = C).^{42,75}
- 1.1.** Monitor the ulcer in order to continue to meet the goals of comfort and reduction of wound pain, and addressing wound symptoms, such as odor and exudates (strength of evidence = C).

PAIN IN PRESSURE ULCERS

PrUs are painful.^{18,19,92-94} In a systematic review, 15 studies addressed the impact of pain and concluded that “pain was the most significant consequence of having a PrU and affected every aspect of patients’ lives.”²¹

There are 3 different pain mechanisms in chronic wounds. The first is noncyclic acute wound pain that occurs in a single or infrequent single episode(s). The second is cyclic acute wound pain, which occurs on a more regular basis with wound manipulation or with position changes and treatments. The third is chronic wound pain, or the persistent pain occurring without external stimulation; this pain has a multifactorial etiology, making it difficult to manage. The cause is often ongoing pathology or wound inflammation or infection. This type of pain is frequently called neuropathic, and its etiology can be difficult to discern. Cyclic or noncyclic wound pain is usually of a nociceptive nature resulting from actual tissue damage,⁹⁵ whereas pain persisting long after tissue damage is neuropathic pain.^{2,96,97}

A study of 32 subjects from acute, home, and extended care found that 87.5% of the subjects experienced pain with a dressing change and 84.4% had pain at rest, compared with 12.5% who reported experiencing no PrU-related pain. Of the 28 who experienced pain, 75% of them rated the pain as mild to distressing, whereas 18% rated it as horrible or excruciating. Pain from PrUs can be the most distressing symptom the patient might report.⁹⁸ In 1995, Dallam et al⁹⁹ conducted a cross-sectional survey of 44 hospitalized patients with PrUs at 3-month intervals over 1 year. Subjects able to complete at least 1 pain questionnaire reported experiencing pain, with several having severe pain. Those patients with Stage IV PrUs experienced more pain than individuals with lesser stage ulcers. A study in acute care of 23 patients found that 91% reported a PrU as painful.²⁰

Qualitative research findings provide a description of the patient’s pain experience. Pain was the encompassing theme that emerged in 1 study after the interviews of 5 subjects with Stage III-IV PrUs.¹⁸ These subjects also often reported pain as constant and adversely affecting their lives. Langemo et al¹⁹ interviewed 8 individuals with current or past Stage II-IV PrUs, and all 8 had experienced PrU pain, with extreme pain emerging as 1 of the 7 themes. Several subjects commented that the pain was present most of the time despite the use of analgesics. Rastinehad⁹³ interviewed 10 subjects who were hospitalized with a PrU. Subjects reported the pain as severe and often sharp, throbbing, or burning and called upon healthcare providers to be more sensitive, knowledgeable, and responsive to PrU pain. In a qualitative study of 8 patients living with a PrU, movement was reported to heighten pain, the cycle of pain was reported to

be constant and severe, the pain was not always recognized by their physician, and analgesia was not always effective.¹⁰⁰

Pain Assessment. The assessment for pain needs to be comprehensive, including objective and subjective assessments. The Numerical Rating Scale, the visual analog scale, and the Faces Pain Rating Scale are effective tools to assess pain in patients who can verbalize and can comprehend data intervals.^{94,99,101-110} Cognitively impaired patients can be assessed using the above tools or by assessing for specific behaviors, such as withdrawal, grimacing, or crying out, as well as other facial expressions, body movements, vocalizations, changes in activity such as refusing food or rest pattern changes, or mental status changes such as crying or irritability.^{97,105,111}

Researchers have recommended initial and routine pain assessment for all patients with a PrU and regular treatment, beyond just at dressing change time or with manipulation.⁹⁴ Patients relate experiencing pain with these treatments. Patients who are nonverbal should also be understood to have pain, even though they cannot verbally report it.

Recommendations: Pain Assessment and Management

1.0. Perform a routine PrU pain assessment every shift, with dressing changes, and periodically as consistent with individual’s condition (strength of evidence = B).

1.1. Assess PrU procedural and nonprocedural pain initially, weekly, and with each dressing change (strength of evidence = C).^{42,75,112}

Pain management must be integrated into a treatment paradigm for PrUs. Effectively managing pain to enhance quality of life is an important palliative care goal.² Despite reports of pain in PrUs, only 3 of 123 patients (2%) with PrUs had received pain analgesia within 4 hours of the pain measurement.⁹⁹ In another study, only 6% of subjects had received medication for their PrU pain.⁹⁴ It is unacceptable to have patients experience PrU pain that is controllable.

Pain Prevention. PrU pain can be minimized by keeping the PrU wound bed moist and covered, repositioning the patient, and keeping linens organized and fairly taught. Urinary catheters and fecal containment devices may be used to enhance comfort, particularly when pain severely limits movement.⁵⁵ Pain may be managed better if the individual is educated about the cause and expected duration of pain, as well as what to do to minimize it.

Management of Chronic PrU Pain. Despite the number of individuals with a PrU in palliative care settings, there is minimal to no evidence to support any measures for the treatment of PrUs in these individuals.⁶⁰ Most studies suffer from small samples, insufficient number of subjects from which to draw meaningful conclusions with statistical power,

poor methodological rigor and analysis, or insufficient evidence presented for adequate evaluation by the reader.

Minimizing chronic pain arising from the PrU can be accomplished by using anesthetics and analgesics on the ulcer bed or providing systemic nonopioid analgesics to the patient. Topical anesthetics include medications that act on opioid receptors in the peripheral nerves that become activated during inflammation. Such medications include morphine or diamorphine gels,^{101,113-115} eutectic mixture of lidocaine and prilocaine (EMLA; AstraZeneca, Alderley Park, UK),¹¹⁶ or foam dressings containing ibuprofen (Biatain-Ibu; Coloplast, Petersborough, UK)[not available everywhere].^{103,117,118} A topical opioid anesthetic such as 2% lidocaine gel, or a nonsteroidal anti-inflammatory drug, can be applied to the wound bed.¹¹⁹ These are frequently injected into a hydrogel (HDG) that assists in exudate absorption and produces a moist wound environment, thereby facilitating healing, controlling exudates, and hopefully minimizing pain. Neuropathic pain tends to be resistant to simple analgesics, and this is where local anesthetic or adjuvant may be helpful.¹²⁰ Such medications can provide some relief.

Systemic analgesics for pain management should be prescribed following the World Health Organization (WHO) 1996 guidelines for the control of cancer pain. The WHO Pain Relief Ladder recommends that persistent and temporary pain treatment begin with nonpharmacological methods, then proceed up the ladder to oral nonsteroidal anti-inflammatory agents, then mild oral opiates, with the last option being potent opioid analgesics.³ When the lower level becomes ineffective, the next level should be added to the pain-relief regimen without fear of addiction or tolerance.

Management of Acute PrU Pain. Acute PrU pain is defined as the pain that is experienced during debridements and dressing changes. In a study by Hollinworth,¹²¹ it was found that even though nurses reported being aware of actions to relieve pain, they did not offer or administer an analgesic before a dressing change. Short-acting opioids can be used 30 minutes before dressing changes or debridement to minimize pain⁸³ and promote comfort. Administration of anesthetic agents 30 minutes or so before treatment helps control pain and could include incremental strengths of topical lidocaine ointment or a like agent.^{2,60,83,122} Pain medication needs to be administered in the appropriate dose and on a regular basis to control chronic pain if present.¹²² Patients can be encouraged to request a time out during a procedure that causes pain, and music, meditation, and guided imagery are sometimes beneficial.⁹⁶ Nurses need to advocate for the patient's comfort during unplanned dressing changes, asking that adequate time be allowed for

analgesia. There is little evidence to support beliefs that "the pain will last only a moment while the dressing is changed." Changing dressings without adequate analgesia leads to pain for hours per patient self-report. When nurses are changing dressings that are painful to remove or reapply, there is no excuse for not medicating the patient before the dressing change. Cognitive impairment does not hamper the sensation of pain, even though it may hamper a cogent response to the painful stimuli.

Recommendations

1.0. Provide systematic treatment for PrU pain.

- If consistent with treatment plan, provide opioids and/or nonsteroidal anti-inflammatory drugs 30 minutes before dressing changes or procedures and afterward (strength of evidence = C).
- Ibuprofen-impregnated dressings may help decrease PrU pain in adults; however, these are not available in all countries.
- Lidocaine preparations help decrease PrU pain.
- Diamorphine HDG is an effective analgesic treatment for open PrUs in the palliative care setting (strength of evidence = B).^{101,114,123}
- Provide local topical treatment for ulcer pain.
- Select extended-wear-time dressings to reduce pain associated with frequent dressing changes (strength of evidence = C).

1.1. Encourage individuals to request a time out during a procedure that causes pain (strength of evidence = C).^{96,99,124}

1.2. For a patient with PrU pain, music, relaxation, position changes, meditation, guided imagery, and TENS [transcutaneous electrical nerve stimulation] are sometimes beneficial (strength of evidence = C).^{96,99,124}

TREATMENT OF PRESSURE ULCERS

At this time, there are no standardized protocols for treating a PrU in a dying patient, owing in large part to the lack of research in this population.²² Naylor⁹ proposed 7 principles for the management of palliative wounds. These principles include preventing wound development and/or deterioration, correcting or treating the underlying cause of the wound, controlling wound-related symptoms, using patient self-assessment, providing psychosocial support, promoting independence, and improving quality of life, all of which are incorporated throughout this article. The NPUAP supports the philosophy of palliative care in the treatment of PrUs in patients with terminal illness. "Treatment should be realistic and accepted by the patient and carers [caregivers]. If the treatment does not promote quality of life and a sense of well-being, it should be changed. Few treatments are absolute."¹²⁵ Because healing is seldom the goal, the goals

of palliative wound care include minimizing pain, odor, exudates, bleeding, and infection.^{22,83} Pain management was discussed in the previous section.

INFECTION AND ODOR

Bacteria thrive on wound exudates and moist devitalized tissue in the presence of poor vascularization,¹²⁶ and these pathogens cause wound odor. The most common odor-causing organisms are anaerobic and enteral (eg, enterococcus, *Escherichia coli*). Infection in PrUs does not present like infection in acute wounds. Acute wound infection has the classic signs of infection (redness, pain, swelling, loss of function). Infected PrUs show no signs of healing for 2 weeks, have malodor, and present friable granulation tissue (if granulation tissue is present), increased pain in the ulcer, increased heat in the tissue around the ulcer, increased drainage from the wound, an ominous change in the nature of the wound drainage (eg, new onset of bloody drainage, purulent drainage), increased necrotic tissue in the wound bed, and pocketing or bridging.^{127–129}

Infection induces the inflammatory response that retards healing and increases drainage from the ulcer.² Planktonic bacteria on the surface of wounds can be reduced by functional white blood cells. However, the frail and/or older adults often lack a classic immune response to infection,¹³ and the bacteria then thrive, often producing biofilm, which does not signal an immune response or respond to antibiotics.^{130–133}

A prospective, quantitative, and qualitative study sampled tissue for bacteria in PrUs in 34 patients with advanced cancer on a palliative care unit. Ninety-two species of bacteria were identified in 19 PrUs (79.3% aerobic, 20.7% anaerobic), and bacteria were present in every ulcer cultured. The most common species were *Staphylococcus aureus* or *Staphylococcus epidermidis*, *Enterococcus faecalis*, and *Streptococcus pyogenes*.¹³⁴ Although this information is important and helpful in guiding treatment, infection can be difficult to ascertain without qualitative cultures, and in the individual receiving palliative care, this level of diagnosis is often not in order. If the individual's goal is not to heal the ulcer, the formal diagnosis and treatment of wound infection are not warranted.

Most patients are more distressed by the odor, drainage, and pain from the infection, and those are the symptoms that should be treated. Wound odor can contribute to significant feelings of embarrassment and/or depression, self-imposed isolation, and poor quality of life.^{2,83,135} Wound odor decreases appetite and social interactions.²¹ Repugnant wound odor can even precipitate healthcare staff "bunching their treatments" to limit exposure to the wound odor.² Treatment to control odor can be 2-fold, one aimed at the cause of the

odor and the second aimed at the odor itself. Malodor can also be caused by the saturated dressings full of exudate from the PrU. Frequent dressing changes and wound irrigation should be used to keep the ulcer bed clean. To address the cause of the odor, the ulcer can be debrided or cleansed if no necrotic tissue is present.

Debridement. Debridement, the removal of nonviable tissue, may be beneficial to reduce odor and/or infection and to reduce pain in the ulcer. The goal will not be for healing. Debridement can be done mechanically, enzymatically, autolytically, biologically, surgically, or via sharp methods. Consider patient comfort when selecting the debridement method. Premedicate the patient for any sharp debridement, and plan ahead for methods to control bleeding.⁸³ Frank bleeding can be controlled with direct pressure as long as the surrounding tissues can withstand the pressure. Localized oozing of blood can be controlled with silver nitrate sticks. Gel foam is a hemostatic dressing that coagulates blood. Alginates also have hemostatic properties because they can place pressure on the bleeding tissues. Autolytic debridement often is the easiest for the individual to endure. The care provider is advised to simply remain vigilant for changes in the ulcer that need to be addressed, such as infection.² If a dry eschar is present on the PrU of a palliative care individual with a limited life expectancy, and where revascularization is not an option, leaving it alone may be best as it provides a natural protective barrier.²

If the eschar becomes wet, if signs of infection are present, or if necrotic tissue is present, sharp or surgical debridement may be done; however, this should be done with caution as it can lead to excessive bleeding or pain.^{60,83} When mechanical debridement is needed, a topical anesthetic can be effectively used.¹⁰⁶

Odor-Controlling Dressings and Odor-Controlling Products

These products are directed at reducing bacterial levels.

Metronidazole. Metronidazole is an antimicrobial agent effective against anaerobic bacteria^{2,67} and protozoal infections such as *Trichomonas*. Topical metronidazole gel (0.75%–0.80%) is frequently used directly on the wound once per day for 5 to 7 days or more often as needed,^{136,137} and metronidazole tablets can be crushed and placed onto the ulcer bed.^{83,138}

Cadexomer Iodine. Cadexomer iodine is an antiseptic that allows for low-concentration release of iodine over time and promotes an acid pH that enhances the antimicrobial action of the iodine.¹³⁹ Local antibiotic dressings with metronidazole or cadexomer iodine, wafers, or paste can be used.² Once these products become oversaturated, their odor-control action diminishes.

Charcoal. Charcoal-impregnated dressings have been found to minimize wound odor. Activated charcoal attracts and binds wound odor molecules.^{83,135,140,141}

Dakin Solution. Odor can also be controlled using Dakin solution 0.25% (sodium hypochlorite) saturated onto gauze packing and placed into the ulcer.¹⁴² Dakin solution produces its own odor and can be irritating to the respiratory system, especially if the patient is in isolation or rooms with limited ventilation. Dakin solution may cause some pain in the wound when used.

Povidone Iodine. Odor can also be controlled using povidone solution.¹⁴²

Silver Dressings. Silver dressings are effective in countering some infections in the wounds and thereby controlling odor. They are discussed in the next section.

Other Methods. Less conventional methods of treating malodorous wounds include the use of honey, some varieties of which contain potent antimicrobial agents, and sugar, either alone or in the form of a paste. The hyperosmotic environment produced by high concentrations of sugar is believed to inhibit bacterial growth and thus prevent odor. Live yogurt is also sometimes applied in an attempt to encourage overgrowth of pathogenic organisms by lactic acid bacteria such as *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. More recently, larval therapy has been shown to be an extremely effective way of eliminating wound infection and odor from extensive necrotic wounds.¹⁴³

Other Odor-Control Methods. To control odor in the room, kitty litter can be placed under the bed. Vinegar, vanilla, coffee beans, or a candle in the room are also helpful in controlling odors.^{2,138,144} External odor absorbers in the room are effective but, at times, the smells they create can be overwhelming themselves.

Recommendations

1.0. Manage the PrU and periwound area on a regular basis as consistent with the individual's wishes (strength of evidence = C).

- Cleanse the wound with each dressing change using potable water (ie, water suitable for drinking),¹⁴⁵ normal saline, or a noncytotoxic cleanser to minimize trauma to the wound and to help control odor^{71,75} (strength of evidence = C).
- Debride the ulcer of devitalized tissue to control infection and odor^{75,146,147} (strength of evidence = C).
- Use conservative, nonsurgical (autolytic) debridement of necrotic tissue as appropriate^{42,75,148,149} (strength of evidence = B).

1.0.1. Debride devitalized tissue within the wound bed or at edges of pressure ulcers when appropriate to the individual's condition and consistent with the overall goals of care (strength of evidence = C).

1.0.2. Avoid sharp debridement with fragile tissue that bleeds easily (strength of evidence = C).

1.1. Control wound odor (strength of evidence = C).

- Cleanse the ulcer and periwound tissue, using care to remove devitalized tissue^{2,150,151} (strength of evidence = C).
- Assess the individual and the ulcer, with a focus on comorbid conditions, nutritional status, cause of ulcer, presence of necrotic tissue, presence and type of exudates and odor, psychosocial implications, and so on^{2,150,151} (strength of evidence = B).
- Assess the ulcer for signs of wound infection: increasing pain; friable, edematous, pale dusky granulation tissue; foul odor and wound breakdown; pocketing at base; or delayed healing¹²⁷ (strength of evidence = C).
- Use antimicrobial agents as appropriate to control known infection and suspected critical colonization (strength of evidence = C).^{2,83,136,151}
- Consider use of properly diluted antiseptic solutions for limited periods of time to control odor (strength of evidence = C).
- Consider use of topical metronidazole to effectively control PrU odor associated with anaerobic bacteria and protozoal infections (strength of evidence = C).^{2,83,136,138,152-154}
- Consider use of dressings impregnated with antimicrobial agents (eg, silver, cadexomer iodine, medical-grade honey) to help control bacterial burden and odor (strength of evidence = C).¹⁵⁵
- Consider use of charcoal or activated charcoal dressings to help control odor (strength of evidence = C).^{83,135,140,156}
- Consider use of external odor absorbers for the room (eg, activated charcoal, kitty litter, vinegar, vanilla, coffee beans, burning candle, potpourri) (strength of evidence = C).^{2,138,144}

PRESSURE ULCER EXUDATE

Exudate is the inflammatory fluid present in any open wound that arises from the fluid in extracellular spaces. The fluid accumulates during the inflammatory process when vasodilation creates edema in the wounded area. In PrUs, persistent inflammation or infection also increases exudate; however, exudate from chronic wounds is composed of proteolytic enzymes and other components not seen in acute wounds. Exudate from chronic wounds can injure surrounding tissue and aggravate the inflammatory process. The denuded tissue is painful and increases the size of the ulcer.² However, plasma exudate keeps the wound bed moist, which promotes healing.

Exudate can contain proteins, and when exudate volume is high or chronic, serious hypoproteinemia can occur.¹⁵⁷ When combined with inadequate oral intake of protein, the colloid oncotic pressure falls and more tissue edema develops. The assessment and management of exudates are

a key component of PrU management to promote comfort and healing.¹⁵⁸

DRESSINGS AND DRESSING CHANGES

Moist wound healing is the process used to promote epithelialization. When healing is not the goal, dressings should be used that require infrequent changing, adequately absorb exudate, and are nonadherent for nontraumatic removal. Dry dressings should be avoided because they will stick to the open wound causing both pain and trauma on removal.¹⁵⁹ The number of dressing changes should be minimized, and individuals medicated with analgesics before dressing changes.⁶⁰

Dressings should be moistened before removal to minimize any chance of bleeding, and nonadherent dressings used to prevent further chance of bleeding on dressing removal.⁸³ A gentle cleanser (normal saline or neutral-pH cleanser) will minimize wound irritation and discomfort.⁸³ Irrigating the wound to remove loose slough can be done using a syringe with normal saline.

Transparent Film Dressings. Transparent films are adhesive, waterproof, and impermeable to contaminants. Being transparent, they allow for wound bed visualization and are flexible for contouring over joints. They do permit water vapor to cross the semipermeable barrier. Film dressings can be used to protect intact skin including skin that is likely to become irritated from friction against the bed linens. Plan to leave film dressings in place for up to a week or more, as they can injure the skin if removed frequently. Film dressings should not be used if drainage is excessive and should not be used on infected wounds or fragile skin.^{29,83,144,160} Follow the manufacturer's directions for removal; pulling them off rapidly can leave areas of denudement.

Foam Dressings. Foam dressings can protect skin that is dry and/or over bony prominences. In a 3-week study of 37 bedridden individuals, persistent erythema of the trochanter was significantly reduced ($P = .007$; relative risk, 0.18) with the application of a preventive foam-based dressing. In addition, no PrUs developed, and skin hydration was significantly increased ($P = .001$).¹⁶¹ Overall, foam dressings also help create a moist environment, are moderately absorbent, and help insulate and protect the wound. They are nonadherent, making it easy to apply and remove them. A secondary dressing may be needed in some instances.^{29,144} Polymeric membrane foam dressings are very absorptive, have a surfactant to help cleanse the wound, and have been shown to decrease pain.^{162,163}

Hydrocolloid Dressings. A hydrocolloid dressing (HCD) is occlusive or semioclusive and helps create a moist environment, promoting autolytic debridement of necrotic tissues and formation of granulation tissue to form in clean

full-thickness wounds. HCDs may be used for clean Stage II or III PrUs with minimal to moderate drainage.^{29,144} Use these dressings cautiously in patients who are immunocompromised, as the autolytic debridement process requires functional white blood cells. HCDs can also be used to provide a "window frame" around a large wound or on fragile skin to prevent damage from repeated tape removal.

Hydrogel Dressings. An HDG is a water- or glycerin-based amorphous gel, impregnated gauze, or sheet dressing. An HDG can maintain a moist environment, help promote granulation and epithelialization, and facilitate autolytic debridement, as well as help soothe pain. HDGs can contain up to 95% water; therefore, they cannot absorb much exudate and can dehydrate if left on too long. They work well for wounds that are dry. A cover dressing is recommended along with protection of periwound skin.²⁹ HDG dressings work well to soothe skin injury from radiation treatments. The dressings can be placed in the refrigerator to provide additional cooling.

Silver Dressings. Silver has been added to many forms of dressings, due to its bacteriostatic ability. In an 8-week, randomized controlled trial, researchers compared DuoDERM CGF (ConvaTec; Skillman, New Jersey) with saline gauze on 34 subjects who had a Stage II–III PrU. Significantly more pain was experienced on dressing removal (0% vs 44%, $P < .01$) and overall (0% vs 50%, $P < .01$) while the dressings were in place for subjects with saline gauze as compared with DuoDERM CGF.¹⁶⁴ In an open, prospective, comparative parallel and block-randomized study of 619 subjects with a variety of ulcer types, including 7.5% ($n = 46$) with a Stage II–III PrU, a silver-releasing foam dressing significantly increased mean wear time ($P < .0001$) and significantly reduced pain at dressing change ($P < .0001$) when compared with a local best practice group (LBP).¹⁶⁵

One study found no statistically significant difference between 34 patients whose PrUs were treated with Lyofoam/polyurethane (LBP) (Seton) foam versus Aquagel/HDG (Wytw. Opatrunkow) dressings on efficacy, healing rates, and treatment times. PrUs were cultured and all had bacteria present. A total of 92 species of bacteria were cultured, with the most frequent being *Staphylococcus*, *E faecalis*, and *S pyogenes*.¹³⁴ In addition, the silver-releasing foam dressing also significantly reduced pain, and mean wear time was significantly greater when compared with the LBP group. Silver dressings are more costly and may not be the first choice in a palliative care setting. Once infection appears to have subsided, use a non-silver-impregnated dressing.

Alginate Dressings. Alginates are derived from seaweed and can absorb up to 20 times their weight as they interact with exudates to form a soft gel. This gel assists in maintaining a moist wound bed, thereby facilitating autolytic

debridement and decreasing pain. Alginates also have hemostatic properties because they can place pressure on the bleeding tissues. Exudative Stage III or IV PrUs may benefit from a calcium alginate dressing due to their absorptive capacity and relative ease of removal.^{16,29}

Periwound Management. Barrier creams can help protect periwound tissues from injury due to wound drainage. If dressings are being changed often, place window frames made from HCDs on normal intact skin. The tape can then be placed onto the hydrocolloid, from which removal will not injure the periwound skin.

Recommendations: Dressings

1.1. Manage the PrU and periwound area on a regular basis consistent with the individual's wishes (strength of evidence = C).

- Choose a dressing that can absorb the amount of exudates present, control odor, keep periwound skin dry, and prevent dessication of the ulcer (strength of evidence = C).^{42,71}
- Use a dressing that maintains a moist wound healing environment and is comfortable for the individual (strength of evidence = C).⁷¹
- Use dressings that can remain in place for longer periods to promote comfort related to the PrU care^{134,165} (strength of evidence = C).
- Consider use of an antimicrobial dressing to control bioburden and odor^{166,167} (strength of evidence = C).
- Consider use of a hydrogel to soothe painful ulcers¹⁶⁸ (strength of evidence = C).
- Consider use of a foam or alginate dressing to control heavy exudate and lengthen wear time^{16,29,144} (strength of evidence = B).
- Consider use of a polymeric membrane foam for exudate control and cleansing^{162,163} (strength of evidence = B).
- Consider use of silicone dressings to reduce pain with dressing removal¹⁶⁸ (strength of evidence = B).
- Protect the periwound skin with a skin protectant/barrier or dressing⁷⁵ (strength of evidence = C).

MANAGING INCONTINENCE

A PrU on the trunk can be particularly problematic. Effectively managing incontinence generally controls the immediate wound environment, including stabilizing the wound, controlling the odor, and enhancing quality-of-life goals.² In an individual receiving palliative care, a frequent toileting schedule may increase pain from movement; thus, the use of an indwelling catheter to control urinary incontinence, while not a desirable approach in other populations, could be considered at the end of life. With fecal incontinence, odor control and skin protection are important, and a fecal containment device may be helpful in later stages.²

EDUCATION

The burden on the caregiver to a patient at the end of life with a PrU is a heavy one.⁴ Providers and patients have an interdependent, shared decision-making relationship to enable a patient's self-determination of goals of care.^{22,169} Education of patient, family, and significant others, as well as providers and payers, on palliative care management options and implications of options in light of patient needs will assist with enhancing appropriate care planning and appropriate utilization of resources. It is important to educate the patient and family that the PrU is likely not expected to heal and may even deteriorate and that exudates and odor are not unexpected but will be controlled to the extent possible, and to not avoid the patient. A consultation with a palliative care team is also very helpful. Once the patient and/or family has made the decision to support symptomatic and comfort rather than curative care, ensure that this is appropriately documented in the patient record and incorporated into the plan of care.^{42,75,124}

Recommendations: Resource Assessment

1.0. Assess psychosocial resources initially, and at routine periods thereafter (psychosocial consultation, social work, etc)⁴² (strength of evidence = C).

1.1. Assess environmental resources (eg, ventilation, electronic air filters, etc) initially and at routine periods thereafter⁴² (strength of evidence = C).

1.2. Validate that family care providers understand the goals and plan of care (strength of evidence = C).

SKIN FAILURE

The skin is the largest organ of the body, and in many patients at the end of life, the skin fails along with other organs. Skin failure is due to hypoperfusion of skin and is seen with concomitant severe dysfunction or failure of vital organs.⁸ From a physiological perspective, body systems begin to shut down over a period of 10 to 14 days and again within 24 hours of death.³³ PrUs occurring just before death were described by Karen Kennedy-Evans and coined the "Kennedy Terminal Ulcer."¹⁷⁰ These ulcers were described as purple areas on bony prominences, particularly the sacrum, that preceded death by 2 to 3 days. Skin failure was also identified in a study where the majority of PrUs occurred in the 2 weeks before death.³² Today, these PrUs might be labeled as suspected deep tissue injury. However, caution must be used because not all deep tissue injuries precede death, nor have they been shown to be a marker of impending death. Skin failure can be acute, chronic, or end of life.

FUTURE RESEARCH NEEDS

Research on palliative care patients is significantly challenging as their life span is limited; they are usually moderately to

heavily medicated and have a variety of comorbidities.² Research is needed that scientifically identifies the characteristics of the patient receiving palliative care and what makes a PrU unlikely to heal while not limiting quality of life.² A validated tool or process for healthcare providers to determine the value of healing versus nonhealing in these patients is needed. This information could lead to the appreciation of nonhealing objectives while maintaining comfort, dignity, and quality of life for the patient receiving palliative care. Elimination of culpability for PrU development in this population should go hand-in-hand with this focus.²

SUMMARY

The scientific body of knowledge related to palliative care of PrUs must be expanded. This will take time. In the mean time, Kennedy¹⁷¹ put it well when she stated that “palliative nursing [care] must acknowledge the tacit, intuitive elements of practice and the potential of reflective practice to provide important insights into the nature of knowledge contained within clinical nursing practice.” ●

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