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SURGICAL DEBRIDEMENT OF WOUND, BURN, AND PAIN CONTROL; NURSING REVIEW

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Abstract:

The failure to give adequate postoperative analgesia has multiple causes. Insufficient understanding, concern about analgesic medication-related concerns, inadequate pain evaluation, and limited personnel are among the factors. This review will focus on the management of acute postoperative pain as well as the history and classifications of debridement. We did a comprehensive literature search of relevant research on the therapy of acute postoperative pain and will explain the background and types of debridement using the PubMed (Midline) database up to 2022. Debridement is considered an essential component of wound-bed preparation, as it removes impediments to wound healing. However, there is currently insufficient evidence to favor one debridement procedure over another; hence, the choice of which method to employ is dependent on the clinician's skill and judgment. As inadequate care can result in delayed recovery, increased discomfort, an increased risk of infection, and the inappropriate use of wound dressings, all of which have a negative influence on a patient's quality of life, experts must be well conversant with all debridement options. Patients with chronic injuries face a number of concerns, including pain, movement restrictions, social isolation, and mental issues. As the ultimate goal of wound management is to improve a patient's complete quality of life, care planning must incorporate all of these factors while simultaneously preparing the injury bed for recovery. It is essential to recall that certain debridement techniques necessitate the practitioner's ability to attend to minute details.

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INTRODUCTION:

Management of a wound, whether chronic or acute, requires regular, effective, and continuous evaluation and examination of the patient, including: aetiology of the wound, wound bed, periwound spot, signs of infection, basic patient malaise, and evaluation of wound dressings chosen to promote the healing process [1]. This continuous and accurate analysis of wounds is essential for achieving a practical and appropriate treatment objective.

Debridement is the process of removing devitalized, necrotic, nonliving, or diseased tissue or fibrin, debris, or foreign material from a wound [2]. It is considered that debridement has a beneficial effect on the injury bed, promoting granulation tissue growth and hence promoting injury healing. As this assumption was previously largely dependent on expert opinion, there is accumulating evidence indicating debridement improves wound healing [2]. Various debridement procedures have been developed and can be implemented [3]. When selecting a debridement method, it is important to consider a number of factors, including the patient's preferences, the etiology and characteristics of the injury (such as the amount of exudate, the bacterial load and infection status, pain, etc.), and the cost [3]. Debridement techniques include autolytic, biological, enzymatic, mechanical, sharp, and surgical techniques [3].

Debridement is a crucial step in the treatment of diabetic foot ulcers, which occur in at least 15% of people with diabetes mellitus and precede 84% of all lower-leg amputations caused by diabetes. The method alters the environment surrounding the chronic injury and promotes healing [3].

According to the American Society of Anesthesiologist's practice recommendations for the management of acute pain in the perioperative situation, acute pain is defined as the pain experienced by a surgical patient following a procedure [4]. The World Health Organization and International Association for the Study of Pain acknowledge pain relief as a fundamental human right [4]. Ineffective management of postoperative pain might result in complications and long-term rehabilitation. Sharp, unrestrained pain is associated with the onset of chronic pain and a decline in quality of life [4]. Excellent pain relief results in shortened hospital stays, less medical expenses, and increased patient happiness. Consequently, postoperative pain management is a highly evaluated quality indicator. The Hospital Consumer Assessment of Health Care Providers and Systems (HCAHPS) score gauges patient satisfaction with in-hospital pain management and may have reimbursement implications.

The failure to give adequate postoperative analgesia has multiple causes. Insufficient understanding, concern about analgesic medication-related concerns, inadequate pain evaluation, and limited personnel are among the factors. This review will focus on the management of acute postoperative pain as well as the history and classifications of debridement.

METHODOLOGY:

We conducted a comprehensive literature search for relevant studies on the therapy of acute postoperative pain and will explain the background and forms of debridement using the PubMed (Midline) database for the period up to 2022, with the following Mesh terms: wound debridement, pain management. We attempted to extract more research from the reference lists of selected studies in order to provide more evidence in favor of our analysis.

DISCUSSION:

The literal meaning of 'debride' is to remove constraints (i.e., to unbridle). In terms of wound management, debridement refers to the removal of adhering, dead, or infected tissue. It is distinct from the act of cleansing, which is defined as the removal of dust, loosened metabolic waste, or foreign substance [5]. For some years, scientific standards from organizations such as the European Wound Healing Society and Wounds UK [5, 6] have recommended debridement. However, there has been an absence of evidence examining whether debridement actually accelerates wound healing. Nonetheless, a recent study provides evidence that this is the case. Wilcox et al. analyzed 154 644 patient reports over a period of four years [7]. All of the patients visited a wound-healing clinic for a variety of wound types, with venous leg ulcer being the most common (26.1%), followed by diabetic foot ulcer (19%). Almost twice as many venous leg abscesses and diabetic foot ulcerations completely cured with regular debridement compared to those treated less frequently: 50% against 30% in the venous leg abscess group and 30% versus 13% in the diabetic foot ulceration group, respectively. Wilcox et al. concluded that regular debridement significantly decreased healing times for all wound types (P0.001) [7].

• TYPES OF DEBRIDEMENT

Several types of debridements are capable of removing weakened tissue. These include surgical debridement, biological debridement, enzymatic debridements, and autolytic debridement.

This is one of the most conventional debridement methods. This type of debridement is a natural process in which endogenous phagocytic cells and proteolytic enzymes disintegrate necrotic tissue. The debridement is an exceedingly selective process in which only necrotic tissue will be affected.

It is recommended for noninfected wounds. It may also be used as an adjuvant treatment for infected wounds. It can be used in conjunction with other debridement techniques, such as mechanical debridement, for infected wounds.
It requires a moist environment and a healthy immune system. Utilizing moisture-absorbing dressings can improve it. This type of debridement results in the softening and eventual separation of the diseased tissue from the wound bed.
The effectiveness of this type of debridement is determined on the amount of necrotic tissue to be removed as well as the actual injury size.
Autolytic debridement will undoubtedly take several days. If a significant reduction in fatal tissue **is not observed**

within 1 or 2 days, alternative debridement techniques must be examined.

Biological Debridement

Biological debridement, also known as larval therapy, employs sterilized larvae of the environmentally-friendly bottle fly species Lucilia sericata. It is an efficient method of debridement, particularly appropriate for the painless removal of necrotic tissue from large wounds [8]. Massive therapy/debridement primarily functions by releasing proteolytic enzyme-containing fluids and discharges that dissolve dead tissue from the wound bed. Other activities that contribute to the overall efficacy of larval treatment include:
Bactericidal because the larvae consume and decompose bacteria
Inhibiting bacterial development by releasing ammonia into the wound bed, which raises the wound's pH.
One can apply maggots to the wound bed. They are either packaged in organic bags or are free-range.
Studies have demonstrated that free-range maggots may debride a wound at least twice as quickly as bag-pain maggots. 14 days, 28 days, and 72 days are required to complete debridement using free-range maggots, bio bags containing maggots, and hydrogel autolysis, respectively, according to research [8].
Contraindications to organic debridement include abdominal injuries adjacent to intraperitoneal tooth cavities, pyoderma gangrenosum in patients receiving immunosuppressive therapy, and injuries in close proximity to septic arthritis-affected areas.

Enzymatic Debridement

This is a technique for the selective removal of Clostridium bacteria from necrotic tissue utilizing an exogenous proteolytic enzyme, collagenase. Collagenase removes necrotic tissue by digesting its collagen content.
Enzymatic debridement is a slower form of hair removal than mechanical and sharp debridement.
Collagenase and moisture-absorbent dressings can collaborate to improve debridement.
Enzymatic debridement is not recommended for advanced procedures or in patients with known sensitivity to the active elements of the product [9].
The application of enzymatic debridement to severely infected wounds is a relative contraindication. Additionally, collagenase must not be used in conjunction with silver-based products or Dakin solution.

Surgical Debridement Using Sharp Tools

In the presence of an underlying infection, devitalized tissue (slough, necrotic, or eschar) is removed using sharp instruments such as a scalpel, Metzenbaum, and curettes, among others. This can be performed at the bedside, in an office or wound care center, or in the operating room, depending on the skill of the anesthesiologist and their ability to control perioperative complications like as blood loss. The health care professional must be knowledgeable, skilled, competent, and licensed to provide medical treatment [11].

During the perioperative period, sharp-instrument debridement is compatible with all other debridement techniques.
Negative aspects of surgical debridement include adverse events from the debridement itself, such as blood loss and the possibility of basic anesthetic complications.

Contraindications for medical debridement in the operating room must undoubtedly account for the patient's unique medical risk stratification. In patients with an intact eschar and no medical evidence of a hidden infection, sharp surgical debridement is contraindicated because the intact eschar functions as an organic covering for the underlying skin problem. This is frequently observed in unstageable sacral, buttock, or heel pressure injuries with intact and/or dry eschars.

Mechanical Debridement

Mechanical debridement is a nonselective form of debridement, meaning it removes both necrotic tissue and debris as well as viable tissue. In most cases, mechanical force is used: wet-to-dry, pulsatile lavage, or wound watering [12].
It is seen for both acute and chronic injuries with moderate to substantial volumes of necrotic tissue, regardless of a current infection.

Contraindications include, depending on the mode of mechanical debridement used, the presence of more granulation tissue than devitalized tissue, the inability to control pain, patients with poor perfusion, and the presence of an intact eschar without gross scientific evidence of an underlying infection.

Hydrosurgery involves use pressurized water or saltwater as a cutting instrument with a disposable handset. It provides a rapid, precise method of debridement, but it can be painful for patients and occasionally necessitates local or regional anaesthesia. Hydrosurgery can be performed in a non-theatre setting, such as a treatment room, although caution is required due to the water vapor spray and the danger of cross-contamination; protective clothing and eyewear must be worn with care. Hydrosurgery can be expensive due to the cost of the disposable handpiece, but it is far less expensive than surgical debridement because it does not require operating room time.

• PAIN MANAGEMENT AFTER SURGERY
The management of postoperative pain is an essential but undervalued aspect of perioperative care. In recent years, postoperative pain management, especially the management of surgery-related and surgical pain, has been the subject of substantial research [13].

The nociceptive character of postoperative pain (knowledge of pain after surgical disrespect) must be regarded as essential in pain management because it might result in problems such as hyperalgesia and allodynia, in which the primary sensitivity to pain rises [14]. Therefore, it is necessary to investigate both the fundamental concept of discomfort and the path by which discomfort signals are delivered to the brain's center.

The development of a comprehensive list of protocols that include analgesic products with varied mechanisms of action and administration techniques [15] is a consequence of the identification of many targets for the inhibition of pain signals. However, the selection of a proper pain management protocol by pain care specialists must be based on important characteristics such as the patients' comorbidities, mental states, and anesthetic exposure, as well as the surgeries performed and the operative site [16]. In a multimodal pain care approach, the availability of an effective pain management procedure is crucial.

The alternatives for managing pain are classified according to the management pathways, mechanisms of action, and types of drugs. In the subsequent sections, we actually specify these category requirements in brief [16].

Administration Route and Method of Operation
The most common methods of administration include oral, intravenous (IV), intramuscular, subcutaneous, rectal, transdermal, intrathecal, and epidural. Other promising approaches include neuronal blocks like neuraxial blocks and peripheral nerve blocks. Among the sophisticated approaches for pain control are epidural analgesia (which is difficult to give since it requires the administration of outside nerve blocks via catheters) and extended-duration analgesia (which can be administered at home).

On the basis of their mechanisms of action, analgesics (opioids and acetaminophen) and anti-inflammatory agents (nonsteroidal anti-inflammatory medications [NSAIDs]) can be categorized as analgesics and anti-inflammatory agents, respectively, for use in pain treatment.

Classes of Drugs
The various types of drugs include conventional drugs, such as acetaminophen (which is safe, but its total dose must be carefully monitored), NSAIDs (which can reduce the opioid-related side effects), and opioids (which are the preferred medications); ultramodern drugs, such as ketamine (which is an excellent analgesic at very low doses) and gabapentin (which is both an analgesic and anxiolytic agent); and intravenous patient-controlled drugs,

Multimodal Analgesia
Although the use of combination therapy for pain management is relatively new, a number of readily available combinations of medications are already available [17]. As the number of patients undergoing minimally invasive surgical procedures continues to rise, adjunctive anesthetics, such as regional and nonopioid anesthetics, are increasingly being used for pain management; however, opioids are still commonly used to treat moderate to severe postoperative pains [18]. Despite the fact that a medication may have harmful consequences at high doses, a supplementary medication may reduce its adverse effects or intolerability. Recent evidence

suggests that a combination of centrally and peripherally active drugs and devices [19] may be the most effective way to reduce these undesirable side effects.

Table 1. Sample multimodality pain management [17-19].

Preoperative
Acetaminophen (paracetamol) 1,000 mg IV in preop
Ketorolac 800 mg IV in preop
Intraoperative
Liposomal bupivacaine 266 mg wound infiltration
Postoperative
Acetaminophen (paracetamol) 1,000 mg IV every 6 h until patient taking oral meds
Ibuprofen 800 mg IV every 8 h until patient taking oral meds
PCA (morphine or Dilaudid) for severe pain (scale 6-10) until patient taking oral meds
Oxycodone 10 mg PO every 4 h for moderate pain when taking oral medication

Abbreviations: IV, intravenously; PCA, patient-controlled anesthesia; PO, by mouth.

CONCLUSION:

Debridement is considered an essential component of wound-bed preparation, as it removes impediments to wound healing. However, there is currently insufficient evidence to favor one debridement procedure over another; hence, the choice of which method to employ is dependent on the clinician's skill and judgment. As inadequate care can result in delayed recovery, increased discomfort, an increased risk of infection, and the inappropriate use of wound dressings, all of which have a negative influence on a patient's quality of life, experts must be well conversant with all debridement options. Patients with chronic injuries face a number of concerns, including pain, movement restrictions, social isolation, and mental issues. As the ultimate goal of wound management is to improve a patient's complete quality of life, care planning must incorporate all of these factors while simultaneously preparing the injury bed for recovery. It is essential to recall that certain debridement techniques necessitate the practitioner's ability to attend to minute details. Not all registered nurses working in wound care must be proficient in all debridement techniques. However, every registered nurse should be able to determine the appropriate debridement technique. While they may not necessarily be trained in that specific option, they should be able to detect the need and refer the patient to an appropriately trained specialist.

Correct pain management, particularly postoperative pain management, is a key concern for both clinicians and patients undergoing surgical treatment. Patients frequently inquire about the level of pain they may experience after surgery. Postoperative pain influences not only the operative outcome, well-being, and treatment satisfaction of the patient, but also the progression of tachycardia, hyperventilation, decline in alveolar ventilation, transition to chronic pain, poor wound healing, and sleeplessness, all of which may influence the operative outcome. After drowsiness and digestive system discomfort (i.e., nausea and vomiting), discomfort is the most common cause of delay in ambulatory surgical patients' release. The constantly increasing number of complex outpatient surgical procedures has made perioperative and postoperative pain treatment essential.

REFERENCE:

1. Ousey K,Atkin L (2013) Optimising the patient journey: made easy. Wounds UK 9(2): 1–6.
2. NICE (National Institute of Clinical Excellence) Guidance on the use of debriding agents and specialist wound care clinics for difficult to heal surgical wounds. 2001 URL http://www.nice.org.uk/page.aspx? o=16585 [accessed on 25 October 2016].
3. Sibbald RG, Woo K, Krasner DL, et al. Wound bed preparation: special considerations in wound bed preparation 2011: an update. Adv Skin Wound Care 2011;24:415–36.
4. American Society of Anesthesiologists Task Force on Acute Pain Management. Practice guidelines for acute pain management in the perioperative setting: an updated report by the American Society of Anesthesiologists Task Force on Acute Pain Management Anesthesiology 20121162248–273.
5. Strohal R, Apelqvist J, Dissemond J, et al (2013) EWMA Document: Debridement. J Wound Care 22(1): S1–S52.
6. Wounds UK (2013) Effective debridement in a changing NHS: a UK consensus. Wounds UK, London. http://www.wounds-uk.com/pdf/content_10761. pdf (accessed 9 June 2014).
7. Wilcox JR, Carter MJ, Covington S (2013) Frequency of debridements and time to heal: a retrospective cohort study of 312,744 wounds.

JAMA Dermatol 149(9): 1050–8. doi: 10.1001/jamadermatol.2013.4960.
8. Broadus C (2013) Debridement options: BEAMS made easy. Wound Care Advisor 2(2): 15–18.
9. Snyder RJ, Fife C, Moore Z. Components and Quality Measures of DIME (Devitalized Tissue, Infection/Inflammation, Moisture Balance, and Edge Preparation) in Wound Care. Adv Skin Wound Care. 2016 May;29(5):205-15.
10. Snyder RJ, Fife C, Moore Z. Components and Quality Measures of DIME (Devitalized Tissue, Infection/Inflammation, Moisture Balance, and Edge Preparation) in Wound Care. Adv Skin Wound Care. 2016 May;29(5):205-15.
11. Leak K (2012) How to: ten top tips for wound debridement. Wounds International 3(1).
12. National Institute for Health and Care Excellence 2014) The Debrisoft monofilament debridement pad for use in acute or chronic wounds. March 2014. http://guidance.nice.org.uk/MTG17/Guidance/pdf/English (accessed 27 April 2014).
13. Ritchey RM. Optimizing postoperative pain management. Cleve Clin J Med. 2006;73(Suppl 1):S72–6.
14. Stubhaug A, Breivik H, Eide PK, Kreunen M, Foss A. Mapping of punctuate hyperalgesia around a surgical incision demonstrates that ketamine is a powerful suppressor of central sensitization to pain following surgery. Acta Anaesthesiol Scand. 1997;41(9):1124–32.
15. White PF, Kehlet H. Improving postoperative pain management: what are the unresolved issues? Anesthesiology. 2010;112(1):220–5. doi: 10.1097/ALN.0b013e3181c6316e.
16. Vadivelu N, Mitra S, Narayan D. Recent advances in postoperative pain management. Yale J Biol Med. 2010;83(1):11–25.
17. Elia N, Lysakowski C, Tramer MR. Does multimodal analgesia with acetaminophen, nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors and patient-controlled analgesia morphine offer advantages over morphine alone? Meta-analyses of randomized trials. Anesthesiology. 2005;103(6):1296–304.
18. White PF. Ambulatory anesthesia advances into the new millennium. Anesth Analg. 2000;90(5):1234–5.
19. White PF. The changing role of non-opioid analgesic techniques in the management of postoperative pain. Anesth Analg. 2005;101(5 Suppl):S5–22.