Acute Wounds

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Presenters in the Acute Wounds stream discussed a range of topics; particularly classification, infection control and treatment. Although acute wounds have several different etiologies, burns and surgical wounds were the main focus.

Classification

Classification for burns has existed since 1483 (Jean de Vigo) but has evolved over time. Burns are now classified as superficial and deep, or first, second or third degree. The type of burn—thermal, chemical or electrical—needs to be identified as well. As with other wounds, burns need to be assessed to ascertain their healing potential, to determine if healing will originate from the base or the edge of the injury and how long the healing process will take.

The inter-rater reliability related to the assessment of the severity of a burn is vital for a proper prognosis of that particular wound. However, this can vary significantly.

Inter-rater reliability

Clinical assessment:	50 to 70 per cent
Laser Doppler:	94 per cent
Diffuse reflectance:	74 per cent

Assessment tools have been devised to reduce discrepancies in the initial assessment phase. As a standardized method, this assessment is calculated according to the percentage of the body surface affected, including the degree of severity.

Burns are also non-homogenous in nature. Within the same patient, burns can range through different levels of severity, from first to third degree. Burns can also worsen within the first 48 to 72 hours and convert into a higher severity of burn. The planning of treatment must sometimes be deferred until the full extent of the injury is known and the severity of the burn has stabilized.

Treatment

The initial treatment may include cooling of a portion of a burn. Ice, however, is not recommended to achieve this. Pain control is carried out through intravenous analgesia. Cleansing of a burn is normally performed with soap and water. Adherent dressings are contraindicated. Dead tissue—slough that is found to be purulent or friable—requires debridement. The expected time for a second-degree burn to heal ranges from 14 to 21 days.

Infection

Infection is the cause of death for severely burned patients in 50 to 60 per cent of all cases. This infection may manifest itself in different ways: nosocomial pneumonia, septic thrombophlebitis, urinary infection or infection at the burn sites. A progressive avascular eschar will be colonized within five days despite antibiotic therapy. This risk of infection creates elevated energy depletion for burn patients, resulting in major weight loss and classic immunocompromised status.

It is vital for clinicians to assess and monitor the burn wound's edges, as this is where the precursor infection signs develop. The monitoring of the bacterial level at the burn site is performed with a semi-quantitative culture twice a week. Biopsies or quantitative cultures are controversial and contraindicated due to the difficulty in identifying the correct site where the culture should be performed. When dealing with sepsis, an aggressive systemic antibiotic treatment should be initiated based on the prevalent bacteria existing on the burn unit.

Une version française de cet article est disponible à la section Wound Care Canada du site Web de l'ACSP à www.cawc.net.

The preferred topical antibiotic treatments for local infections are silver sulfadiazine, povidone iodine, gentamycine and other silver-derived products.

Scar Formation

Improper scarring with acute wounds can result in hypertrophic scars, keloids and/or a large scarred surface. On the human body, all wounds cause scarring to various degrees (except venopunctures, superficial injuries and tattoos). Research has demonstrated that stem cells migrate within the injured tissue to divide and differentiate themselves to produce scar tissue within an avascular area as soon as the fifth day following the trauma. Fibroblasts—important cells in the scarring process—respond to mechanical forces. When these forces are too strong, the fibroblasts will migrate in a stellate fashion, subsequently becoming misaligned and causing scar tissue. Research has also allowed clinicians to understand that wounds that are innervated create a negative reaction that promotes healing by contraction and causes a less esthetically pleasing result. To further illustrate this, on an animal model with denervated tissues, healing occurred by epithelialization rather than contraction, resulting in a more desired esthetic result.

Growth factors are also important in the scarring process. Certain molecules show promise in decreasing the risks of improper scarring tissue. Transforming growth factor β3 (TGFβ3) is one example. Certain surgical approaches can also contribute to the reduction of hypertrophic scarring and keloids.

Surgical Site Infections

Surgical site infections (SSIs) are a significant problem. Thirty per cent of all home-care patients suffer from an infection at the surgical site, and 90 per cent of the SSIs develop within 21 days following the surgery.

Preventative measures provide the biggest impact in decreasing the risk for SSIs. Hand-washing and use of antiseptic gel before and after patient care is paramount. Frequent decontamination of the surfaces and work environment must be done diligently. Use of antibiotics prophylactically is recommended when indicated during anesthesia. Warming the patient and increasing their FIO_2 during the pre-operative period has proven to be effective in reducing the incidence of infection. Finally, adequate control of glycemic levels during surgery and post-operatively has also been shown to reduce the incidence of infection.

The use of antiseptics to reduce the risk of infection should be reinforced. Many types are available, such as cadexomer iodine and silver products.

The unjustified use of antibiotics is an important trap that promotes the emergence of high-virulence bacteria. Antibiotics should never be prescribed to treat fever as a lone symptom without proof of local infection, and should never be administered systemically.

Many assessment tools have been created to support clinical evaluations of wounds, such as the Bates-Jensen Wound Assessment Tool, Southampton Scoring System and ASEPSIS.

Good communication within the care team—including the patient—decreases the risk of post-operative surgical wound infection. Good wound care and clear post-operative guidelines covering issues such as the authorized level of activity, expected pain, and signs and symptoms of infection, are important factors that will decrease the risk of infection.

Vascular Surgery

The infectious process of venous graft sites is a particular problem. Complications like infection, lymphatic leakage, thrombophlebitis, pulmonary embolism and a variety of vascular problems are possible. Clinicians can decrease the risk of infection of venous site grafts with a detailed initial pre-operative assessment that includes an ankle-brachial pressure index (ABPI).

Management of the risk in vascular surgery must also include relief of pressure, control of infection, perfusion status while monitoring hypothermia and hypotension, and wound evaluation.

Adequate control of lower leg edema in the post-operative period also decreases the risk of infection. Pneumatic intermittent compression can be an interesting adjunct therapy to achieve control of the lower leg edema in the post-operative period.

Traumatic Wounds

The approach to the treatment of trauma and war-zone-related wounds must be done within a multidis-

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ciplinary team while considering all individualized treatment options. Statistics have shown a high death rate of 15 to 20 per cent caused by infection with these types of wounds. An early and efficient cleansing of the wound is pivotal for successful treatment, as is doing everything possible to avoid complications through effective management of infection risk.

Pressure Ulcers

Pressure ulcers present multifactorial problems. In order to achieve surgical success when treating such ulcers, it is essential to include the patient in the decisions related to the care plan. A successful care plan must include the following: pain relief; mobility assessment in the pre- and post-operative period; management of infection; contractual understanding with the patient, assuring a reasonable time off work; and a decrease in activities to allow the wound to heal. The recidivism rate is 80 per cent if the patient does not actively participate in the care plan.

The success of treatment in plastic surgery reconstruction includes early and aggressive debridement (going down to bone if necessary), care of the wound bed in a moist environment, negative pressure therapy and simple closure of tissues with a muscle flap, musculo-cutaneous flap or skin graft.

During the pre-operative period, assessment must include:

- Preparation status of the patient for surgery
- Smoking history
- Anesthesia risks
- History of the treated wound
- Risk of osteomyelitis in the post-operative period
- Patient's management of muscular spasms
- Patient's at-risk areas of body surfaces for pressure relief
- Psychological preparation related to the surgery
- Pre-operative assessment with the rehabilitation team of the available equipment to have the patient in a sitting position to better meet the post-operative needs
- Ongoing evaluation of the wound's status during surgery

During the post-operative period, treatment must include:

- Pressure redistribution
- Pain management
- Management of spasms
- Management of wound, including drainage of dead spaces
- Reduction of shearing forces to protect the skin flap, and ensuring that staff are knowledgeable about skin flaps and the delicate blood perfusion associated with them
- A rehabilitation plan that includes returning the patient to a sitting position while monitoring the integrity of the flap
- Assessment and reduction of pressure risk and stress at the flap site

Failure of the skin flap is not the most frequent surgical failure; a poor outcome is due mostly to the patient's lack of adherence to the care plan, as well as the patient's personality and lifestyle choices.

Summary

The WUWHS's sessions in the Acute Wounds stream shone a new light on the importance of all the conditions affecting our patients and further reinforced some of the basic tenets of best practice:

- The management of infection is a key factor for most acute wounds.
- A multidisciplinary approach to treatment is essential.
- The patient must be included in the treatment plan to achieve the best possible results.

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