



## ADVANCED NURSING CARE OF BURN PATIENTS

Abdullatif. G. Almoabadi<sup>1</sup>, Ali. O. Alharbi<sup>2</sup>, Mohammed. A. M. Almadadi<sup>3</sup>, Mansuor. K. Almadadi<sup>4</sup>, Osama. M. Al Lehaibi<sup>5</sup>, Talal. G. R. Almalki<sup>6</sup>, Sami. A. Alhomrani<sup>7</sup>, Nabil. H. Alsubhi<sup>8</sup>, Fahad. A. M. Alsahli<sup>9</sup>, Abrar. F. Mashat<sup>10</sup>, Abdulmajeed. M. Alharbi<sup>11</sup>, Aisheh. A. Tyash<sup>12</sup>, Nasser. T. H. Alhassan<sup>13</sup>, Entisar. M. M. Alhawsawi<sup>14</sup>, Itimad. I. Toukhi<sup>15</sup>, Areej. A. Albeshri<sup>16</sup>, Ahmed. O. Alshardi<sup>17</sup>, Talal. M. M. Alallah<sup>18</sup>, Maryam. O. A. Rajeh<sup>19</sup>, Hanan. H. Alnemari<sup>20</sup>, Abdulkhliq. S. Almuntashiri<sup>21</sup>, Abdullah. A. Almalki<sup>22</sup>.

### Abstract:

Burns are the most intensely painful injuries. All patients will experience pain, regardless of the cause, size, or depth of the burn. In spite of advances in topical wound care and pharmacological management and palliative care, wound care is the main source of the pain associated with burn injury. A deeper understanding of the many aspects of treating burns and their associated pain can help nurses to provide more effective analgesia. Nurses play a vital role in understanding the management of burn wound, prevention of infection and pain management.

**Keywords:** Nursing prevention: Burn complications

---

<sup>1-17</sup>\* Ministry of health-Health cluster in Makkah-Saudi Arabia

<sup>18-19</sup>\* Ministry of health- Health Affairs in Jazan-Saudi Arabia

<sup>20-21</sup>\* Ministry of health-Health cluster in Makkah-Saudi Arabia

<sup>22</sup>\* Ministry of health-Health cluster in Taif -Saudi Arabia

**\*Corresponding Author:** - Abdullatif Ghazi ALmoabadi

**DOI:** 10.53555/ecb/2022.11.12.362

## 1- Introduction:

Skin is the largest and primary protective organ in the body, covering the body's entire external surface and serving as a first-order physical barrier against the environment. Skin is the largest organ of the body, the skin spans 3 000 square inches (approximately 2 square meters) and comprises 15% of the entire human body's weight. It is a dynamic organ that grows, differentiates, and routinely renews itself every 26–42 days (Wysocki, 2019). Burn injuries are among the most devastating of all injuries and a major global public health crisis. Burns are the fourth most common type of trauma worldwide, following traffic accidents, falls, and interpersonal violence. Approximately 90 percent of burns occur in low- to middle-income countries, regions that generally lack the necessary infrastructure to reduce the incidence and severity of burns (Murray, 2020).

Burns are a global public health problem, accounting for an estimated 180 000 deaths annually, and here in the United States, at least 40,000 people may require hospitalization for burn injuries, and the rate of deaths from burns is currently over 7 times higher in low- and middle-income countries than in high-income countries. Burns are among the leading causes of disability in adjusted life-years (DALYs) lost in low- and middle-income countries, burn accidents happen every 15 seconds (Murray, 2020). Burn takes place when the skin comes into contact with a heat source, there are many causes of burns, dry heat such as fire or a hot object, wet heat such as boiling water, steam, or hot liquids, radiation such as from the sun or nuclear radiation, friction such as rubbing forces with an object electricity, and certain chemicals can all cause burns. Minor burns can cause reddened skin, pain, and swelling. The skin may blister and peel. Severe burns can cause white or blackened and charred skin (Ronald, 2016).

More severe burns need medical management, may leave scars, and carry a higher risk of complications, such as: Infection, burns cause open wounds where bacteria and other germs can enter the body, the resulting infections can be minor and easily treatable or can develop into more severe infections, such as sepsis, sepsis occurs when the infection enters a person's bloodstream and can be life-threatening (Mehta, 2019). Dehydration, burns cause the body to lose fluid, losing excessive amounts of fluid can cause dehydration, which can affect the volume of blood flowing through the body. Low body temperature, a person's skin helps to regulate their body temperature, when a burn damages the skin extensively, the resulting heat loss can result in hypothermia, when a person's body temperature suddenly drops to dangerously

low levels (Debra, 2018). Burns are characterized by the degree to which they affect the skin, First-degree burns, affects only the outer layer of skin, known as the epidermis. Skin that has suffered a first degree burn is typically red and dry, but lacks blister formation. Second-degree burns, it can be superficial, partial or, deep partial thickness and will include the epidermis and part of the dermis, the layer of skin below the surface. In a partial-thickness second-degree burn, some of the upper dermis is affected, while a deep partial-thickness second degree burn will destroy all of the lower dermis.

(Joye, 2020).

Third-degree burns full-thickness burns, not only are the epidermis and dermis destroyed, but the underlying muscles, tendons and bones may also be damaged, skin appear White or black/brown, non-blanching. A third degree burn causes severe damage to nerve endings and permanent tissue damage and scarring. It heal by contracture in more than 8 weeks. Skin grafting will likely be necessary, as will functional and/or cosmetic surgery (Evers, 2018). Fourth-degree burns, these burns are the most severe out of all the classifications, they affect all layers of skin, and reach down to the fat, bone, tissues, and muscles, the appearance of the burn may be black or charred, and nerve damage may cause the victim to feel no pain. Because they reach so deep into the victim's body, they can cause permanent damage or even death if not immediately treated by a medical professional (Carol, 2019).

A nurse who cares for a patient with burn injury should be knowledgeable about changes that occur after a burn, as well as astute assessment skills to detect subtle changes in the patient's condition and know how to deal with patients. Providing care to the burn-injured patient is a very challenging and, ultimately, rewarding profession for a nurse. Skills needed is varied and includes comprehensive clinical assessment and monitoring, pain management, wound care and psychosocial support (El-Sayed, et al., 2019). Meanwhile, the nurses play an important role in this regard. The nurses who provide care services for the burn patients should obtain adequate knowledge on the physiologic effects after caused burning and possess the rapid analysis and decision-making on trivial changes occurred in the patient status. The beginning of the rehabilitation could establish compassionate and sympathetic relationship with the patients and their families. The audit cycle is a quality improvement intervention used to decrease evidence practice gaps (Ghezeljeh, et al., 2019).

Burn care nurses help treat burn victims from the initial trauma treatment to recovery and post-trauma therapy. Burn unit nurses can get a position

with only an associate's degree, but certification and higher education can provide an edge over other candidates (Ali, et al., 2018). From my observation the new employment nurses at burn units in previous places developed a lot of knowledge and practices regarding burn care and are qualified nurses able to managing burn patient. A burn care nurse specializes in the care of patients who suffer from burn injuries, and in many cases, have also experienced other kinds of trauma. The burn care nurse treats and monitors burn wounds, and plays a critical role in the assessment of emotional and psychological trauma that so often accompanies a burn injury. Optimal care of the burn patient requires a distinctive multidisciplinary approach. Positive patient outcomes are dependent on the composition of the burn care team and close collaboration among its members; at the center of this team is the burn nurse, the coordinator of all patient care activities (Tirgari, et al., 2018).

## **2- Management of Burns patient: Emergent Phase**

During the emergent phase, rapid assessment and intervention are essential, the nursing care is prioritized as follows; Initial assessment by primary survey includes a rapid examination of the ABCs: airway stabilization and C-spine immobilization (if needed), breathing and circulation (check status and start IV lines and fluid), history taking based on **AMPLE** (Allergies, Medications, Past Medical History, Last Meal and Events Preceding Injury). Accurate burn size estimation using Rule of nine<sup>35</sup>. The fluid resuscitation needs within the first 24 hours after burn injury, is calculated using the following formulae; Parkland formula, Modified Brooke formula, Consensus formula, all pain medications should be given intravenously, tetanus status should be checked and baseline laboratory studies obtained (Cope, 1947).

## **Acute Phase**

Infection control and wound care constitute the primary focus during the acute phase (Sheridan, 2001).

## **Wound care**

The overall goals of wound care for burn patients are universally accepted and seek to: Eliminate media for bacterial growth; promote healing of partial-thickness wounds; prevent conversion of burn wounds, promote patient comfort and minimize scarring and contracture (Meyer, 1997). Wound care procedures such as wound cleansing, debridement, skin grafting (including donor site care and the removal of surgical staples anchoring skin grafts into place), dressing removal, insertion

and inflation of tissue expanders, passive range of motion exercises in affected joints, and splint application helps to achieve these goals (Choiniere, 1992).

## **3- Recent Advancement in Burns Management: Hydrotherapy**

Hydrotherapy is used to vigorously flush the burn wound, cleaning the wound and removing loose, nonviable tissue. Most often, a shower gurney is used for this purpose. Because this method reduces the risk of infection, it is preferable to another form of hydrotherapy known as Tanking, in which the patient is immersed into a tank of turbulent warm water. An antimicrobial soap such as Dial liquid soap or Hibiclens should be used, with water, to wash the burn wound before the application of any antimicrobial ointment. Followed by hydrotherapy Manual debridement is often done by nurses after wound cleansing. It involves the scraping or pulling off of loose nonviable skin (Lazovic et al., 2005). Deep surgical debridement is also done to remove adherent eschar under general anesthesia within three to five days after injury. Moistening the adherent dressings prior to removal will minimize patient discomfort (Meyer, 1997).

## **Collagen dressing**

Collagen dressings are dressings that are derived from animal sources, such as bovine (cattle), equine (horse) or porcine (pig) sources. The collagen helps to promote the growth of new collagen at the wound site, prompting an often speedier recovery period. Collagen dressings can also help with fibroblast production and according to, some dressings may also help maintain the appropriate temperature of the wound site's microenvironment (Long, 2001). There are different types of collagen dressing:

### **- Hydrocolloid:**

Hydrocolloid dressings are used on burns, light to moderately draining wounds, necrotic wounds, under compression wraps, pressure ulcers and venous ulcers.

### **- Hydrogel:**

This type of dressing is for wounds with little tone excess fluid, painful wounds, necrotic wounds, pressure ulcers, donor sites, second degree or higher burns and infected wounds.

### **- Alginate:**

Alginate dressings are used for moderate to high amounts of wound drainage, venous ulcers, packing wounds and pressure ulcers in stage III or IV.

- Collagen:

A collagen dressing can be used for chronic or stalled wounds, ulcers, bed sores, transplant sites, surgical wounds, second degree or higher burns and wounds with large surface areas.

### Banana leaf dressing

It is the less expensive and widely used dressing for burns. Banana leaves are a cheap and effective alternative to traditional medical wound dressings. Wounds treated with banana leaves heal in the same period of time as wounds treated with Vaseline gauze dressings.

### Aquacel foam dressing

The only silver foam dressing that offers the healing benefits is AQUACEL. Combining hydrocolloid technology with Hydrofiber Technology and ionic silver, AQUACEL Ag Surgical dressing provides the following benefits; Waterproof, provides excellent absorption and retention capabilities for moderate to highly exuding wounds. Antimicrobial Protection, Comfortable and Flexible, comforts to the wound surface to form an intimate contact, Skin Friendly, Helps reduce wound pain while the dressing is in situ and upon removal (Horch & Stark, 1998). Supports wound healing by providing a moist wound healing environment.

## 4- Pain Management:

### Pharmacologic therapies

- **Morphine** remains the gold standard in the treatment of moderate-to-severe acute pain. Hospitalized burn patients require three types of pain medication; background, procedural and breakthrough. Severe background pain can be managed with morphine through continuous IV infusion or patient-controlled analgesia (PCA). Mild-to-moderate background pain can be managed with short-acting, orally administered opioids, such as oxycodone 5 mg - acetaminophen 325 mg (Percocet). Regularly scheduled long-acting morphine can be used to treat chronic pain. If used, the dose must be adjusted as needed and should be tapered over time (Sharar, 2002).

- **Intravenous fentanyl (Sublimaze)**, another opioid, is more effective in the control of severe burn pain (Nataraj, 2007). Fentanyl is often combined with the benzodiazepine midazolam (Versed) to induce conscious sedation with analgesia. The success of efforts with fentanyl has led to research on alternative routes of administration. Sharar and colleagues compared the use of oral transmucosal fentanyl citrate delivered in a raspberry-flavored lozenge with oral oxycodone before outpatient pediatric burn wound

care and documented similar outcomes in pain and anxiety levels. The patients also preferred the taste of the fentanyl preparation (Hadjiiski & Anatasov, 1996).

- **Ketamine (Ketalar)**, a dissociative drug used in general anesthesia, has been described as effective in controlling procedural burn pain in children (Prakash, 2004). Procedural pain is more severe than background pain and can be excruciating without adequate analgesia so that procedural medication is usually ordered before dressing changes. The dose is dependent on the extent and severity of injury. Morphine is the preferred drug and can be administered in an IV, oral instant-release or elixir form. Propofol (Diprivan) is another general anesthetic used for procedural burn wound care. Propofol is preferred over ketamine for procedural burn pain in adults. Breakthrough pain medications are added as needed. Narcotics should be administered based on objective pain scores. Titrating according to response and weaning when appropriate helps decrease untoward side effects (Finn, 2004).

- **Gabapentin (Neurontin)** and **methadone hydrochloride (Methadone)** can prove helpful in controlling chronic burn pain. Methadone can also be used to help wean off patients from opioids after long-term use.

### Nonpharmacologic modalities

Nonpharmacological therapy includes relaxation techniques (for example, focused deep breathing and hypnosis), cognitive strategies (such as distraction, reappraisal, guided imagery, and visualization), biofeedback, music therapy, therapeutic touch, and the presence of significant others for emotional support, have been studied by researchers. Many of these have proven to be beneficial, but such modalities are adjuncts to, not substitutes for, narcotic analgesia during painful wound care (Raymond, 2004). Prensner and colleagues found music to have a distracting benefit when used as an adjunctive therapy to reduce pain and anxiety during burn wound care (Raymond, 2002). Transcutaneous electrical nerve stimulation (TENS) has also been used successfully in burn pain management.

### Rehabilitative Phase

During the rehabilitative phase, significant lifestyle changes become more evident to patients. Prurities can be problematic, caused by a combination of dry skin and the release of histamine during scar remodeling. The relief strategies include cool or tepid baths, pressure garments, massage, and avoidance of caffeine and the application of ice. Sensitivity to heat and cold is a problem for many patients with a high TBSA. These patients should

avoid extremes in temperature, especially in the first year post-injury. They should dress appropriately for the weather, with an emphasis on layers of clothing that can be removed as needed. Grafted areas have decreased sensation and require visual inspection for open areas, Scar and discoloration are topics of great discussion and controversy. Some agents may minimize hypertrophic scarring: pressure garments, silicon gel sheets (Silon, Cica-Care, Avogel), steroid injections and creams (Kenalog, Aristocort, Triderm), and Uvex face masks. Camouflage makeup may help with hypoor hyperpigmentation (Veves, 2002).

Reintegration into society is difficult due to the disfigurement associated with burn injury. Support is available through various groups typically based at burn centers. School re-entry programs are available to help children with the transition back to school. A peer support counseling network, Survivors Offering Assistance in Recovery, is available throughout many areas of the country (Groeneveld & Inkson, 1992). A burn injury is challenging and requires specialized care across the continuum. Nurses are ideally suited to facilitate this process.

### 5- Conclusion:

Nurses spend their majority of time in direct patient care that affords them the opportunity to establish meaningful therapeutic relationship with burned patients and their families. Therefore, it is vital that nurses should update their knowledge on advanced practice for burns wound care to establish a standard and quality in nursing practice.

### Acknowledgments

Praise be to God, prayer and peace be upon our Master Muhammad and his family and companions, to begin with, we would like to offer thanks to the eminent professors who have taught us beneficial knowledge and we have taken their credit after the first God ladders glory like, we thank Dr. Anas Seraj Dablood the dean of the college of science at Umm Alqura university the Holy Capital, which helped us a lot in the area of analysis results, ask God Almighty to gives him richly rewarded Amen, and we will never forget that we give thanks to our brothers Hamza Ukal the manager of primary health care in Alnawaria in Holy Capital and brother naif allehyani and the rest of the colleagues involved with me in the research and the managers of the four health centers on their efforts and fatigue in the service of patients and patient families and health centers to provide better health services for them and we ask God to give the best reward .

We would love to offer this modest effort to all the faithful who wish to develop related health services to citizens and residents in the Holy Capital, ask God that we have been successful in the output of this business as desired Amen.

### References:

1. Ali, H. A., & Abdel-Hakeim, E. H. (2018). The Effect of Ergonomics Program on Nurses' Knowledge and Practice in Operating Room. *Journal of Nursing and Health Science (IOSR-JNHS)*, 7(1), 6-15.
2. Carol, A. (2019). Nursing Core Competencies of Staff Nurses Providing Care for Burned Patients. Master Degree in nursing science, Faculty of Nursing, Ain Shams University, PP113-116.
3. Choiniere M. (1992). Patient-controlled analgesia: a doubleblind study in burn patients. *Anaesthesia*, 47(6):467-72.
4. Cope, O., Laugohr, H., Moore, F.D., & Webster, R. (1947). Expeditious care of full-thickness burn wounds by surgical excision and grafting. *Annals of Surgery* 125: 1- 22.
5. Debra. A., (2018). Effects of a multimodal program including simulation on job strain among nurses working in intensive care units: a randomized clinical trial. *Jama*, 320(19), 1988-1997.
6. El-Sayed, et al (2019). Nurse knowledge of burn management. *Annals of burns and fire disasters*, 31(3), 246.
7. Evers. I. (2018). Effect of burn rehabilitation program on improving quality of life (QoL) for hand burns patients: a randomized controlled study. *European Journal of Plastic Surgery*, 41(4), 451-458.
8. Finn J. (2004), A randomised crossover trial of patient controlled intranasal fentanyl and oral morphine for procedural wound care in adult patients with burns. *Burns*, 30(3):262-8.
9. Ghezeljeh, T. N., Aliha, J. M., Haghani, H., & Javadi, N. (2019). Effect of education using the virtual social network on the knowledge and attitude of emergency nurses of disaster preparedness: A quasi experiment study. *Nurse education today*, 73, 88-93.
10. Ghezeljeh, T. N., Mamashli, L., Ardebili, F. M., Manafi, F., & Bozorgnejad, M. (2019). Investigating the psychosocial empowerment interventions through multimedia education in burn patients. *World journal of plastic surgery*, 8(3), 372.
11. Groeneveld A, & Inkson T. (1992). Ketamine: A solution to procedural pain in burned children. *Can Nurse*, 88(8):28 31.

12. Hadjiiski O, & Anatasov N. (1996), Amniotic membranes for temporary burn coverage. *Ann Burns Fire Disasters*. 9:88–92.
13. Horch RE, & Stark GB. (1998). Comparison of the effect of a collagen dressing and polyurethane dressing on healing of split thickness skin graft donor sites. *Scand J Plast Reconstr Surg Hand Surg*. 32:407–13.
14. Joye. I. (2020). The effect of self-care nursing intervention model on self-esteem and quality of life among burn patients. *Clin Nurs Stud*, 6(2), 79-90.
15. Lazovic G, Colic M, Grubor M, & Jovanovic M. (2005). The application of collagen sheet in open wound healing. *Ann Burns Fire Disasters*, 18:151–6.
16. Long TD, (2001). Morphine-infused silver sulfadiazine (MISS) cream for burn analgesia: a pilot study. *J Burn Care Rehabil*, 22(2):118-23.
17. Mehta, K. (2019). The effect of pressure injury training for nurses: A systematic review and meta-analysis. *Advances in skin & wound care*, 33(3), 1-11.
18. Meyer WJ. (1997). Acetaminophen in the management of background pain in children post-burn. *J Pain Symptom Manage*, 13(1):50-5.
19. Murray, H. (2020). Intensive care unit nurses' performance regarding caring patients with head injury: an educational intervention. *International Journal of Studies in Nursing*, 3(3), 141.
20. Nataraj C, Ritter G, Dumas S, Helfer FD, Brunelle J, & Sander TW. (2007). Extra cellular wound matrices: Novel stabilization and sterilization method for collagen-based biologic wound dressings. *Wounds*. 19:148–56.
21. Prakash S. (2004), Patient-controlled analgesia with fentanyl for burn dressing changes. *Anesth Analg*, 99(2):552-5.
22. Raymond I. (2002). Incorporation of pain in dreams of hospitalized burn victims. *Sleep*, 25(7):765-70.
23. Raymond I. (2004). Sleep disturbances, pain and analgesia in adults hospitalized for burn injuries. *Sleep Med*, 5(6):551-9.
24. Ronald, M. (2016). Investigating the psychosocial empowerment interventions through multimedia education in burn patients. *World journal of plastic surgery*, 8(3), 372
25. Sharar SR. (2002). A comparison of oral transmucosal fentanyl citrate and oral oxycodone for pediatric outpatient wound care. *J Burn Care Rehabil*, 23(1):27-31.
26. Sheridan R. (2001). Management of background pain and anxiety in critically burned children requiring protracted mechanical ventilation. *J Burn Care Rehabil*, 22(2):150-3
27. Tirgari, B., Mirshekari, L., & Forouzi, M. A. (2018). Pressure injury prevention: knowledge and attitudes of Iranian intensive care nurses. *Advances in skin & wound care*, 31(4), 1-8.
28. Veves A, Sheehan P, & Pham HT. (2002). A randomized, controlled trial of promogran (a collagen/oxidized regenerated cellulose dressing) vs standard treatment in the management of diabetic foot ulcers. *Arch Surg*, 137:822–7.
29. Wysocki, A., (2019). The effect of self-care compact disk-based instruction program on physical performance and quality of life of patients with burn at-dismissal. *World journal of plastic surgery*, 8(1), 25.