

FIRST AID TO BURNS: A CATASTROPHE THAT CAN BE PREVENTED

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ABSTRACT

Burn injuries have a significant morbidity and fatality rate around the world. Over 75% of all burn fatalities (after first resuscitation) are caused by infection, making people with burns extremely susceptible to infections. Topical antiseptics work to stop the development of microorganisms. To stop infection and expedite the healing of burn wounds, a variety of techniques are employed. Complex issues arise from skin burn injuries, including scarring, psychological impacts, and a person's overall life quality (LQ). Burns on exposed body parts were more likely to result in psychological and social discomfort. traditional medicine, according to the World Health Organization, is the "sum of the knowledge, skill, and practices based on theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement, or treatment of physical and mental illness." Medical therapies differ depending on the extent of the damage and the severity of the burn. Traditional medicine is frequently used as an alternative to other therapies for small burns. Worldwide, it has become a well-liked kind of treatment for individuals with a variety of ailments.

Keywords: Burns, First-Aid, Initial Assessment, Burns-Care

INTRODUCTION

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. A burn is defined as a traumatic injury to the skin or other organic tissue primarily caused by thermal or other acute exposures. Burns occur when some or all of the cells in the skin or other tissues are destroyed by heat, cold, electricity, radiation, or caustic chemicals. Burns are acute wounds caused by an isolated, non-recurring insult and progress rapidly through an orderly series of healing steps. Any damage or injury to human biological tissue, such as the skin, that is predominantly caused by heat exposure in the form of scalds and flames is referred to as a burn. Secondary attributions include radioactivity, electricity, friction, and chemical interactions.

The worldwide incidence of fire-related injuries in 2004 was estimated to be 1.1 per 100,000 population, with the highest rate in Southeast Asia and the lowest in the Americas. The incidence of burns in low and moderate income countries (LMIC) is 1.3 per 100,000 population compared with an incidence of 0.14 per 100,000 population in high income countries. The incidence of burn injuries severe enough to require medical care is nearly 20 times higher in the Western Pacific (including China) than in the Americas. Infants in Africa have an incidence of fire-related burns that is three times the world average for this age group.

Burns are potentially fatal injuries with a wide range of side effects, including physical, functional, and vocational harm as well as aesthetic and emotional harm. First aid for burns should be properly understood to reduce the severity of the damage. The contemporary home is the most frequent site of burn injuries; this is due to cigarette smokers, the use of electrical appliances, cooking, water heaters, and the presence of chemical goods. Examining the locations of home burns reveals that the kitchen and bathrooms were the most frequent locations.

In terms of first aid, halting the burn process, using cold running tap water right away for 20 minutes, taking off clothes and jewellery, and treating the area with a sterile dressing would all improve the result of burns. Applying cold water that is between 2 and 15 °C right away for the same amount of time has been found to aid healing and the ultimate aesthetic results. According to animal histological section studies, there would still be some positive effects if water is applied somewhat later or for a shorter period than 20 minutes, but the analgesic benefit of immediate administration would be lost. Additionally, the positive effects of cooling the burn

site shouldn't worsen the patient's overall health (like hypothermia in youngsters). First aid for burns performed incorrectly may have negative effects. Both sufferers and first responders frequently utilize ice, which raises the risk of hypothermia, particularly in burns with a higher surface area. The use of eggs, toothpaste, mud, and other traditional therapies is a widespread myth in many cultures. At worst, these treatments are ineffective and can worsen the injury by fostering an environment that is more conducive to infection.

EPIDEMIOLOGY OF BURNS

Burns constitute a major health problem in India. A very high mortality in major burns was noted two decades ago. However, owing to recent advances in fluid and electrolyte maintenance and burn wound care and to the availability of more specific systemic topical medications, survival rates have greatly improved in specialized burn centres in India.¹ However, India is a vast country with a diverse cultural and ethnic background, and more than 75% of the population live below the poverty line. Burn patients come from all over areas in towns and villages, but not all of them are fortunate enough to reach hospitals where recent information has been made available. Exact mortality figures for India are not available owing to the lack of any proper burn registry. The projected figures suggest an annual mortality rate of 100,000 to 140,000. This staggering incidence is largely due to illiteracy, poor living conditions, neglect of children, and certain social customs that are unique to India.

TYPES OF BURNS INJURY

There are three types of burns that can result from a variety of mechanisms. Types of burns include first, second- and third-degree burns. These burns may also be referred to as superficial, partial, and full-thickness burns. Types of burns may also be classified according to the mechanism of burn injury.

Superficial Burns

These types of burns cause superficial erythema (redness) and swelling and may be quite painful. The skin will blanch upon pressure. These types of burns involve only the outermost layer of skin, or the epidermis. Treatment generally involves cooling the burn with running water or the application of cool cloths and application of an over-the-counter burn ointment or a soothing agent, such as aloe cream or gel. These types of burns heal quickly and do not result in scarring. A physician should be consulted if superficial burns are extensive, especially in children or the elderly.

Partial-Thickness Burns

Partial-thickness burns affect both the epidermis and the dermis to varying degrees. Superficial partial-thickness burns do not involve the full thickness of the dermis, while deep partial-thickness burns may involve the dermis more extensively. Depending on how much of the dermis is affected, these types of burns may result in scarring and may require skin grafting to heal. It may be difficult to determine whether a burn affects the dermis superficially or more deeply; the difference lies partially in healing time, as superficial partial-thickness burns will heal more quickly, often in less than 3 weeks. These types of burns will cause blisters. Blisters should never be punctured but should be left intact, as rupturing them may increase the risk of infection. These types of burns may cause permanent disfigurement. They may also be quite painful, as nerves are intact and undamaged.

Full-Thickness Burns

Full-thickness burns extend down into the hypodermis, or subcutaneous tissue. These types of burns may affect underlying bone, nerves, tendons and other structures. These burns in themselves are generally not painful; however, there may be surrounding areas of partial thickness burns that are painful. These burns will require surgery to close and may result in permanent disfigurement and disability, especially if they occur over a joint. The risk for complications, especially infection, is very high and these types of burns may be life-threatening if they are extensive. These types of burns should be cared for in specialized burn centers.

CAUSES OF BURNS

- Contact with fire
- Inflammable liquid or gas burn
- Electricity burn
- Chemical burns
- Sunburns
- Therapeutic burns (as in operation, laser etc)
- Burns due to contact of skin with extreme hot materials, like frying pan, oven's grill.
- Radiation
- extreme cold
- Inhaling smoke or toxic fumes, particularly from chemical explosions or house fires

SIGN AND SYMPTOMS

Signs and symptoms of burns include:

- Red, swollen skin
- Pain, which may be severe
- Wet or moist-looking skin
- Blisters
- Waxy white, leathery or tan skin
- Blackened or charred skin, in severe cases

MANAGEMENT

INITIAL MANAGEMENT

Primary Survey

The rapid implementation of the ABCs of trauma management (airway, breathing, circulation) also applies to burns. The initial physical examination of the burn victim should focus on assessing the airway and the patient's hemodynamic status, as well as estimating the size and depth of the burn. Airway oedema can result in airway obstruction and death. One hundred percent oxygen should be administered from the outset. If there are any concerns about the adequacy of the airway, prompt endotracheal intubation is mandated. In addition, signs of inhalational injuries should be quickly recognized.

If there are concerns of cervical spine injuries, nasotracheal intubation can be performed because it has the advantages of decreased cervical spine manipulation, and the tube can be easily secured by suturing it to the nasal septum. The disadvantage of nasotracheal tubes is that they tend to be of smaller calibre, which are not as good for suctioning, and may increase the risk of sinusitis. In difficult cases, fibre-optic bronchoscopy (if available) can prove to be an invaluable tool in securing the airway. Vocal cords, directly injured from smoke, may be resistant to usual topical anaesthesia and care must be exercised to avoid laryngospasm. Consideration should be given to securing the tube to the teeth with wires (or heavy sutures), rather than risking further damage to burned facial skin with tie-tapes.

Once the airway has been addressed, the next step is to place two large-bore (at least 14 gauge) peripheral intravenous catheters through non-burned viable tissue. If necessary, these catheters can be placed through burned skin because the eschar is still sterile in the acute phase and more importantly, death can result from delays in fluid resuscitation. A Foley catheter should be placed to monitor urine output because this is the most straightforward and reliable indicator of

intravascular volume status in most of these patients. Associated life-threatening injuries such as cardiac tamponade, pneumothorax, haemothorax, and flail chest must be identified and treated quickly. Tetanus toxoid should also be administered routinely to all burn patients, depending on immune status .

Assessment of injury

Quantifying the extent of the burn is crucial in determining subsequent management. Burns are dynamic injuries, and damage to the skin can continue for 24 to 48 hours after the initial injury due to oedema, coagulation of small vessels, pressure, desiccation, and infection. Thus daily evaluation is of paramount importance in reassessing burn depth and success of excision.

Fluid resuscitation

The most used formula for adults, for fluid resuscitation after a burn, is the Parkland formula. To calculate daily fluid requirements, a crystalloid solution at the rate of 4 mL/kg/%TBSA burn is given intravenously. The first half of the calculated amount of fluid is administered within the first 8 hours after the burn, and the remaining is given over the next 16 hours. In the first 24 hours post-burn, the initial resuscitation fluid is Lactated Ringers, which is isotonic to plasma. In children, maintenance requirements must be added to the resuscitation formula, and should be provide as a dextrose containing solution for infants due to the risk of hypoglycaemia if they are not drinking. The addition of maintenance is less important in adults due to the large volumes and low risk of hypoglycaemia. One formula that accounts for the maintenance requirements is the Shiners Burns Hospital SBH-Galveston Formula, which calls for initial resuscitation with 5000 mL/m² BSA burn/d + 2000 mL/m² BSA/d of Lactated Ringers solution.

Another option to intravenous fluids, in cases of less severe burns or where intravenous solutions are at a premium, includes oral rehydration solution. The WHO describes a method for preparation of an electrolyte-balanced solution. Although very time consuming, IV fluids may also be prepared on site at low cost.

It is important to remember that these are only guidelines, and the infusion volumes must be titrated on a regular basis. Urine output is the usual indicator of adequate resuscitation. Urine output in a child should be maintained at 1 mL/kg/h. In an adult, 0.5 mL/kg/h is sufficient (unless myoglobinuria is suspected in which case it should be over 2 mL/kg/h). It is essential to avoid over-aggressive resuscitation, which may lead to increased extravascular hydrostatic pressure and pulmonary oedema. This is especially important in patients who have a cardiac history, as well as patients with a concomitant inhalation injury, because they will also have increased pulmonary vascular permeability. Administration of colloid or hypertonic solutions decreases

the total amount of fluid requirements in the first 24 hours post-injury; however, no clear advantages in long-term outcomes over isotonic crystalloid resuscitations have been clinically documented. In general, crystalloid resuscitation with isotonic Lactated Ringers is the best option in the acute phase.

If a patient is having increased fluid requirements, it should raise suspicion of concomitant inhalation injury, a delay in resuscitation, or another associated injury. It must be reiterated that the most important thing is to begin resuscitation as soon as possible after the time of injury. Unfortunately, delays in adequate resuscitation are common and lead to increased fluid requirements because of additive perfusion-reperfusion injury, which lead to unnecessary loss of life.

WOUND CARE

Wound care is a fundamental pillar in the care of the burn patient, and an area of evolution partially responsible for improved survival seen since the 1960s. As a result of loss of dermal integrity, the burn wound loses its protective barrier against invasion by micro-organisms and against evaporative losses. Therefore, until complete re-epithelization occurs, the burn dressing serves a number of functions: protection against micro-organism invasion, minimizing metabolic losses, limiting the pain of exposed burn surfaces, containing messy wound secretions, and hiding the burn to help prevent adverse psychological responses. Most of the practices used in modern burn units are based on anecdotal or uncontrolled clinical observations. However, with the introduction of topical antimicrobial prophylaxis, occlusive dressing, and improved sterility as well as a goal of early wound closure, the incidence of burn wound infections have steadily declined.

Burn wound care requires an experienced eye and knowledge of the dressing options available. Surgeons often lack the time to examine wounds as often as they should so developing expertise in the nursing staff is important. If dressings are changed each day by a nurse experienced in burns many problems will be averted and if staff understand well the importance of both splinting and early mobilization to prevent contracture functional results will improve. The routine inspection of wounds by a knowledgeable person is at least as important as the selection of the dressing material itself. This is the advantage of a burn team.

Exposure Method: Leaving a burn open is a poor option but where dressings are not possible it may be the only option. The patients is washed daily and kept of clean dry sheets with another sheet or mosquito net draped over a frame to reduce the pain from air currents and to reduce contamination from the environment. Ambient temperature control is important to maintain

normothermia. Exposure is less painful for full-thickness burns than for partial thickness burns but has little else to recommend it.

Tubbing: Most modern burn units avoid the regular immersion of patients in water both because they practice early excision and grafting and because of the high risks developing resistant strains of bacteria in the tub environment and of patient cross-infection. That said, tubbing can be helpful to clean the wounds and gently remove eschar as it separates. When early wound infections develop suspect the tub! Avoid the routine immersion of infected patients in filthy bathtubs of cold water on the basis of ignorance and tradition.

Bland Dressings: These provide a clean, moist wound healing environment, absorb exudates protect from contamination and provide comfort at a fraction of the cost of antibiotic dressings. Where antibiotic dressings are scarce bland dressings are a very acceptable solution for burns. Expensive topical antibiotic dressings may be reserved for infected wounds. Paraffin gauze is widely available and can be manufactured locally. Honey and ghee dressings were first advocated in Ayurvedic texts two thousand years ago and remain an excellent choice for bland burn dressings. Mix two parts honey with one part ghee (clarified butter) and pour over a stack of gauze dressings in a tray. Cover and store. Vegetable oil or mineral oil may be substituted for Ghee. Gauze sheets can be applied directly to the wound in a single layer and covered with plain dry gauze to absorb exudates, then wrapped. Dressings should be changed at least ever second day, or when soiled.

Antimicrobial dressing: There exist numerous topical antimicrobial agents that are effective in delaying the onset of invasive wound infections, but none prevent them entirely. This is why they must be used in conjunction with a goal of early surgical wound closure when possible. A brief review of the agents most likely to be available to low- and middle-income countries will follow. There are also alternative synthetic wound coverings and newer silver-ionized agents that can be used; however they are often very costly and inaccessible in low-income countries.

CONCLUSION

Because of the severe physical, functional, and psychological repercussions, burn injuries are among the most serious public health problems. Numerous studies have shown that there is a shortage of knowledge on burn first aid in both industrialized and developing countries.

This article is intended for health care professionals, especially those who provide primary care services, emergency rooms, paramedics, and even the general public, as prompt and effective administration of first aid to burn victims can significantly lower the ensuing morbidity and even mortality.

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