

## **Early Management of Burns**

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Early management of the burn patient requires replacement of fluid loss, a high calorie diet, treatment of sloughing and the avoidance of infection. Complications of burn injuries may include circulatory and pulmonary dysfunctions and the development of contractures and hypertrophic scarring, which can limit joint motion and result in severe cosmetic deformities and psychological problems.

Although certainly the obvious tissue damage secondary to burns appears most evident and in need of treatment, the research literature and medical texts reviewed clearly indicate that the systemic effects secondary to burns pose a greater threat to survival than the burn itself.

The initial effect of a burn is to produce a dilation of the capillaries and small vessels in the area or body surface involved. This has the effect of increasing capillary permeability resulting in the seeping of plasma into surrounding tissue causing blisters and edema. For this reason, early management of burn patients involves a replacement of this fluid loss. To fail to do so may result in reduced blood volume, a thickening of the blood, and a reduction in the efficiency of the circulatory system. One frequently seen outcome is the patient entering into shock.

Once fluid loss has been stabilized, the next important consideration is battling infection and sloughing. It is during this process that the destroyed tissue begins to separate from viable tissue under the surface. The sloughing results in large areas of exposed tissue, which are subject to infection. Patients at this stage may experience increased fever, local tenderness, tachycardia, and lymphangitis. The burn wound is usually closed as quickly as is feasible and antibiotics are administered intravenously.

To close the burn, repair usually begins at the outer edges and whenever possible involves the use of skin grafts to minimize excessive overgrowth of granulation. When grafting is necessary, but it is not possible to initially use the patient's own skin, then temporary grafts defined to as homografts or allografts are used. These are provided by graft banks and provide temporary coverage until later grafting using the patient's own skin can be accomplished. It is also possible to use pigskin known as heterografts or xenografts. In the case of the latter grafts the dressing is usually changed once every two to three days until the patient's own skin can be taken from a donor site.

In addition to grafting and blood transfusions the patient suffering from severe burns requires a high caloric, high protein diet.

Perhaps one of the most severe initial problems in the treatment of burns is the control of bacterial infection. As previously noted the burn site is initially covered

by destroyed tissue, (eschar) which in essence forms a crust across the wound. This crust has no blood supply and accordingly our body's natural defenses for fighting infection are of little help. Moreover, it is not even possible to use systemic antibiotics because the circulatory system will not allow them to reach the wound. A variety of methods has been undertaken to try to combat the severe complication of infection in the burn patient. These methods include exposure, occlusive dressings, open method with topical chemotherapy, and excision.

In the exposure method, bacteria is controlled by exposing the burn site to light and maintaining a cool environment. This method is most frequently applied to burns of the face, neck, perineum and trunk. Over a relatively brief period of time (two to three days) the drying effects to exposure results in the formation of a hard crust, which will protect the wound.

Occlusive dressings are typically used with burns to the feet and hands. A fine gauze impregnated with a topical antimicrobial agent is applied directly to the burn without overlapping the unburned skin. This gauze is maintained on the burn site through the application of a tubular mesh over-dressing which applies a light pressure. In instances where this method is used it is often necessary to check circulation every three to four hours to make certain it is not being impeded by the tubular dressing or other types of fixation bandages, which are used. These bandages are frequently changed and during this process the dead tissue is debrided from the wound.

Perhaps the most frequently used method of treating burns and averting infection is the open method with a topical chemotherapy. This method basically combines the two previous methods. It is highly valued by many individuals treating burns because it is easier to assess the progress that the wound is making and it is possible to initiate physical therapy at an earlier point in time. In addition, temperature control is easier. The disadvantages of this method tend to be patient complaints of chilling and the need for frequent bacterial cultures to monitor the impact of topical agents used.

The last method employed is excisional therapy. In this treatment choice all destroyed tissue is removed down to viable tissue. Excision tends to be a newer method of treating burns and does have the advantage of carrying with it less danger of infection. Other advantages discussed in the literature include less metabolic stress and quicker movement into rehabilitation.

Several excellent resources for the rehabilitation counselor interested in further data on burn management and care during the acute phase include the following: *Burns, A Team Approach*, by Artz, Moncrief, and Pruitt 1979; *Burns of the Upper Extremity*, by Salisbury and Pruitt 1976; and *Practical Approaches to Burn Management*, Flint Laboratories 1977.

## ***Complications***

As with most catastrophic injuries, a major consideration in the acute medical management phase is the prevention of complications. Problems may arise during any stage of the initial acute medical rehabilitation treatment. These may include circulatory dysfunction; pulmonary impairment secondary to the inhalation of smoke, carbon dioxide or heat; contracture deformities; hypertrophic scarring; and pruritus.

### **Pulmonary and Circulatory Complications**

In the case of circulatory dysfunction, the initial medical management necessary includes fluid and plasma replacement as well as monitoring of blood specimens and urinary output. Table 20-5 provides an outline of the problems which may develop secondary to water and electrolyte changes and fluid imbalances which the first 48 hours after a severe burn.

To view Table 20-5, "Water and Electrolyte Changes in the First 48 Hours Of Major Burns," [click here](#).

(please see attached file- "LCP 4- Lesson 7- Water and Electrolyte Changes in the First 48 Hours Of Major Burns.pdf")

Pulmonary complications may result during the initial post-burn stage, but can also appear many months later secondary to damage incurred at the time of the burn. Basically two types of airway obstruction will result from exposure to burns. In the instance where there are burns around the neck, chest or upper abdomen extrinsic airway obstruction will result. This can also develop secondarily to foreign matter entering the nose, mouth or throat. In the instance in which an individual inhales super heated air, steam, gases, flame or smoke while in an enclosed or semi-enclosed space resulting in impairment to the pulmonary system, then intrinsic airway obstruction develops. Initial medical treatment includes establishing an appropriate airway, and the administration of oxygen. The severity of the damage will dictate the initial treatment with more mild cases often being cared for by exposing the individual to heated air and encouraging a productive cough. Bronchial suctioning may follow. Later, the use of appropriate antibiotics may be necessary to avoid the development of more severe complications, which are secondary to the physiological damage and limitations of the body in this circumstance to fight off bacteria effectively.

It must be understood that the resultant vocational handicaps secondary to either cardiovascular or pulmonary impairments will remain the same regardless of the etiology, which was involved in precipitating the disability.

### **Contractures and Hypertrophic Scarring**

One of the major concerns from a vocational rehabilitation standpoint and the quality of life of the individual is the development of contractures and

hypertrophic scarring. In the case of contractures, the result is a severe reduction in the normal range of motion in a joint because of having to maintain a joint in an immobile position over prolonged periods of time. Immobilization results in a tightening or shortening of tendons, muscles and associated structures. Almost any joint with severe reduction in range of motion will result in the development of severe and permanent vocational handicaps. Loss of motion in the fingers, hand, wrist, elbow, or shoulder particularly in the dominant arm may have the greatest impact in terms of the ability of an individual to participate in the labor market. At the same time very severe vocational handicaps and functional limitations can result from impairments to the joints in the toes, feet, ankles, knees, and hips. Although less frequently seen, the back and cervical areas may also suffer limitations.

There is no ready solution to the problem of contractures in light of the need to immobilize patients to maximize the healing process and for comfort. The most effective treatment of contractures is prevention. It is for this reason that major burn centers work in a team approach to maximize those treatment modalities which will allow the individual to enter the rehabilitation process as quickly as possible. Physical therapy to improve range of motion and reduce contractures is important as it increases activity on the part of the patient to a level that will improve range of motion, reduce contractures, but not expose the individual to potential harm or further complications.

Another threat to joint range of motion can come from hypertrophic scars although this is not their only complicating feature. This type of scarring develops almost exclusively in burn patients and results from a significantly increased production of collagen fibers, which take on an abnormal appearance on the skin surface. The development of these scars may begin as the burns heal and will usually reach a peak in formation some two to four months post-onset. Although the major secondary problem resulting from this type of scarring is contracture deformities, the cosmetic appearance, which results may be equally debilitating. This is particularly true when hypertrophic scar formation occurs about the face or exposed extremities and adversely affects an individual's self-concept, sense of self-worth and ability to develop appropriate interpersonal relationships.

A frequent treatment of choice to assist in the reduction of contracture deformities and reduce the development of hypertrophic scar formation is the use of the burn suit. The burn suit is referred to by a combination of manufacturer names or by the area covered (ie. jobst stocking, jobst gloves, jobst vest, etc.) These burn suits are carefully measured and applied to the individual and provide substantial assistance in reducing the potential for scar formation and contracture development. Because they are worn over prolonged periods of time and in public, they too may result in some psychological complications. When hypertrophic scar formation still develops to a significant degree, consideration should be given to reconstructive plastic surgery. This must be carefully considered in the development of a catastrophic profile or future care and service

plan.

### **Pruritus**

Another complication (pruritus), which may appear to be of minor concern, is frequently dismissed by the rehabilitation counselor unfamiliar with the burn client as simply a problem of itching as the healing process progresses. Unfortunately, it cannot be dismissed so lightly as the scratching which results can in and of itself cause damage to new skin and lead to infection. Development of itching should be followed by the counselor working with the client. The patient should be encouraged to return to the physician promptly to receive either oral or topical medication to alleviate the problem.

### **Psychological Complications of Treatment**

The fact that we anticipate the development of psychological complications in severe burn cases comes as little or no surprise to most individuals. Most associate such complications with strictly the cosmetic impairment secondary to severe burns and do not think of many of the other sources of psychosocial disability associated with burns and burn treatment.

From the time an individual is admitted into a burn unit through to the point at which he or she has reached a maximum level of adaptation to disability, they are exposed to a new and typically very unique series of environments and personal contact which may have an effect psychologically. When a patient is first admitted to a burn unit and placed in a bacteria control unit they find themselves in an environment, which is strange, unique, and often frightening. They are repeatedly approached by professional staff and even visitors who are dressed in sterile gowns and masks and who initially may appear unfamiliar. Surrounded by equipment, plastic tents, and a variety of different professional service providers, the patient becomes exposed to a stress-producing environment, which by itself can begin to precipitate significant psychological problems. Feelings of insecurity, helplessness, and inability to cope may ensue. Such an environment is particularly frightening for children involved in severe burns and it is necessary for the burn treatment team to take into consideration significant psychosocial factors involved in the treatment process.

As the patient moves through the treatment process, many of the psychological factors, which develop secondary to functional limitations, may result. The burn patient has the added potential for severe complications secondary to cosmetic deformity.

The longer the hospitalization associated with severe burn, the more potential there is for the patient to have psychological limitations of a permanent nature. Long-term exposure to stress coupled with severe depression and even regression to more infantile forms of behavior often results in the need for long-term counseling intervention. The manner in which staff and particularly family and social contacts react to the patient will play a very important part in the long-

term prognosis.

Because of the progressive nature of the psychological factors through the treatment process, it is recommended that re-testing be done during the latter stages of medical treatment and/or shortly post-discharge. Early testing followed by testing post-discharge can help the clinical counselor develop a better understanding of the progression of psychological factors and adaptive behaviors. It is also appropriate to consider where possible re-testing in both the rehabilitation and psychological areas subsequent to the provision of rehabilitation services.

Works Cited:

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