

HORIZONS IN BURN SURGERY

by

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War, pestilence and catastrophe create a multitude of new problems for the surgeon as well as augment the ever-present problems of acute traumatic care. The bomber, tank and flame thrower greatly multiply the numbers of potential burn victims, but even these diminish in importance considering complexities to be encountered when dealing with the victims of atomic bomb explosions. As a matter of fact, no other event has so aroused interest in thermal burns.

In order to accomplish better and more efficient treatment of the burned patient, there are specific problems hovering over the horizon of burn surgery which must have solution.

In the past ten years, modest advances have been made in the better understanding of some of the mechanisms responsible for burn shock, but many gaps remain. Most surgeons realize salt is required to combat some of the features of burn shock but the salient question remains--how much salt and water is needed? Oral saline is quite effective in the less severely burned patient. The ease of administration suggests its advantage in treatment of mass burn casualties; however, how effective this therapy is in the treatment of the more severely burned patient has not as yet been established.

Certain plasma substitutes for instance, Polyvinyl Pyrrolidone (Peristen), still require serious study in the severely burned patient. The clinical

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problem of whole blood requirement for severe burns must be further explored; such studies should employ available methods for tagging of the red blood cell in order to determine accurate red cell mass in the burn patient.

The enthusiastic use of ACTH in the early treatment of the burn patient has not been substantiated. The stress response in the burned patient has been demonstrated to be so intense that it is unlikely it could be further augmented by the administration of ACTH. ACTH therapy may be found useful in later phases of burn care. The value of Cortisone in the early days post-burn has not as yet been delineated. Cortisone in amounts up to 300 mgm. per day has been given to some severely burned patients with no dramatic improvement. Real advances in this field await the development of simple and more precise methods for the identification of small amounts of adrenal steroid compounds in both blood and urine. This requires the support of fundamental biochemical research in clinical endocrinology. Such studies should provide an opportunity to answer the question, "just what is the adrenal response?" qualitatively and quantitatively in severe burns.

Would the burn patient benefit by therapy designed to abate the stress response rather than augment it? The suggestion of Selye of counteracting ACTH effects with the somatotropic (growth) hormone of the pituitary compels serious consideration. Such studies may lead to methods for altering the early catabolic response, the course of invasive wound infections, and harmful fluid and salt transfers in the severely burned patient. Because

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many growth hormone preparations contain thyrotropic hormone the action of this principle in altering the stress response should be discerned.

The clinician is still confronted by the badly burned patient who develops severe liver dysfunction. When the use of tannic acid was abandoned in burn therapy it was hoped that liver dysfunction would not occur. In the severe burn, liver dysfunction is still seen almost as often now as during the heyday of tannic acid therapy. Liver failure appears to be responsible for some of the early deaths in burns. The problem may be one of prevention of liver dysfunction rather than treatment. The hormonal imbalance following severe burns should be studied in relation to this liver damage, with particular attention to the many enzyme systems of this organ.

With the improvement of shock therapy in burns, renal failure is seen much less commonly than ten years ago, but yet so frequently as to warrant further investigation. It often follows a lapse of several hours between the time of injury and the beginning of shock therapy in the elderly patient. Studies should include more general therapeutic trials of the artificial kidney or similar methods of blood clearance.

In recent years, there has been little discussion of toxins in burn shock. There is a real need for knowledge of the role of bacterial metabolites as toxins in severe burns. Present clinical efforts to prevent toxin absorption include the early surgical excision of the burn slough. If this procedure should prove valuable, there would be a real need for skin banks for temporary wound coverage. Studies on burn toxins should be combined with those on renal and liver dysfunction in the severely burned.

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There is no single ideal method for burn wound care. Surgeons are learning the advantages and limitations of both the closed and open methods. The apparent ease of handling large numbers of burn casualties by the open method suggests that careful study should be made to learn its true limitations. Improved adaptations of the closed method for burned fingers and hands are needed with accent upon simple but effective splinting of the hands. Ordinary surgical gauze adheres to the granulating burn wound unless it is covered with some ointment or oily substance. If the dry wound principle is to be employed for all stages of local burn care, study should be pursued to develop a more universal applicable non-adherent dressing.

In spite of available potent antibiotics of the broad spectrum type, chronic infection of the burn wound of long-standing is all too frequent. Cross-infection of burn wounds is more often the rule than the exception when large numbers of burned patients are involved. Indeed, in most surgical clinics visited recently, burn wound infection appears just as frequently as it did ten years ago. Some groups should evaluate without bias the feasibility of using Colebrook's layout for a burn center. Colebrook's plan may appear too complicated for general adoption, but the problem of a severe burn wound infection and cross-infection will be with us until some equally effective plan is adopted. Our experience would indicate that dressing all burn wounds in a central dressing station, without some such control as Colebrook's, may result in more serious cross-infection than when these individuals are dressed on the open wards. Continuous effort must be made to develop and employ a closed dressing which cannot be "soaked through."

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Investigations of the frequency of development of insensitivity to antibiotics in organisms responsible for burn wound infection should be pursued vigorously with special attention to pyocyanus and proteus strains.

The excision or enzymatic debridement of the burn wound allows early closure of the deep burn by skin graft. Streptokinase-streptodornase, and proteinases from clostridial cultures, trypsin, and other enzymes require clinical trial to answer such questions as, (1) are these preparations effective? (2) when is it clinically useful to employ them? (3) in how large a wound is their use safe? (4) do they damage adjacent wound skin? and (5) are they useful as preparation for surgical debridement?

Because of the likelihood that more and more extensively burned patients may survive the shock period and therefore require wound debridement and grafting, it is hoped that efforts to preserve the life of homografts will be made. The failure of Cortisone and ACTH to prevent the dissolution of such grafts should turn such efforts in the direction of the fundamental aspects of the homograft problem.

There is a tendency in some experimental burn research to ignore the fact that the clinical subject with burns may have additional severe complicating trauma. For this reason, studies of the effect of concomitant injury to burning such as fractures, radiation and cranial and chest injuries must also be made in preparation for any sort of mass casualties, especially those of atomic attacks.

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On the horizon of the problems in burn patients loom many questions such as better nutrition, the many faceted problem of rehabilitation, and the teaching of the medical students and training of resident surgeons and nurses in what is already known about modern methods of burn care. The importance of teaching certain fundamental principles of physiology, chemistry, and bacteriology to the young surgeon is well recognized. The severely burned patient presenting a problem in each of these fundamentals is the ideal study case for the surgeon in training. This is of the utmost importance to the medical department of the Armed Forces on whom, in the event of global war, must necessarily fall much of the responsibility for the care of all wounded.

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