

The Acute Burn as a Catastrophic Illness

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TWENTY YEARS AGO* the first nuclear weapons were fired at Hiroshima and Nagasaki, with hundreds of thousands of casualties, and the world entered a new era of power and of fear—fear of bombs and fear of burns, burns occurring in such numbers as to stagger the imagination and to fill the mind with panic.

But as we contemplate millions of burns under hypothetical and unpredictable conditions, we seldom realize that in the known, predictable world, burns *are* occurring every day in catastrophic numbers. Since the close of World War II more than 30 million persons in this country have received burns sufficiently serious to require medical treatment or to incapacitate them for work, and of these a million and a quarter—more than 70,000 per year—have been hospitalized for treatment of severe lesions. At least half of all burns occur in the home. They are related to igniting of inflammable clothing by a gas stove or other open fire; to starting a fire with kerosene and similar fluids; to the use of gasoline for such household purposes as cleaning clothes and scrubbing wax off floors; to carelessness with matches; to cigarette smoking; to scalds from liquids and burns from grease in the kitchen; to immersion in overheated bath water; to chemicals such as lye and strong acids; and to electricity sources, including defective wiring. Three-fourths of all fatal burns are the result of domestic accidents, all too often with a group of children left alone in a house; and many persons are found dead of asphyxiation as well, in home fires, as may be verified repeatedly in the pages of any newspaper. One great tragedy is that 36 per cent of burns occur in young children below the age of ten, and an additional 14 per cent are seen between ten and twenty. In 50 per cent of the patients, therefore, the burn affects the formative years of physical and emotional development and its influence extends into middle and later life.

SYSTEMIC EFFECTS UNDERESTIMATED

While a severe burn represents maximum trauma to the patient, both qualitatively and quantitatively, there is still a tendency to underestimate the systemic effects initially and even to regard the lesion as a type of dermatologic disorder *per se*, rather than as a summation of the effects of heat upon the body as a whole. Even the local wound repre-

*August 6 and 9, 1945

sents a certain volume of tissue in depth, and almost every full-thickness area is surrounded by concentric zones of lesser involvement which may appear to be of superficial nature but which contribute to the total pathology. The burn, unlike many other types of injury, provokes continuing trauma, and response is dependent not only upon reaction to the initial insult but to the various phases which develop in sequence.

The severe burn is actually an illness, a catastrophic surgical illness, long and tedious and costly. It is very difficult to treat a single patient with lesions of critical extent without a large number of assisting personnel oriented toward problems of day-by-day management and with an understanding of the physiological disturbances involved.

IMPLICATIONS NOT COMPREHENDED BY FAMILY

But rarely does the family of the patient appreciate the over-all implications in the early stages. Even though they are aware of the gravity of the situation and are fearful of imminent death, they are not aware of the necessity for skin grafting in major burns and are conditioned by advertising for proprietary remedies to believe that some local preparation can be applied to promote healing and prevent scar formation, if the patient survives. When the entire course of a serious burn and its inevitable complications are outlined, they are usually completely overwhelmed.

In analysis of the effects of the burn upon the patient himself we have observed that on admission, typically, are present marked hyperexcitability engendered by fear of death from incineration, apprehension over disfigurement, and general anxiety rather than severe pain. This is followed by some clouding of the sensorium and blunting of sensation during the period of edema, after which a rather characteristic mild depression develops for a few days' time and subsides spontaneously during the second week postburn. Thereafter it is apparent that the patient's preburn personality is the single most important element in his adjustment to the hospital environment and to the sequelae of thermal trauma as well. In this regard a knowledge of the precise circumstances of injury often offers considerable insight into pertinent factors which will affect convalescence and ultimate rehabilitation.

When a child is burned, for example, we find it

helpful to know whether he was injured through his own daring; at the hands of a jealous brother or sister; following a fall after a convulsive seizure; or through adult carelessness. Often several members of one family are burned in the same accident. During the winter of 1964-65 on our service, three or four groups of multiple burns were admitted. In one instance nine persons were severely burned when a small farmhouse caught on fire during the Christmas holidays as the grandfather by error poured gasoline over wood to start a fire in the morning when a "norther" blew up. Three persons died before admission to the hospital and two later.

An occasional person, fortunately rare, appears bent on self-destruction, and the burn may be a part of a pattern of repeated injuries or may occur as a conscious or unconscious suicide attempt. Such a patient admitted in 1964 in his late twenties had had a traumatic amputation of his right arm ten years previously in an automobile-train collision and had lost several fingers of the left hand two years before in a boating accident. He came in with severe burns of the stump of this hand sustained when he reached into sulfuric acid while developing photographs in a dark room, and ultimately it was necessary to amputate the arm above the wrist. We have treated four patients who after pouring gasoline over their clothing set fire to themselves, apparently under the influence of newspaper reports of Buddhist monks in Saigon who have burned to death in protest demonstrations. One was a 17-year-old mother of three children who had just had an argument with her husband. Another, a 20-year-old youth, siphoned off gasoline from his automobile into a soft drink bottle, poured it over himself, and struck a match just outside the emergency department of a hospital to which he had brought his young wife, a 16-year-old girl, for treatment.

BURNS, HOMICIDE AND ARSON

On at least two occasions we have discovered that burns which appeared to be accidental injuries were actually the result of homicide attempts, in association with arson. This is a fairly common *modus operandi* in mystery stories and probably happens in real life as well, more often than suspected. Several times, we have seen patients who have been set afire, usually during a drinking bout, as a sort of practical joke by acquaintances with no real purpose in mind except a "good scare."

Every Fourth of July brings in one or more cases

of acute burns from fireworks. Occasionally we admit a patient whom we call the Good Samaritan. This is the man who stops to help with a car accident and discovers a leak in the gasoline tank. Just as he reports it, someone lights a match to help him see better. The majority of accidents, of course, are related to carelessness rather than to stupidity. But, nevertheless, there is often a strong factor of panic and disorganized behavior at the scene of an accident which contributes to the incidence of fatal cases and to the severity of injury in the survivors.

In rather extensive psychological studies of burn patient behavior we have noted that a large number of cases categorized as passive-helpless individuals have been somewhat insecure, anxious and dependent prior to injury or have been well adjusted only within rather narrow limits. These persons become very much involved in details of therapy and in hospital routine and often make co-operative and docile patients; but they are reluctant, even fearful, to give up the role of the invalid on return to familiar environment.

PATIENTS PROFOUNDLY DISTURBED

In some instances patients with a strong ego or body image are profoundly disturbed by physical deformity which results from burn injuries, even insignificant patches of depigmentation or scarring. One of our patients, for example, is suing his employer for pain and suffering related to the loss of a few hairs from one eyebrow and is rather seriously disturbed. If marked disfigurement occurs in such an individual, rehabilitation may be impossible. This is particularly likely if compensation for injury is a factor or if in the home atmosphere the family, through feelings of pity and guilt, will actually foster a state of helplessness and indecision during the period when the patient is constructing a new image of himself and his personality.

Most children are more adaptable in the hospital atmosphere than are adults. They tolerate restraint and fixation devices well and are easy to handle from the mechanical standpoint during ward and operating room care unless they have had painful experiences prior to admission. As a rule, they are not particularly aware of scarring and deformities during association with other burned children with similar lesions. Unfortunately, however, many children and adults do not adjust well after prolonged illness and hospitalization, and for them the most difficult and catastrophic aspect of the severe burn is the phase which should be devoted to rehabilitation in the fullest meaning of the word.

Return to the home environment is often a most traumatic time if members of the family and friends

fail to provide emotional support with acceptance and affection. This is especially true for children when the mother is disturbed and anxious or even unduly fatigued from the long ordeal of hospital visits combined with home duties, worry and financial strain; and psychiatric assistance may be necessary for both the patient and the mother.

School presents additional problems, and a pupil may be placed one or more grades below his age level because of time missed during hospitalization. Under unfavorable circumstances the child tends to become extremely withdrawn and shy, or, worse, to develop overly aggressive behavior patterns which result in disruption of class routine and antagonize the teacher and other children as well.

During the time of maturation of scar tissue, at the base and margins of skin grafts, there is often a chronic nonspecific low-grade inflammatory reaction which persists for many months and is accompanied by intense itching or burning and by redness, induration and hypertrophy. These distressing changes require a period of 12 to 18 months as a rule to subside. In the interim, however, contractures may have developed as the result of motion perpendicular to flexion and joint creases, from shrinkage of transplants, from inadequate initial skin cover, and from growth of tissue adjacent to skin grafts. Children, in fact, must usually be followed closely for a number of years so that relief of these cicatricial contractures related to growth may be undertaken as indicated.

MAJORITY FACE MULTIPLE PROCEDURES

Even though the immediate convalescent period may be satisfactory, the majority of severely burned patients, hence, still face multiple definitive surgical procedures for two or three years after their initial hospitalization, perhaps even longer. One patient of ours, who was first treated in 1950, has had 27 hospital admissions and a total of 63 separate operations for revision of scars. Even though he has been repeatedly discouraged from subjecting himself to the discomfort and expense of additional surgery for only minor gain, he appeared again in 1964 for another "touch-up" procedure,

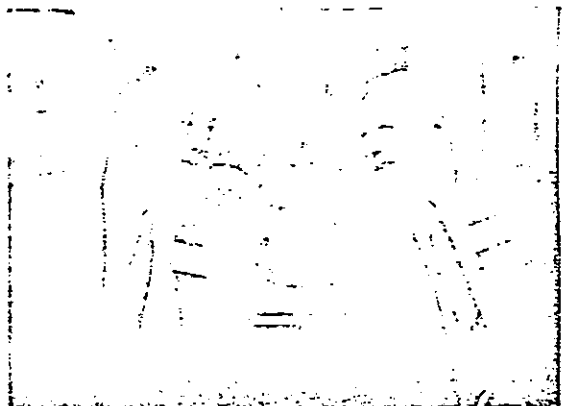
which he felt he needed for morale purposes. It is true, in general, that the more severe the initial burn lesions, the greater will be the residual deformities and the more limited must be the aims of reconstructive surgery.

SO INCLUDE CATASTROPHIC ILLNESS CLAUSE

As it is almost impossible for a single surgeon to take care of a single serious burn patient, it is with rare exception equally as impossible for that person to pay for his hospitalization and medical treatment unless he carries an insurance policy with a catastrophic illness clause or extended group benefits. At the present time 70 per cent of the population in this country has some type of private health insurance coverage, but only 25 per cent of the total hospital costs is actually paid by insurance. The remainder must be met from private sources or public funds of one category or another. Hospitalization averages \$50.00 per day in most sections of the United States, of which about 65 per cent is for labor, and the expense of a burn is much greater because of the time which must be allocated for almost continuous care. The usual hospital stay of all patients is currently from six to 15 days, but the acute burn requires, first, a minimum of three weeks in preparation for grafting; next, 12 to 14 days between grafts, if more than one procedure is needed; and, finally, two or two and one-half weeks following the last operation before discharge from the hospital. A burn of less than 20 per cent of the body surface will be hospitalized approximately six weeks, as a rule; burns of 20 per cent to 50 per cent will require nine to ten weeks; and those over 50 per cent, at least 12 to 14 weeks under the most favorable conditions.

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Truman G. Blocker, Jr., (left) who is seen here with Oscar P. Hampton, Jr., St. Louis, made the accompanying Seudder Oration on Trauma on October 7, 1964, at the Clinical Congress in Chicago. Dr. Blocker is executive director of the University of Texas Medical Branch and a noted authority on burns, which he says hospitalize 70,000 Americans each year. What Dr. Hampton, chairman, A.C.S. Committee on Trauma, has to say about ambulance service in the United States begins on page 177.



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Second degree burns may be expected to heal in about half the time of third degree lesions of equivalent extent, but if the lower extremities are affected, the time may be considerably increased. Chronic burns, in which there has been preliminary failure of skin graft take or where the optimum time for application of the first grafts has been delayed by infection or other causes, have

averaged twice as long a period of hospitalization, in our experience, as acute burns. Burn of 30 per cent at \$50.00 per day will total \$3,000.00, not including accumulated professional fees. In addition, the cost of various definitive procedures over a period of several years will approximate the initial amount for hospital and medical care. When several members of a family are burned simultane-

ously, as is often the case, the actual cost is an exorbitant sum of money.

The majority of families in this country have sufficient income to afford insurance coverage which will be adequate, or almost adequate, to take care of medical expenses; but few can purchase enough disability insurance to maintain the status quo when deprived of regular earnings, as when the head of the family is injured. Litigation, increase in benefits from public sources; and prolonged compensation all interfere with rehabilitation since in unstable individuals they so often destroy motivation for return to productive employment. In particular, the lump cash settlement must be supplanted by a more rational solution to the needs for medical care and support of catastrophic injuries. In this area the surgeon, together with industry, insurance carriers and both private and governmental agencies concerned with rehabilitation, has a responsibility in assessment of physical disability, work capability, and long-range planning.

FUNDS CAN BE EASILY SQUANDERED

On repeated occasions extremely large amounts of money are dissipated in a remarkably short time with very little accomplished in the direction of financial security or rehabilitation. Several years ago a patient of ours who had sustained tragic, serious and permanent injuries from deep electrical burns was given an early settlement of \$25,000, actually in the expectation that he would not survive the initial period. This amount was soon divided between his lawyer and his wife, and six months after the accident he had no money, no bills paid, no wife, and the prospect of at least three years of surgery before he could hope to begin working at any occupation. Not long ago a similar patient on our service received a lump-sum settlement of ten times this amount, approximately \$250,000, less 40 per cent legal fees, following several years of litigation. During this time he had returned to the hospital for 13 operations but had been unable to work at his former occupation as a house painter and was unwilling to accept any type of job for fear of jeopardizing the outcome of his lawsuit. He had always been an emotionally unstable person and now he began to drink heavily. His wife obtained a divorce and left him with the care of three small children. From his mother, herself a cardiac invalid, have come pitiful letters to the doctors, begging them to use their influence

to keep her son from disappearing on alcoholic binges for several days each time he is discharged from the hospital after another surgical procedure. It is doubtful if this patient will ever pay for his hospitalization and medical bills, make any constructive use either for himself or his family of the funds received, or even accept job retraining aid and advice.

BURN IS HEALTH AND ECONOMIC PROBLEM

In 1962 the Shriners of North America inaugurated a program* for the development of research centers for burned children, and in June, 1964 our staff at the University of Texas Medical Branch attended the ground-breaking ceremony for the first institute, which is now under construction in Galveston, and which is shortly to be followed by similar units in Boston, and in Cincinnati. This event was in marked contrast to the opening of the first burns hospital in Edinburgh a little more than a century ago, which was established following an argument between James Syme, of Syme amputation fame, and the board of managers of the Royal Infirmary over a severely burned woman, who, they said, "stank all the wards and annoyed the other patients." The burn is now recognized as a serious problem to health and our economy. It is hoped that the Shriners Burn Institutes and existing burn centers will provide leadership not only in fundamental research and in methods of improvement of local and systemic therapy, but toward solution of problems of prevention and rehabilitation as well. For the severe burn is a serious catastrophic illness. It represents a major financial burden to the hospital and is a calamity for the patient—physically, socially, psychologically and economically. From the medical point of view the care of the burn, even with the most enthusiastic and skillful team of workers, is fraught with discouragement and requires the patience of Job. The results of definitive surgery may be disappointing, but it is surprising that so many patients are able to return to useful, happy lives, adjusting well to their deformities and willing to accept the least common denominator in reconstructive surgery—that is, the achievement of results which make them inconspicuous to the casual observer and which do not provoke feelings of revulsion in themselves or others with whom they are closely associated. Such rehabilitation, with restoration of self-confidence, independence and a sense of dignity, is the only hope for the burned patient. Prevention is the only cure for burns themselves.

*ARTZ, CURTIS P., The Shriners Burn Institute at Galveston, BULLETIN A.C.S., May-June 1965, page 93.