

Mass casualty organisation in burn disasters

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Summary:

THE ORGANISATIONAL PROBLEMS related to the management of large numbers of burn casualties are reviewed. The key to the problem is the effective categorization of casualties on the basis of the extent of injury and the urgency of needed treatment. This allows for the proper routing of the patients to appropriate treatment centres and a more efficient employment of specialized medical and subsidiary personnel.

Introduction:

The recent spate of fires around the country, especially those involving large high rise buildings and those occurring in factories and squatter areas where there are large concentrations of population, has brought into mind the necessity for detailed planning to enable effective mobilisation of resources and proper handling of patients during large scale burn disasters.

The problems related to the handling and care of large numbers of people suffering from burns have been recognised as a result of the horrible experiences of the last World War. Burn cases present difficult administrative problems even in peace time. Anyone with some hospital experience is well aware of the chaos that might be caused in a non-specialised hospital by the arrival of even a few patients with moderately severe burns because of the urgent and continuous care they need, therefore, making heavy demands on facilities and personnel.

The technical and administrative problems that can result from the admission of large numbers of

burn casualties are such, therefore, that a pre-arranged plan is all the more imperative. In the United States of America, a number of disasters have occurred in the past 30 years, resulting in large scale burn injuries. These include the Coconut Grove fire in Boston (1942); the circus fire in Connecticut (1949); the Texas City explosion in 1947 and the USS Bonnington fire in 1945. In each of these situations, prior planning and the rapid and effective management of survivors have made possible the salvage of a high percentage of cases. By contrast, the circus fire in Niteroi, Brazil, in 1961, resulted in a large scale loss of lives among those rescued from the fire. This was attributed to the insuperable administrative problems encountered due to absence of prior planning, as well as the relative inexperience of nearby hospitals in the treatment of burns.

Operation Planning:

The overall management of large scale burn disasters revolves around 4 stages of operation:-

1. The setting up of first-aid stations.
2. The sorting of patients according to the extent of their injuries and the urgency of treatment needed.
3. The transport of these patients to various treatment centres which are appropriately equipped for the management of their injuries.
4. Treatment.

First-Aid Stations:

These should be set up as near to the site of disaster as is operationally possible. These stations should be equipped to deal with the waves of stretcher cases and walking wounded that will be present. As the number of cases, mainly burns and multiple injuries, may be in the region of a few hundreds, the function of the first-aid stations must be limited to dispensing only the most essential treatment needed. This should follow a pre-established plan which fits in with subsequent treatment to be given at a higher level in the burn centres. In many instances, the immediate first-aid care will have to be carried out by paramedical personnel and will have to be limited to the following manoeuvres:-

1. Management of airway and respiratory problems.
2. Protection of the burn wound.
3. Commencement of antishock treatment with i/v infusions for the severe cases of burns.
4. Immobilisation of fractures and the control of bleeding from open wounds.
5. Anti-tetanus prophylaxis.
6. Administration of analgesics if indicated.

Medical Sorting:

This involves the categorisation of casualties on the basis of the urgency and type of condition encountered, for the purpose of routing them to medical units appropriately situated and equipped for therapy (Figure 1). It forms the key to the effective management of a large number of burn injuries. Without it, an orderly and efficient utilisation of available medical facilities becomes impossible. This process should be continued through each stage of patient care and should be directed by the most experienced surgeon in that area. Without proper sorting, hospitals close to the disaster area will be swamped by the less severely injured who can effectively be treated on an out-patient basis or transported safely to more distant points of medical care. Decisions on the disposal of patients should be based on:-

1. The condition of each particular patient as assessed by the extent and depth of his injuries and his ambulatory status.
2. The availability of facilities and personnel in the adjacent hospitals.

The cases seen at the first-aid stations should be graded into the following categories (Table 1):-

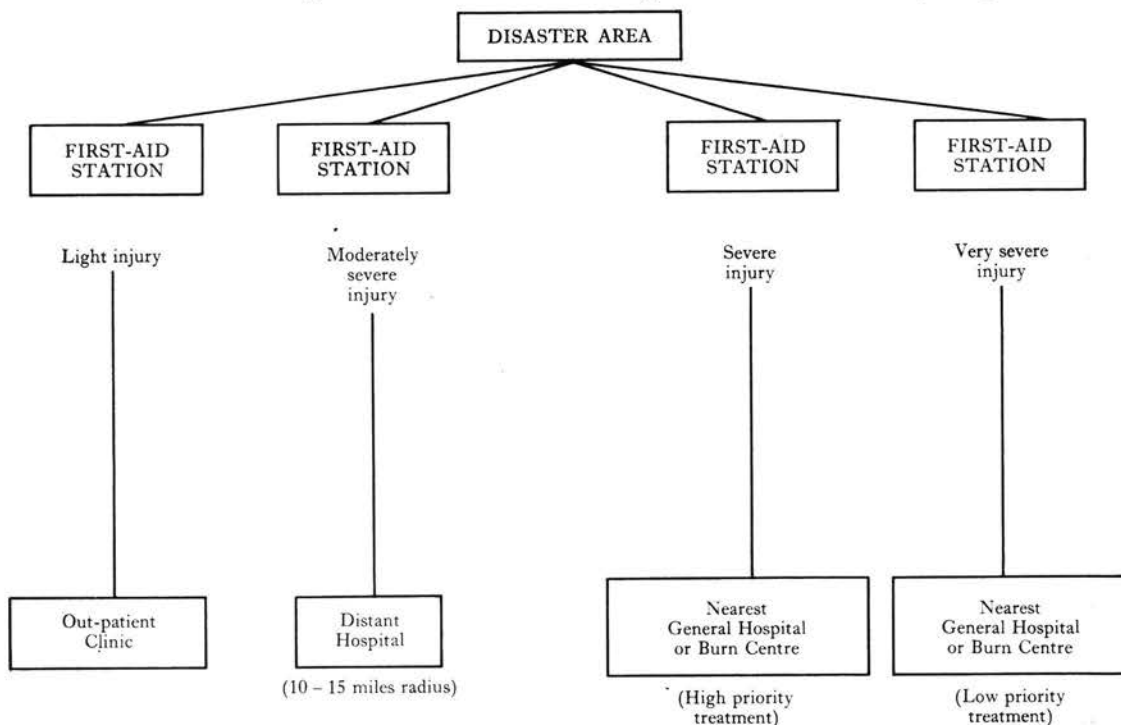


Figure 1

Medical sorting (triage) of patients mass casualty burn disaster

Table 1

Grading of Patients in mass casualty burn disaster

Grade	Degree	First-Aid Therapy	Triage (Sorting)
Light	First and second degree burns Less than 10% BSA	Local wound therapy Analgesics Antibiotics	Out-patient Clinic
Moderately serious	First and second degree burns of 10 – 30% BSA Small patchy areas of third degree burns	Sterile wound cover i/v therapy analgesics	Evacuation to distant hospital
Serious – salvageable by energetic measures	First and second degree burns of 30 – 50% BSA Third degree burns – various sizes	Sterile wound cover i/v therapy analgesics	Immediate evacuation to nearest hospital
Very serious – not salvageable in disaster situations	Second and third degree burns of more than 50% BSA	Sterile wound cover i/v therapy analgesics	Immediate evacuation to nearest hospital – admit to separate wards

- A. Ambulant patients with less than 10% burns – local wound therapy is started at the first-aid stations. These patients are then asked to continue their treatment at the outpatient clinics nearest to their homes. Exceptions to the rule are cases at the extremes of age; cases with involvement of the head and neck, hands and feet and groin and perineum; cases with deep burns requiring subsequent skin grafting.
- B. 10 – 30% burns. After first-aid treatment, these cases can be safely moved to more distant hospitals so as not to overload the nearby burn centres.
- C. Serious burns involving 30 – 50% of their body surface area. These are the patients who may be saved by energetic and expert measures. They should be transferred to the nearest hospital immediately after commencement of antishock therapy. Included in this category are cases requiring urgent respiratory care.
- D. Cases with more than 50% body surface area involvement. These patients are also transferred to the nearest hospital but should be admitted into a separate ward.

In any disaster, it is advisable to group similarly injured casualties in the same installations. Certain hospitals near the disaster area should be designated as 'burn centres' and all cases requiring immediate and intensive care should be sent to these institutions. Within the burn centres themselves, another phase of medical sorting may be necessary. After the shock period has been treated and the patient stabilised, a second stage evacuation of the less seriously injured to the more peripheral hospitals may be advisable so as to reduce the strain on the

facilities and staff of the burn centres, especially during the period when frequent dressing changes and grafting are necessary. There should be a co-ordinated two-way traffic between the burn centres and the more peripheral hospitals. Cases requiring speciality care and extensive grafting procedures may be referred back to the burn centres. Treatment should therefore be integrated at all levels of hospitalisation and during all stages of the patient's recovery.

Transport:

The conveyance of the patients from the first-aid stations to the hospitals must take place according to priority – the more extensive the burns, the higher the priority. Most burn patients, however extensively involved, can be safely transported during the first 7 hours after injury, provided they are properly handled. After this period, because of the danger of impending shock, the more seriously injured cases should not be moved until their condition has been stabilised and competent medical personnel are available to accompany them. Patients with lesser degrees of injury may be moved at any time without harm.

Treatment:

In other disaster situations, the most seriously injured patients receive the greatest priority. However, such a priority system is based on an unfailing source of supplies and an abundance of medical and nursing personnel. In large scale burn disasters, some modifications of this priority system will have to be made. Available knowledge points towards the fact that in a mass casualty situation, the cases with burns involving more than 50% of the body surface area would not probably survive. In such a situation, therefore, it would be futile to divert a large proportion of the supplies and personnel to

the management of this category of patients when they can be more effectively applied to the care of the more salvageable cases. Patients with more than 50% burns should be admitted to a separate ward. They should be made as comfortable as possible by adequate doses of analgesics. However, they should not receive any definitive treatment until all patients in the higher priority, more salvageable groups are cared for.

The quality of therapy in the burn centres will vary with the number of casualties as well as the available personnel and supplies. Certain compromises in ideal therapy are therefore inevitable in a disaster situation.

1. Plasma and Blood

Supplies of these are difficult to come by even in normal situations. Therefore, in the presence of large numbers of casualties, their usage should be stringently supervised. Recent studies in burn physiology have shown that salt solutions (dextrose-saline or Ringer's lactate) can effectively satisfy the replacement needs of most patients in the first 24 hours. These electrolytic solutions are relatively easier to manufacture in large amounts and can be stored for a longer period of time without losing their effectiveness. They should therefore form the basis of initial fluid therapy in mass casualty situations. Blood and plasma can then be reserved for cases with bleeding from associated trauma or for use in subsequent desloughing procedures.

2. Local Wound Care

The exposure method is used preferentially for certain regions of the body even in normal circumstances. Its use, in conjunction with a topical antibacterial agent, has been found effective in reducing the amount of nursing time required for each patient, as well as reducing the necessity for expensive dressing materials.

3. Grafting Procedures

One of the major problems in dealing with a large number of burn casualties is the availability of operating room space and time for the multiple grafting procedures that are necessary. Patients whose wounds can be closed by a single grafting procedure should be taken into the operating room first so that they may be discharged earlier. Since it might be difficult to cover massive burns cases with autografts, heterografts might be used for supplemental temporary cover until space becomes available in the operating room for definitive autografting.

Conclusion:

The handling and treatment of a large number of burn casualties is chiefly a problem of organisation involving an assessment of existing facilities, prior preparation and planning, and sensible execution.

The following is a list of suggestions for overcoming the administrative problems in such situations:-

1. Obtain an up to date census of hospital and subsidiary facilities on a regional and state-wide basis.
2. Specification of the tasks that each organisational unit should perform in the event of an emergency.
3. Training of the highest number of medical and ancillary personnel in the first-aid care of patients with burn injuries. This includes the planning and staffing of mobile medical units and the organisation of police, military and voluntary services.
4. Conduct an adequate campaign for instructing the whole population on the problems of burns and first-aid care.
5. Certain hospitals in each state should be designated as burn centres. These should be adequately and appropriately staffed. An organisational plan should be drawn up to meet with a disaster situation and regular periodic drills carried out to familiarise the staff with the plan.
6. A standardised system in the treatment of burns should be drawn up, keeping in view the requirements that might become necessary in an emergency situation.

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