his responsibility to society is grave; but God will not fail to bless him for his charity and for his unstinting, devoted efforts to alleviate the sufferings of his fellow-men on earth, so that he may not fall short of the incomparable joys of heaven. It is our most earnest prayer that this blessing may be granted to you all abundantly from the loving bounty of God.

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BURNS

THE FIRST FIVE DAYS IN THE TREATMENT OF MASS CASUALTIES

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Our object in the treatment of mass casualties due to burns is to save life and prevent infection. The later phases of skin replacement and rehabilitation can then be effected as quickly as possible.

At the outset, it must be emphasised that in the first five days all extensive burns are serious, irrespective of their depth. The serious consequences of the partial thickness burn must not be underestimated, particularly in children and old people, and these superficial burns cannot be lightly dismissed.

TYPES OF BURNS

The depth and area of a burn are closely related to the prognosis. Let us consider two patients in one ward—the one with a very severe (over 50 per cent) full thickness burn, and the other with a partial thickness burn of comparable area. The prognosis with the former is very poor indeed even under good conditions. He is probably delirious, restless and incapable of doing anything at all for himself. He will present no veins for infusion and will require "cutting down." He will possibly have complete suppression of urine (apart from a small initial blood-stained specimen), and under normal civilian peace-time conditions, the full resources of a skilled team may not succeed in effecting a successful result.

The other patient, however, is in a different category. He may require the same amount of nursing, particularly if his face and hands have been affected, but with adequate fluid therapy he will be able to fend for himself in a few days, and the prognosis is good. Furthermore, no long-term reconstructive problems will arise.

Between these two contrasting cases there is an infinite variety of different types and distributions of burns, for instance the mixed deep burn which in the early days looks superficial and later appears as a much deeper and more serious entity, particularly if it becomes infected. Burns affecting the hands, face and perineum by their interference with function alone can be crippling even though superficial.
**Burns**

**TRIAGE**

Under conditions of a total disaster leading to mass casualties the sorting of burned patients according to prognosis depends largely on the early recognition of the depth of the burn. The surface area of a burn can readily be estimated even by personnel with no special qualifications, but someone must be available even in the filter unit to decide which patients are to be treated expectantly. The use of a pin prick is a useful guide in the estimation of full thickness skin loss. Where reaction is absent such loss is probable, but there are in fact no reliable clinical tests by which a partial thickness burn can be distinguished from one of full thickness. Only experience can determine this.

**In the Filter Unit:** It is felt that burns here can be placed on admission into four categories:

1. **Walking patients.** These would probably consist of patients with a partial thickness burn of part of one limb, mild flash burns, and small areas only of full thickness skin loss. In this group the old and the young—over 50 and under 5—will have to be very carefully observed before evacuation.

2. **More extensive superficial burns.** If less than 20 per cent in area many of these may have to be watched and evacuated quickly. The shortage of intravenous fluids may mean that these patients will have to take their fluids by mouth only. If over an area of 20 per cent, early intravenous therapy must be instituted with all supportive measures thought advisable. Very few of these patients will have to be held in the filter unit and not evacuated. This is the category that will repay energetic treatment at an early stage.

3. **Extensive deep burns.** It seems probable that the group for expectant treatment will be largely drawn from this class of patient, particularly the older patients (over 50) with over 50 per cent burns. It would not be wise to divert too much care and attention to these patients if it means that those in category (2) above will suffer as a result.

4. **Burns complicated by wounds.** In this category are burns of all kinds with open wounds. It is to be feared that only a very few surgical teams are likely to be found at this level. However, the arrest of haemorrhage, the splinting of fractures and urgent amputations will have to be performed before evacuation to the base unit. It should be borne in mind that partial thickness burns do well in plaster if this is loosely applied with plenty of padding, but that full thickness burns are better exposed. This may be impossible during transportation under conditions of stress, when dressings should be applied.

The situation at the filter post can be summarised by the accompanying diagram.

On arrival at the base hospital the careful triage of these patients must be organised all over again. At this level it is hoped that a really experienced officer will be available for this purpose, for instance the commanding officer of the burns team. This man again will have to make the most important decision as to which patients are to be diverted to the "expectant" group.
He will receive patients from the filter unit in the order in which they are evacuated and already classified. In many cases he will have to change the classification of these patients. Many of the superficial burns may prove to be deeper than was expected. Some patients who might have “got by” without intravenous therapy will now require it. Some patients originally thought to be fit only for expectant treatment may be thought suitable for more energetic measures.

TREATMENT

General Treatment

Blood is desirable but not absolutely essential during the first five days for the treatment of burns and will probably not be available. It will, however, be essential later and it is stressed that long before the end of the first ten days it will be urgently required for most of the full thickness burns. Plasma or plasma substitutes may be more readily available, but then only in limited quantities. The pathological services will also be fully extended in grouping and cross-matching patients for transfusion, and the actual quantity of fluid to be given by the intravenous route will have to be judged by simple clinical means.

The clinical guides recommended are:

(a) The presence of cyanosis, restlessness or thirst.
(b) Increased pulse rate (adults over 120 per minute and children over 150).
(c) The urinary output (under 500 ml. per day or 30 ml. per hour for adults or half these quantities in children up to seven years).
Where adequate fluids are available, then total dosage may be based on the "rules of nine" (Wallace, 1951) and the ready reckoner. Fluids must be available for drinking by every bedside. Tea should be in plentiful supply or at least plenty of drinking water. Artz & Pittsbury (1956) recommend 3 g. of salt and 1.5 g. of sodium bicarbonate in 1 litre of water by mouth.

Feeding will be difficult even if adequate supplies of food are available, but the situation may be eased with plenty of volunteer help. Cases with burns of the hands and face find feeding extremely difficult and will commonly have to be spoon-fed. The most severe burns will require intubation.

**Antibiotics**

Many antibiotics given by mouth are either not absorbed or else lead to intestinal upsets, which must not be risked at this stage. If applied locally, penicillin commonly causes reactions due to sensitivity. The ideal antibiotic has yet to be found, but at present the injection of "penidural" is recommended to tide the patient over the first five critical days. In an emergency any antibiotic will be preferable to none.

**Local Treatment**

If a burn that is suitable for exposure presents itself grossly contaminated—e.g., covered with dust and débris—then there is no need for a special toilet. However, with large open wounds or circumferential burns, if the decision is made to cover with dressings, then the burnt areas covered must be cleansed beforehand.

If a patient arrives from the filter unit covered with burns dressings, they should be left alone to avoid making extra work later. The only exceptions to this routine are dressings on the face, hands or perineum which should be replaced by exposure when practicable.

The overwhelming nature of the nursing problem in the treatment of mass casualties suffering from burns must be emphasised. The ward medical officer has a particular responsibility in this connection for the greater number of the nursing personnel available will be relatively untrained.

We have underlined the need for oral and parenteral fluids, for the measurement of urinary output, for the administration of antibiotics and for the possible dressing and redressing of patients with associated lesions. In addition there are many points in the nursing of specific areas which may be considered topographically: the face, the hands, the lower limbs and the perineum.

**The face.** Hair must be cut well back off the affected area of the forehead or it will stick and become involved in the eschar. The eyelids in the first five days will be so oedematous (unless burnt in full thickness) that the patient may for practical purposes be blind. The eyelids should be kept moist and the eyes carefully wiped clear of mucus. Irrigations are not necessary but albuclid drops may be used if available. The nose will be scorched and clogged up with exudate, and must be carefully and painstakingly cleaned with cotton wool and liquid
Case 1.—This patient sustained severe burns of the arms and legs in addition to this facial burn. The only area of full thickness lost on this patient’s face was a tiny area on the chin—only experience could have diagnosed this in the early days.

Case 2.—This patient sustained a burn in full thickness of the right side of her face. Had this been missed or underestimated the right eye might well have been lost. Extensive grafting procedures were necessary.

ASSESSMENT OF THE DEPTH OF A BURN
THE WALKING WOUNDED EVACUATED BY STRETCHER

Illustrate the problem of burns of the face and hands in a small girl. The forehead burn is largely full thickness and so is that on the dorsum of the right hand. This child would probably reach the Field Post with her family on foot, but would have to be evacuated by stretcher.

Treatment was by exposure and grafts were applied on the twenty-first day.

SORTING PROBLEMS

The walking wounded that becomes non-transportable and is treated expectantly with a fatal termination.

This old lady set her clothing on fire in her own home. She took off her clothing, gave herself a hot bath and got into bed. The doctor was sent for and immediately arranged for her transfer to hospital. On arrival she spoke coherently—passed a few cubic centimeters of bloodstained urine and died that night.

This patient in an emergency might well have found her way to the Field Post unaided, but even with full resuscitation such a burn would eventually prove fatal.
paraffin. The lips will be parched and stiff and should be covered with petroleum jelly.

The hands. Should these be exposed and encouraged to move, or should they be covered and splinted? If the patient is able to move his fingers, exposure is recommended. If oedema and the depth of the burn are such that movement is not possible, then dress in the position of function and suspend the arm above the level of the shoulder. Many patients will have both hands elevated in this way and the nursing problem is made correspondingly more difficult. There may be a great future in the employment of special bags or gloves that are relatively permeable to discharge from within, but which do not allow the ingress of dirt and organisms.

The legs. These should be treated by exposure wherever possible. Care must be taken that no undue pressure is allowed on the back of the heels. If the patient insists on flexing the knees into a more comfortable position, the legs will have to be splinted with a back splint, but this should not occur in the first five days. With the usual amount of oedema elevation must be tried. Some overhead “Balkan” beam may have to be improvised and a sling suspension employed. Watch for extension at the ankle and splint if the power of movement to a right angle is lost.

The perineum. However deep the burn, treat by exposure. If the other lesions permit, nurse on the front with arms and legs spreadeagled. Children must be tied out into this position and they suffer little discomfort. Adults will adopt the position more readily but suffer greater discomfort and should be allowed to move on to their sides if practicable.

GENERAL CONSIDERATIONS

To what extent will it be necessary to segregate the sexes? This particularly applies at filter post level where families will be admitted together. The forcible separation of children from their parents, or of wives from husbands, must inevitably increase alarm and despondency. At this level there may be little adequate documentation and children will very easily get lost. In the presence of radiation risks, admissions will have to be divided up into two main categories by a monitoring service, and this further division by the segregation of the contaminated, is likely to tax the resources of the unit even more. No harm can result from treating men and women together in the filter post and then reconsidering the question at base hospital level.

Some discussion always arises when the word “exposure” is mentioned. In the climate of the British Isles, with ambulances as they are today and in improvised buildings without adequate heating, it stands to reason that the severely burnt patient will usually do better if his burns are dressed than if he is exposed to the elements. The walking case also must feel more secure if the burn is dressed, and protected from the friction of rough clothing. Pain is often relieved as soon as a burnt area is covered. The decision to expose a burn should mostly be taken at the main base hospital when evacuation is completed.
Medical officers will be in short supply. It would be a mistake to lay down an exact number of patients per medical officer as a definite establishment. If a figure must be given, I should try to have on duty over twenty-four hours three medical officers for a hundred beds. More medical officers would be preferable, but any decrease in the number would lead to a serious deterioration in the standard of professional care and an immediate reflection of this in an increased mortality and morbidity rate.

SUMMARY AND CONCLUSIONS

The above remarks are intended to underline the serious nature of the problem of the treatment of mass casualties suffering from burns in war. There has been a tendency to underestimate the gravity of the partial thickness burn and the work required to bring these victims through the first five days. The difficulties and importance of adequate treatment of this large group are particularly stressed.

In the treatment of burns the result obtained is commensurate with the amount of care and attention that each patient receives. There is no easy way of obtaining peace-time results in the warfare of the future by merely increasing the burden on the hospital staffs. The results in the patients will be reflected by a parallel increase in the mortality and morbidity rates.

The immediate task before us is to supplement the hospital staff by interesting and training the civilian population in first aid with particular reference to the problem of treating burns. Only in this way can we ensure an adequate pool of trained medical and nursing personnel to assist wherever incidents may arise.

REFERENCES


ERRATUM

In the article on the Field Training Centre on page 169 of the Diamond Jubilee Number, the 1950 D.G.A.M.S. Exercise was mistakenly referred to as "John Bull" instead of by its correct title "Horatius." "Britannia" studied Civil Defence as it affected the United Kingdom and "Horatius" the defence of a river line.