BURNS IN GENERAL PRACTICE

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The general practitioner has an important part to play in the treatment of burns. He can control completely the therapy of the less extensive injury, while in the more severe case he has the extremely important task of instituting measures to combat shock and infection before referring the patient to a special centre. He has in his power, therefore, a key to the rapid and uncomplicated recovery from the burn injury. Since children are frequent victims of thermal injury his responsibility is all the greater.

It is important that the practitioner has a clear idea of what he is able to treat with the facilities at hand. The various types of burns which may be encountered are set out in Table I, together with a suggested disposal of burnt patients.

TABLE I. SUGGESTED CLASSIFICATION OF BURNT PATIENTS

Group 1: *Burns not requiring hospitalization*

- Superficial burns of less than 9% in a child and 18% in an adult.
- Deep burns less than 2% on limbs (excluding feet and hands) and trunk (excluding genitalia).

Group 2: *Burns best referred to a general hospital*

- Superficial burns over 9% in a child and 18% in an adult.
- Burns of the face, hands, feet, genitalia and respiratory tract.
- Deep burns over 2%, including electric burns.
- Burns complicated by other injuries.

The practitioner may institute treatment to patients falling in group 1, the continuation of which he will be able to supervise until the injury has healed completely, usually in a period of 2 weeks. Patients in group 2 require to have their treatment commenced by the practitioner and thereafter to be referred to hospital. In all cases, therefore, it is the general practitioner who deals with the burn in the first instance and the successful outcome depends to a certain extent on this early treatment. The following is a brief account of the management of the burnt patient from the point of view of the general practitioner.

PREVENTION

Because of his domiciliary visits the family doctor has many opportunities to advise a household on elementary measures aimed at preventing the occurrence of burn injuries. Since it is difficult to prevent children from entering the kitchen, pots and pans containing hot substances must be placed on the stove in such a way as to make it difficult for the child to reach them and, similarly, they should be prevented from scalding themselves with hot water running into tubs and basins.

Open fires should be protected by screens, electric heaters placed out of a child's reach and electric plugs fitted with safety catches. In addition the family should be discouraged from attempting to repair electrical equipment. The use of non-inflammable nightwear for children cannot be stressed too strongly.

In commerce and industry the doctor attached to a factory where thermal injuries are liable to occur should see to it that workers are adequately protected from burn injuries by wearing suitable gloves, boots and goggles. It is a good idea to display posters in prominent positions to emphasize the danger and the need for caution and care (Fig. 1).

By his advice the practitioner may prevent a serious injury with possible life-long effects.

FIRST AID

The flames should be extinguished by covering the person with a rug or coat and rolling him over. Running or jumping about only fans the flames and worsens the severity of the injury. The burnt area should be covered by a clean sheet and the patient put to bed. Constricting agents, e.g. boots, must be removed, but burnt clothing should not at this stage be taken off, nor should any local application such as 'borrie', picric acid, tannic acid or cod-liver oil be applied. These substances do no good and may be decidedly harmful. Sedation

Fig. 1. An example of two posters which may be displayed in public places such as libraries and rest rooms.

with morphine (see later) may be indicated; in any case reassurance is very important since the patient may at this stage be suffering from neurological shock.

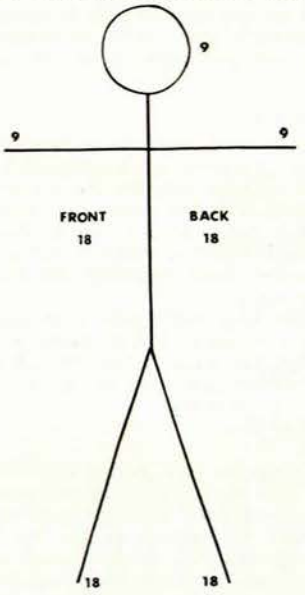

Fig. 2. Wallace's 'rule of nines' which gives a rapid and sufficiently accurate estimation of the size of a burn.

Chemical burns are treated by irrigation with copious quantities of water. If necessary the patient may be immersed in a bath of water.

Estimation of Severity of Burn

By history and general examination the condition of the patient is assessed. Particular attention is paid to the state of the peripheral circulation (by pinching the ear or the nose and noting duration of pallor) and recording the pulse and blood pressure. The presence of other injuries must be looked for, especially in traffic accidents.

The severity of the burn is then appraised. This depends mainly on the extent, depth, and site of the injury but in addition the age and general condition of the patient are important contributory factors.

Extent. A rapid and sufficiently accurate method of determining the size of the burn is by the use of 'rule of nines'[1] (Fig. 2).

Depth. Burns are simply divided into superficial and deep.

(a) *Superficial burns* involve only the epidermis. They are characterized by erythema and blistering. Although tissue destruction is minimal, pain and fluid loss are the chief problems. Healing is usually rapid and, following separation of the eschar, complete.

(b) *Deep burns* involve the epidermis and a variable amount of the deeper tissues. Destruction of tissue may be extensive, blood-loss may be great and general physio-

logical upset considerable. The typical deep burn appears white or charred and is characteristically dry and painless. Healing is slow and, following separation of the eschar, grafting procedures are necessary for the restoration of skin cover.

Site. Burns of the face, hands, feet, genitalia and respiratory tract constitute severe injuries because of the functional importance of these areas. Any deformity will result in a handicap for the patient.

Age and general condition. Small children and elderly people withstand thermal trauma poorly. Malnutrition, anaemia and other general debilitating diseases worsen the prognosis.

General Supportive Measures

Bed rest. In all but the smallest burns, the comfort of bed rest will help to allay anxiety and combat shock.

Sedation. Intravenous morphine, in doses, e.g., of a $\frac{1}{4}$ gr. diluted in 5 ml. of saline and given slowly, is indicated in more extensive injuries. The drug is given intravenously to prevent pooling in a patient with a sluggish circulation. In children excellent results have been obtained with heroin (gr. 1/12—gr. 1/96, depending on the size of the child). It should be remembered that in the extensive burn restlessness may be due to hypovolaemia.[2]

Antibiotics. Antibiotics are only given where specifically indicated.

Anti-tetanus measures. If the patient has received toxoid within the previous 5 years a booster dose of 0·5 ml. may be given. Otherwise the administration of 1,500 units of tetanus antitoxin, together with 0·5 ml. of toxoid, is advised.

Resuscitation. In burns covering less than 9% of the skin surface in children and in adults covering less than 18% intensive replacement therapy is not usually required. Although Moyer[3] advised on the dangers of water intoxication with unrestricted oral intake, we have not experienced this complication and we usually allow less extensive cases an unrestricted intake of water or fruit juice. The healthy kidney will deal with any excessive fluids.

In burns exceeding 9% of skin surface in children and 18% in adults, intensive intravenous fluid therapy is essential if the development of oligaemic shock is to be prevented. Plasma is the fluid of choice and the amount to be given may be based on a variety of formulae, the one used at the Royal Hospital for Sick Children, Edinburgh, being 3 ml. × weight in kg. × percentage of burn. The amount of plasma indicated by this formula is given over a period of 40 - 50 hours, rapidly at first and gradually slowing down as the oral intake increases. (In extensive burns the oral intake is best severely restricted for the first 24 - 36 hours because of a paralytic ileus often associated with these cases.) However at any stage the calculated infusion volume and its rate of administration may be altered depending on the response of the patient (see below).

Since it is advisable that the extensive burn is referred to a general hospital the general practitioner need not concern himself unduly with the details of intravenous therapy. What is vitally important, however, is that he *commences* intravenous therapy without delay and *before* sending the patient to hospital. Since an ambulance ride of varying duration will be necessary the intravenous cannula should be well anchored into a suitable vein. It should always be remembered that over-hydration is rare whereas under-hydration may be fatal.

As a guide to the function of the kidneys and to the adequacy of the infusion, an indwelling urethral catheter should be placed in the bladder so that the urinary output may be measured This, together with pulse, BP and Hb readings, will greatly assist the medical attendant in assessing the state of hydration, particularly if the patient is seen at hospital some hours after sustaining his injury.

Tracheostomy. In burns of the face or respiratory tract it may be wise to do a tracheostomy earlier, when the procedure will be comparatively easy, rather than later, when the condition of the patient has deteriorated and local oedema and infection are present. Once the intravenous infusion is going, the airway established and the patient responding to resuscitative measures, attention can be focused on the local lesion.

TREATMENT OF THE BURNT AREA

Extensive burns. Patients with extensive burns are referred to a general hospital without delay. It will suffice merely to cover the burnt area with clean or sterile bandages.

Patients who are to be managed outside hospital should have their injury dealt with as follows:

Very small burns may be covered by a spirit dressing, which will remove the sting and provide adequate cover.

A more severe burn should be considered a surgical wound and must be dealt with in a clean dressing room or theatre. All personnel must be gowned and masked and the dressing technique must be strictly aseptic. Although general anaesthesia is only rarely required, sedation is advisable.

Any burnt clothing is gently removed and the burnt areas thoroughly but gently cleaned with soap and water. Burnt skin and other debris must be removed; it is best to snip any blisters and cut away the overlying epidermis. Tar may be removed with 'triline'. If the burn involves the scalp it is best to shave the entire head so that any burnt areas may be precisely demarcated.

After the burn has been cleaned it may then be left exposed or dressed. The exposure method of treatment popularized by Wallace,[4] of Edinburgh, is based on the fact that if the burn is kept dry and cool infection will be discouraged although bacterial contamination must inevitably occur. Therefore, if the practitioner can be sure that the lesion will be kept dry and cool, he may quite safely treat his patient by exposure. Burns involving one side of the trunk or a limb are ideally suited to this method (Fig. 3). A child should be restrained

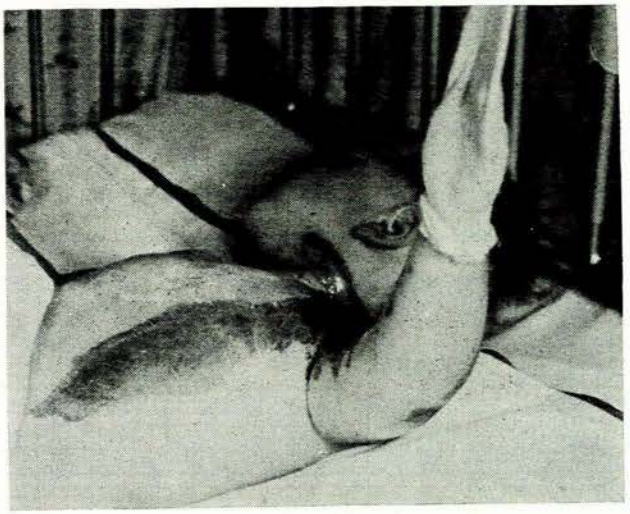

Fig. 3. Burn of the anterior trunk, arm and neck adequately treated by means of the exposure method. Note that the arm is being restrained as well as being elevated.

from touching his burn, otherwise the patient merely lies in bed with his burn exposed to the atmosphere. Limbs may with advantage be kept elevated. The crust which forms will gradually separate after 10 - 14 days revealing an erythematous but fully epithelialized surface underneath.

A small deep burn may be excised as soon as possible or it too may be left exposed. In these cases, after separation of the eschar, skin grafting may be required.

If the burn is circumferential, or if the physician deems it desirable, he may dress the burn. The aim here should be to provide a cover for the injury. It should not irritate or adhere and it should allow any exudate to drain away. After cleansing the burn it is covered by a single tulle gras over which is placed a layer of dry gauze. A thick layer of Gamgee tissue (cottonwool covered by a layer of gauze will do just as well) completes the dressing and the whole is kept in place with a crepe bandage. Care must be taken that the dressing does not constrict the burnt area. Again, limbs may be elevated to discourage the formation of oedema.

Follow-up. Dressings should be left undisturbed for 10 days, by which time healing will be well under way. If, however, the dressing becomes soaked or odorous, or if the patient complains of pain or develops an inexplicable hyperpyrexia, the dressings must be changed. This must be done under aseptic conditions; usually it can be done under heavy sedation and often it facilitates the removal if the dressings are moistened.

Local antibiotics are not used as a routine procedure but if the physician thinks that there is an indication for their use the choice should depend on the bacteriological report of a swab from the surface of the burn. Infection occurring in a superficial burn is a dangerous complication; with the associated tissue destruction the lesion may develop the characteristics of a deep burn with delayed healing and severe contracture formation.

When the burn has eventually healed the new skin cover is exceedingly delicate. It should be gently massaged twice a day with euserine or 'nivea' cream and protected from excessive sunlight. Finally, for burns of the legs, crepe bandaging for some months will provide support and prevent swelling and discomfort.

SUMMARY

1. A distribution of burnt patients between the general hospital and general practitioner is suggested.
2. First aid measures are described.
3. Methods of estimating the severity of the burn injury are discussed, particular emphasis being placed on the estimation of extent and depth of the injury.
4. Supportive treatment, including methods of resuscitation, are discussed.
5. The local wound management by the use of the 'open' and 'closed' methods is detailed.
6. In conclusion, several late features in the care of the patient are mentioned.

It gives me great pleasure to thank Mr. A. B. Wallace, F.R.C.S., for his guidance and teaching, upon which much of this paper is based.

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Abstract