

THE BASIC LOCAL TREATMENT OF MINOR AND MEDIUM SIZED BURNS

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Thermal injuries are frequent in most countries. Unfortunately, there is no fixed set of rules which can be applied in their treatment.

Major burns require a specialised team working in a special centre yet even in the best burn centres the set of rules must be modified by an individual approach in the therapy of very extensive burns. Minor and medium sized burns are no problem for the burns specialist, yet they present a problem for a general surgeon or general practitioner.

The aim of this paper is to present a "loose" set of rules, that may serve as a guideline for the general physician or a general surgeon treating burns under conditions, that are not always optimal.

In the first place, it is necessary to stress, that a different approach has to be taken to different types of burn wounds.

1. "fresh" or "acute" burn wounds

Superficial dermal wounds, that do not penetrate into deeper layers of dermis and may heal spontaneously without necrotic scab formation

Deep dermal wounds, where pathological changes caused by heat penetrate into deep layers of skin destroying the majority of hair follicles. In these spontaneous healing occurs under a necrotic layer, and the burn sometimes converts into a full thickness skin loss.

Full thickness burns : in these, thermal changes penetrate through the whole dermis

and the burn cannot heal spontaneously from the wound bed. Healing may occur only from the edges of the wound.

2. inveterate burn wounds

Wounds, in which the necrotic layer is sloughing off spontaneously

Granulating wounds with remnants of necrotic tissues "clean" granulating wounds.

Old granulating areas resembling trophic ulcers

3. post burn contractures

An important factor, that should be observed, is the localisation of the burn, the age and general state of health of the patient.

The first decision to be taken is which case should be referred by a general practitioner to a surgeon, and by a surgeon to a plastic surgeon. All deeper burns of hands and face should be referred at least to a surgeon, as well as all extensive burns and electrical burns (in the latter the extent of damage is very difficult to judge). This leaves the general practitioner with burns of the limbs and trunk up to 10% of body surface involvement at the most, the general surgeon with the more extensive burns and burns in special localities.

1. Acute burns

The aspect, which is most frequently discussed, is the open or closed treatment of burn wounds. According to our experiences in situations, in which there is no controlled

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environment the closed treatment should be preferred as it prevents further contamination of the wound by airborne infection and dust and it also prevents evaporative water loss from the wound, which otherwise may cause deeper penetration of necrotic changes. This secondary necrotisation has been proved both experimentally and clinically and it may in some cases convert a deep dermal wound into a full thickness wound.

The superficial and deep dermal burns are those, that really require some cover. If there is no temporary skin substitute available, the area is to be desinfected, blisters punctured, the blister fluid thoroughly evacuated. The blisters themselves may be then left in place and covered by a protective bandage. Vaseline gauze may be recommended, but only a light, not too greasy layer. Acute burns should be checked if possible after 24-48 hours, as further blister formation may occur and blister fluid might accumulate. If the blister fluid gels, it forms an ideal media for bacterial growth, and that is of course most unwished for. If the wound at the change of dressings is quite dry and shows signs of spontaneous epithelisation proceeding from skin adnexa, and if the wound has been handled under sterile conditions, the dressings may be left in place until healing is completed or, if the dressings are soaked through with wound secretion. In deeper burns, a necrotic layer may be observed at change of dressings. If the localisation of the burn is in an area, where there is little danger of functional or cosmetic sequelae (the back, the abdomen, the thighs) the wound can be allowed to heal spontaneously by epithelization under the necrotic scab. For an experienced surgeon though, it is preferable to cut off the thin necrotic layer tangentially (till free capillary

bleeding of the wound bed may be observed) and to cover the resulting raw area (after thorough haemostasis by compression) by an autograft. It is advisable to perforate the autograft or to use a meshed transplant, to allow drainage and prevent haematoma formation. Haematomas under the graft interfere with revascularization of the transplanted split-skin graft.

In *deep burns*, full thickness burns, the fastest method of treatment again is an excision of the necrotic tissues and grafting. Nevertheless, the authors are well aware that this may not be possible for various reasons (patient's refusal of surgery, lack of facilities and trained staff etc.). In such cases, lengthy conservative methods must be adopted. The necrosis will slough off (with some gentle help of the surgeon) by the third week post burn and by that time the wound bed will be filled with granulating tissues. Further treatment in such cases is the same, as in the following paragraph.

(2) *Granulating wounds* that a general practitioner or surgeon very frequently encounters, mostly still bear islets of necrotic tissues. These have to be debrided to avoid gross bacterial colonisation. Nature in its efforts to cast off the dead tissue should be aided. If the granulating area is in the vicinity of joints, on the face, neck, in the axillae or in the popliteal region, it must be grafted. Granulating areas, if left uncovered by a graft, have a tendency to contract markedly, thus causing both functional and cosmetic sequelae.

A granulating wound must be well prepared for grafting. All remnants of necrotic tissues must be pain-stakingly cut off. If there is any suppuration from the wound bed, the best method to be adopted is the frequent application of moist dressings, i.e. gauze,

soaked in a mild disinfectant, preferably of a low pH. Once the granulations improve, are bright red with a fine "grain", are no longer covered with residual necrotic islets or purulent secretion, grafting should not be postponed.

It is preferable to remove the granulating tissues; oedematous, hypertrophic granulations must be scraped off and the wound bed thus prepared for grafting (again moist dressings may be applied prior to surgery).

Local application of antibiotics can be recommended only when there is a possibility of prompt bacterial examination, on which the correct choice of antibiotics should be based.

During conservative treatment, attention should be paid constantly to the danger of scar contraction. If the granulating area is located in the axilla for instance, the upper extremity must be kept constantly in abduction and elevation, until healing is completed. The same goes for other localities. The positioning of the body (of limbs) must act against the natural tendency of the wound tissue to contract.

If a patient refuses surgery and grafting, a very lengthy process of healing is to be expected. This has to be explained to the patient thoroughly. The patient should also be instructed how to position the injured limb and how to exercise it, to minimise the inevitable danger of wound contraction.

The authors are well aware that many general practitioners and general surgeons are overworked and short of nursing staff and that treating burns represents a sizable burden. Most of the patients though are sufficiently intelligent (or have a skillful family member) as to be able to take at least

part of the load off the surgeons' shoulders. They can position the limbs and do active exercises during the process of healing at home or in a hospital (sometimes even the most dressings may be changed by sufficiently skillful and well instructed family members).

Autografting

Prior to the application of a medium thickness split-skin graft, possible bleeding is to be checked by compression. The grafts should be spread out well. In hospitalised patients, the semi-opened method of treatment may be adopted, as recommended by Bilwani. In the semi-opened method, the graft is covered by a thin layer of vaseline gauze and over it is a sterile sheet is loosely draped, so that the surgeon can check the wound frequently and with ease; a graft must never be left without supervision, as accumulation of pus or haematomas might endanger its take.

For smaller granulating areas that seem to be unfavourable and resist local therapy, a good, practical method can be recommended. If the grafts can be taken under general anaesthesia, then it is advisable to harvest twice the amount of split-skin grafts then is necessary. The surplus grafts can then be wrapped into gauze moistened with saline, placed in sterile Petri dishes (sealed with tape) and stored at $+4^{\circ}\text{C}$. Should the first set of grafts fail to take, moist dressings should be applied for a very short period and with the improvement of the wound bed the second set of grafts can be transplanted without anaesthesia. The sooner a granulating area can be grafted, the better. The area need not necessarily be sterile, but there should be no visible suppuration, and no suspicion, that the colonising agent might be pathogenic Streptococci, the worst enemies of

grafts (besides residual necrotic tissues on the wound bed).

Possible obstacles and difficulties

Most of the failures in the treatment of burns are caused by the surgeon being unable to do, what he knows should rightly be done (because of the patients refusal to undergo surgery, lack of facilities, lack of staff. Lack of time is not an excusable reason). In well equipped hospitals with an experienced nursing staff, early necrectomy (within 3-10 days post burn) is performed with immediate grafting. This procedure shortenes the treatment considerably (60%) and also cuts down the cost of treatment.

The authors, who visited several foreign countries and also had the privilege of spending two highly instructive weeks in India, realize, that the standard procedure adopted in Prague, Birmingham, Cincinnati, Barcelona and many other places cannot be carried out everywhere and in every case. For one, the authors are well aware that the patients often come late to a doctors office, at a time, when the wound must be classified as "inveterate", and a clean wound bed can no longer be expected. The patient may refuse surgery, or the facilities may be unadequate. If there is no choice and the wound has to be allowed to heal spontaneously, this natural process must at least be supervised. The wound must be kept clean, protected from dust and insects (and the patient.) When there is a shortage of gauze for a more frequent change of dressings, small, clean, preferably sterile cotton sheets may be used as an upper layer of a protective bandage. Positioning of injured limbs and active excercises are specially important in these cases of protracted healing. Whenever though autotransplantation is

indicated the surgeon should use all his resources to persuade the patient to agree with surgery.

During our fascinating stay in Ahmedabad we saw work being done both in the state hospital as in the Municipal hospital. There is no doubt, that Indian surgeons are true to the great Indian tradition in plastic surgery and that they are well able to do beautiful reconstructive work. But.....and here comes the point : many reconstructive operations of burn scar contractures would not be necessary, had the initial treatment of the thermal injury been correct and timely. In most cases, medical people are not to blame, as the patients simply come for treatment too late. That of course is an immense problem to be solved by medical authorities combining forces with social workers.

Nevertheless, once a burned patient is under medical supervision, functional sequellae should not develop. Positioning must be started immediately after injury and adequate physiotherapy must be insured during the whole course of treatment.. The gravest mistake is to wait till healing is completed. The patient must be supervised even after he is discharged from the hospital. In deep dermal burns that heal spontaneously secondary contraction of the area occurs in most of the patients even after 3-4 months. The patient must be made aware of this danger and urged to seek medical advice at regular intervals. The advice to give in such cases in this : pressure massage, that the patient can do himself (or his family member) Light pressure applied with thumbs for 30 seconds in one spot, starting from the periphery, one centimeter after another. The patients are in most cases happy to be able to do something for themselves, and if the

procedure is explained to them properly, they eventually form a habit of at least twice daily ritual of massage. The scar tissue in time becomes pliant, soft, and thus functional deformities can be prevented, as well as the necessity of reconstructive surgery.

With a frequency of burns as high as it is in India, no effort should be saved in preventing these grave injuries as well as in improving the treatment, to make the burden of the victim lighter. If we want the victim to cooperate, and cooperate he must, then

everything, the whole process of healing, possible necessity of grafting and the danger of sequellae must be explained to him thoroughly. Making the burden of the patient lighter no doubt makes the burden of the surgeon greater.

Let us hope though, that future preventive campaigns, and some improvements in household appliances may help to lower the incidence of burns, most of which, are unnecessary, as they are frequently caused by the patients carelessness.