The early cooling of burns

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Although its beneficial effect has been known for 200 years (Davies, 1982) the immediate application of cold water to a burn is a technique rarely performed by first-aid teams, and the few teams that do practise this restorative therapy lack precise indications as to its use.

The purpose of this paper is to provide a brief review of the benefits of the cooling of burns, to suggest some precise indications and to codify its application.

The proportion of persons treated every year for burns is 3 per 1000 inhabitants, i.e. 0.3% of the population (Latarjet, 1989). Among the immediate forms of first aid therapy an important role is played by the cooling of the burned parts by the application of cold water.

THE BENEFITS OF COOLING

Reduction of burn depth

Even if the burning agent is no longer exerting any caloric action, the heat stored in the superficial layers of the skin continues to spread towards the deeper layers. This heat spreads radially both outwards (into the air at the initial moment of the burn) and inwards (to the skin and muscles). Considering that the skin consists mostly of water and that water conducts heat 20 times as fast as air, the dissipation of heat is bound to be in the direction of the deeper layers of the skin, so that its destructive action is extended.

Cooling reduces tissue temperature and therefore the gravity of the lesions; it spares the basal membrane and thus facilitates cicatrization (De Camara et al., 1981).

Reduction of oedema

Simply by diminishing the extent and the depth of the burn, cooling reduces oedema. Also, the resulting vasomotor mechanisms improve the quality of
local circulation and reduce the liberation of histamine and kinins responsible for inflammatory phenomena and in particular for oedema, both at the level of the damaged tissues and at a distance.

Reduction of pain

Cooling reduces pain through the effect of the mechanisms already mentioned (improvement of the local circulation, reduction of the liberation of inflammation mediators, limitation of the extent and depth of the burn) (Davies, 1982). The soothing effects of cold, which blocks cutaneous nervous conduction, are also familiar.

INDICATIONS

All recent burns benefit from the application of running cold water. Apart from deep electric burns with a clear cutaneous–mucous manifestation, all burns must be cooled with running cold water, whatever the nature of the burn agent.

MANNER OF APPLICATION

The cooling of a burn must be achieved by a constant flow of water over the burn, extending beyond the region initially burned but avoiding the 'bath-tub effect' i.e. contact of all or part of the body with the water that has been used for cooling.

POSITIONING OF THE VICTIM

Burns in one or two limb segments

The victim should be placed as comfortably as possible and the uninjured parts of the body protected by a waterproof covering. For example, in the case of burns in both legs, water should be applied to the patient in a sitting position. Gravity will ensure the flow of water. In the case of burns in the upper limbs also the victim should be placed in a sitting position, and the lower part of the body covered by a waterproof apron, using, for example, a plastic sheet.

Burns of the back or thorax

The same system can be used provided the seat used has no back (stool, edge of table, edge of stretcher). The waterproof garment is worn like a loose skirt to cover the lower part of the body.

Extensive burns

In this case only the lying position is possible for the application of cold water. The victim must therefore be placed on a hard, flat surface such as a pressure