ENZYMATIC DEBRIDEMENT BY MEANS OF BROMELEIN IN BURNS

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Early surgical debridement followed by autografting is the standard of care for deep dermal and full thickness burns.

Recently the use of an enzymatic debriding agent rich in bromelain (DAB) has been proposed as a non-surgical alternative for a prompt removal of burn necrotic tissue and healing acceleration.

Bromelain belongs to a group of protein digesting enzymes obtained commercially from the fruit or stem of pineapple. It is a mixture of different components and in particular of escharase which is capable of dissolving and removing necrotic tissue and, at the same time, it does not damage viable tissue.

It is here described a clinical experience in patients affected by extensive burns admitted to Turin Burn Center employing DAB.

From January 2016 to September 2016 15 patients, 10 males and 5 females, age ranging from 16 to 84 years, with acute burns were treated. Most injuries were diagnosed as mixed depth (deep dermal and full thickness), while 4 were deep dermal and 5 were third degree burns. The distribution included upper extremity burns (11 cases), lower extremity burns (8 cases), trunk burns (7 cases), neck (5 cases) and face burns (12 cases); the percentage of the total body surface area ranged from 10% to 80%. Approximately half of all burns were caused by contact with fire or flame. Other etiologies included hot oil and cast aluminum burns.

Treated surfaces ranged from 8% to 15% of TBSA according to the producer recommendations. Treatment was applied in the early phase (average 3 days): the burned areas were covered with a thick DAB layer and then occluded with a sterile polyurethane sheet for 4 hours. Afterwards DAB was removed, the wound bed scrubbed, irrigated and further covered with a wet-to-dry dressing containing saline and antibacterial solution for 2 hours to remove any residual DAB and dissolved eschar.

The efficacy of debridement was estimated as a percentage of the necrosis removed. Following termination of DAB protocol, well debrided areas were immediately grafted with glycerol preserved allografts in 13 cases. In 2 cases debridement was judged as incomplete and topical preparations were applied. Four patients died within two weeks and eleven survived. Out of the latter 8 were successively operated with autografts in those areas where bromelain was applied, while in 3 patients a spontaneous wound healing was achieved.

In 7 patients local infection requiring local and systemic anti-infective therapy occurred in the treated areas. Out of these cases, 4 patients reported wounds deepening and needed surgical excision.

DAB debrided and immediately allografted wounds afterwards treated with autografts reached wound closure after 12-18 days, while other wounds spontaneously healed in 35-45 days.

The most common adverse events possibly drug related were temperature elevation (60%), localized pain (20%) and a localized burning sensation (13.3%).

Many patients complained of various sensations at the treated area immediately on DAB application. These sensations ranged from a discomfort to a very mild burning or itching. Typically, the more intense sensations started to decrease after 15-20 min of treatment and most of these symptoms quieted within 40 minutes of application. Pain assessment was evaluated by a 10 -grade visual analogue scale.

The protocol of analgesia was the one in use during extensive burn dressing changes in our center. Out of the 8 autografted patients 6 had hypertrophic scarring. Out of the 3 spontaneously healed patients, 1 developed hypertrophic scars. All hypertrophic scars were treated with pressure garments or silicone sheets. In conclusion enzymatic debridement by means of a product rich in bromelain has shown to be safe and effective since in most cases a complete debridement of the eschar was obtained after only one application with minimal side effects and very low blood loss

It also was selective, resulting in removal of the necrotic eschar without affecting the surrounding viable tissue. Selectivity of the debridement seemed particularly accurate in deep partial thickness burns, where enzymatic debridement could be used as a diagnostic procedure to differentiate between partial and full thickness burns.

Prevalence of local infections and late appearance of hypertrophic scars seems to be similar in this little case series to our standard results, even if more numerous experiences will allow us to gain stronger evidences.