

Caustic burn caused by intradermal self administration of muriatic acid for suicidal attempt: optimal wound healing and functional recovery with a non surgical treatment

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SUMMARY: Caustic burn caused by intradermal self administration of muriatic acid for suicidal attempt: optimal wound healing and functional recovery with a non surgical treatment.

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Background. Caustic burns are burns of third and fourth degree caused by strong acids or strong bases. Muriatic acid is often used for suicidal attempt by ingestion. We describe a case of a caustic skin lesion caused by intravenous failed attempt of suicide by injection of Muriatic acid in a woman affected with bipolar-syndrome. Generally, caustic burns are treated by cleansing, escalectomy and coverage with skin grafts.

Case report. We treated the patient with a non invasive technique with collagenase and hyaluronic acid sodium salt cream (Bionect start®), hyaluronic acid-based matrix (Hyalomatrix®) and Vacuum-Assisted Closure (VAC) Therapy®.

Results. We obtained complete healing in 6 weeks.

Conclusions. Combined use of non invasive techniques seems to ensure only advantages for both the patients and the Health System. It reduces health care costs and risks for the patients such as nosocomial infections. Patient's compliance is high, as its quality of life. Complete healing of the wound is fast and recovery of function is full.

KEY WORDS: Caustic burns - Collagenase - Hyaluronic acid-based matrix - Muriatic acid - Vacuum-Assisted Closure (VAC) Therapy®.

Introduction

Caustics are strong acids or strong bases exerting an irritant action on the body tissues (1-3). Strong acids more commonly used are hydrochloric, phosphoric, chromic, sulphidric, nitric, hydrofluoric acids. Accidental contact with these substances cause chemical burns. Caustics are also used to aim suicide by ingestion (4-7) or for the purpose of aesthetic disfigurement. The extent of the damage depends on concentration and amount of the substance and type of commercial preparation (1, 2, 4). Damage caused by concentrated acids in contact with the skin is linked to dehydration and coagulation of albuminoid matter of epithelial and connective tissues and cell necrosis (1-3). Chemical burns are burns of third and fourth

degree (3). Lesions are painful and no bleeding (1-3).

Therapy is based on the expulsion and neutralization of the caustics, then escharotomy, cleansing and coverage with grafts. We describe a case of skin caustic lesion by self-administration of muriatic acid for suicidal attempt, proposing a non surgical treatment with combined use of collagenase and hyaluronic acid sodium salt cream, hyaluronic acid-based matrix and Vacuum-Assisted Closure (VAC) Therapy®.

Case report

We received a 42-year-old woman, former alcoholic, affected with bipolar syndrome, presenting a skin lesion 3 hours later a suicide attempt by the intravenous essay injection of about 1 cc of Muriatic Acid. She reported a caustic lesion on the volar surface of the distal third of the right forearm with a black and depressed necrotic eschar of 3x1.5 cm associated with Median Nerve compression (Fig. 1a). Lesion was lardlike in consistency with regular margins. Perilesional skin was erythematous, edematous and painful. Rating joint motion, grip strength, power clamp and sensitivity showed remarkable reduction for I to IV ray.

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Non-surgical burn repair



Fig. 1 - Photograph sequence of wound at different time: lesion 3-days after the injection of 10 cc of Muriatic Acid (a); surgical decompression of Median Nerve, wound debridement and apposition of Hyalomatrix® (b); lesion 3-weeks (c) and 30-days (d) after Hyalomatrix®; VAC Therapy® apposition (e); wound appearance 7-days (f) and 15-days after VAC Therapy® (g). Six weeks later the trauma we obtained optimal healing of the wound (h).

We performed percutaneous infiltrations of 20 cc of physiological solution and 2 mEq of sodium bicarbonate. Then, we covered with a cream of gentamicin and betamethasone, hyaluronic acid impregnated gauzes and non-compressive bandage. Moreover, we medicated every day with hyaluronic acid sodium salt cream (Bionect Start®), zinc oxide past in the perilesional skin and compressive dressing. A week later, we performed surgical decompression of Median nerve and escharotomy. So we applied a hyaluronic acid-based matrix (Hyalomatrix®) in the area of the loss of substance (Fig. 1b), drainage and compressive dressing. Three weeks later, we removed Hyalomatrix®. Because of the presence of little skin suffering areas (Fig. 1d), we performed VAC Therapy® for two weeks (Fig. 1e).

Results

Six weeks later the trauma, we obtained an optimal healing of the wound (as shown in the photograph sequence Fig. 1a-h) with total recovery of sensitive and motor function (Fig. 2).

Discussion and conclusions

Caustics burns are burns of third or fourth degree (3) with features depending by the caustic agent (1, 2). Caustic's action is progressive. At time of first observation, it is difficult to assess the degree of the lesion: the damage develops within minutes or days. A careful examination of patient's general conditions is always required (1). Muriatic burns are generally caused by occasional contact or working accidents. As far as we know, just one case of self administration of high concentration solutions of HCl has been described (2). Cases of oral ingestion have been reported for suicidal attempt (2, 11). Cutaneous contact with HCl (solution of HCl of 10% of concentration) (12, 13) causes skin necrosis, with formation of a dry eschar of varied thickness, irregular form, dark color and hard consistency (1, 2) and hypertrophic or keloid scars 2-4 weeks later (1-3, 10).

Therapy should be as immediate as possible, in order to prevent the continuation of the detrimental action and is based on the expulsion and neutralization of the caustic with appropriate non-toxic and well tolerated sufficiently alkaline chemicals antidotes. Hydrochloric acid is neutralized with sodium bicarbonate or magnesium hydroxide soap (1). Once the removal and neutralization of the caustic, local lesions are treated by escharotomy, cleansing and coverage with skin grafts.

In our case, we preferred a non surgical treatment op-

ting for application of Bionect Start® combined with hyaluronic acid-based matrix (Hyalomatrix®) and V.A.C. Therapy®.

Bionect Start® is a topical cream containing hyaluronate acid, bacterial fermented sodium hyaluronate (0.2% w/w) salt and bacterial collagenase obtained from nonpathogenic *Vibrio alginolyticus* (>2.0 nkat1/g) (14). Its application on the lesion provides wound preparation. It promotes vascularized granulation tissue, it reduces formation of fibrin and exudates (15), generating a microenvironment stimulating the secretion of growth factors, proliferation and migration of fibroblasts, endothelial cells, keratinocytes (14-18).

Hyalomatrix® PA (i.e. "Prolonged Action") is a bio-resorbable dermal substitute. Fibers integrate themselves into the wound bed and provide a 3-dimensional scaffold leading to cellular proliferation, migrations and extracellular matrix (ECM) fibrous components deposition, accelerating wound healing or providing an excellent wound preparation to support implantation of autologous skin grafts (19-23).

Vacuum-Assisted Closure (VAC; KCI, Switzerland) Therapy consists of a sterile polyurethane sponge, tightly sealed with a self-adhesive plastic sheet and connected to a pump generating subatmospheric pressure (24-26). This lead to acceleration of granulation tissue formation: secretions from the wound bed are continuously evacuated, decreasing edema and bacterial contamination and improving local blood flow.

Our non invasive technique was advantageous. First of all, it allowed to obtain a complete resolution of the wound over a short period (just 2 months). Then, patients show more compliance for treatments avoiding hospitalization, achieving reduction of risks of nosocomial infections and physical and psychological diseases due to entrapment.

Bionect Start®, Hyalomatrix PA® and VAC Therapy®, as well as allowing the healing of the wound, decrease significantly the pain felt by the patient, the amount of exudate and the bad smelling from the wound, improving patient's quality of life.

In this case, the management of the patient was complicated by patient's psychiatric condition and we thought mandatory to choose a treatment that would ensure the least physical and psychological stress.

In addition, the use of non invasive techniques allows also the reduction of health care costs.

Thus, combined use of non invasive techniques seems to ensure only advantages for both the patients and the Health System. In fact, it reduces health care costs and risks for the patients such as nosocomial infections. Moreover, patient's compliance is high, as its quality of life. Complete healing of the wound is fast and recovery of function is full.

Non-surgical burn repair

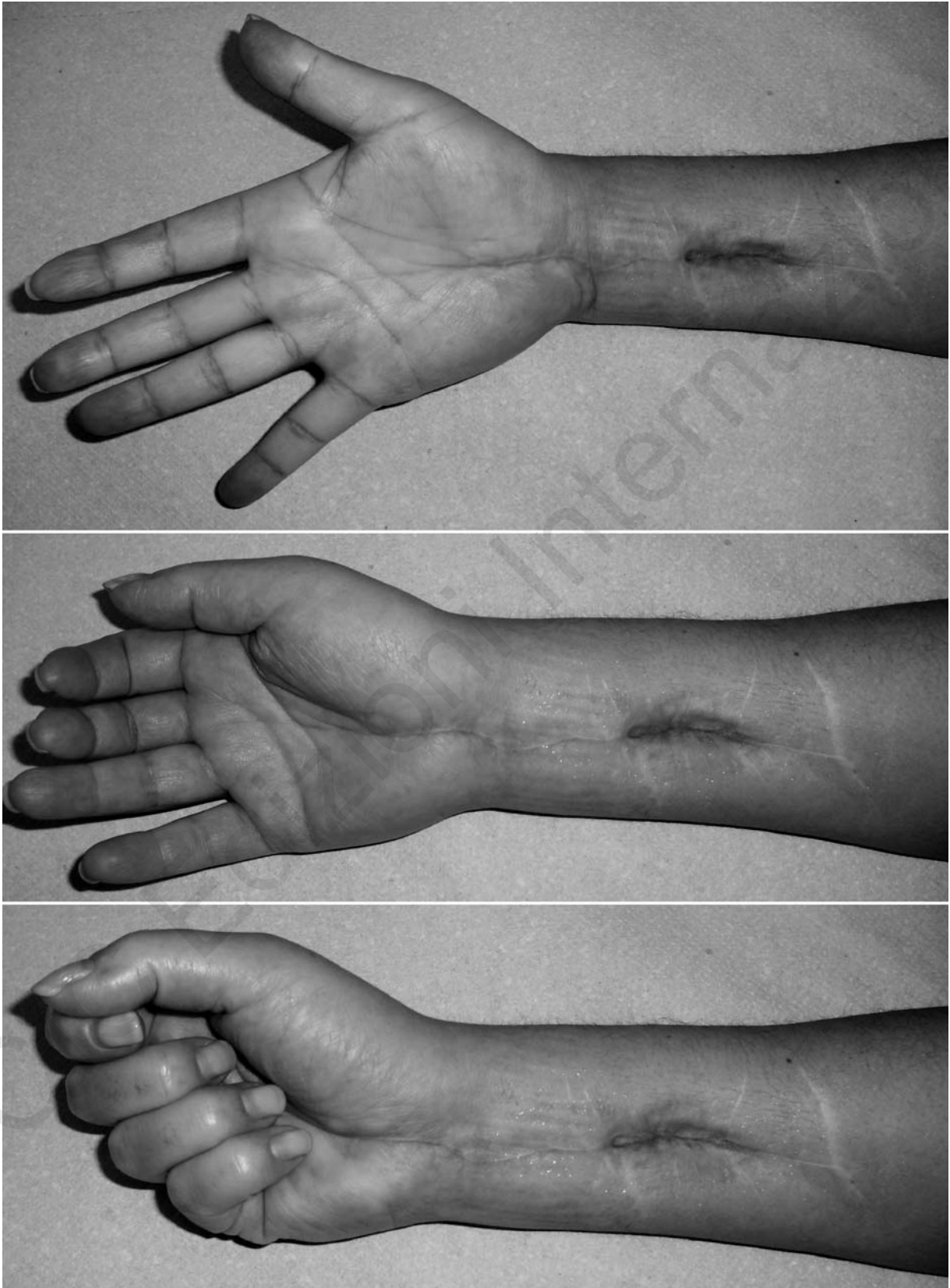


Figure 2 - Total recovery of motor function.

Acknowledgements

All Authors hereby declare not to have any potential conflict of interests and not to have received funding for this work from any of the following organizations: National

Institutes of Health (NIH); Wellcome Trust; Howard Hughes Medical Institute (HHMI) and other(s). Each author participated sufficiently in the work to take public responsibility for the content.

Special thanks to Dr. Franco Bartolomei for his help in preparing this paper.

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