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CORRESPONDENCE AND COMMUNICATION

Treatment of hypergranulation tissue with intralesional injection of corticosteroids: Preliminary results

Dear Sir,

Granulation tissue typically consists of fibrous connective tissue mixed with numerous blood vessels. It grows from the base of a wound and is able to fill the edges during the proliferative phase of healing, facilitating epithelialization and wound closure.

Prolonged stimulation of fibroplasia and angiogenesis results in hypergranulation, that prevents epithelialization and arrests the healing process. Treatment of hypergranulation tissue is controversial and sometimes difficult.¹

Different treatment modalities like silver nitrate, laser ablation, hydrocolloid dressing, trichloroacetic acid, poliuretan foam, surgical excision, topical corticosteroids have been reported in literature. Nevertheless, hypergranulation tissue is highly resistant to previous described treatment modalities.

Between July 2012 and February 2013, 55 patients were recruited at our Department's "Difficult Wounds Clinic" where non-healing wounds, ulcers, post-operative complications and external referral are treated once a week.

Slow-healing (more than two weeks) or non-healing post-traumatic wounds, flaps edges or skin graft recipient or donor sites, complicated by hypergranulation tissue at post-operative follow up were included in the study as soon as it was detected. All patient were investigated for contraindications to systemic steroid therapy and, if any, they were excluded. The age of patients ranged between 6 and 78 years. Ethical approval was obtained by the Hospital Ethical Committee. Intralesional injection of corticosteroid (triamcinolone acetonide 40 mg/2 ml) diluted 1:1 with NaCl 0.9% was used. The dose of corticosteroid injected varied for each patient, ranging from 0.3 to 1.5 ml, according to the size of the area to be treated. On average, we injected 0.1 ml for each square centimeter of hypergranulation tissue. Insulin syringes of 1 ml with needles of 29G diameter and 12.7 mm length were used. Patients were followed up

at one week, two weeks, one month and six months. A second or a third treatment was performed when hypergranulation tissue was still present at follow up visits. Patients were asked to classify their pain level at treatment ranging from 0 to 5 according to the "Faces Pain Rating Scale". Each number was associated to a progressive and ascending intensity of pain.

All 55 patients showed an improvement of the injected areas at seven days follow up. In 11 cases a second treatment was necessary and, in three of them, a third injection was needed to complete the healing process. Forty-four patients (80%) completed epithelialization seven days after the first treatment. Only 20% of the patients completed their healing in two or three weeks. In particular, eight patients received a second injection seven days after the first one and three patients were treated with triamcinolone acetonide injections for three times, once a week. Hypergranulation tissue disappeared, the exuberant area of unhealed tissue underwent atrophy, the margins lowered and epithelial cells were able to grow towards the center of the wound or the graft (Figures 1 and 2).

The mean healing time was noticeably reduced compared to the previous treatment methods. Silver nitrate medications have been used for years with a mean healing time of six weeks² while, using triamcinolone acetonide injections, wound closure was obtained in one to three weeks.

The mean score of Faces Pain Rating Scale was 1.2 and all patients, including children, tolerated the procedure very well. Most frequent aspect of the healed tissue at one week was a crusted area where, once the superficial, non-adherent crust had been removed, epithelized tissue was found. No local or general major complications occurred after treatment or even during the follow up period.

According to Borkowski et al.,³ chemical cautery with silver nitrate sticks or topical steroids, directly applied to the wound, is the most frequently used treatment. Chemical treatments produce fibroblasts destruction and a subsequent decrease in the density of pathological tissue but their application can cause adverse effects like pain, discomfort, and rarely, electrolyte abnormalities.

Topical corticosteroids have shown to inhibit the inflammatory response and reduce excessive angiogenesis in a small series of children treated by McShane et al.⁴ with good results and ideal compliance. Nevertheless, topical treatments required frequent applications (twice daily)

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Figure 1 Skin graft recipient site on the scalp, complicated by hypergranulation tissue.

with occlusive dressing and the healing process took at least two to five weeks to be completed.

The mechanism of steroids action on the inflammatory response and their molecular targets have been extensively studied and described in literature. In particular, many studies focused on the efficacy of their use to treat keloids and hypertrophic scars because of the ability to induce atrophy of excessive fibrous tissue.⁵ We used injective instead of topic application to maximize the efficacy of the treatment and to avoid the use of occlusive dressing; in this way, steroids penetrate directly in the target tissue



Figure 2 Follow up at one month after two treatment sessions.

accelerating notably the action time and simplifying the management of the wound.

This procedure was very well tolerated by patients. Injections were almost painless, no medication was needed at home and the treatment took only one session in most of the cases. The mean healing time and the cost of medications were noticeably reduced. Patients' compliance to the treatment was optimal.

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Author's roles/Participation in the authorship

Dr. Mariagrazia Moio was the primary investigator, conceived the idea for the study and contributed substantially to the conception, analysis, interpretation, drafting and revision of the manuscript submission.

Dr. Ilaria Mataro was the secondary investigator and contributed to the conception, analysis, interpretation, drafting and revision of the manuscript submission.

Dr. Giuseppe Accardo contributed substantially to the conception, analysis, interpretation, drafting and revision of the manuscript submission.

Dr. Pierluigi Canta oversaw the clinical follow up of patients and contributed to the revision of the manuscript submission.

Dr. Fabrizio Schonauer was the Senior Author and contributed to the revision of the manuscript submission.

Conflict of interest

None.

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