Utilizzo di staminali da tessuto adiposo nelle lesioni cutanee croniche: esperienza clinica

Use of adipose tissue stem cells in chronic skin lesions: clinical experience

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RIASSUNTO

La guarigione di una ferita cronica è un processo articolato e complesso, che richiede una visione clinica globale del paziente. Tuttavia, il trattamento locale del letto della ferita riveste un'importanza fondamentale. Sempre più ormai si parla di *medicina rigenerativa di tipo induttivo* come mezzo per stimolare le cellule senescenti all'interno di una lesione cutanea cronica, in particolare mediante l'utilizzo delle cellule staminali mesenchimali. Il tessuto adiposo autologo rappresenta una fonte di cellule staminali e la tecnologia Lipogems® ne rende possibile la sua applicazione clinica. In questo studio vengono analizzati i risultati ottenuti con tale metodica che, seppur con i limiti di un numero ancora non consistente di pazienti, sono comunque incoraggianti nel proseguire lungo questa strada, considerata da molti come l'ultima frontiera nel wound care.

ABSTRACT

The healing of a chronic wound is an articulated and complex process, requiring a patient's clinical global vision. However, local treatment of the wound bed is of fundamental importance. More and more now we talk about regenerative medicine as a means to stimulate senescent cells in a chronic skin lesion, particularly through the use of mesenchymal stem cells. Autologous adipose tissue is a source of stem cells and Lipogems® technology makes it possible for its clinical application. In this study we analyze the results obtained with this method that, even with the limits of a not yet substantial number of patients, they are still in encouraging continue along this road, considered by many as the last frontier in wound care.

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INTRODUCTION

The process of healing in acute wounds is interrupted in cutaneous ulcers resulting in a chronicity of the wound bed. Even in global and holistic surroundings, it is necessary to intervene locally in order to determine any changes to the environment that will encourage epithelialization[1]. With the increase in the incidence of the pathology, a number of dedicated and specialized centres are finding a progressive diffusion on the Italian panorama. These centres tend to frequently experiment new treatments, precisely because of the quantity of patients with complex and difficult cases. We have analysed our experience in the use of mesenchymal stem cells extracted from adipose tissue via a dedicated system.

Lipogems® is a system of lipoaspiration, processing and re-implantation of adipose tissue[2]. The entire procedure is undertaken in one surgical step under general or epidural anaesthesia. About 60 cc of adipose tissue are aspirated from the fat that is commonly found in the abdomen or thigh areas. The harvested material is then introduced into a closed and sterile system. Through a minimal mechanical *enzyme free* processing a micro fragmented, non-expanded adipose tissue destined for an

autologous use is obtained[3]. The obtained Lipogems® product, supporting the natural regenerating process of tissues[4], is injected into and around the ulcerous wound where it can carry out the process of *lipofilling* (Figure 1).

MATERIALS AND METHODS

We have gathered case studies from our centre obtained from patients treated with this technique during the period January to June 2017.

Figure 1. *Lipofilling* procedure .

Table 1. Registry of patients involved in the study.

Patients	17
Males	8 (47.1 %)
Females	9 (52.9 %)
Mean age of the patients (years)	65.01 (38÷84)
Mean age of the lesions (monhs)	116.3 (1÷588)

Table 2. Etiology.

Venous + arterial	6
Inflammatory	5
Decubitus	4
Others	2

Table 3. Results and status of the lesions.

Improved	6	35.2%
Worsened	2	11.8%
Unchanged	2	11.8%
Healed	7	41.2%

A total of 17 patients, of which 9 were female and 8 male, were treated. The mean age of the patients was 65.01 years whilst the mean time of wound development was 116.3 months (Table 1). Regarding the aetiology, 35% were vascular ulcers, 29% inflammatory ulcers and 23% decubitus lesions (Table 2).

The method was used in particular on deep ulcers, with the aim of obtaining a replenishment of the lost material. Furthermore, the lesions presented a wound bed, which was clean, granulating and free of infection.

RESULTS

All the patients were followed-up for 4 weeks. In 7 patients (41.2% of cases) there was found to be a complete healing of the lesion. In 6 cases (35.2%) there was an evident improvement in the lesion (Figure 2 and 3)

Figure 2. Control 7 days after Lipogems® treatment.

Figure 3. Control 28 days after Lipogems® treatment.

in 2 cases there was no result; finally in 2 cases there was a deterioration with an expansion of the wound and surrounding area: in one case due to a post-operative infection and in the second no specific cause was found (Table 3). The best results were found to be in the group with decubitus ulcers, with 3 lesions out of 4 healing by week 4 meanwhile the fourth healed by week 9.

DISCUSSION

We started using this method in January 2017. The technique required the harvesting of fat from the abdominal area (lipoaspiration): the fact of having to execute this phase under sedation or epidural anaesthesia limits the possibility of patient recruitment. Furthermore, in the candidates, there has to be a good representation of adipose tissue as a consequence it cannot be used in subjects who are debilitated or particularly thin (a problem particularly found in the elderly). Despite the limitations of the study for the reasons expressed above, the results are encouraging. Further studies are necessary to confirm the evidence.

CONCLUSIONS

The use of mesenchymal stem cells from fat is a valid solution in the treatment of deep lesions, because of its capacity to *fill* the wound bed and, at the same time, regenerate the tissue. The limits are in the invasiveness of the technique, that requires an increased anaesthesia, and in the need for the patient to have an adequate amount of adipose tissue. Undoubtedly, the techniques of cell regeneration exploiting mesenchymal stem cells are increasingly emerging as a potential new clinical application in the treatment of chronic cutaneous lesions.

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