

Wound piercing: a novel approach for deep cutaneous ulcer cleansing



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Wound piercing: a novel approach for deep cutaneous ulcer

AIM: *To achieve healing of cutaneous deep and complicated ulcers, along with adequate ulcer debridement and microbe-specific antibiotics, any fluid and/or exudate stasis should be avoided.*

METHODS: *We have designed a surgical procedure of ulcer piercing and drainage with silastic tube which allows a continuous or daily cleansing of any pierced hidden tract by positive pressure irrigation. This procedure has been utilized in a series of 11 patients with deep infected recess of a sacral pressure ulcer (n=5), of 2 posttraumatic leg ulcers (n=2), of a deep perianal fistula (n=1) and dehiscence of a laparotomic surgical wound (n=3).*

RESULTS: *In these patients deep ulcer recess completely recovered within 2, 3.5, 1.5 and 2.5 months with ulcer piercing procedure.*

CONCLUSION: *Therefore, taking into consideration the advantages and the lack of adverse side effects or contraindications, the ulcer piercing procedure represents a small but effective step toward a better, safer and conservative approach in the treatment of deep complicated cutaneous ulcers.*

KEY WORDS: Cutaneous ulcer, Pressure ulcer, Perianal fistula, Surgical wound dehiscence, Wound healing

Introduction

Deep contaminated cutaneous ulcers with hidden tracts or fistula represent a critical surgical problem which requires adequate and careful ulcer debridement, removal of any dead/infected tissues or foreign body, drainage and treatment with systemic microbe-specific antibiotics.

Surgical drainage of any superficial or deep recess of the ulcer is mandatory for the prevention of any fluid or exudate stasis: stasis contributes for persistent bacterial contamination and infection.

Therefore, in order to reduce the negative impact of stasis on wound healing, we have, recently, designed a simple surgical procedure of ulcer piercing (UP) and drainage which allows a constant adequate cleansing of the ulcer and facilitates irrigation of any pierced hidden tract. We have successfully utilized UP technique in a series of diabetic patients, affected by deep complicated neuropathic foot ulcers¹. Therefore, we have extended the utilization of this procedure to other settings of complicated deep cutaneous ulcers such as pressure ulcers, perianal abscesses, prost-traumatic soft tissue lesions and surgical wound dehiscence.

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Materials and Methods

11 patients were recruited on this study and patient's consent to UP procedure was obtained. This conservative procedure was performed as an alternative of surgical drainage with extended incision of the hidden tracts. Deep contaminated ulcers recess were the consequence of a sacral pressure ulcer with ischiatic extension in 5 patients (Fig. 1), horse shoe perianal abscess with deep perianal fistula (n=1) (Fig. 2), posttraumatic leg ulcer with subfascial hematoma of both medial and anterolateral leg compartments (n=1) (Fig. 3), perimalleolar post-traumatic deep wound in a patient affected by scleroderma (n=1) and dehiscence of a laparotomic surgical wound (n=3) (Fig. 4). In all instances wound exploration with a probe was carried out and, after the removal of any infected/dead tissue or foreign body, any wound recess or not well drained hidden tract was carefully checked. Under local anesthesia, at the opposite site of any main and not well drained recess, where the end of the tract explored by the probe became more superficial toward the skin, interposed tissues and the skin were pierced and incised in order to pass through a small soft silastic tube. Once this was passed along the ulcer's recess tract, the two ends were tied together with two silk

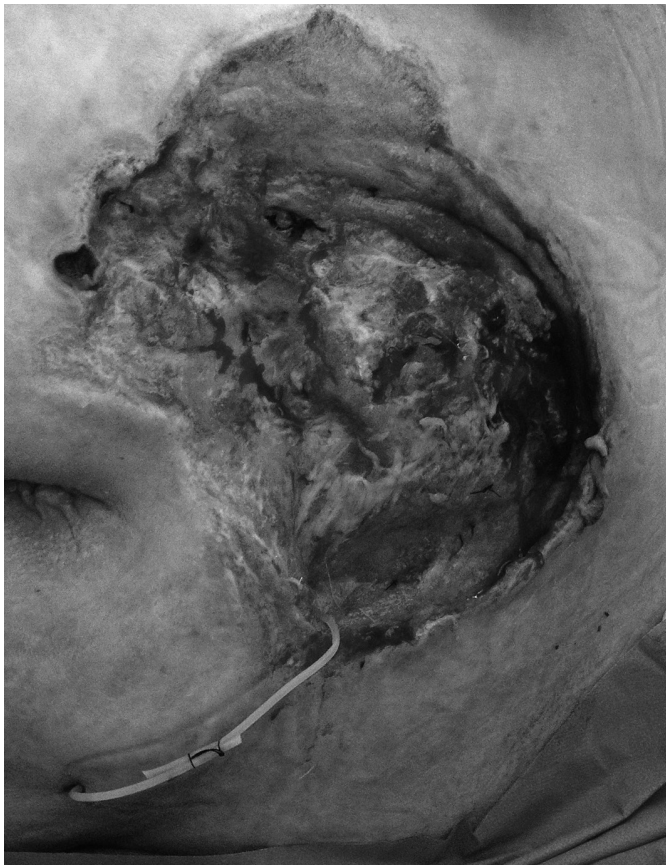


Fig. 1: A patient with large infected sacral pressure ulcer with a deep right ischiatic recess treated with the ulcer piercing procedure

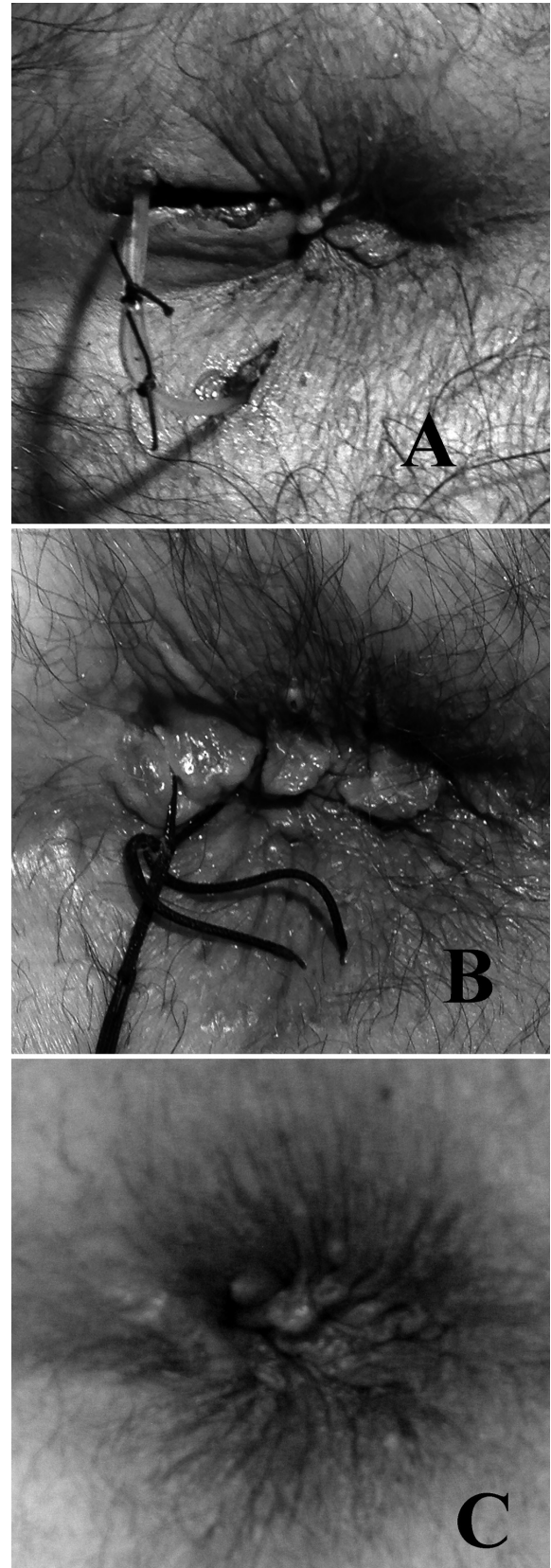


Fig. 2: A) A patient affected by horse shoe perianal abscess due to deep perianal fistula and treated with a piercing technique; B) the piercing ring has been removed after the healing of horseshoe abscess; C) all area is healed after the resection of the anal sphincter.



Fig. 3: A) A patient with a posttraumatic leg ulcer and a deeper subfascial hematoma involving both anterolateral and medial leg compartments and treated with a double ulcer piercing procedure; B) after removal of the medial piercing; C) after removal of the lateral piercing in almost healed ulcer.



Fig. 4: A patient with the dehiscence of the laparotomic surgical wound with a deep not well drained recess treated with the piercing procedure.

stitches in order to construct a blocked ring (ulcer piercing ring). The ulcer piercing ring, therefore, is designed to keep the fistula tract open and to facilitate the insertion of a syringe into both sides of the openings to allow cleansing with saline or Dakin solution. The patient, family members and the home caregiver are then instructed and invited to learn how to irrigate, twice a day with a syringe, the ulcer piercing tract. Dakin solution was preferred in cases with clinical signs of active infection including exudate, pain, edema and perilesion-

al erythema. Subsequently, all patients followed a weekly check-up in the Hospital outpatients facility. The ulcer piercing ring was replaced once a week in the presence of clinical active signs of infection (edema, perilesional erythema, pain, exudate, etc.) or once every two weeks in order to evaluate overgrowth of granulation tissue and the covering process of the fistula tract. The ulcer piercing ring was definitely removed once the tract kept open by the ring was completely covered by granulation tissue. All patients have been treated with systemic specific antibiotics on the basis of the results of ulcer culture tests and relative antibiotic assay.

Results

Complete healing of the ulcer recess, in 5 cases with pressure ulcer, was achieved within 2 months (1-2 months) after the UP procedure was performed and in no cases adverse or side effects of UP ring has been observed. In 3 patients with surgical wound dehiscence wound healing was achieved within 2.5 months (1-2,5 months). In patient with perianal horseshoe shaped abscess healing was achieved after 1.5 months while the perianal fistula was surgically resected and required 1 further month of medications for healing. Posttraumatic lesion of the leg with subfascial hematoma collection on both medial and anterolateral compartments of the leg fully recovered within 3.5 months while posttraumatic leg lesion in a patient affected by scleroderma recovered in 2 months.

Discussion

Inflammation is a physiological response to wounding and represents, after an acute injury, the early phase of wound healing. Excessive inflammation due to the persistence of a critical bacterial contamination, biofilm or infection lead to wound chronicity². Stalling of ulcer healing, which do not progress beyond the inflammatory phase, has been related to persistent inflammation³, and increase of matrix metalloproteases and elastase activities^{4,5}. Chronic degradation of extracellular matrix, suppression of growth-factors function, increase of proinflammatory cytokines (TNF- α , IL-1, IL-6)⁶, which inhibit downregulation of the immune response, and the prevalence of senescent fibroblasts at the end of their cell cycle⁷ further hinder wound healing. Any local or systemic treatment finalized to eliminate or reduce prolonged inflammation, therefore, revitalises physiological tissue healing, reduces exudate and is associated with a reduction in bioburden.

On this regard, the results of a study by Alfano et al⁸, demonstrating the effectiveness of careful surgical debridement and vacuum therapy in improving and accelerating ulcer healing, are of particular interest. More specifically, vacuum therapy results in a continuous aspiration of bed ulcer, therefore, reducing the possibility of ulcer fluid stasis and critical bacterial contamination/infection. This procedure seems to be particularly useful and effective in cases with diabetic foot ulcers⁹. Therefore, to achieve ulcer healing, in patients with adequate tissue arterial blood supply underlying, surgical debridement of ulcer bed and removal of all infected/dead tissues are mandatory along with drainage of all ulcer recess or fistulas and systemic antibiotics. In cases of a deep narrow ulcer recess or fistula, surgical drainage could consist in an extended incision of the tract and in the apposition of a draining gauze, Penrose or rubber drain. These latter solutions, however, are not always effective and safe and could be detrimental since they can become obstructive or can be easily and/or accidentally removed during homecare treatments. Moreover, quite often, any small skin wound, fistula or incision progressively reduces its opening, therefore interfering with ulcer tract drainage. In case of a deep and narrow not well drained ulcer recess UP procedure, in our opinion, is useful to warrant effective tract cleansing by daily positive pressure irrigation. UP procedure is easy and safe and the constructed blocked ring of tubing system avoids the possibility for drainage displacement or accidental removal. This procedure increases the ease at which the patients themselves or the caregivers (nurses or family) can perform wound care in the homecare setting. In our opinion, this conservative technique should be considered as a first step procedure in treating not well-drained ulcer recesses because it could avoid unnecessary and untimely extended and deep tissue incisions which, as a consequence, can result in scarring.

Conclusions

To achieve cutaneous ulcer healing, in order to avoid any fluid or exudate stasis, we designed a novel procedure involving ulcer piercing and drainage of any hidden tract and daily positive pressure irrigation and cleansing. This procedure represents a small but effective step towards an easier and safer treatment of cutaneous ulcers with not well-drained deeper recesses.

Riassunto

OBIETTIVO: Per ottenere la guarigione di ulcere cutanee profonde e infette, oltre ad una adeguata bonifica chirurgica e ad una terapia antibiotica specifica, è necessario evitare la stasi di liquidi o di essudato che favorisce il persistere dell'infezione.

METODI: Abbiamo, per questo, ideato una procedura di piercing dell'ulcera e drenaggio, con un sottile tubo di silastic a permanenza, che consente il lavaggio giornaliero dei tramiti fistolosi individuati.

Questa tecnica è stata utilizzata in una serie di 11 pazienti affetti da ulcera cutanea complessa profonda ed infetta conseguente a decubito sacrale (n=5), ad una lesione posttraumatica di gamba (n=1), and una lesione posttraumatica perimalleolare in un paziente affetto da sclerodermia ad un ascesso perianale a ferro di cavallo da fistola perianale (n=1) e a deiscenza della ferita laparotomica (n=3).

RISULTATI: In questi pazienti il recesso dell'ulcera trattato è guarito completamente ed in ogni caso rispettivamente entro 2, 3,5, 1,5 e 2,5 mesi.

CONCLUSIONI: La tecnica qui proposta di piercing dell'ulcera rappresenta un piccolo ma significativo miglioramento nel trattamento di ulcere cutanee profonde ed infette.

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