Skin ulcer caused by venous extravasation of heroin

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Key words
Bionect Start®; Collagenase; Extravasation of heroin; Hyaluronic acid; Skin lesion

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Abstract
The accidental leakage of the compound, in this case heroin, from the veins where it is injected, causes the formation of tissue lesions. Similar mechanisms lead to progressive tissue necrosis, which, if not immediately treated, results in the loss of the relevant function. A 57-year-old man presented a skin lesion on the posterior region of the left forearm with extensive necrosis of skin and subcutaneous layer involving the underlying muscle planes, caused by a venous extravasation of heroin that he reports having injected himself. The wound size is 15 × 10 cm; it had a sanious, fibrinous, secreting and smelly bottom. In this period, the patient was subjected to daily focused dressing before debridement of the lesion through a collagenase plus hyaluronic acid ointment: Bionect Start® (FIDIA Pharmaceutical, Abano, Italy). The therapeutic choice was rewarded with a complete resolution of the wound through a non-invasive technique and over a short period. Avoiding the hospitalisation of the patient achieved a reduction of risks for him and of the costs for the National Health Service (NHS). The Bionect Start® (FIDIA Pharmaceutical) as well as allowing the healing of the wound also decreased significantly the pain felt by the patient, the amount of exudate and the bad smell improving in a non-negligible way his quality of life.

Introduction
Extravasation is the accidental leakage of a substance originally injected intravenously into the surrounding tissue from the vein or a direct exposure or loss caused by a malposition of the cannula (1). The lesions typically present local swelling, erythema, blistering and pain. These wounds continue with a progressive destruction of tissue, loss of substance, tissue necrosis and eventually cause a loss of the affected function or result in amputation (2). Therefore, injuries resulting from extravasation are considered to constitute a medical emergency and need immediate treatment (3). The severity of extravasation injury is often proportional to the amount of drug extravasated, but properties of the medication, such as pH, osmolarity and molecular weight, also affects the degree of tissue damage (2,3).

Extravasation of heroin has the same pathogenesis. The accidental leakage of the compound, in this case heroin, from the veins where it is injected, causes the formation of tissue lesions. Mechanisms similar to those described above lead to progressive tissue necrosis, which, if not immediately treated, results in the loss of the relevant function.

Key Messages
• the accidental leakage of the compound, in this case heroin, from the veins where it is injected, causes the formation of tissue lesions, the wound size is 15 × 10 cm, it had a sanious, fibrinous, secreting and smelly bottom, the lesion improved through collagenase + hyaluronic acid ointment: Bionect Start®, the option of chemical debridement, when possible, is certainly better because of the risks, costs and quality of life of patients

Case report
A 57-year-old man presented a skin lesion on the posterior region of the left forearm with extensive necrosis of skin and subcutaneous plants to involve the underlying muscle layer, caused by a venous extravasation of heroin that he reports having injected himself. The wound size is 15 × 10 cm, it had a sanious, fibrinous, secreting and smelly bottom. A buffer performed within the lesion resulted positive for Pseudomonas aeruginosa, and then an antibiotic therapy was
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Figure 1 Preoperative appearance of the ulcerative skin lesion on the posterior region of the left forearm.

prescribed based on ciprofloxacin cps. 500 mg, 2 cp./die for two weeks (Figure 1).

The patient was treated at our facility for difficult wounds, at the Department of Plastic, Reconstructive and Aesthetic Surgery, Rome, over a period of 3 months. In this time, the patient was subjected to daily focused dressing before debridement of the lesion through a collagenase plus hyaluronic acid (HA) ointment: Bionect Start® (FIDIA Pharmaceutical, Abano, Italy). Each dressing was made up of four phases: disinfection with sodium hypochlorite 0.05% (Amukina Med® – Aziende Chimiche Riunite Angelini Francesco – A.C.R.A.F.S.p.A., Rome, Italy) and povidone-iodine solution 10%, cleansing with saline solution, applying a layer of 2 mm Binect Start® and cover with a pre-medicated patch. After the first week, a considerable reduction of exudate, an initial cleavage of fibrin and also the reduction of pain and smell were already evident. Tissue formation was already underway.

After a month of treatment, we obtained an increase in the granulation with a reduction in the depth of the wound from the bottom and the beginning of reepithelialisation from the margins (Figure 2).

After 3 months, we obtained a complete wound healing (Figure 3).

Discussion

Tissue necrosis with skin ulceration is a possible outcome in the inadvertent extravasation of several cytotoxic drugs during intravenous administration. The management of this complication remains an important challenge in cancer patients (4). The role of cytotoxic drugs in the treatment of malignancy is well established and increasing day by day. In addition to their therapeutic effects on the malignant cells, cytotoxic agents have the potential of causing destruction of healthy cells. However, physicians in such non-specialised centres may not be aware of the local side effects of the drug. Very often, even in oncology departments, the work of infusion of cytotoxic drugs is left to a junior house surgeon, whose inexperience in venupuncture and ignorance of precautions for infusing a cytotoxic drug can lead to extravasation of the drug (5).

Skin ulcers caused by extravasation of heroin in size similar to that described in our patient are rare (6–8). However, the results were excellent. We obtained the closure of the wound in a relatively short time, considering the size, the type of lesion and the infection, without going through surgery but using dressings with Bionect Start® (FIDIA Pharmaceutical) the new collagenase. The action of this ointment is to operate a chemical debridement of the wound bed by the action of the fibrinolytic enzymes (collagenase), maintaining the environment moist and protected in order to encourage granulation and the proliferation of fibroblasts also thanks to HA it contains.

Bionect Start® (FIDIA Pharmaceutical) is a topical cream containing HA, bacterial-fermented sodium hyaluronate (0.2% w/w) salt and bacterial collagenase obtained from non-pathogenic Vibrio alginolyticus (>2.0 nkat/g) (9). The use of collagenase is based on performing lysis of fibrin and necrotic tissue. The topical administration of collagenase increases the effect of macrophagic collagenase, responsible for wound debridement by splitting and breaking down proteins that hold eschar (dead and devitalised material) on the wound (10–12). This collagenase also contains HA (12), which first generates a microenvironment stimulating the secretion of growth factors, proliferation and migration of fibroblasts, endothelial cells, keratinocytes and angiogenesis (10,12), and has a positive effect on the inflammatory response (13–15). Moreover, HA is also capable of regulating the water balance acting on osmotic pressure and flow resistance and selectively sieving the diffusion of plasma and matrix proteins (16). With conservative management and the use of Bionect Start® (FIDIA Pharmaceutical), we obtained the complete resolution and reepithelialisation of the circumferential lesion in 3 months.

Conclusion

The therapeutic choice was rewarded with a complete resolution of the wound through a non-invasive technique and relatively short time. Avoiding the hospitalisation of the patient...
achieved a reduction of risks for him and of the costs for the national health service (NHS).

The Bionect Start® (FIDIA Pharmaceutical, Abano, Italy) as well as allowing the healing of the wound also significantly decreased the pain felt by the patient, the amount of exudate and the bad smell improving in a non-negligible way his quality of life.

In conclusion, we can say that the option of chemical debridement, when possible, is certainly better because of the risks, costs and quality of life of patients.

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