SUCCESSFUL TREATMENT USING NEGATIVE-PRESSURE THERAPY FOR DEEP DISSECTING HEMATOMA DUE TO DERMATOPOROSIS

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Abstract

The present case is that of an 84-year-old woman who had been using dabigatran (Prazaxa® Boehringer Ingelheim, Germany) for 6 months to prevent recurrence of a cerebral infarction. Two days before initial examination at our hospital, she sustained a bruise on her right lower leg, followed by gradual exacerbation of subcutaneous bleeding and partial swelling. She was therefore referred to our hospital for examination. Although computed tomographic imaging of the site revealed a subcutaneous hematoma, no clear hematoma was observed in the muscle layer. Based on these findings, she was diagnosed with deep dissecting hematoma. After removing the hematoma through a skin incision, we performed negative-pressure therapy (NPT) with the application of a basic fibroblast growth factor spray. Granulation tissue gradually formed. NPT was continued following a subsequent skin grafting. NPT has previously been performed as a treatment for skin ulcers and engraftment of skin. Currently, NPT allows for more certain and stable application of negative pressure, which has led to relatively short healing times.

Key words: dabigatran, negative-pressure therapy, deep dissecting hematoma, dermatoporosis

INTRODUCTION

Skin aging has long been considered a cosmetic problem. With the increase in lifespan, we are now more frequently experiencing additional aspects of skin aging, which are not cosmetic and have a functional component in the sense that the skin has lost its protective mechanical function. Dermatoporosis is the name proposed to encapsulate, in a holistic approach, all the aspects of this chronic cutaneous insufficiency/fragility syndrome[1].

Dr. Kaya and Prof Saurat coined this term by analogy with osteoporosis to designate skin failure and described four stages: Ⅰ, extreme skin thinning, purpura and pseudoscar; Ⅱ, skin laceration resulting from minor traumas, in addition to previous signs; Ⅲ, larger and more numerous skin lacerations and delayed wound healing; and Ⅳ, advanced lesions with subcutaneous bleeding, leading to deep dissecting hematomas and, potentially, skin necrosis[2].

We observed the case of a patient who was taking the anticoagulant dabigatran to prevent cerebral infarctions due to a bruise on her lower leg, which developed into a hematoma and subsequently caused an ulcer. The patient was successfully treated with negative-pressure therapy (NPT).

ETHICAL CONSIDERATIONS

We have taken steps to protect the identity of the patient. We obtained patient consent after verbally explaining the purpose of the study to the patient and her family.

CASE PRESENTATION

The patient was an 84-year-old woman who had been taking dabigatran for 6 months to prevent recurrence of a cerebral infarction until December 21, 2012. On December 21, 2012 she sustained a bruise on her right lower leg, which was followed by subcutaneous bleeding at the same site. She then underwent an examination in our department after 2 days. In the initial examination, we observed swelling with marked tenderness and moderate pain in the right lower leg, as well as subcutaneous bleeding accompanied by a black discoloration indicative of a necrotic phase with an indistinct boundary (**Fig. 1**). Her general condition was relatively good.

Laboratory Findings

Laboratory tests yielded the following values: white blood cell count, 9300/μL (normal range: 4000 to 9000); red blood cell count, 353×10^4/μL (normal range: 410 to 550); hemoglobin level, 10.8 g/dL (normal range: 13 to

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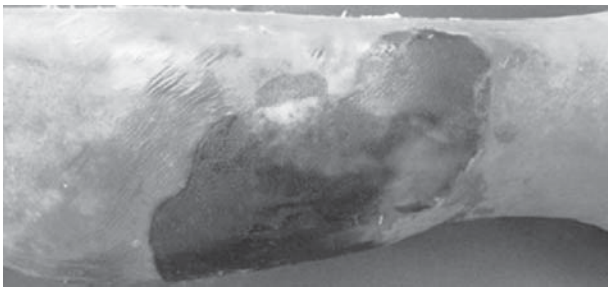

Fig. 1 Subcutaneous bleeding accompanied by black discoloration indicative of a necrotic phase with an indistinct boundary on the inner portion of the right lower leg.

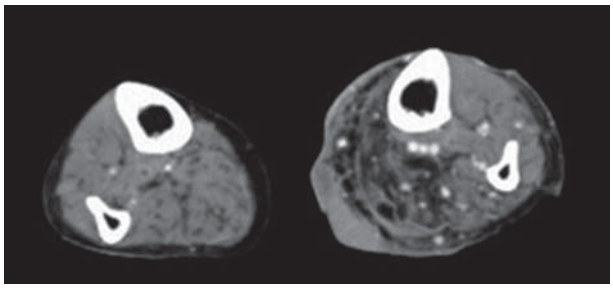

Fig. 2 Although increased soft tissue density was observed below the skin in the right lower leg, this did not extend to the inside of the muscle (enhanced computed tomography). Blood flow was relatively maintained.

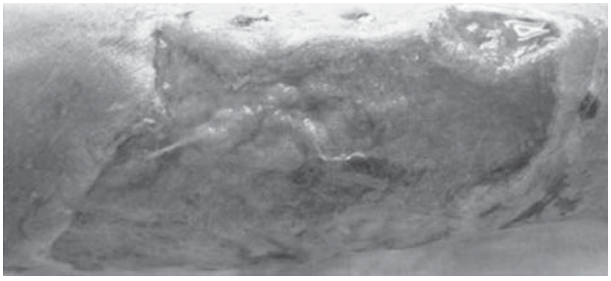

Fig. 3 Necrotic tissue was reduced, and hyperplastic granulation tissue was observed (16 days after the injury).

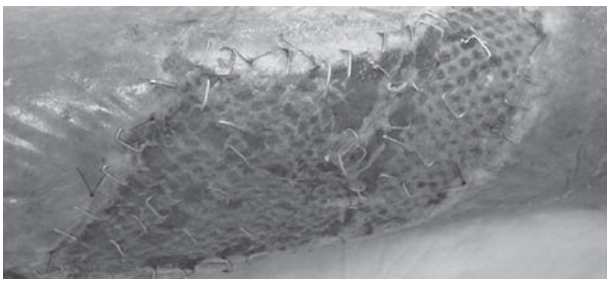

Fig. 4 Split-thickness skin grafting was performed, and the NPT was continued (27 days after the injury).

35); hematocrit, 33.0% L (normal range: 40 to 48); platelet count, $11.5\times10^{4}/\mu$L (normal range: 13 to 35); C-reactive protein level, 0.77 mg/ dL (normal range: 0 to 0.3); prothrombin time, 96%; prothrombin time-international normalized ratio, 1.03; activated partial thromboplastin time, 23 s L (normal range: 25 to 40); activated partial thromboplastin time ratio, 0.85; fibrinogen level, 307 mg/dL; antithrombin level III, 98 mg/dL; and D-dimer level, 1.3 μg/mL. These findings revealed that the patient had anemia and a bleeding tendency.

Bacterial Culture Results

The bacterial culture from the ulcer site in the right lower leg showed negative results.

Contrast-enhanced Computed Tomographic Findings

Although a deep dissecting hematoma was observed in the image, no clear hematoma was detected in the muscle layer of the right leg (**Fig. 2**).

TREATMENT AND CLINICAL COURSE

Based on the aforementioned, the patient was diagnosed with deep dissecting hematoma with necrotic tissue. We made a skin incision in the inner right lower leg and removed the hematoma. Although gradual formation of granulation was initially observed, we began to apply NPT using the V.A.C. ATS Therapy System along with a basic fibroblast growth factor spray (Fiblast®: Kaken Pharma, Japan) on and after post-injury day 14 to further promote granulation formation, which showed subsequent reduction on day 16 (**Fig. 3**). After observing hyperplastic granulation and reduced effusion, we performed skin grafting on day 22 (**Fig. 4**). NPT continued to be used to further engraftment of the skin. Favorable epithelialization was observed on day 28, and NPT was discontinued. The patient showed almost complete recovery by day 42 (**Fig. 5**). No recurrence or sensory abnormality has subsequently been detected.

Fig. 5 The healed wound (42 days after the injury).

DISCUSSION

The term dermatoporosis has recently been proposed to describe the clinical signs and functional sequences of age-related extreme skin fragility. Dermatoporotic skin

appearance was described 40 years ago and was grouped with other dermatoses characterized by atrophy under the generic term of atrophoderme. It is classified into four stages that range from injuries that do not attract the attention of the patient and the clinician, to a stage exhibiting deep skin dissection (DDH)[3].

DDH is a poorly known but severe complication of dermatoporosis. It can be seen in a non-negligible proportion of elderly patients with extreme skin atrophy. In DDH, minimal traumas are thought to cause massive bleeding into the virtual space between the subcutaneous fat and muscle fascia. Initially, the traumatized zone exhibits erythema and is swollen and hot; patients are frequently diagnosed as having erysipelas despite the absence of local or generalized symptoms of infection, and most are treated with antibiotics. Although DDH occurs mainly in advanced stages of dermatoporosis, it can be seen at any stage depending on the degree of the trauma[2]. NPT and/or autologous thin skin grafts may be used to obtain reepithelialization of these large defective skin surfaces[4].

The use of sub-atmospheric pressure dressings, available commercially as a V.A.C. device, has been shown to be an effective way to accelerate healing of various wounds[5-8]. The optimal sub-atmospheric pressure for wound healing appears to be approximately 125 mm Hg utilizing an alternating pressure cycle comprising 5 min of suction followed by 2 min off suction. Animal studies have demonstrated that this technique optimizes blood flow, decreases local tissue oedema, and removes excessive fluid from the wound bed[9]. Furthermore, Jacobs showed that wounds treated with the NPT device showed accelerated wound closure rates, increased pro-angiogenic growth factor production, and improved collagen deposition[10].

In a study that compared the application of NPT with the shoelace technique, which involves making anchors with staples and gradual application of tension, wound closure was significantly faster in the NPT group[11]. The shoelace technique utilizes skin expansion to close wounds, but does not contribute to improvement of local edemas or swelling. In contrast, NPT absorbs excess moisture in the wound and allows for a relatively comfortable physiological closure in a short period with alleviation of wound capacity. The use of NPT in our case also achieved a relatively favorable course.

NPT is considered an effective method for the treatment of skin incision wounds, with the advantage of reducing the frequency of dressing changes and the attendant risk of infection. NPT also allows for faster alleviation of edemas and can reduce the need for skin grafts.

New insights into dermatoporosis, including the absence of CD44 and hyaluronate in aging skin, allow us to better understand the process of cutaneous atrophy[12].

CONCLUSION

We propose to group the different manifestations and implications of this syndrome under the umbrella term ‘dermatoporosis’ since we believe that this can strengthen its understanding by health professionals, in a manner similar to osteoporosis, and help them appreciate that ‘dermatoporosis’ should be prevented and treated in order to avoid complications. Dermatologists should be aware of this emerging syndrome and must function as key participants in prevention and therapy.

CONFLICT OF INTERESTS None

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