

Successful Treatment of Wound Dehiscence by Innovative Type 1 Collagen Flowable Gel: A Case Report

Giuseppe A. Ferraro, MD, PhD
Giuseppe Lanzano, MD
Elisa Grella, MD, PhD
Adelmo Gubitosi, MD, PhD
Giovanni F. Nicoletti, MD, PhD

Summary: The growing demand for postbariatric body-contouring surgery after massive weight loss goes hand-in-hand with an increase in wound complications. Consequently, surgical reoperation or conservative management is necessary and represents a difficult challenge to healthcare professionals. Moreover, it is well known that postbariatric patients present aberrant wound healing due to multifactorial causes, such as preoperative illness, nutritional deficiencies, and vascular disease. To treat such complex wounds, several methods have been recommended, such as the use of negative pressure wound therapy, tissue-engineered skin substitutes, and collagen-based wound dressings. The case presented here is of a patient with deep wound dehiscence of the inner left thigh, 1 week after a medial thigh lift procedure, successfully managed with Vergenix Flowable Gel, a human recombinant type I collagen produced in plants. After 2 weeks of treatment, wound dehiscence was replaced with granulation tissue, and after 4 weeks, the patient was completely healed, with an acceptable aesthetic outcome of the surgical scar. (*Plast Reconstr Surg Glob Open* 2022;10:e4360; doi: [10.1097/GOX.0000000000004360](https://doi.org/10.1097/GOX.0000000000004360); Published online 20 June 2022.)

In patients undergoing body-contouring after massive weight loss, the increased risk of wound complications is well described. These complications result in infection, seroma, or hematoma formation and wound dehiscence.^{1,2} In the latter case, surgical revision followed by split thickness grafting, or conservative wound treatment is required. The poor overall condition of some postbariatric patients may be incompatible with surgical procedures such as the closure of the wound by primary intention. Furthermore, it would lead to an increase in healthcare costs, and it is not always desirable for the patient. Therefore, as outpatients, it is desirable to quickly stimulate wound healing by secondary intention, through the

formation of granulation tissue to fill the space inside the wound, thus avoiding any infection of the deep structures and obtaining rapid epithelialization of the wound. In these instances, several treatment methods are available.³ An example of these techniques is Vergenix Flowable Gel (CollPlant Ltd, Ness-Ziona, Israel). It is an advanced wound care device primarily comprised of lyophilized tobacco plant-purified type I recombinant human collagen for the management of acute and chronic wounds.⁴ It is supplied as a powder in a syringe that is hydrated with saline just before application to form a gel, which creates a collagen-fibrin matrix. It contributes to local hemostatic and chemotactic stimuli, enhancing cell migration and tissue repair, while supplying a structural support scaffold upon which new tissue can be formed at an enhanced rate. Intimate contact between therapeutic matrices and deep, irregularly shaped wound beds provides the basic elements required for tissue regeneration.⁵

From the Plastic and Reconstructive Surgery Unit, Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania Luigi Vanvitelli, Naples, Italy.

Received for publication February 21, 2022; accepted April 12, 2022.

Presented by Dr. Giuseppe Lanzano at the XXVII edition of the Italian Society of Plastic, Reconstructive and Aesthetic Surgery (SICPRE) Meeting, January 29–February 2, 2022, Cortina d'Ampezzo, Italy.

Copyright © 2022 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the [Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 \(CCBY-NC-ND\)](https://creativecommons.org/licenses/by-nc-nd/4.0/), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: [10.1097/GOX.0000000000004360](https://doi.org/10.1097/GOX.0000000000004360)

CASE REPORT

We describe the case of a 58-year-old woman with a history of severe obesity who underwent bariatric surgery

Disclosure: The authors have no financial interest to declare in relation to the content of this article.

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.

1 year before reaching our attention. As a result of drastic weight loss, the patient had developed thigh contour deformities, particularly those of the inner thigh. For this reason, she was a candidate to undergo a medial thigh lift surgery for removing soft tissue excess at our plastic and reconstructive surgery unit. One week postoperatively, the patient presented with wound dehiscence at the upper medial left thigh of about 1 cm² in width (Fig. 1). A swab culture was obtained from the wound bed, which confirmed the presence of *Staphylococcus aureus*, and the patient responded well to treatment with amoxicillin and clavulanic acid capsules 1000 mg × 2 daily for 6 days. The wound was treated with standard dressing (topical antiseptic agents, paraffin-impregnated dressings, and gauze). However, after 1 week of treatment, the patient developed a severe wound dehiscence that had reached a width of 15 × 5 cm (Fig. 2). The patient was not interested in surgical revision. Negative pressure wound therapy was offered, but due to practical reasons, it was not desirable to the patient. Therefore, a preliminary surgical wound debridement was performed until viable wound bed tissue was reached. Vergenix Flowable Gel was applied once to the wound bed by using two 2-cc doses of the gel to cover the whole wound area, particularly in the undermined parts (see Video [online], which displays the recombinant type 1 collagen application of 2-cc dose to the wound, particularly in the undermined parts), followed by placement of a sterile gauze pad. The patient returned to our unit weekly for wound debridement, wound size, granulation and epithelialization assessments,

and application of sterile gauze dressing. A good continuous progress in healing was observed at the following controls. Her wound dehiscence had healed when she was seen after 3 weeks post Vergenix application (Fig. 3). Complete epithelialization was complete, avoiding the risk of additional superinfections, particularly fearful in that area, that may worsen the clinical outcomes, as seen after 12 weeks (Fig. 4). All wounds were photographed before and after the treatment with human recombinant type 1 collagen. (See Video [online], which displays the recombinant type 1 collagen application of 2-cc dose to the wound, particularly in the undermined parts.)

DISCUSSION

Wound treatment is challenging because of the multifactorial nature of skin breakdown and repair, characterized by damaged tissue homeostasis. Impediments to wound healing include the presence of necrotic tissue, hypoxia, high bacterial burden, corrupt extracellular membrane, and senescent cells within the wound bed. Therapeutic options range from healing by second intention for rather small lesions to advanced wound healing therapies and various surgical interventions for major lesions.⁶ In recent years, a growing number of bioengineered human fibroblast-derived skin substitutes have emerged to restore the lost dermis in full-thickness skin defects.⁷⁻⁹ The use of collagen matrix is well known in



Fig. 1. First presentation of the wound 1 week after surgery.



Fig. 2. Wound dehiscence after standard dressing treatment 2 weeks after surgery.



Fig. 3. Appearance of the wound 3 weeks after gel application.

clinical practice for soft tissue restoration, and its applications range from breast reconstruction to acute and chronic wound treatment.^{10,11} One of many possibilities is Vergenix. It maximizes contact with the wound bed and surrounding tissues, enabling scaffolds to develop across the wound bed and reducing the risk of wound bacterial colonization.^{4,5} The cost issue using this material is of interest, in the era of managed care and cost-effectiveness. In our analysis, although the cost of Vergenix Flowable Gel (about 1300€) is higher compared with standard dressings, against which there is a superior effectiveness according to our experience, it is certainly lower than the hospitalization of the patient for a reoperation (from 3000 to 5000€, relative to the length of stay), while there is no



Fig. 4. After 12 weeks, complete healing was achieved with a cosmetically satisfactory scar tissue formation.

substantial price difference between Vergenix Flowable Gel and other acellular dermal matrix products. In summary, Vergenix Flowable Gel is safe, cost-effective, and most importantly, beneficial to the patient. To our knowledge, after performing a review of current literature, no previous publication has addressed management of post-surgical wound dehiscence in postbariatric patients with this product.

CONCLUSIONS

Vergenix FG contains bioengineered recombinant human type I collagen. When mixed with normal saline, it creates a collagen-fibrin matrix, enhancing cell migration and tissue repair. It has shown efficacy for wound healing in animal models and appears promising for healing of acute surgical wound defects refractory to standard treatment. As presented in our case, its ease of use and improved safety make it an alternative tool for optimizing the treatment of complex surgical wounds with undermining areas left to heal by second intention. However, although the product is part of the therapeutic toolkit within our unit in the postoperative care, so patients do not incur any additional charge for its expensive cost, additional research is required to identify those who will benefit most from this treatment and to quantify its advantages over standard care.

Giuseppe Lanzano, MD

Plastic and Reconstructive Surgery Unit
Multidisciplinary Department of Medical-Surgical and Dental
Specialties
University of Campania Luigi Vanvitelli
Piazza Luigi Miraglia, 2, 80138 Naples, Italy
E-mail: dottgiuseppelanzano@gmail.com

PATIENT CONSENT

Written consent has been obtained from the patient for publishing the case and for the use of pre- and postoperative photographs for publication purpose. All specific patient information is deidentified.

REFERENCES

1. D’Ettorre M, Gniuli D, Iaconelli A, et al. Wound healing process in post-bariatric patients: an experimental evaluation. *Obes Surg.* 2010;20:1552–1558.
2. Ricciardi C, Gubitosi A, Lanzano G, et al. Health technology assessment through the six sigma approach in abdominoplasty: scalpel vs electrosurgery. *Med Eng Phys.* 2021;93:27–34.
3. Hanna JR, Giacomelli JA. A review of wound healing and wound dressing products. *J Foot Ankle Surg.* 1997;36:2–14.
4. Shoseyov O, Posen Y, Grynspan F. Human collagen produced in plants: more than just another molecule. *Bioengineered.* 2014;5:49–52.
5. Shilo S, Roth S, Amzel T, et al. Cutaneous wound healing after treatment with plant-derived human recombinant collagen flowable gel. *Tissue Eng Part A.* 2013;19:1519–1526.
6. Boateng J, Catanzano O. Advanced therapeutic dressings for effective wound healing—a review. *J Pharm Sci.* 2015;104:3653–3680.
7. Capito AE, Tholpady SS, Agrawal H, et al. Evaluation of host tissue integration, revascularization, and cellular infiltration within various dermal substrates. *Ann Plast Surg.* 2012;68:495–500.
8. Kim H, Son D, Choi TH, et al. Evaluation of an amniotic membrane-collagen dermal substitute in the management of full-thickness skin defects in a pig. *Arch Plast Surg.* 2013;40:11–18.
9. Oh D, Son D, Kim J, et al. Freeze-dried bovine amniotic membrane as a cell delivery scaffold in a porcine model of radiation-induced chronic wounds. *Arch Plast Surg.* 2021;48:448–456.
10. Ricciardi C, Gubitosi A, Lanzano G, et al. The use of Six Sigma to assess two prostheses for immediate breast reconstruction. In: *European Medical and Biological Engineering Conference Proceedings.* Springer; 2020: 1112–1120.
11. Dai C, Shih S, Khachemoune A. Skin substitutes for acute and chronic wound healing: an updated review. *J Dermatolog Treat.* 2020;31:639–648.