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CASE REPORT
Reconstructive

Adherent Abdominal Scar Revision Does Not Require Total Scar Removal

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Summary: Abdominal surgery can cause notable scars that adhere to the abdominal tissues below. Full scar removal is generally not recommended due to the risk of intestinal damage and delayed wound healing. Here, we describe a surgical scar-revision procedure for adherent abdominal scars that does not involve either opening the abdominal cavity or total scar removal. A 58-year-old woman exhibited an aesthetically displeasing hypertrophic adherent abdominal scar that extended from the umbilical fold to the pubic area and distorted the umbilicus. It arose from multiple laparotomies for hernia repair and subsequent complications. Pain/discomfort and functional impairment were absent. Scar-revision surgery was conducted under general anesthesia. The skin around the adherent scar was excised down to the subcutaneous layer with a minimal margin. However, only the epidermis and superficial dermal layer of the adherent scar were removed; the deep scar dermis remained. The skin flaps on either side of the midline were then advanced and sutured over the remnant dermis. One year after surgery, the aesthetic and functional outcomes were excellent. Furthermore, no hypertrophic scars or epidermal cysts were found. This technique is effective, efficient, does not involve intraabdominal procedures, provides a vascularized tissue layer, and results in an aesthetically pleasing scar. *(Plast Reconstr Surg Glob Open 2023; 11:e5357; doi: 10.1097/GOX.0000000000005357; Published online 16 October 2023.)*

Over 200 million incisions are made annually, each of which will induce some scarring. If these scars are aesthetically unappealing, they can be improved by scar-revision surgery with total-scar removal or with surgical techniques that produce less conspicuous scars.[1] However, this approach is contraindicated for scars that adhere to the anterior abdominal wall: such scars are common after laparotomy incisions, but their complete removal would require breaching the abdominal wall, which carries serious risks of infection and further scarring. Thus, such scars are removed only if there is significant functional impairment. As an alternative, we describe here a surgical method of adherent abdominal-hypertrophic scar revision where only the superficial layers of the scar are removed. It is safe because neither abdominal-cavity opening nor adhesiolysis are involved, and its aesthetic outcomes are satisfactory.

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CASE REPORT

A 58-year-old woman presented with hypertrophic abdominal scarring after multiple laparotomies, which were performed 6 years earlier to repair a hernia and then resolve peritonitis complications. The main complaint at presentation was scar tightness and its unappealing width. The patient lacked abdominal discomfort/pain or functional impairment. The Valsalva maneuver was negative, indicating there was no recurrent hernia. The scar adhered to the abdominal wall via scar-tissue seals of variable thickness, and stretched from the lateral umbilical fold to the superior pubic area. It was irregularly shaped and occupied an area of 14.5×2.3 cm. Umbilicus distortion was also observed (Fig. 1A). The patient had a healthy body-mass index (<25 kg/m^2). Abdominal-computed tomography confirmed the presence of central scar-peritoneal adhesions.

Given the history of peritoneal complications, the risk of further injuries during intraabdominal surgery, and the absence of functional complaints, we planned to revise the scar without opening the abdominal cavity and removing the adhesions. The surgical complexity, ethical dilemmas, and possible complications were discussed

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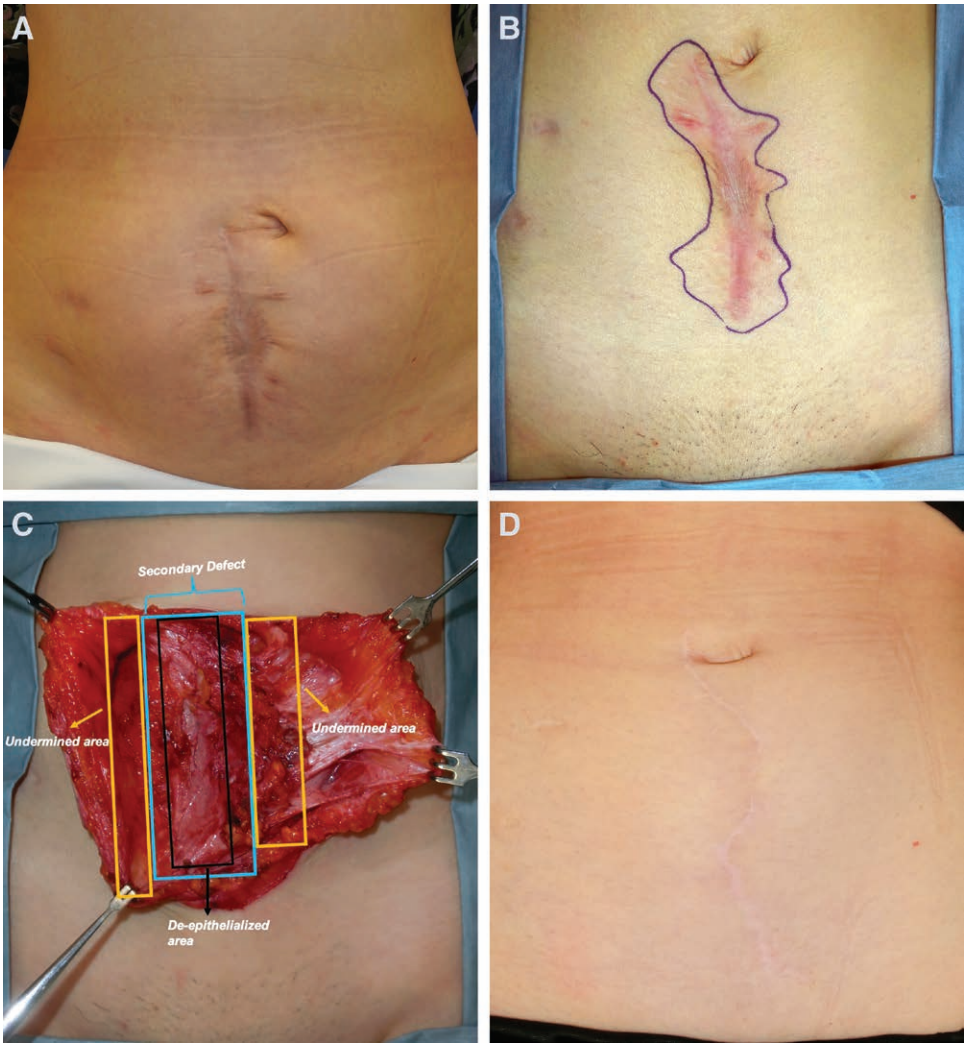

Fig. 1. Photographs of the abdomen of the patient. A, The scar before revision surgery. B, The preoperative design. C, Perioperative view. The epidermis and superficial dermis of the adherent scar tissue were shaved off, leaving only the deep dermal stub of the scar (black box). The normal tissue was incised until it reached the subcutaneous layer (blue box). The left and right flaps were advanced and sutured over the remnant scar dermis at the midline (yellow box). D, Twelve months after surgery.

comprehensively. The patient consented to the plan and was prepared for the operation.

The operation was performed under general anesthesia and additional local anesthesia (Xylocaine 1% with epinephrine 1:200,000). The scar was traced with a pen so that it bore a 5- to 10-mm normal-skin margin (Fig. 1B). The margin was incised, and the skin, including the subcutaneous layer, was excised laterally up to the adherent scar. Because this tissue generally adhered to the intraperitoneal organs, it was not removed completely. Rather, its epidermis and superficial dermis were removed using a scalpel (Fig. 1C). These steps would prevent postoperative cyst formation. Subsequently, the left and right skin flaps were advanced and sutured so that they covered the deep dermal stub of the abdominal scar. The suturing was conducted layer by layer: first the subcutaneous layer with 2-0 and 3-0 polydioxanone, then the dermis with 4-0 polydioxanone, and then the epidermis with 6-0 polypropylene. The postsurgical scars were covered with silicone tape for 6 months.

One year later, the patient lacked aesthetic or functional issues and was satisfied with the final result. No hypertrophic scars or inclusion cysts were observed. The shape of the navel was considerably improved (Fig. 1D).

DISCUSSION

Hypertrophic adhesive scars often develop after repeated laparotomy procedures. Total scar removal in such cases frequently results in internal organ injuries. Consequently, surgeons have long been profoundly reluctant to remove adherent scars for nonvital reasons such as aesthetics.[2,3] Indeed, our patient was dissatisfied with the appearance of her laparotomy scar but had not been

offered further treatment due to the absence of functional abdominal-cavity disorders. Here, we used a novel scar-revision technique that did not involve intraabdominal surgery.

We took into account several considerations when devising the scar revision. First, we reviewed other methods for revising adherent-abdominal scars without opening the abdominal cavity. These methods were autologous fat grafting, which is the best option for depressed or atrophic scars because it restores skin volume and texture.[4] However, it is relatively expensive and requires supplementary procedures.[5] Another possibility is the dermal-fat flap, which has adequate clinical outcomes on adherent abdominal scars. However, other studies showed that it was not effective for recurrent hypertrophic scars.[6] Thus, neither option was suitable in our case.

Second, we considered that leaving the partial dermis of the scar could reduce the strength of the adhesions. An animal study showed that using AlloDerm during hernia repair with prosthetic synthetic surgical mesh significantly reduced the total surface area and strength of the adhesion.[7] It was thus possible that the partial dermis of the scar that was left in our procedure acted in a way analogous to AlloDerm.

Third, we considered that leaving the scar dermis plus employing an advancement flap could reduce the hernia recurrence risk, or at least not worsen it. This notion reflects two observations: First, the mechanical strength of the skin is defined by the dermis, and skin strength exceeds that of the abdominal wall; recent tensile-strength testing of full-thickness skin specimens showed that even the weakest specimens (from diabetic patients) were stronger than the normal abdominal wall. Second, a trial showed that reinforcing suture-reduced hernias with full-thickness skin grafts yielded recurrence rates the same as synthetic mesh.[8] Thus, the advancement-flap skin over the repaired abdominal wall would limit the risk of hernia recurrence, and the remnant scar dermis could further strengthen this effect.

Fourth, the skin-graft trial showed better wound healing and less pain.[8] This may be due to the use of autologous material, which did not provoke a foreign-body reaction.

Fifth, a typical complication of buried scars is the formation of epidermal inclusion cysts.[9] However, scars generally lack hair follicles, and we removed the full thickness of the normal skin areas, including those with hair follicles. Thus, our technique was unlikely to induce inclusion cysts.[10]

Our technique presented excellent cosmetic outcomes without any complications, as well as being cost-effective with a shorter operation time compared with recent alternatives. However, this technique is suitable only for low to normal body-mass-index patients. Study limitations are that only one patient was treated, and the previous hernia size and the mesh type used during hernia repair could not be retrieved from the medical records.

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DISCLOSURE

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

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