

# Abdominal Wall Incisional Hernia Repair with the Anterior Component Separation Technique and Reinforcement with an Anterior Rectus Abdominis Sheath Flap

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**Summary:** Mesh repair is currently the mainstay of treatment for abdominal wall incisional hernias and is considered the standard of care. However, if radiotherapy is used, the possibility of complications such as exposure or infection of the prosthesis after the surgery as a complication of the radiotherapy is a concern. The patient was a 51-year-old woman who underwent laparotomy by a mid-abdominal incision for ovarian tumors. Approximately 2 years later, the patient presented with a hypertrophic scar of the wound and mild pain in the scar. The hypertrophic scar was improved gradually by corticosteroid injection. However, she had a bulge on the left side of the umbilicus just below the hypertrophic scar. Computed tomography showed a 65×69 mm<sup>2</sup> hernial orifice on the left side of the umbilical abdominal wall, and an abdominal wall incisional hernia was diagnosed. The patient underwent closure by the ACS technique and reinforcement by unilateral inversion of the anterior rectus abdominis sheath for the abdominal wall incisional hernia. No recurrence of the hypertrophic scar or abdominal wall incisional hernia was observed during the follow-up period. In the present case, the hernial orifice was closed by a modified ACS technique that was combined with the anterior rectus abdominis sheath turnover flap. This technique is likely a less invasive and relatively simple method resulting in a tighter repair of the abdominal hernia than the ACS method alone, without prostheses. (*Plast Reconstr Surg Glob Open* 2023; 11:e5106; doi: [10.1097/GOX.00000000000005106](https://doi.org/10.1097/GOX.00000000000005106); Published online 6 July 2023.)

An abdominal wall incisional hernia is one of the most common complications of abdominal surgery. It occurs in 2% to 11% of patients after laparotomy.<sup>1</sup>

In this study, a case of incisional abdominal hernia that occurred during treatment with corticosteroid injection for a hypertrophic scar after laparotomy is presented; a modified anterior component separation (ACS) technique combined with an anterior rectus abdominis sheath turnover flap is described; and the operation methods for an incisional abdominal hernia are discussed based on the case presented and earlier literature.

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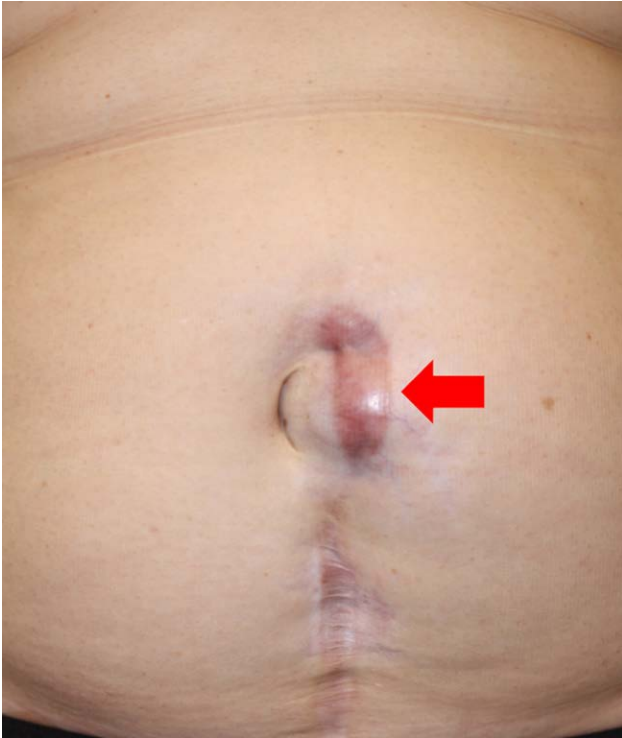
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## PATIENT AND METHODS

The patient was a 51-year-old woman who had undergone laparotomy by a mid-abdominal incision for ovarian tumors. Approximately 2 years later, she presented with a hypertrophic scar of the wound and mild pain in the scar. Steroid injections for hypertrophic scars were performed using a 27-G needle to inject the steroid only within the scar, and it improved gradually. However, she had a bulge on the left side of the umbilicus just below the hypertrophic scar (Fig. 1). Computed tomography (CT) showed a 65×69 mm<sup>2</sup> hernial orifice on the left side of the umbilical abdominal wall, and an abdominal wall incisional hernia was diagnosed (Fig. 2). There were no findings suggestive of small bowel incarceration, but the hypertrophic scar, which was just above the hernia, was getting thinner because of the hernial sac and content pressed against it. Therefore, because further injection of triamcinolone

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**Fig. 1.** Bulging in the hypertrophic scar area on the left side of the umbilicus. The hypertrophic scar is getting thinner and wider because of the bulging (red arrow).



**Fig. 2.** Preoperative CT. Abdominal wall incisional hernia with a hernial orifice of  $65 \times 69 \text{ mm}^2$ . There is no evidence of small bowel incarceration.

acetamide could cause perforation of the hernial sac, it was decided to simultaneously resect the hypertrophic scar and repair the abdominal wall hernia.

The hypertrophic scar along the previous mid-abdominal incision was resected, and the hernial sac was identified. After incision of the hernial sac, the small intestine could be recognized in the hernial sac, and the hernial orifice was identified. The hernial orifice was  $45 \times 75 \text{ mm}^2$  in size and located on the left side of the umbilicus. The ACS method was performed to close the hernial orifice. The aponeurosis of the bilateral external oblique muscles

was incised longitudinally and dissected under the external oblique abdominal muscles laterally to release tension. Next, the anterior rectus abdominis sheath turnover flap method was used to reinforce the hernial site. A U-shaped incision was made in the anterior rectus abdominis sheath on the left side (Fig. 3A), and the anterior rectus sheath flap was elevated. The hernial orifice was closed with horizontal mattress sutures with nylon suture, and the anterior rectus abdominis sheath turnover flap was fixed with nylon suture to reinforce the horizontal mattress sutures (Fig. 3B). (See figure 1, Supplemental Digital Content 1, which displays the schematic diagrams of our technique in the axial sectional views. <http://links.lww.com/PRSGO/C642>.) Finally, the wound was closed by Z-plasty to prevent wound contracture and hypertrophic scars.

## RESULTS

A senior physician performed a physical examination in the outpatient clinic approximately every 3 or 6 months after discharge, and postoperative CT was performed one year postoperatively.

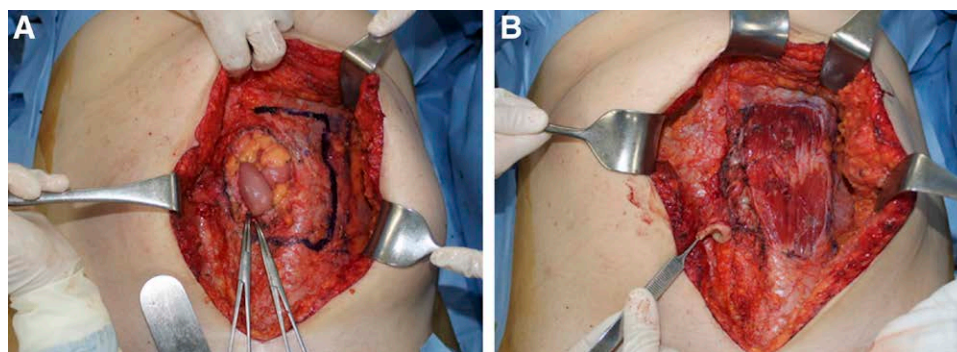
There was no recurrence of the hypertrophic scar, abdominal wall incisional hernia, or any other adverse event up to at least 2.5 years after the surgery. (See figure 2, Supplemental Digital Content 2, which displays the postoperative CT. <http://links.lww.com/PRSGO/C643>.)

## DISCUSSION AND CONCLUSIONS

Various surgical treatments have been reported for abdominal wall incisional hernias. Mesh repair is currently the mainstay of treatment for abdominal wall incisional hernias and is considered the standard of care.<sup>2</sup> In 2004, Burger et al<sup>3</sup> compared the long-term outcomes of simple suture and mesh repair of incisional hernias and reported that the recurrence rate of cases repaired with simple sutures was about twice that of cases repaired with mesh, indicating the usefulness of mesh repair (63% versus 32%). Because the mesh exposure rate after mesh repair is not very high, at 5%, complications of exposure of the mesh are not usually a concern.<sup>3</sup> However, complications such as exposure of the prosthesis are generally a concern after radiotherapy,<sup>4</sup> and mesh exposure was reported as a complication after mesh repair in a patient with an abdominal wall incisional hernia who had undergone radiation therapy.<sup>5</sup>

In the present case, if the hypertrophic scar were to recur, postoperative electron beam radiotherapy might be an alternative after reoperation to prevent additional recurrence. Because an increased risk of prosthesis exposure is the concern in such a situation, mesh repair was not selected.

Direct re-suturing of the surrounding fascia was the simplest method, but, according to a previous study, the recurrence rate after simple suture repair was 63%.<sup>3</sup> The ACS method is effective for reconstructing large midline abdominal wall incisional hernias.<sup>6</sup> The recurrence rate after use of the ACS technique has previously been reported to be 32%. Therefore, in the present case, the minimum anterior rectus abdominis sheath turnover flap was used to reinforce the site of closure of the hernial orifice with the ACS



**Fig. 3.** Intraoperative findings. A, Design of anterior rectus abdominis sheath flap. A U-shaped incision is made in the anterior rectus abdominis sheath on the left side. B, After fixation of anterior rectus abdominis sheath flap. The hernial orifice is closed, and the detached anterior rectus abdominis sheath flap is inverted, covering the closed hernial orifice, and it is fixed to the abdominal wall.

technique.<sup>7</sup> An anterior rectus abdominis sheath turnover flap was sometimes used as an early abdominal closure after open abdominal management,<sup>8</sup> and the ACS technique combined with the anterior rectus abdominis sheath turnover flap when the hernial orifice cannot be closed by the ACS technique alone has been reported, and it has a 6% hernia recurrence rate.<sup>9</sup> This technique might cause additional weakness in the abdominal wall. Especially if the anterior rectus abdominis sheath flap is elevated over the rectus abdominis muscle, the incision area is weakened, and a postoperative hernia may occur.<sup>10</sup> However, in the present case, only a minimal width of the anterior rectus abdominis sheath flap was necessary because it needed to cover only the sutured site of the ACS method. Therefore, the elevated area would maintain abdominal wall strength. This method is also very simple and easy to perform; thus, the additional operation time and surgical invasion are minimal.

The tight covering of the anterior rectus abdominis sheath turnover flap has the theoretical possibility of having a high reinforcing effect, but more cases are needed to confirm its efficacy; at least 2.5 years after the surgery, there has been no recurrent incisional abdominal hernia or any other adverse event.

The patient was a 51-year-old woman who underwent laparotomy by a mid-abdominal incision for ovarian tumors. Approximately 2 years later, the patient presented with a hypertrophic scar of the wound and mild pain in the scar. The hypertrophic scar was improved gradually by corticosteroid injection. However, she had a bulge on the left side of the umbilicus just below the hypertrophic scar.

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The patient underwent closure by the ACS technique and reinforcement by unilateral inversion of the anterior rectus abdominis sheath for the abdominal wall incisional hernia. No recurrence of the hypertrophic scar or abdominal wall incisional hernia was observed during the follow-up period.

In the present case, the hernial orifice was closed by a modified ACS technique that was combined with the anterior rectus abdominis sheath turnover flap. This technique is likely a less invasive and relatively simple method,

resulting in a tighter repair of the abdominal hernia than the ACS method alone, without prostheses.

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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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