



Reconstruction of a deformed umbilicus with a keloid using a single triangular incision line: a case report

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A common goal in reconstructing the umbilicus is to achieve an aesthetically pleasing result. This single-subject study demonstrates the outcome of managing an umbilical keloid scar using a single excisional line. A patient presented with a large, oval keloid scar at the center of his abdomen. The scar, measuring 4×3 cm in diameter, was deformed to the extent that it completely obscured the umbilicus. The patient frequently experienced intermittent inflammation at the site of the scar. We planned a triangular incision around the keloid. The umbilical keloid was excised and reconstructed using a flap anchored along the lower edge of the triangle. The triangular flap was elevated and the deep dermis of its cephalic portion was attached to the linea alba. The remainder of the flap was sutured at the center to create a conical shape. Eleven months post-procedure, the umbilicus maintained an aesthetically pleasing appearance with proper depth, superior hooding, and a concave shape without protrusion. An advantage of this straightforward surgical method is that it allows for simultaneous resection and reconstruction without the need for additional flap design. This method is expected to be a useful option for reconstructing umbilical keloids the size of a fully developed umbilicus.

Keywords Umbilicus / Reconstruction / Keloid / Surgical flaps / Case reports

INTRODUCTION

The umbilicus, a remnant of cicatrix tissue, marks the site of attachment of the umbilical cord during the fetal stage. It primarily consists of dermis, accompanied by fibrous tissue and subcutaneous fat [1]. Although the umbilicus has little functional use, it is important cosmetically. A missing or deformed umbilicus can lead to a distorted body image, potentially resulting in psychological issues, such as feelings of shame.

Various methods have been proposed for umbilical reconstruction, including the purse-string method, several local skin-flap methods, and the ear conchal cartilage graft method [2,3]. However,

none of these methods is optimal; each has its own advantages and disadvantages. The choice of method for umbilicus reconstruction surgery depends on factors such as the presence or absence of scarring, the presence or absence of umbilical tissue, and the patient's body type (i.e., thin or obese).

Herein, we report our successful experience with umbilicus reconstruction using a triangular incision line in a case where the original umbilical shape was lost due to scarring. This method can be easily implemented using only the remaining skin flap after forming a triangular shape with an incision and removing the scar tissue en bloc. The postoperative results were cosmetically satisfactory, maintaining a conical shape and a deep cavity. We recommend this technique as an effective approach for umbilicus reconstruction in patients with scar tissue and abnormal umbilical shape.

CASE REPORT

A 64-year-old male patient presented with a large keloid scar that covered his former umbilicus. This lesion had been created 10 years earlier when the umbilicus was used as a single-port insertion site for a laparoscopic appendectomy. The keloid measured 4×3 cm in diameter, and the scar had completely deformed the umbilicus,

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erasing any trace of its original shape (Fig. 1). The patient reported recurrent itching and sharp pain, and he was suffering from chronic inflammation. He also expressed distress over the deformity of his umbilicus, which prevented him from using public bathhouses or swimming pools due to embarrassment and psychological distress. The patient had not undergone any previous surgeries or injections to treat the keloid.

We decided to use a flap of abdominal skin adjacent to the scar, which remained after the complete excision of the scar tissue, to reconstruct the soft tissue defect. We designed a triangular resection line with a downwardly directed base that fully encompassed the keloid scar (Fig. 2A). The design focused solely on the resection line, without a separate plan for the flap itself. Following the excision in a triangular shape along the incision line, the scar tissue at the center

was removed en bloc, leaving a triangular flap attached along its lower edge. No umbilical or subcutaneous fatty tissue was left in the area from which the scar tissue was removed, exposing the rectus sheath. Subsequently, the bilateral edges of the triangular flap were completely separated from the underlying Scarpa's fascia, elevated, and advanced toward the linea alba. To create a natural cavity, the cephalic portion of the flap was defatted and attached to the linea alba, preserving subcutaneous fat tissue in the caudal portion of the flap (Fig. 2B). This approach was intended to create a natural slope from the cephalic to the caudal portion. Additionally, the abdominal skin adjacent to the cephalic portion of the flap was also attached to the linea alba at one point to facilitate superior hooding (Fig. 3). Postoperatively, the wound was packed with paraffin gauze (Bactigras, Smith & Nephew), and a compression dressing was applied.



Fig. 1. A 64-year-old man had an oval keloid scar at the center of his abdomen following a laparoscopic appendectomy, when the umbilicus was used as the port insertion site. The umbilicus disappeared completely, and the subsequent keloid was 4×3 cm in diameter and often inflamed.



Fig. 3. All stitches were removed 2 weeks postoperatively without any complications. The final results were aesthetically favorable, with a diameter of 1.5–2 cm, superior hooding, and a concave shape without protrusion.

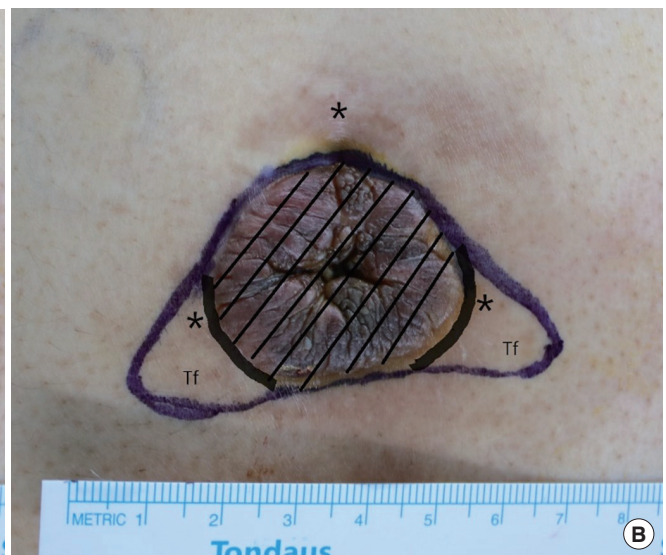


Fig. 2. (A) Design of a triangular flap around the keloid. (B) The keloid was resected (dashed line). Both lower sides of the triangle flap (Tf) were elevated and pulled toward the linea alba. Asterisk (*): the part that was affixed to the linea alba, followed by defatting.



Fig. 4. Photograph from an 11-month follow-up visit. Proper depth and superior hooding were maintained.

After surgery, the patient was instructed to take Treno capsules (tranilast 100 mg; Dalim BioTech) for 3 months to prevent keloid recurrence and to massage the surgical site with silicone gel.

At an 11-month follow-up, there was no recurrence of the keloid, and the patient reported no persistent symptoms of itching or pain. The newly formed umbilicus retained a cavity of sufficient depth and a natural conical shape without any complications, and the patient was satisfied with the results (Fig. 4).

DISCUSSION

Although the umbilicus is a vestigial organ with no functional significance, it serves as a cosmetically important landmark on the abdomen's front. Despite its small size, the absence of an umbilicus or the presence of an unusually shaped navel can impact an individual's body image and cause discomfort. Consequently, some individuals pursue reconstructive surgery due to psychological distress experienced while changing clothes in public, exercising, or swimming.

The umbilicus is typically positioned 9–12 cm above the superior margin of the mons pubis, just above a line that connects the anterior superior iliac spines. An aesthetically ideal umbilicus features superior hooding, deep dimpling, and a conical or oval shape [1].

Umbilicus reconstruction surgery is categorized into umbilicoplasty and neoumbilicoplasty. Umbilicoplasty involves the relocation of the umbilicus, detaching it from its original connection to the deep abdominal wall fascia and reinserting it into a newly created flap of abdominal skin. This procedure is typically performed following cosmetic abdominoplasty or surgical techniques such as the transverse rectus abdominis myocutaneous flap and deep inferior epigastric perforator breast reconstruction. Conversely, neoumbilicoplasty, also known as umbilical reconstruction, is a surgical procedure aimed at recreating the navel when it is absent due to congenital factors or other reasons [2].

The objective of umbilical reconstructive surgery is to create a natural-looking umbilicus with adequate depth and superior hooding, while minimizing the formation of new scars. Various surgical techniques have been suggested for optimal umbilical reconstruction. The principal approaches include the use of local skin flaps, the purse-string suture technique, and grafting, with or without the addition of cartilage. These different surgical methods are tailored to the specific tissue conditions present at the surgical site, such as umbilical tissue without scar tissue, umbilical tissue with scar tissue, and areas of scar tissue lacking umbilical tissue [2-4].

In cases with remnant umbilical tissue, either a single flap or double flap was employed to augment the existing tissue. Conversely, in cases lacking both scar and umbilical tissue, specially shaped skin flaps, such as the C-V flap or tricuspid-shaped flap, were utilized [5]. In instances where only scar tissue was present, all scar tissue was excised en bloc, followed by reconstructive surgery [6].

The disadvantages of certain skin flap techniques include the formation of a visible dog-ear scar around the navel, the gradual loss of the cavity, and a flattened appearance. Additionally, some techniques are not feasible if no navel tissue is available [2-4,7]. Skin graft surgery, on the other hand, often fails to replicate the natural, original shape of the umbilicus and may result in color mismatch [2,3]. Consequently, no single method of umbilicus reconstruction can be deemed the most effective.

Umbilical reconstructive surgery requires different approaches depending on the condition of the surgical site, and the complexity increases when significant amounts of scar tissue are present. In this report, we describe a successful umbilical reconstruction using an abdominal skin flap in a patient whose umbilicus was entirely distorted by a keloid, leaving no original umbilical tissue intact.

Our reconstruction method has the following advantages: (1) it allows the excision of the scar and the reconstruction of the feature in a single procedure; (2) there is no need to design a separate flap, provided that the resection line is clearly marked; (3) the method can be applied to areas as large as the full umbilicus; (4) it creates adequate depth and superior hooding; (5) the procedure is straightforward and simple; and (6) it results in minimal scarring around the umbilicus. However, our method is based on a single case study and has the following limitations: (1) it has not been tested on scars of different shapes; (2) the follow-up period was only 11 months, which means the long-term outcomes of the surgery might have changed; and (3) surgical outcomes may vary among patients due to individual differences in constitution and reactions to keloids.

The use of a triangular incision line to reconstruct a natural-appearing umbilicus in patients with a total umbilical deformity has yielded good cosmetic results and high patient psychological satisfaction. We propose this technique as an additional method in umbilical reconstructive surgery.

NOTES

Conflict of interest

No potential conflict of interest relevant to this article was reported.

Ethical approval

The report was approved by the Institutional Review Board of Hanil General Hospital (IRB No. HGH 2024-01-007-001).

Patient consent

The patient provided written informed consent for the publication and use of his images.

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