Chapter 31
Reconstruction of the Umbilicus Using Rectangular-Shaped Skin Island Flaps

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31.1 Introduction

The umbilicus can be lost due to surgery for congenital diseases, excision of tumors, and sometimes trauma. Although the umbilicus has no function, it is an important landmark of the abdominal wall, and the absence of the umbilicus has strange impression. Therefore, there have been many reports about reconstruction of the umbilicus. However, reports on reconstruction after tumor removal including the umbilicus are rare. Most reported methods use adjacent skin and are therefore not suitable for a large defect.

The authors describe their reconstructive technique for a large defect including umbilicus and surrounding skin.

31.2 Technique (Figs. 31.1 and 31.2)

After the tumor has been excised, a spindle shape with the same width as that of the defect is made. The longer axis of the spindle should be located on the midline of the trunk even if the defect is shifted in any way from the midline. Then two rectangular-shaped subcutaneous pedicle flaps are made at the cranial and caudal sides of the adjacent skin of the defect. These flaps should be made inside the

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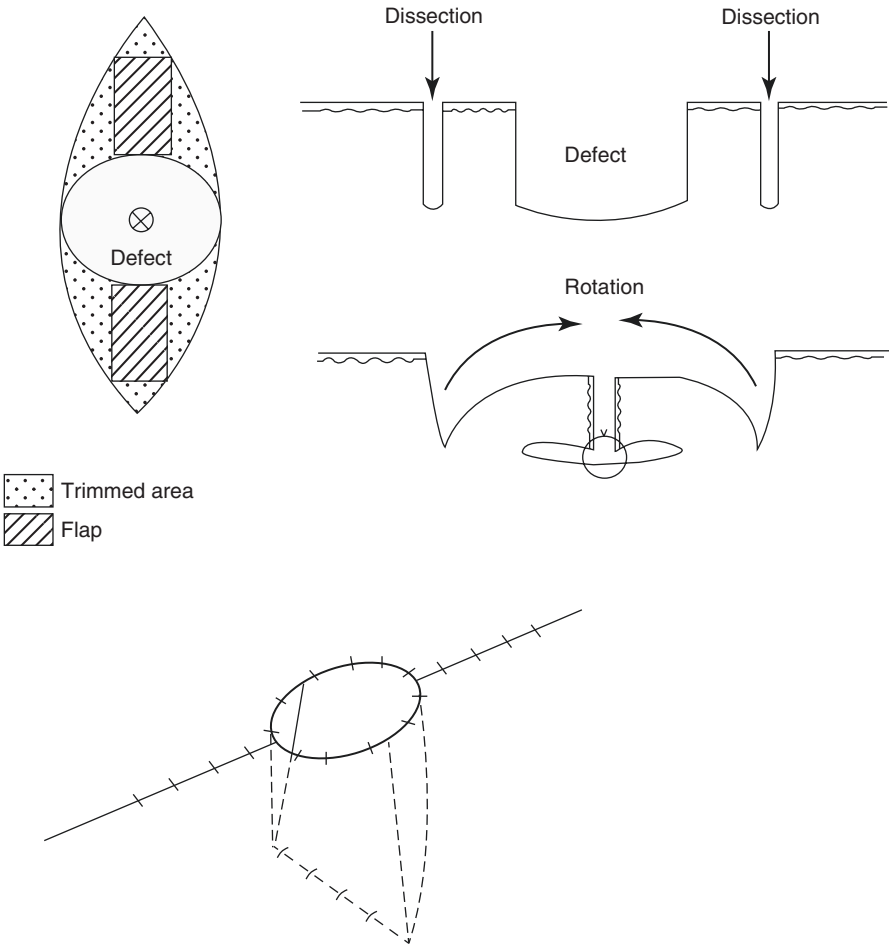

Fig. 31.1 Schematic diagrams of our technique. (*Top left*) Design of the flaps. Flaps should be made inside the dog-ear. (*Top right*) Both flaps are rotated down ventrally, and skin edges are tucked down to the bottom. (*Bottom*) Immediate postoperative

spindle area, which should be removed as a dog-ear, with almost the same sizes. Then the flaps are elevated with care taken not to injure the pedicle. The pedicle should include as much volume of subcutaneous tissue as possible with a perpendicular incision along the flaps, so that the blood supply of the flaps is enough with the penetrating vessels from abdominal fascia. The flaps are rotated down ventrally, and both edges of the flaps are sutured to each other. A skin tube is formed to be used as the lateral wall of the umbilicus. The edges are also tucked down to the rectus fascia tightly at the designed umbilical position. It is better to create a slightly smaller and deeper size as a normal umbilicus. Finally, the skin defect is closed primarily in the midline. The newly formed umbilicus has a sufficient depth with a natural appearance.

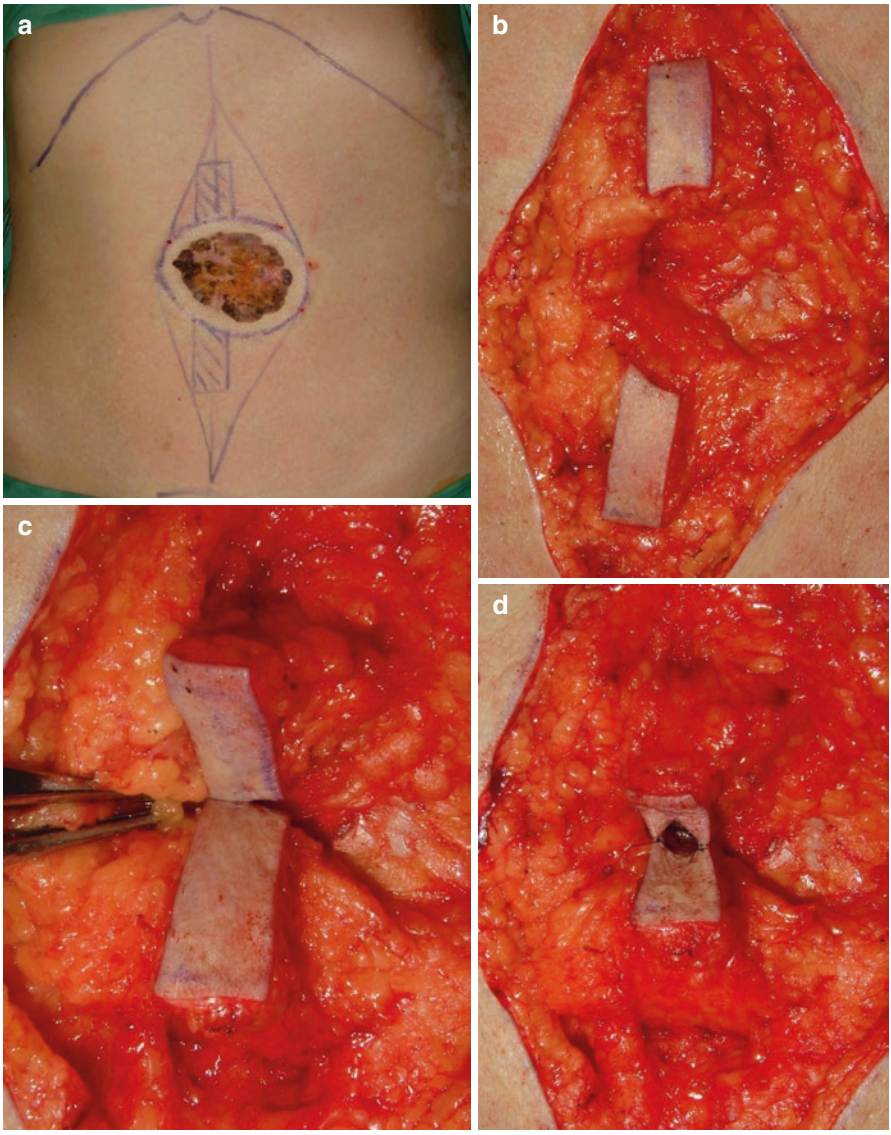

Fig. 31.2 A 78-year-old man with Bowen's disease of the umbilicus. (**a**) Tumor excision line and the flaps. (**b**) After tumor removal, flaps are elevated. (**c**) The flaps are rotated down. (**d**) The flaps are sutured to each other. (**e**) Skin tube. The flaps have thick subcutaneous pedicle. (**f**) Postoperative. (**g**) One year after the operation. (**h**) The umbilicus keeps sufficient depression with a natural appearance

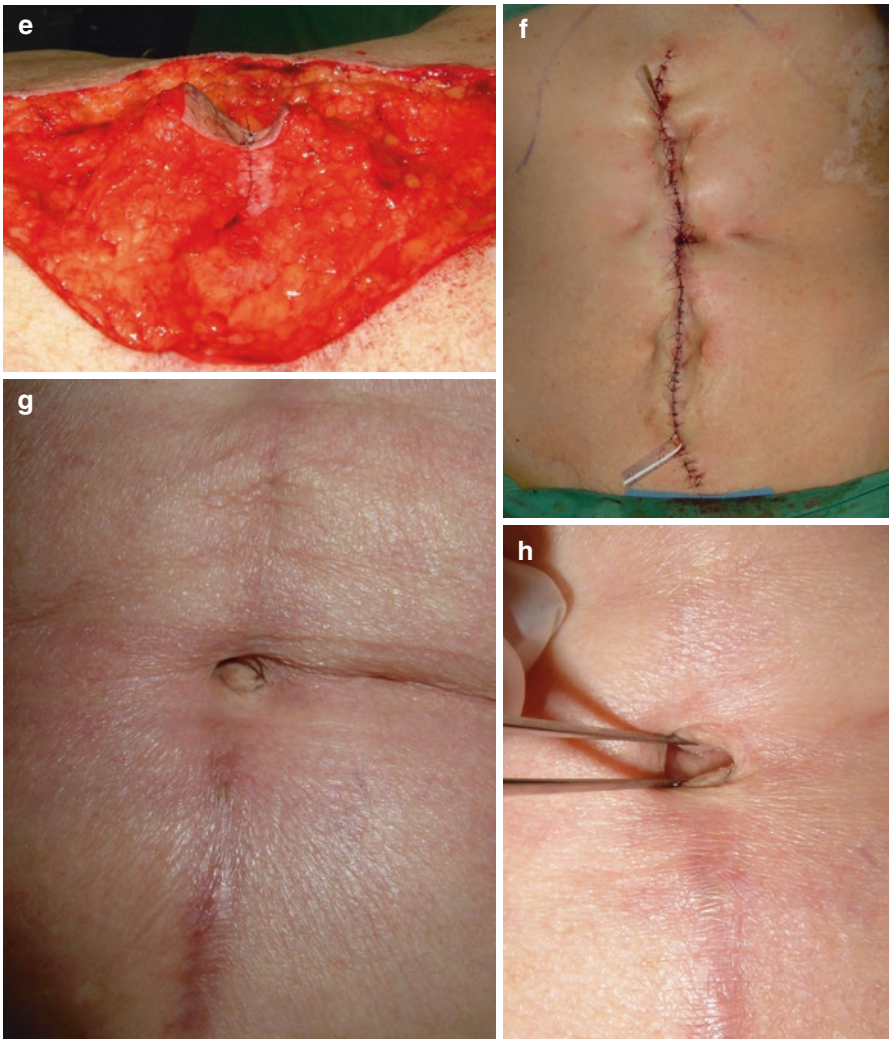

Fig. 31.2 (continued)

31.3 Discussion

The umbilicus can be lost for several reasons such as various abnormalities, trauma, and excision of tumors [1]. Many techniques have been reported for reconstruction of the umbilicus, including skin grafting, the use of local flaps [1–6], and the use of the combination of a local flap and skin grafting [7]. Local flaps are appropriate for making a deep umbilicus and prevent contracture. It is favorable to have skin flaps with sufficient length and width and a thick pedicle to create a deep and natural

umbilicus [6]. The use of small flaps will result in insufficient umbilical depth. If the abdominal wall is thin and a thick pedicle cannot be maintained, the opening part of the umbilicus should be shifted cranially from the bottom to have sufficient depth [4, 5]. Because of the sufficient amount of surrounding skin, a deep and natural umbilicus can be created for congenital diseases such as umbilical cord hernias and omphalocele [1–3]. However, it is difficult to reconstruct a large defect including the umbilicus due to tumor removal, and there are few reports about such reconstruction.

The method is more suitable for cases with thick subcutaneous tissue, and a sufficient depth of the umbilicus can be obtained. Even if the amount of subcutaneous tissue is not sufficient, the depth is adjustable by changing the position of the bottom part of the umbilicus. Skin flaps are made within the dog-ear skin that is excised during skin closure, so that no scar is newly created. There is sufficient blood supply from penetrating vessels, and an umbilicus of any size can be made with an easy and safe technique in a short time [6].

Therefore, when the umbilicus is lost with tumor removal, leaving a large defect, the authors' technique is a useful method for primary reconstruction of the umbilicus.

31.4 Conclusions

An effective method for umbilical reconstruction using two rectangular-shaped flaps was described. The flaps can be created within dog-ears, which will be excised, without new scarring. A deep and natural umbilicus can be made by using this procedure.

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