

Case Report

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Management of Severe Skin Flap Necrosis after Mastectomy: Case Report

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Abstract

Background: Mastectomy skin flap necrosis occurs more frequently than perceived, and an overall incidence of 5%-30% of cases is reported in the literature. The optimal management of severe mastectomy skin flap necrosis continues to remain a challenge. Here, we report a case of unexpected severe skin necrosis after mastectomy in a patient with ductal invasive carcinoma classified as pT2, N0 M0. On the 7th postoperative day, the patient developed an extensive full-thickness flap necrosis on the breast. This report presents such a case, in which the patient was successfully treated with modified rhomboid (Limberg) flap operative management and negative-pressure wound therapy.

Methods: Patient photographs and wound measurement were used to estimate area of necrosis as about 50% for massive skin flap loss. The patient was managed initially with local wound care followed by delayed modified rhomboid (Limberg) flap operative management to close the skin defects. Postoperative Negative Pressure Wound Therapy (NPWT) with PICO (Smith & Nephew) system consisting of a single-use sterile pump and 2 multi-layered adhesive dressings.

Results: Modified rhomboid (Limberg) flap operative management to close the skin flap defects followed by PICO negative pressure wound therapy produced excellent results in this patient with massive mastectomy skin flap loss.

Conclusions: Mastectomy skin flap necrosis is a common complication and may present as massive mastectomy skin flap loss. To the best of our knowledge, use of modified rhomboid (Limberg) flap for closing of massive mastectomy skin flap defects has not been previously reported. The outcomes described in this report may help in the decision-making process for clinicians who are confront with this difficult problem.

Keywords: Breast Cancer; Mastectomy; Modified Rhomboid (Limberg) Flap; Necrosis; Negative-Pressure Wound Therapy (NPWT); Skin Flap Necrosis

Introduction

Mastectomy skin flap necrosis is a common complication and may present as massive mastectomy skin flap loss. Mastectomy skin flap necrosis occurs more frequently than perceived. The reported incidence is 5%-30% of all patients undergoing mastectomy [1,2]. Skin flap necrosis may be influenced by both patient and surgical factors. Patient risk factors include smoking, radiotherapy, previous scars, diabetes, obesity and severe comorbidities. Surgical factors include higher mastectomy weight, type of mastectomy incision, decreased mastectomy skin flap thickness and perhaps

the mastectomy technique itself [1-3]. The optimal management of severe mastectomy skin flap necrosis continues to remain a challenge [1]. Skin grafting is the primary treatment for coverage of the skin defects. However, severe skin flap necrosis has a poor response to grafting, which is dependent on the condition of the recipient site. The large skin defects cannot be closed directly. Even if the defect were closed directly using over-tension, the blood circulation to the edge of the skin would be disturbed and prevent wound healing [1,4].

The rhomboid (Limberg) flap is a transposition flap that can be applied with for many full thickness defects. A rhombus is classically defined as an oblique-angled equilateral parallelogram, whereas a rhomboid differs in that it has uneven adjacent sides. It classically is designed by extending the short diameter of the

defect beyond the flap for a length equivalent to one of the sides [5]. These angles can be modified depending on the shape of the defect. As many as four flaps can be raised from one rhomboid, if required [6,7]. We describe management of a case of severe mastectomy skin flap necrosis caused by mastectomy with a direct wound closure technique followed by a modified abdominal wall rhomboid flap to reduce the tension in the large skin defect [4-8]. (Figure 1).

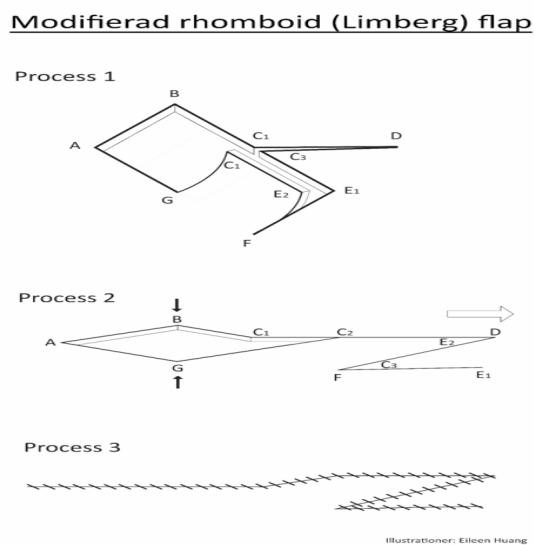


Figure 1: Schema of modified rhomboid flap designs for coverage of the large skin defect.

The PICO single-use negative pressure wound therapy system, which is designed to consistently deliver negative pressure across the incision and zone of injury. Negative Pressure Wound Therapy (NPWT) was developed for treating wounds associated with unfavorable healing factors [9]. It proved to be effective in the treatment of many surgical wounds, including breast surgery [10], to promote healing in closed surgical wounds and to reduce surgical site complications such as surgical site infections [11]. We report a case of unexpected severe skin necrosis after mastectomy in a patient with ductal invasive carcinoma classified as T2, N0 M0. On the 7th postoperative day, the patient developed an extensive full-thickness flap necrosis on the breast. This report presents such a case, in which successfully treated with modified rhomboid flap and direct wound closure operative management and PICO negative pressure wound therapy, which improved the patients' quality of life, as it enabled short surgery duration and hospital stays, efficient wound repair. This present case report details the methods and describes the outcomes of the application of this technique.

Case report

A 77-year-old woman had been referred to surgery as a case of left breast invasive duct carcinoma. She was a smoker and known to have hypertension and polymyalgia rheumatica on medications. Her BMI is 18 kg/m^2 . After discussion in the Breast Meeting, the patient was booked for left breast mastectomy, sentinel lymph node biopsy. Histopathology and Immunohistochemistry report showed invasive ductal carcinoma of left breast grade II with negative lympho-vascular invasion. Positive estrogen receptor ($\geq 90\%$ of cells), positive progesterone receptor ($\geq 50\%$ of cells), negative Her-2 receptors, and Ki-67 is nearly 15% of cells. Sentinel lymph node biopsy was negative for metastases. On the first postoperative day, the lateral part of the flap was noticed to have bluish discoloration. On the 7th postoperative day, the patient developed an extensive full-thickness flap necrosis on the breast. Patient photographs and wound measurement was used to estimate area of necrosis as about 50% for massive skin flap loss (Figure 2A). The protocol of surgical debridement, treated with modified rhomboid flap (approximately 4×8 centimeters) and direct wound closure operative management (Figure 2B) and PICO negative pressure wound therapy were started with successful complete wound closure in almost 6 weeks without any further reconstructive procedures (Figure 3).

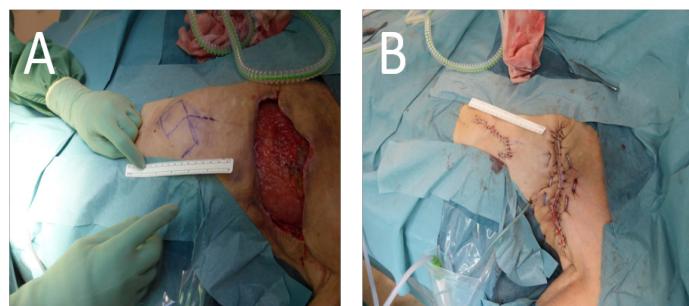


Figure 2: Preoperative and postoperative views of case. (A): The skin defect after mastectomy skin flap necrosis, approximately 4×8 centimeters. (B): The modified rhomboid flap fashioned after transposition.



Figure 3: The outcome 2 months after surgery.

Discussion

Mastectomy skin flap necrosis is a common complication and may present as massive mastectomy skin flap loss. Skin grafting is a useful technique in the correction of skin defects; however, severe skin flap necrosis has a poor response to grafting, which is dependent on the condition of the recipient site. Cosmetic morbidities caused by a mismatched color and/or texture of the grafted skin and scar contracture due to thinner skin are the other disadvantages of skin grafting. The large skin defects cannot be closed directly. Even if the defect were closed directly using over-tension, the blood circulation to the edge of the skin would be disturbed and prevent wound healing [1,4,12]. To overcome these limitations, a modified rhomboid flap and direct wound closure operative management been developed. This modification involved using double oblique rhomboid flaps where lateral stretch is acceptable in abdominal wall (solid arrow in process 2), (Figure 1). The flaps are positioned in the direction of maximum reduce vertical tension when the large skin defect after mastectomy is closed (empty arrow in process 2), (Figure 1). A slight disadvantage of this modification to the Limberg flap is the excess healthy tissue in abdominal wall is lost.

PICO negative pressure wound therapy has also been used postoperatively. Animal and clinical studies have shown that NPWT increased blood flow, increased rate of granulation tissue formation, decreased tissue bacterial count and increased random-patter flap survival [10,11].

It has several advantages of this management for severe skin flap necrosis after mastectomy, including the following: 1. Better cosmetic outcome from skin grafting. 2. It decreases the total time for wound closure and allowed for adjuvant therapy administration without delay. 3. Decrease the total cost because it decreases the need for other reconstructive surgeries to close the post debridement wound defect. The outcomes of this case described may help clinicians in the decision-making process confronted with this difficult problem.

Conclusion

The described protocol proved to be an effective method in managing severe skin flap necrosis complication caused by mastectomy with one operative management, shorter time, better aesthetic outcome and improved the patients' quality of life.

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