



A Free Flap Surgery for Scar Cancer on the Dorsum of the Hand

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Abstract: Keloid carcinoma often occurs in deep burns or traumatic wounds that do not heal for a long time [1], and it is a rare malignant tumor with an incidence rate of only 1% to 2%, but once it occurs, it is a serious threat to the patient's life and safety, so it is extremely important for its early diagnosis and treatment. In this paper, we report a case of a 67-year-old male patient with keloid carcinoma, who was treated surgically with good results.

1. Clinical Date

1.1 General Information

The patient, male, 67 years old, was admitted to our hospital on November 20, 2023, due to the discovery of scarring on the back of his left hand for 10 months. The patient accidentally scratched the back of his left hand while farming 10 months ago, and an ecchymosis appeared at the site of the injury, slightly elevating the skin, without obvious itching and pain and other discomforts, and no treatment was given. 3 months later, the ecchymosis of his hand continued to increase with obvious itching, and he was admitted to the hospital, where he saw two semi-circular old ecchymoses on the back of his left hand of about 3cmx3cm in size and dark red color, with clear borders, a regular shape, a firm texture, a rubbery hardness, and a smooth and shiny surface, with poor mobility. The surface was smooth and bright, with poor mobility and no obvious capillary dilatation. The surrounding nodules were scattered in varying density and shape, with tough texture and dark red color. The skin between the two scars was thin, and the subcutaneous blood vessels were clearly visible (Figure 1).



Figure 1: Preoperative hand picture of patient

1.2 Diagnosis and Treatment

After admission, biopsy of the dorsal hand was performed for pathological examination: the skin of the dorsum of the left hand showed squamous epithelial hyperplasia, thickening of the stratum spinosum, and pseudocarcinoma-like hyperplasia toward the dermis, with a large number of lymphocytes infiltrating the periphery, and multinucleated giant cells could be seen in scattered distribution, and part of the regional squamous epithelium showed nested infiltrative growth, with abundant cytoplasm, inconspicuous nuclear anisotropy, and occasional nuclear schizophrenic images, so it was impossible to exclude the possibility of highly differentiated squamous cell carcinoma. Pseudocarcinomatous hyperplasia and highly differentiated squamous cell carcinoma are very difficult to distinguish morphologically, and immunohistochemical examination cannot provide help, please consider clinically and follow up closely (Figure 2). Special staining results: PAS (-), antacid (-).

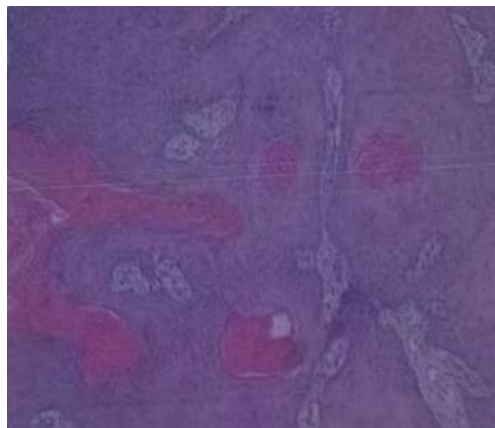


Figure 2: Preoperative pathological examination

When changing the medicine, it was found that white powdery secretion could be squeezed out from the obvious place of scar elevation. Combined with the pathological examination, it suggested that there were a lot of lymphocyte infiltration in the surrounding area, so it had to be suspected whether there was a combination of fungal infection, and then bacterial culture was carried out on the secretion, and the culture result suggested that there was no pathogenic bacterial growth. The culture result showed that there was no pathogenic bacterial growth. Therefore, the possibility of scar carcinoma was still considered to be higher. Then on November 29, 2023, under general anesthesia, left dorsal hand keloidectomy + full-thickness skin grafting was performed. Surgical procedure: after satisfactory anesthesia, the patient was placed in the supine position, on the brace, routinely disinfected and laid with sterile towel, after marking and demarcating the operative area, the skin was incised under the skin along the edge of the left hand bruise for about 0.5cm, the local keloid hyperplasia was obvious, the tissue was tough, and there was a white secretion and a bad smell, the complete excision of the disease lesion was located in the Skin and subcutaneous, probe the muscle membrane and tendon membrane without obvious abnormality, after excision to form two about 5.0 * 4.5cm, 6.0 * 5.5cm trauma (Figure 3), the base of the red, iodine povidone and physiological saline repeated rinsing, wet gauze to cover the trauma. The excised material (Figure 4) was sent for rapid frozen pathological examination, and the return suggested: squamous cell carcinoma (Figure 5), the margin of excision was enlarged again about 0.5cm, and the traumatic surface was formed about 5.5*5cm,6.5*6cm, and after that, 6.0*5.5cm,7*6cm rectangular incisions were made in the medial part of the left upper arm and the medial part of the left thigh to take the skin, and the skin was constructed to take out the fat, and the skin was fixed by saline soaking. After mesh perforation treatment and saline immersion, the left upper arm and left thigh incision free, H-type flap method to promote the closure of the incision, and then the treatment of the medium-thickness skin piece of suture fixation closure of the trauma (Figure 6), gauze and sponge to cover the trauma, connected to the VSD negative pressure continuous suction, closure of

the rest of the trauma, the operation went smoothly, bleeding about 20ml, after surgery, return to the hospital room. Postoperatively, the skin removal site was changed once every 2 days (if there is gauze pasted on the affected area, saline can be used to apply wet compresses first, and the gauze should not be forcibly removed). During the change of medication, erythromycin ointment and recombinant bovine alkaline fibroblast growth factor gel were alternately used externally in the wounds. The VSD negative pressure drainage at the skin graft was removed after 1 week to see: the skin color of the grafted skin flap was normal, no necrosis, the skin flap graft was viable, and the incision at the skin removal site was well recovered, and disinfection was carried out once in 2 days without applying medication (Figure 7). On the 14th postoperative day, the sutures were removed from the dorsum of the hand at the skin grafting site and elastic gloves were worn. On the 20th postoperative day, the sutures were removed from the skin extraction site, and ultrasound examination of the body surface mass was performed to exclude tumor metastasis prior to discharge from the hospital, and the results showed proliferative lymph nodes in the neck bilaterally and the left axilla reaction. The patient was then discharged from the hospital for recuperation, and elastic gloves were worn for at least 45 days. On the 30th postoperative day, the patient returned to the hospital with satisfactory recovery (Figure 8).



Figure 3: The state of the lesion after removal



Figure 4: The tissue removed during the operation



Figure 5: Intraoperative pathological examination



Figure 6: Immediate post-surgical fitting



Figure 7: 7 days after surgery



Figure 8: 1 month after surgery

2. Discussion

Scarring carcinoma is a common type of cutaneous body surface malignancy, first reported by French scholar Marjolin in 1828, so it is also known as Marjolin's ulcer (Marjolin's ulcer) [2][3]. Clinically, it often presents as a localized chronic ulcer [4]. The causes and pathogenesis of scar cancer are complex, and the possible causative factors include: tissue toxins and endogenous growth-promoting factors released from the trauma [5]; chronic irritation: local friction or repeated injuries lead to continuous mitosis of the epidermal cells to repair the damage, and this recurrent cycle of damage repair leads to malignant transformation of the ulcer; infection: a co-causal carcinogenic factor for scar tissue; immunodeficiency: considered a high risk factor for scar cancer formation; immune-deficiency: an immunocompromising factor; and immunodeficiency: an immunocompromising factor for scar cancer

formation. Immunodeficiency: considered to be a high-risk factor for the formation of scar cancer; immune defense dysfunction: due to poor blood circulation in scar tissue and lack of lymphatic circulation, local immune defense dysfunction leads to scar cancer. Possible molecular mechanisms of scar carcinogenesis include: p53 gene abnormality; high expression of Ras protein [6]; Fas gene mutation; abnormal up-regulation of transfer growth factor- β (TGF- β)/Smad signaling; and activation of the PI3K/AKT signaling pathway with inhibition of apoptosis [7] [8]. The main metastatic pathways of scar cancer include local invasion, invasion along the nerves, lymph node metastasis, blood metastasis, distant organ metastasis and medical metastasis, among which lymph node metastasis is the main pathway.

The gold standard for the diagnosis of scar cancer is pathological tissue biopsy. The formation of erosion-like ulcers or cauliflower-like lesions is an important clinicopathologic process in scarred areas that are chronically ruptured and eroded and do not heal over time [8]. For the treatment of keloid carcinoma, the effect of chemotherapy for keloid carcinoma is not yet certain due to the poor blood flow of scar tissue, poor sensitivity to radiotherapy, and the difficulty of chemotherapeutic drugs to reach a high concentration locally. Expanded excision of the lesion is the first choice for the treatment of scar cancer ulcer, and to ensure complete resection of the tumor and tumor-free operation is the basic principle of surgery. The excision range of scar cancer is routinely more than 2 cm away from the healthy skin at the margin of the wound [9], and the depth of excision is determined by the level of invasion of cancerous tissues, which can be cut to the deep fascia, surface of the myofascial membrane, muscular tissues, or even periosteum, and the edge of the resected lesion and the underlying tissues are marked separately in the operation. During the operation, the margins of the resected lesion and the underlying tissue were marked and frozen section was performed quickly, and the need to further expand the scope and depth of resection was determined according to the results of the pathological examination, until the final pathological results were negative; if the conditions permit, Mohs surgery can be used to completely resect the lesion, while preserving the normal tissues to the maximum extent possible [10].

In this case, the patient was 67 years old, who developed scar hyperplasia with recurrent ulcers 5 months after the injury, and cancer cells were detected in the biopsy of the pathologic tissue 10 months after the injury. Fortunately, the pathological type of the patient belonged to squamous cell carcinoma with a better prognosis, and ultrasound examination of the whole body surface did not indicate obvious metastasis. Therefore, surgical resection was preferred, during which the diseased tissue was removed as much as possible and covered with medium-thickness skin, and the patient recovered well after the surgery, with complete recovery of hand function and aesthetic appearance. In this case, the patient used autologous medium-thickness dermal grafting, which was successful but caused new trauma. The author suggests that if the economic conditions allow, decellularized dermis can be used, which does not have to cause new trauma, and the postoperative recovery is fast, and the result may be better.

The two free flaps survived completely in such a tissue weak area as the back of the hand, thanks to the complete asepsis of our surgical procedure, the promptness of the flap sutures and the continuous suction of the VSD negative pressure for 7 days. We hope that this article will help in the treatment of scarring cancer of the hand.

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