

First Dorsal Metacarpal Artery Flap for Thumb Reconstruction Postresection of Subungual Squamous Cell Carcinoma

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Summary: Subungual squamous cell carcinoma refers to rare tumors that arise from the digits, most commonly in the thumb and big toe. These tumors are frequently diagnosed late due to them presenting as chronic wounds or wart infections. They are low-grade tumors that rarely have nodal involvement, and their treatment options include surgical resection with or without amputation, and radiotherapy for patients who cannot tolerate surgery. We present a case of a patient who underwent tumor excision and immediate reconstruction of the digit. (*Plast Reconstr Surg Glob Open* 2023; 11:e5104; doi: [10.1097/GOX.0000000000005104](https://doi.org/10.1097/GOX.0000000000005104); Published online 6 July 2023.)

Although subungual tumors are uncommon, subungual squamous cell carcinoma (SCC) is the most reported neoplasm occurring within the nail complex. It most frequently affects older men aged between 50 and 70 years.^{1–5}

Patients with this disease are usually diagnosed late, presenting as cases of chronic wounds or wart infections. Such cases require proper work-up, and the chronicity of the complaints should urge the treating physician to consider malignancy as a cause. Notably, clinical workup includes biopsy and imaging to delineate the extent of the tumor and involvement of the underlying bone. Lymph node involvement is rare, but has been documented, with these tumors being considered low-grade SCC.^{1,2,6} In this report, we present a case that presented with no bone involvement; therefore, the decision for reconstruction was undertaken.

CASE

A 64-year-old woman with a history of hypertension and hypothyroidism was referred from the dermatology department with a case of chronic nail lesion that was present for the past 10 years over the right thumb. The patient

complained of episodic pain, with bleeding from the lesion. The patient denied any history of skin infections or genital warts. The patient underwent multiple sessions of excision in different hospitals before presenting to our hospital. Physical examination showed a nonhealing wound involving the hyponychium and the nail-bed, with separation of the nail-plate due to a protruding mass (Fig. 1).

A proper incisional biopsy was performed, which showed that severe squamous epithelial atypia and invasive carcinoma cannot be ruled out (Fig. 2). Thumb magnetic resonance imaging showed the lesion to be inseparable from the dorsal cortex; however, it did not involve the bone. Chest, abdomen, and pelvis computed tomography, and oncology referral were arranged by the clinic.

Chest, abdomen, and pelvis computed tomography showed no evidence of metastatic disease or lymph node involvement, and repeated chest computed tomography showed stable pulmonary nodules. The tumor, lymph node, metastasis (TNM) classification for this patient is T1N0M0. A tumor board meeting was initiated after the results of the tumor workup. The unanimous decision was for excision, frozen section, and to go for reconstruction once the frozen section was observed to be negative. The patient underwent excision of the tumor, which included the whole nail complex and distal phalanx periosteum. A 4-mm safety margin was initially scheduled, and was subsequently expanded to 6 mm to allow for a tumor-free margin, resulting in a final distal thumb defect of approximately 2.5×3 cm exposing the dorsal distal phalanx cortex (Fig. 3).

The plan was to reconstruct the distal phalanx of the thumb with a first dorsal metacarpal artery (FDMA) flap, and after confirming the patency of the artery with Doppler, the flap was designed. Additionally, the flap was elevated from the ulnar to radial and distal to proximal

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Fig. 1. Right thumb nail with hyponychial nonhealing wound and marking of the incision, which will be utilized for harvesting flap.

regions with the preservation of the paratenon over the proximal phalanx. A supple adipofascial pedicle was preserved over the length of the FDMA flap. Branches from the sensory branch of the radial nerve were included in the flap. A loose tunnel was prepared over the dorsal aspect of the thumb to allow for a smooth and lax inset of the flap. The flap donor on the proximal phalanx of the index was reconstructed with a full-thickness skin graft from the volar forearm. We opted for FDMA flap reconstruction (instead of skin graft) due to the involvement of the periosteum. Additionally, we aimed to restore functional soft tissue coverage of the thumb, allowing for protective sensation (two-point discrimination of 10 mm).¹⁰

DISCUSSION

Subungual SCC is a rare disease, and usually affects middle-aged men. Digital predilection has been documented, with most cases affecting the thumb and big toe. Multiple causes have been proposed, which include chronic infection; chemical or physical microtrauma; genetic disorders, such as congenital ectodermal dysplasia; radiation; tar; arsenic; exposure to minerals; sun exposure; immunosuppression; and previous HPV infection.¹⁻⁵

It is important to diagnose these cases early once clinical suspicion arises, as bone involvement reaches between 16% and 66%. Notably, these tumors are considered low-grade malignancies and are less aggressive than SCC arising elsewhere.^{1,2,5}

Due to its rarity, cases of subungual SCC are being treated with the same principles as subungual melanoma, involving resection until negative margins if no bone involvement is observed; otherwise, digital amputation is carried out to the next proximal joint. The recommended margins for low-grade SCC lesions less than 2-cm is 4 mm, and 6 mm is recommended for high-grade lesions more than 2-cm, with resection of the nail apparatus. For patients who cannot tolerate operative intervention, radiotherapy is an alternative treatment option.^{1,6}

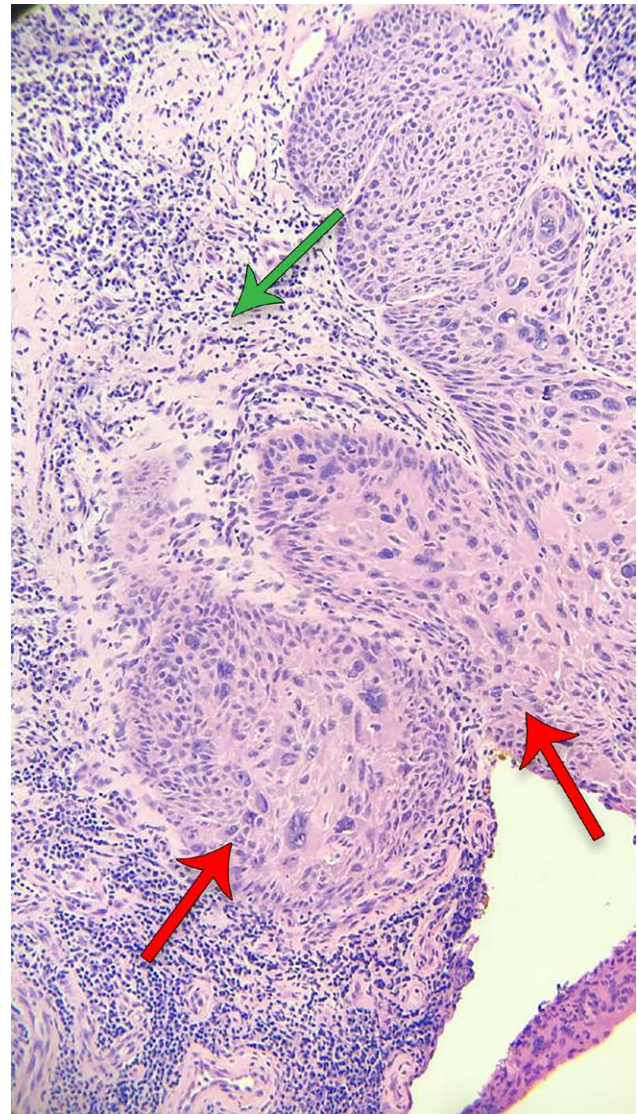


Fig. 2. Irregular nests of SCC, the cells show high nuclear to cytoplasmic ratio, irregular nuclear contour, dark chromatin, and increased mitotic activity (red arrows); the surrounding stomas show desmoplastic changes with chronic inflammation (green arrow).

Our patient was fit for surgical intervention, and due to the lack of bone involvement, we opted for immediate reconstruction with the aid of frozen sections. We decided to go for the FDMA flap because supple coverage is required where the bone is devoid of periosteum, and it provides an acceptable donor scar and defect.⁷⁻⁹ The final pathology report showed that there was an area of suspicion of remnant lesions; the case was discussed with the oncology service, and a positron emission tomography scan was performed. After 6 months of clinic follow-up, there was no metabolic evidence to suggest local recurrence or distant metastasis. Right thumb magnetic resonance imaging repeated upon 9 months of follow-up as an outpatient showed that there were no appreciable masses or abnormal signals. The two-point static discrimination



Fig. 3. The final negative margins of the resection were 6 mm, and the defect was about 2.5×3 cm in size.



Fig. 4. This photograph was taken in the clinic after 9 months of follow-up, showing a completely healed wound with acceptable scarring and no clinical evidence of recurrence.

test showed a result of 7 mm, whereas the dynamic test showed a result of 5 mm, achieving protective sensation at the 10th month of outpatient follow-up. Our patient was satisfied with the treatment provided and is currently being followed up regularly in the clinic (Fig. 4).

CONCLUSIONS

Subungual SCCs should be considered whenever physicians are faced with chronic wounds, and digit preservation is a feasible option with early diagnosis. Our case showed that digit preservation, especially an important digit, such as the thumb, is possible immediately with good outcomes.

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DISCLOSURE

The authors have no financial interest in relation to the content of this article.

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