Giant cutaneous squamous cell carcinoma of the popliteal fossa skin: A case report

Wang K et al. Giant cSCC of the popliteal fossa

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Abstract

BACKGROUND

Cutaneous squamous cell carcinoma (cSCC) is a common malignant hyperplasia of skin epithelium. However, cSCC progressing to giant squamous cell carcinoma of the popliteal fossa skin has not been reported. We used full-thickness skin from the lower left quadrants of the abdomen to reconstruct the popliteal fossa skin defects in our patient.

CASE SUMMARY

A 64-year-old woman presented with a 3-year history of a progressively enlarged integumentary tumor located on her left popliteal fossa, which was surgically treated. The resultant defect (15 cm × 25 cm) was repaired using full-thickness skin from the lower left quadrants of the abdomen.

CONCLUSION

Full-thickness skin is a good choice to repair popliteal fossa defect.

Key Words: Giant cutaneous squamous cell carcinoma; Popliteal fossa skin; Case report

**Core Tip:** We reported an exceedingly rare case of giant cutaneous squamous cell carcinoma (maximum diameter > 5 cm), which presented as skin invasion of the popliteal fossa that was excised with optimal clinical result.

**INTRODUCTION**

Squamous cell carcinoma (cSCC) is a non-melanoma skin and keratinocyte cancer, accounting for 20% of all skin cancers, and it is the second most common cancer worldwide\(^1\). Unfortunately, cSCC is not included in the national cancer registry in the United States, which makes it difficult for us to know the exact morbidity and mortality in China. European data show that the incidence of cSCC in age standardization is 9 to 96 cases per 100000 male residents and 5 to 68 cases per 100000 female residents (2002-2007 estimate)\(^2-4\).

Although most cSCC is a benign tumor, it can locally infiltrate and metastasize. The 10-year survival rate after cSCC is over 90%, but when metastasis occurs, the survival rate drops sharply\(^5\). The frequency of lymph node metastasis is about 4%, and the mortality is close to 2%. Because of the high incidence of cSCC, it has a significant impact on the overall mortality\(^6\). Furthermore most cSCCs can be completely removed by surgery, the cSCC of popliteal fossa is closely related to knee joint and important neurovascular system, which is a very rare site, posing a surgical challenge for reconstruction. Herein, we reported an exceedingly rare case of giant cSCC (maximum diameter > 5 cm), which presented as skin invasion of the popliteal fossa that was excised with optimal clinical result.

**CASE PRESENTATION**

*Chief complaints*

Three-year history of pain and mobility problems due to a progressively enlarged integumentary tumor located on the left popliteal fossa.

*History of present illness*
In June 2020, a 64-year-old woman presented with a 3-year history of pain and mobility problems due to a progressively enlarged integumentary tumor located on her left popliteal fossa.

**History of past illness**

This patient had no history of chronic diseases, such as hypertension, hyperuricemia, hyperlipidemia, and coronary heart disease.

**Personal and family history**

The patient was a non-smoker and had no family history of AS.

**Physical examination**

Physical examination showed an erythematous, nodular, protruding, ulcerative, mainly necrotic, foul smelling, cauliflower-like, firm skin tumor, 15 cm × 20 cm in size on the left popliteal fossa (Figure 1A). However, no significant lymph node or distant metastases were identified.

**Laboratory examinations**

The laboratory results revealed that squamous cell carcinoma antigen was 20 ng/mL, the C-reactive protein level was 15.5 mg/L and the erythrocyte sedimentation rate was 42 mm/h. Other laboratory results were within the normal range.

**Imaging examinations**

The patient’s computed tomography (CT) scan showed that the tumor had infiltrated deep into the muscular layer of her left popliteal fossa, but not the skeletal layer (Figure 1B).

**FINAL DIAGNOSIS**

Giant cutaneous squamous cell carcinoma of the popliteal fossa skin.
TREATMENT
After popliteal fossa tumor excision and skin grafting, the tumor was totally excised. The tumor infiltrated the muscular layer and a 4 cm margin of muscular tissue was excised with the tumor. The final surgical defect measured 15 cm × 25 cm (Figure 2A and B). The surgical defect was repaired with full-thickness skin from the lower left quadrants of the abdomen.

OUTCOME AND FOLLOW-UP
After surgery, the patient’s condition significantly improved every day (Figure 2C and D). Hematoxylin and eosin-stained section of the surgical specimen revealed an invasive well-differentiated infiltrative cSCC (Figure 3). The patient was discharged one month after operation, and had no recurrence and good wound healing after surgery. The patient followed-up for one year after surgery (Figure 2E), without recurrent symptoms.

DISCUSSION
Although most cSCC cases have good prognosis after surgical resection[7], 3.7%-5.2% of patients have lymph node metastasis, and 1.5%-2.1% of patients die of cSCC[8]. Although these incidences are relatively low compared with many other malignant tumors, the absolute number of cSCC patients with lymph node metastasis is estimated to be 5604 to 12572 in the United States alone[9]. In addition, the estimated number of cSCC-related deaths per year is between 3932 and 8791, and its upper limit is close to the number of melanoma-related deaths per year. Thus, it is important to identify such aggressive cSCC cases in time, which can guide additional testing and treatment to improve the prognosis[7].

Old age, fair skin, long-term sun exposure, long-term immunosuppression and previous skin cancer diagnosis are all important risk factors for cSCC[10]. In addition, long-term skin inflammation seems to contribute to the development of cSCC, such as
chronic wound, ulcer, sinus tract, burn or scar observed[11]. This patient developed cSCC mainly due to repeated skin ulceration, leading to local chronic inflammation and popliteal squamous cell carcinoma, which not only affects the functional recovery of knee joint but also increases the probability of malignant degeneration and the difficulty of popliteal defect reconstruction.

Besides BD, Keratoacanthoma (KA), invariant cSCC classic variant described above, the pathological tissues of cSCC also have several types, such as fibroproliferative, spindle cell, keratolytic, pseudovascular, verrucous, wedge-shaped epithelioma, adenosquamous cell and neurotrophic cSCC[12]. Disordered maturation of atypical keratinocytes, single cell keratinization, nuclear pleomorphism, atypical mitosis and multi-nucleated tumor cells appear in all epidermal layers, but the basal layer remains unchanged[13]. KA is a symmetrical keratinocyte with limited proliferation, and its central horn plug and epidermis extend to the tumor. Histologically, invasive cSCC is characterized by atypical and abnormal keratinocytes, hyperchromic and pleomorphic nuclei, and atypical mitotic cells. Well-differentiated cSCC usually has horny pearls and single cell keratinization, while poorly differentiated cSCC usually lacks keratinization, and has many atypical mitosis and mixed inflammatory infiltration.

Pathological examination showed numerous squamous cells with keratosis and mitotic infiltration[13]. Considering that it was invasive cSCC with keratosis and no lymph node metastasis was found, we performed surgery for complete tumor resection and skin grafting, and advised regular postoperative reexamination to the patient.

The resection of cSCC at popliteal fossa involves joint movement and numerous blood vessels and nerves. Therefore, it is critical to protect the important neurovascular system and prevent secondary scar contraction based on extensive activities of popliteal fossa, which may be manifested as external aesthetic distortion and popliteal fossa retraction, thus seriously damaging the shape and function[14]. We chose full-thickness skin from the lower left quadrants of the abdomen to repair the popliteal fossa defect. Full-thickness skin can survive on fresh sterile wounds or infected granulation wounds due to its characteristics of thin skin and strong vitality[15]. Additionally, the donor area
is scar-free and cannot be easily infected[16]. In the present case, the patient could perform normal daily activities, without severe postoperative pain or any complications. Therefore, full-thickness skin repair is suitable for patients with popliteal cSCC who need extensive tumor resection, with fewer complications and faster postoperative recovery.

CONCLUSION
Full-thickness skin is a good alternative for the repair of popliteal fossa defects.

Figure 1 Before the surgery. A: A huge erythematous nodular ulcerative skin tumor, measuring approximately 15 cm × 20 cm, was located on the left popliteal fossa; B: Computed tomography scan of the popliteal fossa.

Figure 2 After extirpating the tumor, the final surgical defect on the left popliteal fossa measured 25 cm × 15 cm. A: The surgical defect in the left popliteal fossa was 25 cm long; B: The surgical defect in the left popliteal fossa was 15 cm wide; C: As seen on day 4 after reconstruction, the surgical defect on the left popliteal fossa was repaired by full-thickness skin; D: Appearance of the full-thickness skin repair of the left popliteal fossa on day 15 after reconstruction; E: Appearance of the full-thickness skin repair of the left popliteal fossa at the 1-year follow-up.

Figure 3 Photomicrographs of the tumor. A: Scattered squamous cells with dyskeratosis and mitotic infiltrates (H&E staining, 40 × magnification); B: Numerous squamous cells with dyskeratosis and mitotic infiltrates (H&E staining, 100 × magnification); C: Squamous cells in the periphery of the tumor (H&E staining, 400 × magnification).
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