Verrucous carcinoma is a low-grade, well differentiated uncommon variant of squamous cell carcinoma and may grow large and can destroy adjacent tissue such as bone and cartilage. A 45-year-old male patient presented with chief complaints of growth mass of the left foot. He is known diabetic, hypertensive, chronic venous insufficiency and related ulcerations on the lower legs. There is a tender, ulcero-proliferative mass on foot. The result of biopsy showed a highly differentiated verrucous carcinoma. At first the patient underwent wide excision and biopsy with mesh split thickness skin graft. But after 4 months that surgery, verrucous carcinoma recurred with ulceration. Because tumor infiltrated the soft periosteal tissues and calcaneus, he need flap coverage or amputation. We decide to reconstruct heel with anterolateral thigh perforator free flap. The goal of heel reconstruction should be functional and aesthetic. Below knee amputation was not performed, so the patient’s quality of life increased.

**Key Words:** Verrucous carcinoma, Anterolateral thigh free flap, Heel defect, Amputation, Diabetic foot
CASE REPORT

A 45-year-old male patient presented with a growth over the shin of the left foot that had been growing in size over the past three years accompanied by pain for the past month. Past history revealed that he was a smoker and an alcoholic for the past 20 years. He had diabetes mellitus and hypertension. The patient had chronic venous insufficiency and ulcerations on the lower legs. There was a tender caulicle over an ulcerative-proliferative-like growth with a diameter of 4.5×4.0 cm on the left ankle and one with a diameter of 5.0×3.0 cm on foot (Fig. 1). Initially, laser therapy was done because the histology of the excisional biopsy specimen of the foot showed chronic inflammation. However, the wound increased progressively. After two months, the patient presented with painful discharge and swelling without bleeding, and was mobile over underlying structures. He underwent debridement with marginal excision, and multiple biopsies (Fig. 2). The histology of an excisional biopsy of the foot showed a highly differentiated verrucous carcinoma (formerly referred to as papillomatosis cutis carcinoides) as well as a Pseudomonas aeruginosa infected tissue. At first, the patient underwent wide excision and biopsy with mesh split thickness skin graft. No post-operative complication was noted after three months. But four months post-surgery, the skin graft of heel was lost with ulceration (Fig. 3). We did an excision and biopsy of the heel pad, and found that verrucous carcinoma has recurred. On microscopy, the tumor was seen to be composed of well-differentiated squamous epithelium with downward growth pattern exhibiting bulbous pushing margin, suggesting verrucous carcinoma (Fig. 4). The tumor infiltrated the soft periosteal tissues and calcaneus. The patient was advised below knee amputation (BKA) but did not consent. Thus, heel reconstruction with an anterolateral thigh (ALT) perforator free flap was performed instead. The primary goal of

![Fig. 1. Preoperative image of the ulcerative masses on both the ankle and heel.](image1)

![Fig. 2. After wide excision of the mass on the left foot and debridement.](image2)

![Fig. 3. Recurrence of verrucous carcinoma on the heel.](image3)
lower extremity reconstruction is to recover and maintain function wherein skeletal reconstruction with stable soft-tissue coverage is essential. In this aspect, ALT free flap can be a good option. Because the patient was diabetic, he was not an ideal candidate for vessel, but anastomosis of one artery and two veins was done. We used the posterior tibial artery for arterial anastomosis, and the flap size was 7.0×15.0 cm. Post-operatively, discharge was noted from the operative site due to osteomyelitis, but all the flaps survived well with dressing (Fig. 5). Furthermore, no notable complications were seen at the donor site of the flap and vessel, which suggests a successful healing process.

**DISCUSSION**

In a patient with diabetic foot, fungal infection, callus formation, squamous cell carcinoma, and verrucous carcinoma occur frequently. Verrucous carcinoma of the foot is an uncommon low-grade variant of squamous cell carcinoma characterized by local aggressive clinical behavior but with a low potential for metastasis. Verrucous carcinoma is a rare variant of squamous cell carcinoma. Past history of hyperthyroidism (increased appetite, loss of weight, tremors, and menorrhagia) may be present. The most common location of verrucous carcinoma is the oral cavity, and extra-oral sites such as the genitalia, but is rare on the foot. Verrucous carcinoma is often related to skin infection; thus, it is essential to obtain a complete history to assess host risk factors, and wound healing. Because of thin skin and subcutaneous tissue, and small foot muscles, focal carcinoma lesion is often complicated by local infection. Wide local excision is the treatment of choice. There are various methods for the reconstruction of defects. The goal of heel reconstruction should be functional and aesthetic. These goals can be achieved by providing the heel with a durable and comfortable weight-bearing surface, adequate contour, protective sensation, and a solid anchor to deep tissue to resist shear-

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**Fig. 4.** (A) The tumor showed a downward growing solid bulbous infiltrative nest (H&E, ×12.5). (B) The tumor consisted of well differentiated squamous cells (H&E, ×400).

**Fig. 5.** After 1 year follow-up of anterolateral thigh free flap operation.
ing. Various flaps such as fascio-cutaneous, musculo-cutaneous, or split skin grafted muscle flaps have been reported for the reconstruction of the weight-bearing foot. The perforator flap; however, deserves attention because of its anatomical characteristics. This study suggests that the ALT perforator free flap is a reliable option for heel reconstruction, resulting in acceptable functional and aesthetic outcome. In this case, a large defect occurred after wide excision. Because the tumor infiltrated the soft periosteal tissues and calcaneus, the patient needed flap coverage or amputation. BKA was not performed; thus, the patient’s quality of life improved. In addition, this case shows that reconstruction using ALT free flap can be performed if the pedicle is stable even when a patient is in a poor condition.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

REFERENCES

사마귀양암종으로 발생한 발뒤꿈치 연부 조직 결손의 재건

안승기¹ · 최환준¹ · 장시형²
순천향대학교 의과대학 ¹성형외과학교실, ²병리학교실

사마귀양암종은 편평상피암의 분화도가 높은 저등급 종류 중 흔하지 않은 종으로, 매우 크게 성장하여 뼈나 연골 같은 인절 조직들을 파괴할 수 있다. 45세의 만성 질환을 가진 남자 환자가 왼쪽 발의 종괴를 주소로 내원하였다. 조직 병리학적 검사상 분화도가 높은 사마귀양암종으로 판명되어 광범위 절제술 및 그물망 부분층 피부이식을 시행하였다. 4개월 후 발뒤꿈치의 피부이식 부분이 궤양으로 손실되었고 암이 재발한 것을 확인하였다. 암이 발뒤꿈치 치범과 골막 조직에도 침범을 하였기 때문에, 피판술 혹은 절단이 고려되어야 했다. 발뒤꿈치의 재건은 기능적인 면과 미용적인 면이 모두 고려되어야 하며 내구성이 있고 빠재하게 무게를 지탱할 수 있는 피판술이 시행되어야 한다. 하퇴아래절단을 시행하지 않고 전외측대퇴부 유리 피판술을 통해 만족스러운 결과를 얻어 삶의 질을 향상시킬 수 있었다.

색인단어: 사마귀양암종, 전외측대퇴부 유리 피판술, 발뒤꿈치 피부결손, 절단술, 당뇨발

게재확정일 2018년 1월 24일
교신저자 최환준
31151, 충남 천안시 동남구 순천향6길 30, 순천향대학교 의과대학 성형외과학교실
TEL 041-570-2195  FAX 041-574-6133  E-mail medi619@schmc.ac.kr