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## Verrucous carcinoma of the foot - A series of 4 cases

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### **Abstract**

Most of patients having soft tissue lesion on heel/foot referred to plastic surgeon because reconstructive options for heel/foot are difficult for general surgeons/orthopedicians. So as a plastic surgeon we should be aware of this rare but local tumor of foot, so that we can diagnose it early and manage properly.

We present a case series of 4 patients of verrucous carcinoma of the foot. This is a rare, locally invasive, well differentiated, low-grade squamous cell carcinoma, with HPV as a possible causative agent. It follows a chronic course and mimics a variety of skin lesions, delaying diagnosis by up to 15 years. The definitive diagnosis is made histologically, and treatment by wide local excision is recommended. Our patients underwent wide local excision and reconstructed. Three patients had lesion on heel, were managed using reverse peroneal artery flap and fourth patient had lesion on forefoot, was managed using reverse medial planter artery flap. There were no postoperative complications. There was no functional impairment.

**Keywords:** verrucous carcinoma, foot tumors, reverse peroneal artery flap, reverse medial planter flap

### **1. Introduction**

Most of patients having soft tissue lesion on heel/foot referred to plastic surgeon because reconstructive options for heel/foot are difficult for general surgeons/orthopedicians. So as a plastic surgeon we should be aware of this rare but local tumor of foot, so that we can diagnose it early and manage properly.

Verrucous carcinoma is a rare, locally invasive, well differentiated, low-grade squamous cell carcinoma, with HPV as a possible causative agent. It has a variety of different names; each is distinguished by its differing location but represents the same pathological condition.[1] These terms include: epithelioma cuniculatum plantare, giant condylomata accuminata of the anorectal region (Buschke-Loewenstein tumour), verrucous carcinoma of the oropharynx, papilloma cutis carcinoids, and cutaneous squamous carcinoma.[2-4] It follows a chronic course and mimics a variety of skin lesions, delaying diagnosis by up to 15 years. The definitive diagnosis is made histologically, and treatment by wide local excision is recommended. Most patients with verrucous carcinoma have a good prognosis.

Local recurrence is not uncommon, but metastasis to distant parts of the body is also rare.

Verrucous carcinoma may occur in several locations in the head and neck, gingiva, buccal mucosa, hard palate, floor of the mouth, larynx, oesophagus, penis, vagina, scrotum. The oral cavity is the most common site of this tumor.

Verrucous carcinoma of the foot is very rare.

### **2. Material and method**

All the cases in this series were chronic smoker males and in their 4<sup>th</sup> to 5<sup>th</sup> decade of age. 3 patients had lesion on the heel (figure 1,4, 5) and one over forefoot (figure 6). The patients were given history of 2 – 5 years slowly growing lesion with discharging some whitish material. The lesion was increased gradually in size, was painless and slowly growing, non-tender, with irregular surface and everted margins. There is no inguinal lymphadenopathy. Wedge biopsy sent on opd basis and report was suggestive of verrucous carcinoma. Morphologic picture showed a biopsy occupied by an ulcerated, polypoid mass characterized superficially by hyper and parakeratosis, and acanthosis; deeply

the tumor invaded with broad strands that often contained keratin-filled cysts in center. Mitotic activity was low and confined in basal layer. The fibrous stroma surrounding the lesion revealed ectatic vessels, moderate inflammatory infiltrate with neutrophils and focal necrosis (Figure 8).

The definitive histopathological diagnosis was verrucous carcinoma, that is, low-grade squamous cell carcinoma. The patient was posted for wide local excision (1 cm margin) (figure 6) and flap surgery. Pedicled Reverse peroneal artery flap (figure 2) with skin grafting for the donor site was done for the patient with lesion on heel. All margins and base

were free from tumor in final excisional biopsy report. After 7-10 days patient discharged and followed after 18 days for final inset. Patient was discharged after 3 days. On 3 month and 6 month follow up flap was healthy (figure 3). Patient satisfaction and functional outcome was good. The patient with lesion on forefoot was treated using reverse medial planter flap and skin graft (figure 7) and discharged after 7 days. A summary of all these 4 patients given in underlying table 1. Summary of previous publications with their references given in Table 2.

**Table 1: table showing age/sex, location, size, procedure, outcome and hospital stay of 4 patients of verrucous carcinoma foot; a summary**

	Age/sex	location	Size of lesion	Size of defect after wide local excision	Primary surgery	Additional surgery	Biopsy	Flap status	Total inpatient days
1	45/m	Heel	6.5x7 cm	7.5x8 cm	Wide local excision (WLE) with reverse peroneal artery flap (RPAF)	final inset after 18 days	Verrucous carcinoma	Healthy	12 days
2	42/m	Heel	6x7 cm	7x8 cm	WLE + RPAF	As above	As above	Healthy	13 days
3	48/m	Heel	6.5x7 cm	7.5x8 cm	WLE + RPAF	As above	As above	Healthy	10 days
4	40/m	forefoot	4.4x4 cm	5.4x5cm	WLE + Reverse medial planter flap	no	As above	Healthy	7 days

**Figure 1. verrucous carcinoma of heel**



**Figure 2. reverse peroneal artery flap with peroneal artery**



Figure 3. final result with RPAF



Figure 4. 2<sup>nd</sup> case of verrucous carcinoma heel



Figure 5. 3<sup>rd</sup> case of verrucous carcinoma heel



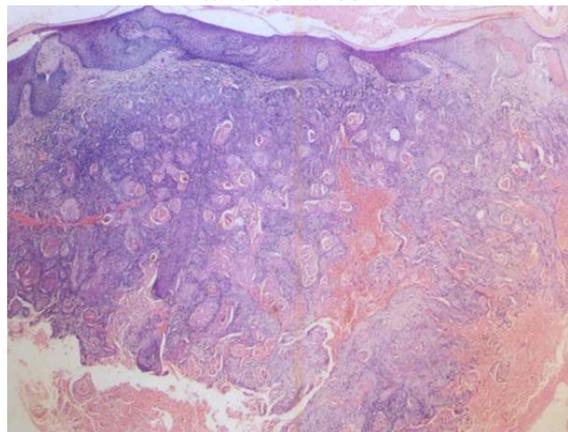
Figure 6: 4<sup>th</sup> case of verrucous carcinoma, lesion on forefoot. Wide local excision with 1 cm margin



Figure 7: Reverse medial planter flap with skin graft



Figure 8: Microscopic view of verrucous carcinoma foot



**Table 2: data of previous publications with their references on verrucous carcinoma of foot**

	Age/sex	Site and size of lesion	Management	Reference
1	63 /m	Forefoot, 3x1.7 cm	Amputation of forefoot	[5]
2	44/m	Interdigital folds of both feet	Bilateral forefoot amputation	[6]
3	74/m	Heel	Below knee amputation	[7]
5	34/m	Forefoot, 3x4 cm	Wide local excision with 5 <sup>th</sup> metatarsal amputation	[8]
6	66/m	forefoot	Wide local excision with skin graft	[9]
7	54/m	forefoot	Amputation of 3,4,5 metatarsals	[10]
8	37/m	forefoot	Wide local excision with 2,3 toe amputation	[11]
9	50/m	forefoot	Wide local excision	[12]
10	46/m	-	Wide local excision	[13]
11	66/m	sole	Wide local excision	[14]
12	77/m	3,4 webspace	-	[15]
13	62/m 69/m	sole	-	[16]

### 3. Discussion

Verrucous carcinoma is a subtype of a low-grade SCC, not an SCC with a verrucous presentation. The pathogenesis of VC is unclear, but all arise de novo in the weight-bearing areas of the foot. VC has histological similarities to plantar warts, and HPV may be a causative agent.[2][17-19] Indeed, the deoxyribonucleic acid of HPV types 6, 11, 16, and 18 have been identified in VC specimens.[18] VC typically occurs in men in their 4th to 6<sup>th</sup> decades, although it has been seen in patients as young as 16 years.[1] It follows a chronic course, evolving from a discrete focal lesion to a large fungating deep penetrating mass. The slow growth and confusing early appearances can lead to delays in diagnosis of 8 to 15 years[17], and hence under-treatment. Differential diagnoses include viral warts, pseudocarcinomatous hyperplasia, and mycosis.[19][20] Although the clinical and macroscopic findings can be marked (the formation of a bulky, exophytic mass, which may ulcerated with numerous sinuses from which foul-smelling purulent keratinous debris is expressed), the definitive diagnosis is made pathohistologically. Specimens exhibit both endophytic and exophytic growth patterns.[21] Proliferations are usually composed of large pale-staining well-differentiated keratinocytes, with the presence of pronounced hyperkeratosis, parakeratosis and papillomatosis. Unlike SCC, keratin pearl formation is little uncommon. Tumour strands may extend deep into the dermis and forming keratin-filled intra-epidermal abscesses and sinuses connecting with the surface. These sinus tracts are the 'rabbit burrow'-like spaces from which epithelioma cuniculatum derives its name. The surrounding stroma may demonstrate an infiltration of lymphocytes, eosinophils, histiocytes

and plasma cells. VC is a low-grade, locally invasive tumour, which generally never metastasises, and thus has a favourable prognosis.[4] The recommended treatment is wide local excision, rather than marginal excision, as VC often causes structural distortion of adjacent tissues, and the margins are not always apparent intra-operatively. The residual defect can then be covered with a skin graft or radial forearm free flap.[20][22] Other therapeutic modalities include topical chemotherapy, electrocautery, and cryotherapy but all have high recurrence rates.[2][22] Mohs microscopically controlled surgery has reported good results for the less invasive VC. Radiotherapy is not recommended, despite being curative in some reports, because of the possibility of malignant change.[2][19][20] Partial (ray or 5th metatarsal)[1][17] or radical (foot or below-knee)[4][17][21] amputations are occasionally required for aggressively invasive disease, and in the presence of poor vascular status, massive skin defects, postoperative infections, or in tumour recurrence secondary to incomplete excision. The long-term prognosis for definitively treated VC is good, with cure rates of up to 98%. Patients should be reviewed annually as recurrence and metastasis remain a possibility. Initially amputation was the most commonly used treatment for verrucous carcinoma but now the wide local excision is the standard. We underwent WLE in all of our 4 patients.

### 4. Conclusion

Most of patients having soft tissue lesion on heel/foot referred to plastic surgeon because reconstructive options for heel/foot are difficult for general surgeons/orthopedicians. So as a plastic surgeon we should be aware of this rare but local

tumor of foot, so that we can diagnose it early and manage properly.

We present a case series of 4 patients of verrucous carcinoma of the foot. This is a rare, locally invasive, well differentiated, low-grade squamous cell carcinoma, with human papilloma virus (HPV) as a possible causative agent. It follows a chronic course and mimics a variety of skin lesions, delaying diagnosis up to 15 years. The definitive diagnosis is made histologically, and treatment by wide local excision is recommended. Our patients underwent wide local excision and reconstructed. Three patients had lesion on heel, were managed using reverse peroneal artery flap and fourth patient had lesion on forefoot, was managed using reverse medial planter artery flap. There were no postoperative complications. There was no functional impairment. (Summary: Table 1)

**Conflict of interest statement:** Authors declare that they have no funding and no conflict of interest.

**Ethical standard:** The manuscript does not contain clinical studies or patient data.

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