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Verrucous carcinoma presenting as recalcitrant verruca plantaris

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Abstract

Verrucous carcinoma is a rare, low-grade variant of well-differentiated squamous cell carcinoma. Plantar verrucous carcinoma presents as a slow-growing, exophytic, verrucous plaque on weight bearing areas of the foot. Verrucous carcinomas have low metastatic potential, but are high risk for local invasion. We describe a patient with a 20-year history of a slowly growing, ulcerated, verrucous plaque on the sole of the left foot that was erroneously treated for years as verruca plantaris and was eventually diagnosed as invasive verrucous carcinoma. Verrucous carcinomas are a diagnostic challenge due to clinical and histopathologic mimicry of benign lesions. Mohs micrographic surgery should be employed to allow the ability to intraoperatively assess tumor margins while excising the minimal amount of necessary tissue. It is important for clinicians to recognize the characteristics and accurately diagnose verrucous carcinomas. Delays in treatment may require more extensive dissection or amputation.

Keywords: cuniculatum plantare, epithelioma, Mohs surgery, verruca plantaris, verrucous carcinoma

Introduction

Verrucous carcinoma (VC) is a rare, low-grade variant of well-differentiated squamous cell carcinoma. It was first described by Ackerman in 1948 as a mucosal tumor in the oral cavity and was later reported in other stratified squamous surfaces [1-4]. Three characteristic anatomic sites include the anogenital region (giant condyloma of Buschke-Lowenstein), the oropharynx (Ackerman tumor), and the plantar surface of the foot (epithelioma cuniculatum plantare), [1-2]. Plantar verrucous carcinoma has a predilection for White males in the fifth to sixth decades of life [1-3]. It presents as a slow-growing, verrucous plaque or nonhealing ulcer that can gradually develop into a tumor infiltrating surrounding structures [1-3,5]. Verrucous carcinomas tend to have an indolent course with low metastatic potential, but are high risk for local invasion [2,6]. Human papillomavirus (subtypes 11, 16, 18, and 33), chronic inflammation, trauma, pressure of weight bearing, poor local hygiene, tobacco, and other chemical carcinogens all may contribute to the pathogenesis [2-5].

Diagnosis is often delayed due to misdiagnosis and treatment of VCs as verruca or chronic ulceration due to clinical and histologic mimicry [1,4-5]. Unlike verruca plantaris and most ulcerations, VCs are recalcitrant to therapeutic modalities [5]. To ascertain an accurate diagnosis of VC, a biopsy must include portions of the deep dermis and subcutaneous tissue. Superficial portions of VCs mimic that of verrucous vulgaris, whereas deeper sections usually demonstrate a mixed endo- and exophytic squamoid growth pattern with broad, blunted rete ridges with pushing margins, keratin-filled crypts, keratin cores, and minimal cytological atypia [1-2,4]. Shallow biopsies often exclude the entirety of the tumor in deeper sections, which is necessary for diagnosis [4]. Although, immunohistochemical studies have been reported in the literature, there is still a lack of validated evidence and reliable immunohistochemical markers for diagnosis of VC [3].

Figure 1. *Preoperative photograph. Hyperkeratotic verrucous plaque with ulceration on the left plantar foot.*

The primary treatment for VCs is surgery, with both wide local excision and Mohs micrographic surgery commonly utilized [2]. However, the ability to intraoperatively assess tumor margins while excising the minimal amount of necessary tissue makes Mohs micrographic surgery the treatment of choice, especially for large or ill-defined lesions [6]. Non-surgical treatments including cryotherapy, photodynamic therapy, oral retinoids, laser therapy, and intralesional chemotherapy have been reported but are often avoided due to high risk of tumor recurrence [2]. Radiotherapy has been associated with anaplastic transformation and nodal metastases and is therefore avoided for treatment of VC [1,3].

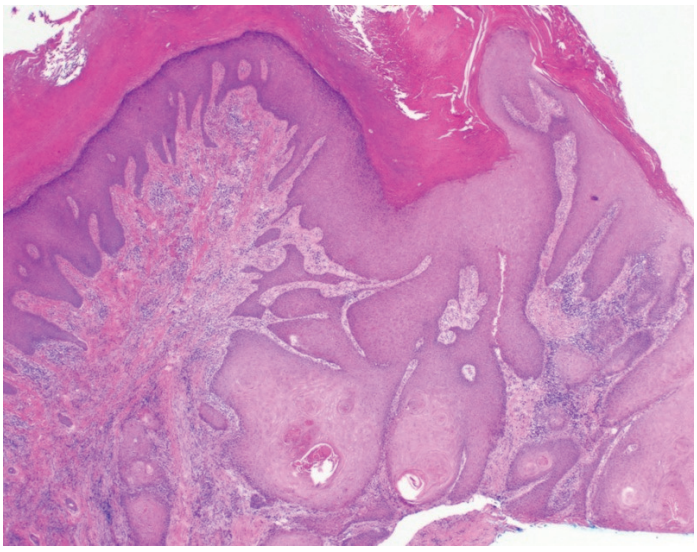

Figure 2. *H&E histophathology. Exophytic verrucoid papule with broad, blunted rete ridges with pushing margins, keratin cores, and minimal cytological atypia,10×.*

Case Synopsis

A 63-year-old woman presented with a 20-year history of a slowly growing, ulcerated, verrucous plaque on the sole of the left foot (**Figure 1**). The lesion was biopsied on two separate occasions prior to presentation to our clinic. The first biopsy, 4mm punch, exhibited histologic features of verrucous plantaris. The second biopsy, a shave, was read as a benign acral fibrokeratoma with verrucous features. The lesion was erroneously treated for years with cryotherapy, candida injections, and cantharidin but was recalcitrant to all therapies. Due to increased pain and difficulty ambulating, the patient presented to a podiatrist, who excised the plaque with the resultant pathology consistent with invasive verrucous carcinoma with peripheral and deep positive margins (**Figure 2**). Standard radiographs demonstrated no osseous invasion. The patient was referred to our department for definitive treatment with Mohs micrographic surgery. Mohs micrographic surgery was performed utilizing a posterior tibial nerve block followed by local anesthesia. Clear surgical margins were obtained after three stages with a surgical defect extending to the peritenon (**Figure 3**).

Case Discussion

In this case, plantar verrucous carcinoma clinically and histologically mimicked intractable verruca vulgaris for over 20 years. Similarly, a case reported by Vlahovic had substantial delays in diagnosis with consequential morbidity for the patient [4]. Ye reported that more than 50% of cases in their series had a disease course for over one year prior to diagnosis [3]. Likewise, Prince reported an average delay in diagnosis of 5 years in a series of 19 patients [5]. He also described that typically the diagnosis did not occur until tumors were greater than 4cm in size or ulceration occurred. Delays in diagnosis are all too common in this type of squamous cell carcinoma variant resulting in increased morbidity for patients [3-5].

Verrucous carcinomas are a diagnostic challenge due to clinicopathologic mimicry of benign lesions [2,4-5]. Clinically, plantar VCs present a slow-growing warty plaque or nonhealing ulceration of weight

Figure 3. *Surgical defect post-Mohs with exposure of peritenon at the central depth.*

bearing areas associated with pain, bleeding, and decreased mobility [5]. Histologically, VC closely resembles that of verruca plantaris in the epidermis, but with tumor invasion; deep sections show an exo-endophytic growth pattern of well-differentiated squamous epithelium with broad invasive fronds containing a central keratin-filled cyst and pushing edges [1,3,4]. It is imperative that biopsy specimens are representative of the entire lesion, including the deep dermis and subcutaneous fat, as superficial biopsies may lead to misdiagnosis [1,2,4]. Clinicians should have an increased suspicion for chronic, non-healing ulcerations or wart-like plaques on the feet.

Often, tumor margins of VC cannot be clinically elucidated, therefore excision with total microscopic control is essential [1.2,6]. Preoperative imaging may be considered to clarify the extent of tumor invasion [1]. Wide local excision is most common surgical procedure performed for treatment of VC, but is associated with high local recurrence rates ranging from 19 to 75%. Mohs micrographic surgery allows for intraoperative assessment of peripheral and deep margins of VCs with more favorable outcomes and lower recurrence rates of 16% [2]. Mohs micrographic surgery should be considered the first line treatment to reduce the risk of recurrence and to minimize morbidity due to the maximum conservation of uninvolved tissue.

A recent study by Prince, proposes that tumors located on the nonglaborous part of the foot, including nonplantar surfaces and the great toe, are more likely to recur after wide local excision with negative margins compared to VCs on the glaborous surfaces of the foot [5]. In the reported cases with recurrence, tumors regrew quickly, within months, on the edges or middle of grafts used for reconstruction, suggesting that regrowth occurs in areas of greatest tissue stress and proliferation [5]. No studies exist that characterize risk factors for recurrence after treatment with Mohs micrographic surgery. Early biopsy and aggressive treatment are warranted for any exophytic lesion at previous operative or reconstruction sites [5]. Prognosis is often favorable; however, accurate diagnosis is essential to curtail local invasion and tissue destruction [1,2,4].

Conclusion

In conclusion, verrucous carcinoma is a rare cutaneous malignancy that can masquerade as chronic, benign lesions, such as verruca plantaris. Verrucous carcinoma should be considered in cases of recalcitrant plantar warts or non-healing plantar ulcerations. It is crucial for clinicians to recognize and accurately diagnose VC with a biopsy containing deep dermis and subcutaneous fat. Mohs micrographic surgery minimizes tissue loss, local recurrence, and morbidity for patients. Delays in treatment may require more extensive dissection or amputation.

Potential conflicts of interest

The authors declare no conflicts of interest.

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