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Atypical Presentation of Squamous Cell Carcinoma of the Foot: A Case Report

NANDHINI GANESH[1], ATHIRA GOPINATHAN[2], B ARUN[3], KAMALESH PRABU GANESH[4], PAVITHRA DHAMODARAN[5]

ABSTRACT

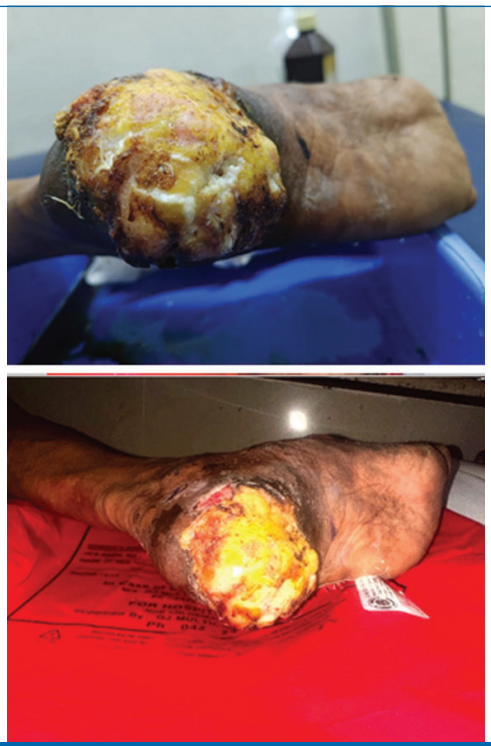
Squamous Cell Carcinoma (SCC) of the foot represents a rare clinical entity, often presenting diagnostic challenges due to its resemblance to benign conditions such as chronic ulcers or calluses. In this report, a case of a 61-year-old male with no history of significant sun exposure or smoking, presenting with a non-healing ulcer over the heel of his left foot. Initially misinterpreted as a benign lesion, biopsy revealed SCC, prompting surgical excision (below-knee amputation) with clear margins. Histopathological examination confirmed the diagnosis, highlighting the importance of considering malignancy in non-resolving foot ulcers even in patients with atypical risk profiles. This case emphasises the necessity for early biopsy and intervention to optimise outcomes in uncommon presentations of SCC, particularly in unusual anatomical locations like the foot. Early recognition and management are crucial to prevent local tissue destruction and potential metastasis in such cases. Understanding and recognising these atypical presentations are crucial for early detection, prompt biopsy, and initiation of appropriate treatment, ultimately improving patient outcomes and reducing morbidity associated with advanced SCC of the foot.

Keywords: Below-knee amputation, Diabetes mellitus foot, Maggots, Sentinel node biopsy, Verrucous carcinoma

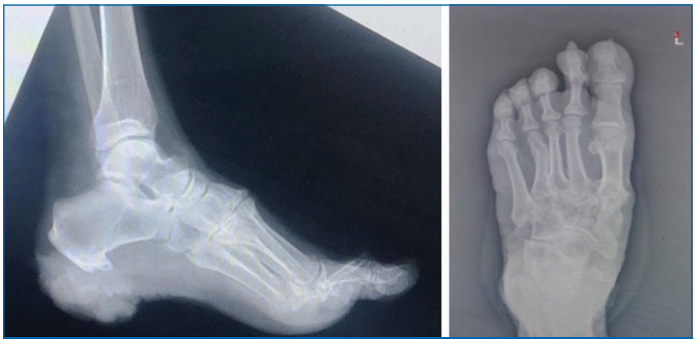
CASE REPORT

A 61-year-old male patient presented with complaints of a non-healing ulcer over the left heel for the past six months, which was associated with pain and foul-smelling discharge. He has been a known case of type 2 diabetes mellitus for the past two years, not on any regular medications. He also had a similar history of ulcer over the same site two years ago, for which wound debridement was done. Details and reports are unavailable. On examination, the patient was conscious, oriented to time, place and person, afebrile and moderately built and nourished. There was no pallor, icterus, cyanosis, clubbing, or lymphadenopathy. An ulcer of size 5×5 cm, with irregular margins, raised edges seen over the plantar aspect of the left foot over the heel region [Table/Fig-1,2]. Necrotic slough and purulent, foul-smelling discharge along with maggots were seen over the floor of the ulcer. Surrounding skin was macerated, and the ulcer was warm and tender to the touch. On admission, his blood reports were as follows: Total leucocyte count- 5800 WBCs/μL; haemoglobin- 14.8 g/dL; fasting blood sugar and post prandial blood sugar- 194 mg/dL and 295 mg/dL, respectively; HbA1c- 10.4%; Renal Function Test (RFT) within normal limits; Liver Function Tests (LFT) within normal limits; Chest X-ray revealed no abnormalities and serum electrolytes were within normal limits. An X-ray of the left foot was done, which shows an ill-defined, irregular soft-tissue swelling involving the plantar aspect of the left foot, more predominantly in the heel region. No evidence of any calcification was noted within. The underlying bone did not show any periosteal reaction/bony erosions, made of diffuse osteopenia and with calcaneal spur [Table/Fig-3,4].

Patient was admitted, and after obtaining informed written consent, a thorough wound wash was administered, bedside wound debridement was performed, and more than 100 maggots were removed from the wound after turpentine oil soak. On debridement of the necrotic slough, fleshy, ulcero-proliferative growth was seen on the floor of the ulcer. The patient was then planned for edge wedge biopsy, which showed low-grade, well-differentiated, with no perineural or lymphovascular invasion, with the possibility of suspected verrucous carcinoma. Tumour tissue showed marked proliferation of squamous epithelium with elongation of rete ridges. The other tissue fragments show skin with papillomatosis,

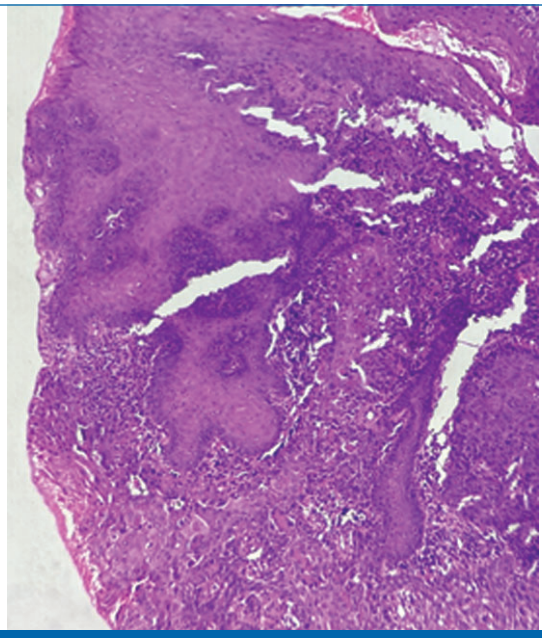


[Table/Fig-1&2]: An ulcer of size 5×5 cm, with irregular margins, raised edges seen over the plantar aspect of the left foot over the heel region.



[Table/Fig-3&4]: X-ray left foot: Ill-defined irregular soft-tissue swelling noted involving the plantar aspect of the left foot, more predominantly in the heel region.

hyperkeratosis, parakeratosis, expanded granular layer, marked acanthosis, and bulbous elongation of rete ridges with pushing margins. No cellular atypia was noted. Dermis showed a chronic inflammatory infiltrate with lymphangiectasia. No tumour invasion was indicated. Brown and Brenn stain was positive for bacterial colonies; no fungi were found using periodic acid-Schiff stain. Because of history, clinical presentation and morphology, the possibility of verrucous carcinoma was considered. The patient was then planned and taken up for below-knee amputation after obtaining anaesthetic fitness. Sentinel node biopsy was done, and the left superficial inguinal node was sent for histopathological analysis along with the amputated specimen. The findings were as follows: verrucous carcinoma; soft-tissue margins were free of tumour; bone margin was free of tumour and the inguinal lymph node was free of tumour and showed follicular hyperplasia and fibrosis [Table/Fig-5]. The intraoperative and postoperative periods were uneventful [Table/Fig-6,7]. On Postoperative Day (POD) 7, the wound was healthy, sutures intact, and the patient was discharged. Adjuvant therapy not given (low-grade tumour, margins and lymph node free of tumour); postoperative recovery was uneventful with complete wound healing. There was no evidence of any recurrence or metastasis during follow-up; functional outcome: the patient was given a limb prosthesis one month postoperatively.



[Table/Fig-5]: Histopathological Examination (HPE) slide: Well-differentiated tumoural proliferation of squamous nature and focal ulceration, irregular acanthosis, papillomatosis, and pushing border of the squamous islands in dermis. Histological image stained with Haematoxylin and Eosin (H&E).

[Table/Fig-6,7]: Postoperative wound pictures.

DISCUSSION

The SCC arises from squamous cells in the epidermis and can occur in various parts of the body, including the skin, lungs, and mucous membranes. While typical presentations are well-documented, atypical cases can be misleading and delay diagnosis. SCC of the foot is a rare condition that often mimics benign pathologies such as Diabetic Foot Ulcers (DFUs) or calluses, making early diagnosis challenging [1]. Both SCC and DFUs can present as chronic, non-healing wounds, particularly in weight-bearing areas. SCC may appear as ulcers with irregular margins or as hyperkeratotic, indurated lesions, closely resembling plantar calluses common in diabetic patients [2]. Due to diabetic neuropathy, pain may be absent even in malignant lesions, further delaying detection [3]. Additionally, impaired wound healing in diabetics can obscure the progressive features of SCC. Chronic irritation, trauma, and pressure points, often due to poor foot biomechanics or ill-fitting footwear, contribute to persistent inflammation and cellular turnover, increasing the risk of malignant transformation [4]. Recurrent infections and reduced immunity also create an environment conducive to carcinogenesis. In such cases, biopsy is essential for evaluating non-healing or atypical ulcers, as it helps confirm or exclude malignancy, directs appropriate treatment, and prevents delayed diagnosis, which is associated with higher risks of metastasis, recurrence, and amputation. Biopsy should be strongly considered for ulcers that persist beyond three months despite optimal diabetic wound care, exhibit suspicious features such as raised or bleeding margins, excessive granulation tissue, or firm induration [5]. This report underscores the importance of including SCC in the differential diagnosis of chronic or unusual foot lesions, even when clinical symptoms deviate from the norm. SCC of the foot is likely underreported and frequently subjected to inappropriate initial management. Skin malignancies comprise about 1-2% of all cancers diagnosed in India; among these, SCC represents 30-60%. And worldwide, the incidence of SCC is 0.6 to 3.0% [6]. A high index of suspicion must be maintained when evaluating persistent skin lesions or wounds for potential malignancy. Regardless of the clinical appearance, biopsy and histopathological analysis remain the gold standard for confirming the diagnosis. Early diagnosis and prompt treatment are crucial to minimise the risk of recurrence and metastasis. A thorough history, combined with appropriate imaging, can facilitate timely diagnosis and management. Ruling out metastatic disease is also essential. Computed Tomography (CT) scanning and sentinel lymph node biopsy play a vital role in comprehensive patient care. MRI serves as an adjunctive tool in the diagnostic process, while histopathology remains definitive. Wide local excision is considered the gold standard for treatment. often followed by skin grafting or flap reconstruction. Radiation therapy is reserved for older patients, those unfit for surgery, or when surgical margins are not clear. Adjuvant radiotherapy is commonly used in high-risk tumours post-surgery. The treatment that offers the highest cure rate for high-risk primary or recurrent SCC is Mohs micrographic surgery [7,8]. The principle of limb salvage is fundamental when managing SCC of the lower extremity. Achieving clear surgical margins, verified histologically or intraoperatively via frozen section analysis, is critical and may help reduce operating room time. SCC of the foot is rare among Indian patients and can be fatal if left untreated. Therefore, early detection and excision are of paramount importance. Despite being curable in most cases, SCC carries a high risk of recurrence and metastasis [9,10] due to delayed diagnosis. [Table/Fig-8] shows the summary of a few similar published cases from the literature [11-14]. The five-year cure rate for patients with large tumours is approximately 70%, regardless of treatment. Hence, any chronic, non-healing lesion should be approached with clinical suspicion to enable early diagnosis and effective treatment.

CONCLUSION(S)

The SCC of the foot is rare, particularly in Indian patients, and often misdiagnosed or treated inappropriately. Early diagnosis and wide local excision are crucial to prevent metastasis. Despite being curable, delayed diagnosis increases the risk of recurrence and

Author	Age/sex /occupation	Presenting complaint	Diagnostic challenge	Management	Outcome
Luo Y et al., [11]	84-year-old male	Chronic, significantly ulcerated area on the right foot; ulcer present to varying degrees	The chronic Diabetic Foot Ulcer (DFU) was misdiagnosed for years; malignant transformation into cutaneous Squamous Cell Carcinoma (cSCC) was delayed	Local tissue excision surgery, wound cleaning, nano-silver excipients, Chinese herbal treatments (Simiao and Tuoli Xiaodu powders)	The ulcer healed slowly post-treatment and did not expand
Snoussi I et al., [12]	60-year-old male tailor	Three-year history of macerated skin between toes, painful fissured ulceration in the fourth interdigital space	Initially misdiagnosed as fungal intertrigo, the first biopsy indicated keratoacanthoma with no malignancy; SCC diagnosis was delayed until a second-deep biopsy	Wide surgical excision of the lesion with a 5 mm safety margin, including the fourth and fifth toes of the right foot	Successful resection with histopathology confirming moderately differentiated SCC; planned follow-up every 6 months for 5 years
Mirigliano E et al., [13]	62-year-old male	Ulcerative lesion overlying a Squamous Cell Carcinoma (SCC) on the plantar aspect of the foot, clinically mimicking osteomyelitis of the third digit/metatarsal	SCC lesion mimicking osteomyelitis both clinically and radiographically; initial surgical excision had incomplete clearance of malignancy	Initial wide excision with partial third ray resection, followed by Lisfranc's disarticulation/ amputation after incomplete excision confirmed on pathology	Successful surgical management with Lisfranc's amputation to ensure complete tumour removal and provide a functional limb for ambulation
Raval RS et al., [14]	61-year-old male, farmer	Chronic, painful, non-healing ulcer on the dorsum of the left foot, present for one year following trauma during farming	Initially managed as an infected wound with antibiotics and home remedies; diagnosis confirmed as metastatic SCC only after wedge biopsy and lymph node Fine Needle Aspiration Cytology (FNAC)	Below-knee amputation using the Burgess long posterior flap technique; postoperative antibiotics, dressing, physiotherapy, and rehabilitation	Uneventful recovery; no complications postoperatively; good wound healing at 2-week and 2-month follow-up
(Present case)	61-year-old male	Non-healing ulcer over the left heel for 6 months with pain and foul-smelling discharge	Initially misdiagnosed as a benign ulcer, the diagnosis of SCC (verrucous carcinoma) was confirmed only after biopsy	Below-knee amputation with sentinel lymph node biopsy; wound debridement; no adjuvant therapy given (low-grade tumour, margins clear)	Uneventful recovery; complete wound healing; no recurrence or metastasis on follow-up; fitted with a limb prosthesis one month post-operatively.

[Table/Fig-8]: Similar cases of SCC foot and their presentations, diagnostic challenges, management, and outcomes [11-14].

metastasis. Chronic, non-healing foot lesions should always raise suspicion for early detection.

REFERENCES

[1] Price ML, Tidman MJ, Ogg CS, MacDonald DM. Skin cancer and cyclosporine therapy. N Engl J Med. 1985;313(22):1420. Doi: 10.1056/NEJM198511283132222.
[2] Smith J, Mello LF, Nogueira NC, Neto, Meohas W, Pinto LW, et al. Malignancy in chronic ulcers and scars of the leg (Marjolin's ulcer): a study of 21 patients. Skeletal Radiol. 2001;30(6):331-37. Doi: 10.1007/s002560100355.
[3] Da Costa JC. Carcinomatous changes in an area of chronic ulceration, or Marjolin's ulcer. Ann Surg. 1903;37(4):496-502.
[4] Potter BK, Pitcher JD Jr, Adams SC, Temple HT. Squamous cell carcinoma of the foot. Foot Ankle Int. 2009;30(6):517-23. Doi: 10.3113/FAI.2009.0517.
[5] Tisch Mendes J, Klein RJ. The value of a biopsy in chronic ulcers: a case series. Wounds. 2022;34(4):119-23. Doi: 10.25270/wnds/2022.119123. PMID: 35452409.
[6] Raval RS, Kavthiya JR, Prajapati BH. Squamous cell carcinoma on the dorsal aspect of foot: A case report and literature review. Int Surg J [Internet]. 2023 Apr. 29.
[7] Guadara J, Sergi A, Labruna V, Welch M, Gazivoda PL. Transformation of plantar verruca into squamous cell carcinoma. J Foot Surg. 1992;31(6):611-14.
[8] Demuth RJ, Snider BL. Primary squamous cell carcinoma of the plantar surface of the foot. Ann Plast Surg. 1980;4(4):310-14. Doi: 10.1097/00000637-198004000-00009.
[9] Kallini JR, Hamed N, Khachemoune A. Squamous cell carcinoma of the skin: epidemiology, classification, management, and novel trends. Int J Dermatol. 2015;54(2):130-40. Doi: 10.1111/ijd.12553.
[10] Smith PJ Jr, Hylinski JH, Axe S. Verrucous carcinoma: Epithelioma cuniculatum plantare. J Foot Surg. 1992;31(4):324-28.
[11] Luo Y, Li CY, Wang YQ, Xiang SM, Zhao C. Diabetic ulcer with cutaneous squamous cell carcinoma: A case report. World J Clin Oncol. 2024;15(12):1514-19. Doi: 10.5306/wjco.v15.i12.1514. PMID: 39720643; PMCID: PMC11514373.
[12] Snoussi I, Boulifa S, Abbad F, El Jouari O, Gallouj S. A case report of squamous cell carcinoma mimicking interdigital intertrigo. Oxf Med Case Reports. 2024;2024(7):omae066. Published 2024 Jul 9. Doi: 10.1093/omcr/omae066.
[13] Mirigliano E, LaTour R, Abramczuk JW. Squamous cell carcinoma of the foot mimicking osteomyelitis: a case report. J Foot Ankle Surg. 2011;50(4):480-85. Doi: 10.1053/j.jfas.2011.04.001. Epub 2011 May 12. PMID: 21570322.
[14] Raval RS, Kavthiya JR, Prajapati BH. Squamous cell carcinoma on the dorsal aspect of foot: a case report and literature review. Int Surg J. 2023;10:953-56.

PARTICULARS OF CONTRIBUTORS:
1. Postgraduate Student, Department of General Surgery, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
2. Professor, Department of General Surgery, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
3. Postgraduate, Department of General Surgery, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
4. Postgraduate, Department of General Surgery, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
5. Senior Resident, Department of General Surgery, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. B Arun,
SRM Medical College Hospital and Research Centre, SRM Nagar, Pothari, Chengalpatu, Chennai-603203, Tamil Nadu, India.
E-mai: arunbharathi95@gmail.com

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