

Beyond infection: squamous cell carcinoma arising in a chronic calcaneal osteomyelitis wound

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BACKGROUND

Squamous cell carcinoma (SCC) is a rare but serious complication of chronic osteomyelitis and long-standing draining wounds. Clinical changes may overlap with recurrent infection, potentially delaying recognition. A changing wound phenotype should therefore broaden the differential diagnosis beyond infection.

METHODS

Clinical records, imaging, operative reports, microbiological data and histopathological findings were retrospectively reviewed at *IRCCS Istituto Ortopedico Rizzoli*, Bologna, a dedicated orthopaedic referral hospital (~350 beds), with an established multidisciplinary orthopaedic-infectious diseases care pathway involving infectious diseases specialist from *IRCCS Policlinico di Sant’Orsola*.

RESULTS

A 57-year-old man with no significant past medical history sustained a severe right lower-limb road-traffic injury in 1981, requiring surgery for multiple fractures. A calcaneal ulcer was first noted upon postoperative cast removal, subsequently improved, and recurred a few years later as an infected wound. Over the following decades, intermittent sinus-tract drainage and chronic calcaneal osteomyelitis persisted despite multiple surgical procedures. In 2023, he underwent further surgical debridement at another hospital, with intraoperative cultures yielding *Pseudomonas aeruginosa*. Postoperative treatment with meropenem plus vancomycin failed to achieve local resolution. The patient was then referred to *IRCCS Istituto Ortopedico Rizzoli* in April 2024 for further evaluation and management. Local clinical findings at presentation and subsequent imaging assessment, including plain radiography and magnetic resonance imaging (MRI) are summarized in **Figure 1**. MRI demonstrated a retrocalcaneal soft-tissue defect, exophytic tissue, erosive calcaneal bone loss and diffuse calcaneal marrow oedema, raising the differential of infection-related osteolysis versus secondary neoplastic bone involvement. Malignant transformation was explicitly considered in the differential diagnosis.

Figure 1

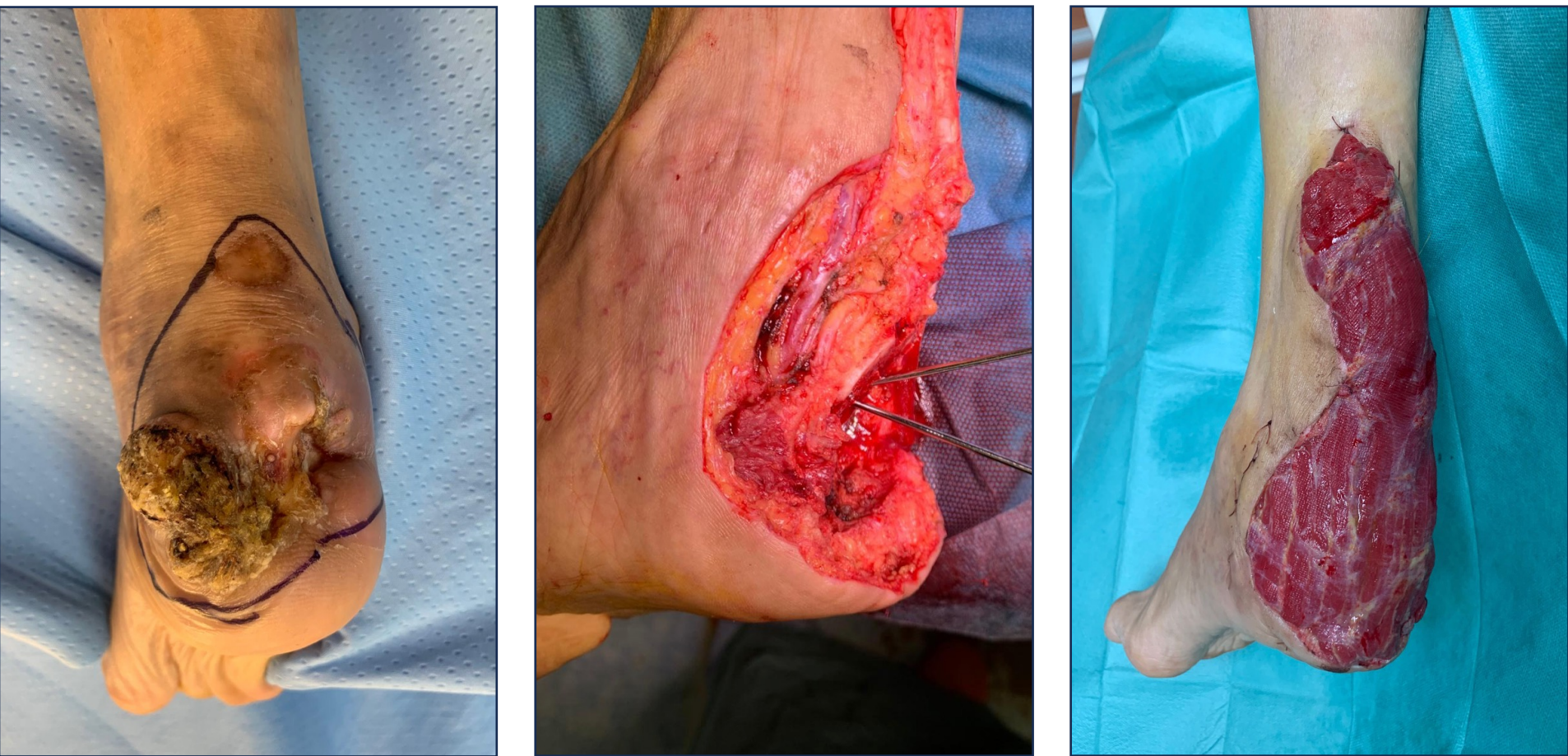
calcaneal findings at presentation • plain radiograph • magnetic resonance imaging



Wide excision with calcaneal bone resection, cement spacer, Achilles tendon reinsertion and flap coverage was performed (**Figure 2**). Histology confirmed SCC in the excised exophytic lesion; frozen sections and definitive bone margin samples were negative for neoplasia but showed chronic inflammation, necrotic bone fragments and microfoci of bone necrosis.

Figure 2

pre-incisional calcaneal appearance • wide margin dissection with excision of the lesion • calcaneal appearance at the end of surgery with flap reconstruction

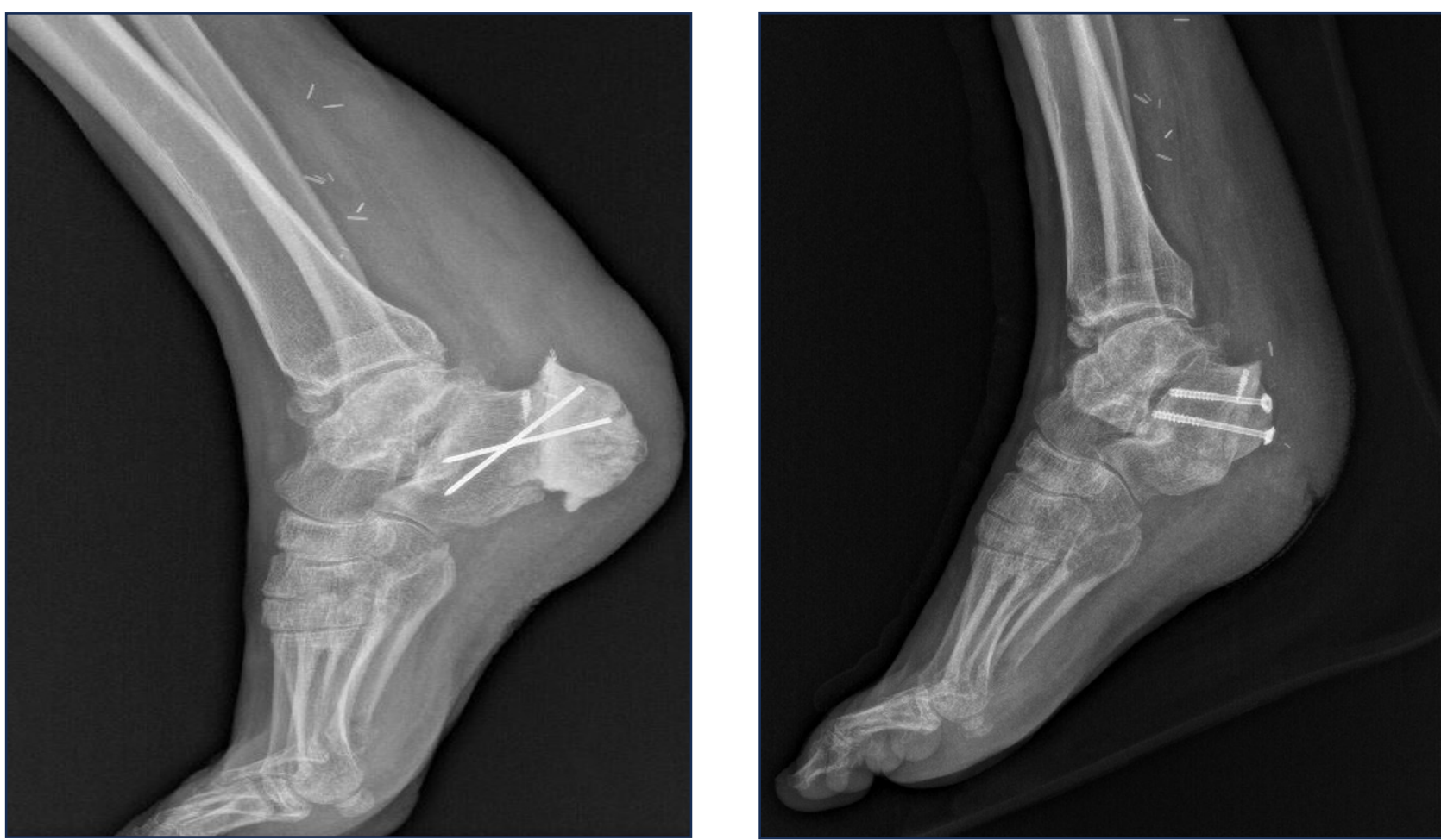


Approximately 9 months after wide-margin resection and cement spacer placement, the patient underwent staged revision with spacer exchange. Seven months later, definitive reconstruction was performed using a bone-bank allograft secured with screw fixation. Histopathological examination of specimens obtained during both subsequent procedures showed no evidence of recurrent SCC.

Microbiological findings and corresponding antimicrobial treatments are summarized in **Box 1**. Radiographic appearances after spacer exchange and final reconstruction are shown in **Figure 3**.

Figure 3

calcaneal cement spacer reinforced with Kirschner wires • final reconstruction with bone allograft and screw fixation



The postoperative course following definitive reconstruction was favourable, with no clinical or radiographic evidence of recurrent infection or local malignancy during follow-up. Cosmetic and functional outcomes were satisfactory, with limb salvage achieved and pain-free independent ambulation. The most recent available local clinical appearance, approximately 9 months after the final surgical procedure, is shown in **Figure 4**.

Figure 4

Local clinical appearance at the most recent follow-up



BOX 1 Clinical, surgical, microbiological and antimicrobial timeline

1981

SURGERY
Fracture surgery after severe road-traffic trauma.

EMPIRIC ABX
Not available in historical records.

MICROBIOLOGY
Not available.

TARGETED ABX
Not available.

STOP
Not available.

02 MAY 2024

SURGERY
Wide excision + calcaneal resection + cement spacer + flap.

EMPIRIC ABX
IV daptomycin + meropenem.

MICROBIOLOGY
Oxacillin-susceptible *S. hominis* (4/5 samples).

TARGETED ABX
Susceptibility-guided therapy; oral minocycline + rifampicin.

STOP
09 Jun 2024.

20 FEB 2025

SURGERY
Flap revision + cement spacer exchange.

EMPIRIC ABX
IV teicoplanin + piperacillin/tazobactam.

MICROBIOLOGY
MSSA in all intraoperative samples.

TARGETED ABX
Oral levofloxacin + rifampicin.

STOP
09 Apr 2025.

18 SEP 2025

SURGERY
Spacer removal + bone-bank allograft + screw fixation.

EMPIRIC ABX
IV teicoplanin + piperacillin/tazobactam.

MICROBIOLOGY
Oxacillin-susceptible *S. epidermidis* in all tissue samples; sonication negative.

TARGETED ABX
Oral levofloxacin + rifampicin.

STOP
07 Nov 2025.

TAKE-HOME MESSAGE

Chronic osteomyelitis and squamous cell carcinoma can coexist: when a long-standing wound changes phenotype, malignant transformation should be considered.

CLINICAL RELEVANCE

- Do not attribute every local deterioration to infection alone.
- Integrate tissue diagnosis when the clinical phenotype changes.

KEY REFERENCES

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