Marjolin’s Ulcer
Radiographic and magnetic resonance appearances in two cases

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Marjolin’s ulcers are rare malignancies that arise in chronic venous ulcers, scars, burns, long standing wounds or sinuses. Radiography provides important information regarding bone destruction and periosteal reaction, and magnetic resonance (MR) imaging provides excellent soft tissue detail, like tumour extent, depth, margins, any underlying bone cortical or marrow involvement, or involvement of adjacent neuro-vascular structures. We report two cases of Marjolin’s ulcer and describe their radiographic and MR appearances.

Keywords: Marjolin’s Ulcer; Chronic wound; Leg ulcers; Magnetic resonance imaging; Case report; Oman

Case One
A 70 year old man developed a chronic non-healing ulcer on his right leg following a childhood trauma and presented at Sultan Qaboos University Hospital (SQUH), Oman. The ulcer had become worse during the previous two years. It had started increasing in size, was oozing blood and had become painful. On examination, he had a large fungating ulcerative mass over the antero-lateral aspect of his right lower leg and right inguinal lymph nodes were palpable. The remainder of his physical examination was unremarkable. A punch biopsy of the ulcer revealed well differentiated squamous cell carcinoma. Radiographs [Figure 1] and a magnetic resonance imaging scan (MR) [Figure 2a, 2b & 2c] confirmed the findings of a large polyoidal soft-tissue mass invading the underlying tibial cortex and marrow. The patient was advised amputation and block dissection which he refused and left the hospital against medical advice.

Case Two
An 85 year old man developed an infective ulcer over a chronic wound on his left lower leg which he had sustained 10 years previously. Despite local and systemic treatment the ulcer was becoming larger and painful. On presentation at SQUH, the examination showed a large, polyoidal, fungating ulcerative mass, measuring 7cm x 7cm located on the anterior surface of the tibia. A biopsy of the ulcer was positive for squamous cell carcinoma. The...
rest of his physical examination was unremarkable. No metastatic lesions were found on the computed tomography (CT) scan. A Tc 99m-MDP bone scan revealed abnormal increased tracer uptake at the local site in the tibia with no other abnormal uptake in the rest of the skeleton.

The radiograph [Figure 3], a bone scan [Figure 4] and MRI examinations [Figure 5a, 5b & 5c] were performed which revealed a large infiltrative
superficial mass extending through the underlying tibial cortex into the medullary cavity. The patient was advised amputation which he subsequently refused.

Discussion
Malignancies that arise in chronic venous ulcers, chronic injuries, scars, burns, chronic osteomyelitis or sinuses are referred to as Marjolin’s ulcers. Marjolin’s ulcer is an extremely rare condition which is reported to develop in approximately 0.05% to 0.05% of long-standing pressure ulcers in patients with spinal cord injuries. A French surgeon, Jean-Nicolas Marjolin, at the University of Paris described the occurrence of ulcerating lesions within scar tissue in 1828; however, he did not identify the warty ulcers he described as malignant. Two years later it was Dupuytren who noted that these lesions were malignant. The commonest type of carcinoma arising from Marjolin’s ulcer is squamous cell carcinoma, followed by basal cell carcinoma. The exact mechanism by which chronic ulcers (wounds) develop malignancy is not known. A variety of causes including chronic irritation and infection (with resulting degeneration and regeneration); decreased vascularity and a weakened epithelium, and elevated expression of proto-oncogenes, have been suggested for the susceptibility of chronic wounds to malignant transformation. Inflammation, ulceration, and repeated trauma, especially in flexion creases, over many years may provide enough chronic irritation to promote malignant change.

Bone destruction is the most important radiological finding for the surgeon. It was found in 20 out of 21 patients described by Smith et al.
In only one patient in their study, bone destruction could not be seen due to sub-optimal quality of the radiograph. Both our patients demonstrated bone destruction on radiographs along with periosteal reaction.

The MRI scan had the advantage of demonstrating excellent soft tissue detail, the extent of the ulcer, its margins, the extension of tumour into cortex and bone marrow, the periosteal reaction and the involvement of surrounding structures.

MRI scanning is superior to CT as it demonstrates the extent of medullary bone, soft tissue and neuro-vascular involvement. Most frequently, both T1 and T2 weighted images are needed to characterise the lesions. T2 weighted images are best suited for soft tissue characterisation and T1 weighted images for distinction between marrow and tumour. Short-tau inversion-recovery (STIR) sequences are useful for detection of subtle marrow or soft tissue lesions. To date, gadolinium has not significantly improved the histological accuracy of MRI except for differentiating solid from cystic lesions and identifying areas of necrosis. Bone scans help to identify areas of increased radioisotope uptake.

**Conclusion**

To conclude, Marjolin’s ulcer is a rare, but important entity, which may be preventable by the early treatment of non-healing ulcers. These ulcers should be followed up with frequent biopsies and imaging evaluation to detect or exclude infiltration of adjacent tissues by an undetected deeper focus of malignancy. The ideal imaging techniques for evaluation of soft-tissues and infiltration of underlying bone and critical neurovascular structures is MRI.

Contrast enhanced transverse T1-fat saturated...
image shows a circumferential mass with patchy intense enhancement and necrotic areas. The bone marrow of the tibia shows a focal moderately enhancing area beneath the mass.

Contrast enhanced transverse T1-fat saturated image demonstrates the longitudinal extent of the mass and infiltration into the bone.

References