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CLINICAL IMAGE

18F-NaF positron emission tomography/computed tomography in voriconazole-induced periostitis

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A 65-year-old Malian woman, with a history of kidney transplantation 15 years before for an end-stage renal disease of unknown origin, under cyclosporine, mycophenolate mofetil, prednisone, and basiliximab for several years, sought medical advice for bone pain of the extremities lasting for 3 weeks. Treatment with voriconazole 200 mg twice daily had been started 16 months before because of an invasive pulmonary aspergillosis. On physical examination, the patient was healthy. She reported diffuse bone pain of hands, wrists, and feet along with soft tissue swelling of both hands. Muscle strength was normal, and no myalgia was present. Serum creatinine level was stable at 250 µmol/l (normal < 97), aminotransferase levels were normal, and alkaline phosphatase level was increased at 214 U/L (normal < 119). Radiographs of the hands and feet showed irregular multifocal periostitis and periosteal reaction (Fig. 1). 18F-NaF positron emission tomography/computed tomography (18F-NaF PET/CT) showed increased tracer uptake corresponding to periostitis and periosteal cortical appositions of long bones, belts, and extremities (Fig. 2A and B). Voriconazole withdrawal resulted in relief of pain within 2 weeks and normalization of alkaline phosphatase level. At 10-month follow-up, 18F-NaF PET/CT showed total regression of lesions (Fig. 2C and D).

Voriconazole is an antifungal agent widely used in solid-organ transplant and hematopoietic stem cell transplant. Periostitis develops within 6 months to 3 years of treatment and can cause diffuse bony pain, myalgias, and muscle weakness near the affected bones [1]. Pain improves within 2–4 weeks after withdrawal of the drug. Radiographs and CT scan show multifocal periostitis. 99mTC and FDG PET/CT demonstrate increased uptake of the radiotracer at the sites of periostitis [1]. 18F-NaF PET/CT is an ancient technique which can be useful in numerous conditions including neoplastic bone lesions and metabolic bone diseases with bone turnover and remodeling [2, 3]. Because of the minimal binding of NaF to serum proteins, and its greater bone uptake and faster soft tissue clearance than other tracers, imaging is acquired within 1 h, with increased sensitivity and specificity when compared to 18F-FDG PET/CT [2, 3]. 18F-NaF PET/CT is an excellent imaging modality to evaluate the extension of voriconazole-induced periostitis and also diverse metabolic and osteogenic bone disorders.

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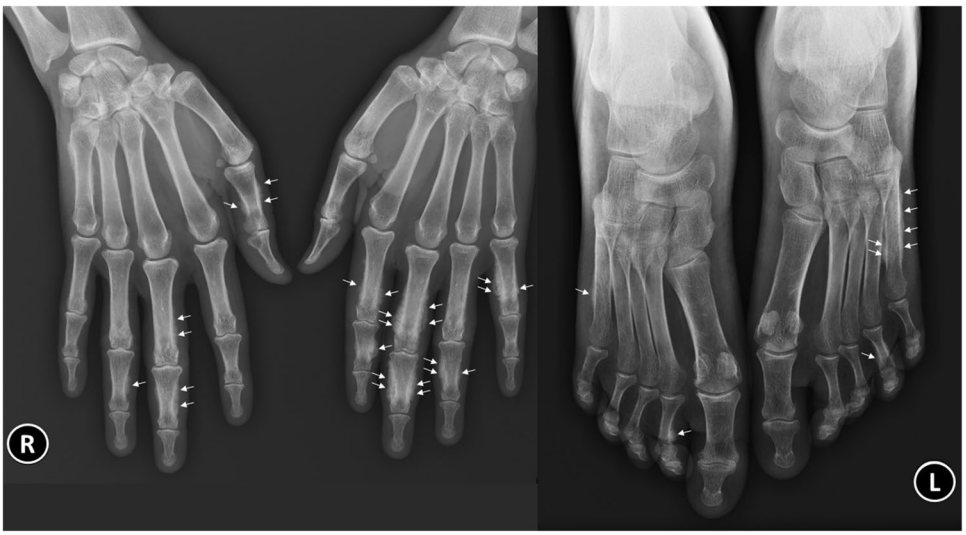

Fig. 1 X-rays of hands and feet showing multifocal periosteal reaction involving several proximal and middle phalangeal shafts (arrows)

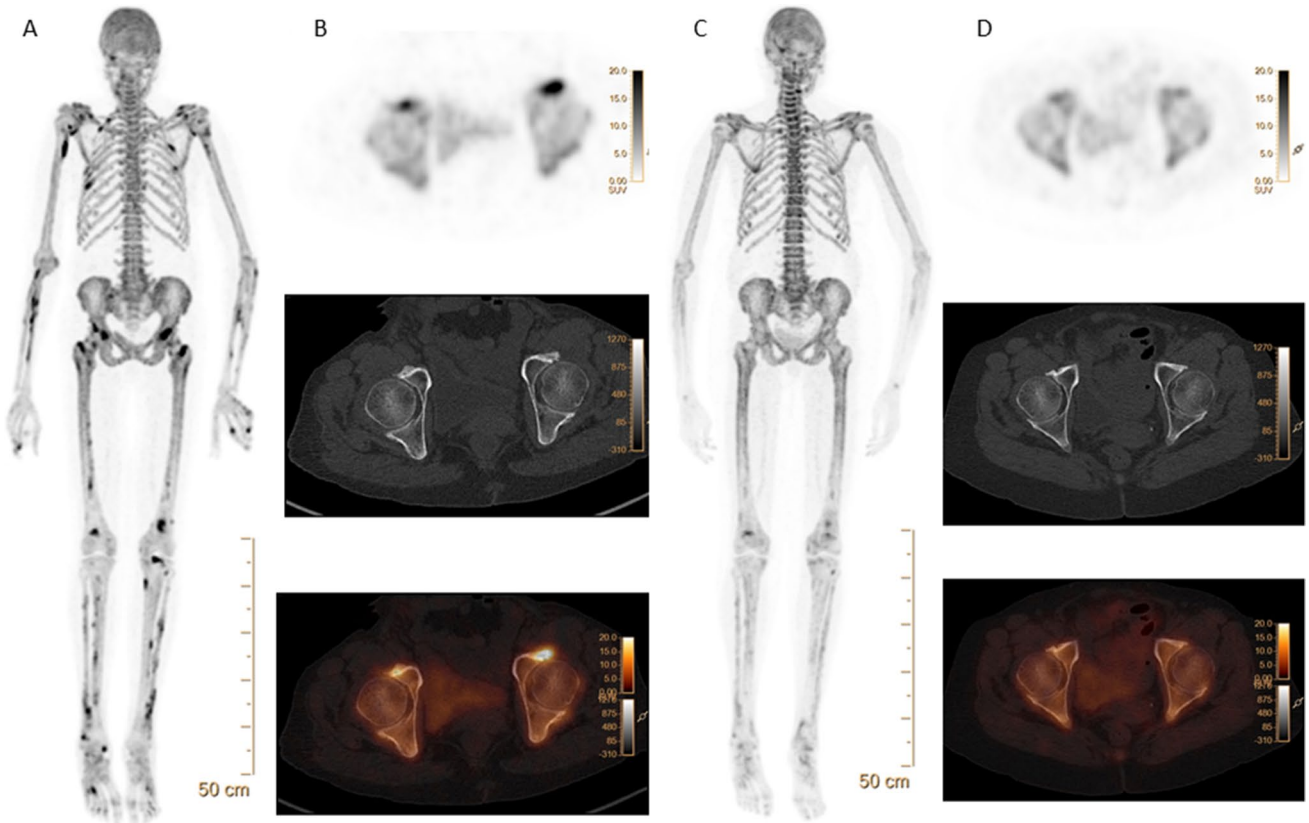

Fig. 2 Imaging of voriconazole-induced periostitis on whole-body 18F-NaF PET/CT. **A** Increased tracer uptake corresponding to periosteal cortical appositions on the extremities and long bones of the limbs, ribs, and belts. **B** Sample of periostitis foci on PET, CT, and fused PET/CT transaxial slices through acetabula. **C**, **D** Total regression of lesions on 18F-NaF PET/CT

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Declarations

Ethical approval Not applicable.

Patient consent Written consent for publication was obtained from the patient.

Disclosures None.

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