

Incremental value of SPECT/CT over planar bone scan in the evaluation of skull base osteomyelitis: A potentially fatal disease in diabetics

Sir,

A 55-year-old male diabetic patient presented to the ENT clinic with symptoms of severe earache and dizziness that progressively increased over 3 weeks. He also had low grade fever for the last 5 days. He was diabetic since 14 years, and on 20 units of insulin/day for the last 8 years. He also had history of left foot pain and swelling since last 2 years. A planar bone scan done with 20 mCi (740 MBq) ^{99m}Tc-MDP using a GE Mill VG dual head gamma camera with acquisition in the continuous mode at a speed of 15 cm/min showed no obvious abnormality in the skull base region [Figure 1]. Increased uptake in the left 3rd and 4th and

4th rib at the costochondral junction was post-traumatic, while increased uptake in the left foot was due to Charcot's arthropathy. SPECT was acquired on the same dual head gamma camera. CT of the skull was done on a Discovery-Goldseal 32 slice CT scanner. Post acquisition fusion of SPECT and CT images was done. The slice thickness was kept at 5 mm. For SPECT, acquisition frame time of 20 s was used with 3 degree angular step. SPECT [Figure 2] only and SPECT-CT [Figure 3] images in axial, coronal, and sagittal planes showed marked ^{99m}Tc-MDP uptake in the left petrous temporal bone (arrow a) including middle ear and internal ear (arrows b and c). SPECT/CT thus aided in establishing the clinical diagnosis of skull base osteomyelitis that was unapparent on planar images. The patient was then treated with intravenous broad spectrum antibiotics.

Skull base osteomyelitis is a complication of infective paranasal sinusitis, trauma, tooth extractions, chronic mastoiditis, malignant otitis externa, and various surgical procedures like surgical debridement or drainage of mastoid abscess especially in patients with diabetes mellitus,



Figure 1: Shows anterior and posterior planar whole body images of a ^{99m}Tc MDP bone scan. Scan shows no obvious abnormality in the skull base region. Increased uptake in the left 3rd and 4th rib at the costochondral junction was post-traumatic, while increased uptake in the left foot was due to Charcot's arthropathy

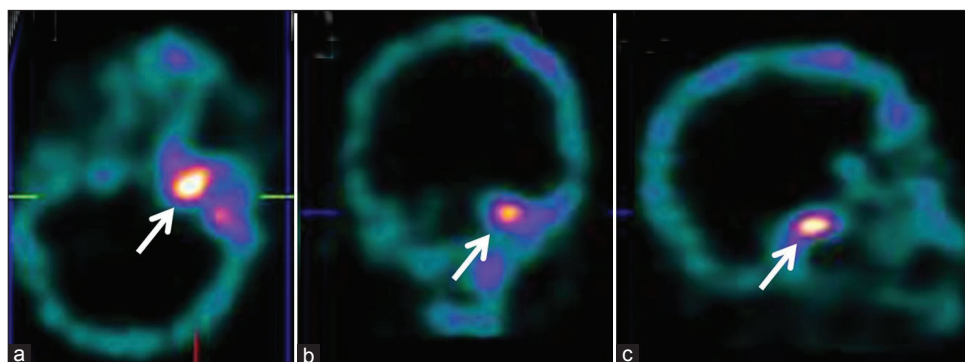


Figure 2: SPECT images (a-c) showing increased activity in left petrous region (arrow a), middle and internal ear region (arrows, b and c)

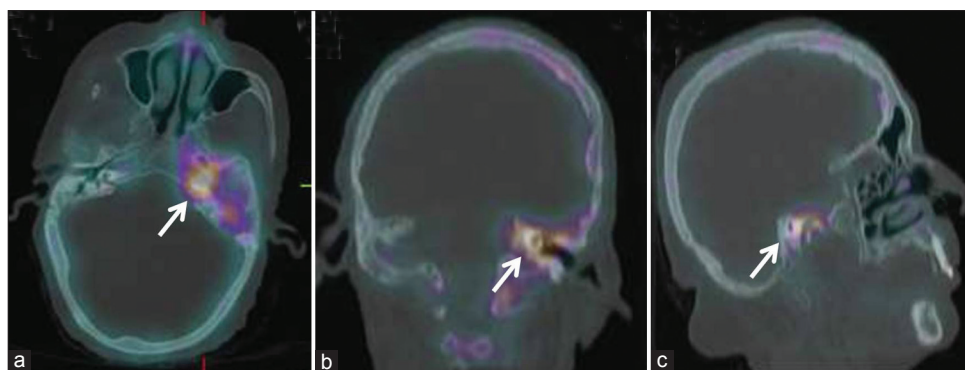


Figure 3: Fused SPECT-CT images in axial (a), coronal (b), and sagittal (c) planes showing the marked ^{99m}Tc -MDP uptake in left petrous temporal bone (arrow a) including middle ear and internal ear (arrows b and c)

corticosteroid use, HIV infection, or chronic inflammatory sphenoid sinus disease.^[1-3] In typical cases of skull base osteomyelitis, patients usually present with otitis externa, but are then found to have involvement of the marrow of the mastoid and petrous parts of the temporal bone and the adjacent soft tissues of the infratemporal fossa.^[4] The usual organisms in typical cases are *Pseudomonas aeruginosa* while Gram-positive bacteria, Fungi, especially *Aspergillus* and *Mucormycosis* and even *Salmonella*, have been reported in atypical cases.^[1,2-7] A previous report described a rare case of skull base osteomyelitis manifesting Villaret's syndrome, likely caused by *Proteus mirabilis* infection.^[8]

Skull base osteomyelitis is life threatening if not recognized and treated in time. Potential complications include cranial neuropathy, cavernous sinus thrombosis, septicemia, and cerebral and meningeal involvement.^[9] In a recent study, Filippi *et al.* found sensitivity of SPECT and SPECT/CT to be equal and high (100%) in identifying infected foci but specificity of SPECT/CT was higher (89% vs. 78%) as compared to SPECT alone.^[10] Bar-Shalom *et al.* using ^{67}Ga - or ^{111}In -labeled WBCs concluded that SPECT/CT with ^{67}Ga - or ^{111}In -labeled WBC made an incremental contribution to scintigraphy by improving the diagnosis, localization, or definition of the extent of disease.^[11] Our own experience in such cases of skull base osteomyelitis is gradually growing and serial findings have been consistent with our previously published study.^[12] We encourage the endocrinologist community to ask for a SPECT/CT and not just a planar bone scan when this entity is clinically suspected.

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