

## Prize Oral 2

**Assessment of SPECT/CT and MRI for Diagnosis of Biopsy Proven Diabetic Foot Osteomyelitis** Javier La Fontaine<sup>1</sup>, Kavita Bhavan<sup>2</sup>, Kenrick Lam<sup>2</sup>, Larry Lavery<sup>1</sup>, William Erdman<sup>3</sup> University of Texas Southwestern Medical Center, Department of Plastic Surgery<sup>1</sup>, Medicine<sup>2</sup> and Radiology<sup>3</sup>, Dallas, Texas, USA

**Purpose** There is a world-wide epidemic of diabetes. As part of the epidemic lower extremity amputations are dramatically increasing. Soft tissue and bone infections are one of the most common reasons for amputation. It is often difficult to determine if diabetic foot ulcers have an underlying bone infection. Inaccurate diagnosis of osteomyelitis leads to unnecessary antibiotic treatment, surgery, and amputation. In addition, we do not have good diagnostic tools to determine when osteomyelitis has been treated successfully. The American College of Radiology recommends the use of MRI to make the diagnosis of osteomyelitis in the diabetic foot. However, because of existing ulcers, trauma, Charcot neuroarthropathy, and surgery, MRI is often inaccurate. Bone biopsy is recommended as the “gold standard” to diagnose osteomyelitis, but it is often not done. We have completed preliminary work using a novel imaging approach to (1) diagnose bone infection and (2) score the severity of the infection in order to predict long term clinical outcomes and (3) evaluate resolution of osteomyelitis with post-treatment imaging. WBC SPECT/CT is a new hybrid imaging technology that combines radiolabelled white blood cells and high resolution computed tomography. In preliminary work, we developed a Composite Severity Index (CSI) that scores WBC intensity, anatomic location of lesions, and radiographic evidence of disrupted bone architecture. This score predicted clinical outcomes a year after diagnosis. The accepted standard for diagnosing osteomyelitis in the clinical infectious diseases literature is the presence of abnormal bone culture or histopathology findings from bone biopsy studies (ref 2). Our purpose was to assess the accuracy of hybrid image 99mTc labeled WBC SPECT/CT for diagnosis of diabetic foot osteomyelitis as determined by bone biopsy results in comparison to MRI. **Method and Materials:** We performed a retrospective chart review of 166 patients who received bone biopsy from 2010 to 2013 to confirm the diagnosis of diabetic foot osteomyelitis. Patients were chosen and separated on the basis of whether they received an MRI or a SPECT/CT. Patients whose scan(s) was not within a clinically relevant timeframe of biopsy, determined to be eight weeks, were excluded. Patients who received both MRI and SPECT/CT within a clinically relevant time frame were included in both groups. **Results:** 114 patients met our inclusion criteria: 51 SPECT/CT patients and 63 MRI patients. The sensitivity, specificity, PPV, NPV and accuracy of SPECT/CT were 0.92, 0.21, 0.76, 0.5 and 0.73 respectively. The corresponding values for MRI were 0.82, 0.21, 0.78, 0.25 and 0.68 respectively. **Conclusion:** Our data suggests that SPECT/CT is not inferior to MRI in the diagnosis of diabetic foot osteomyelitis. Furthermore SPECT/CT results correlate well with the bone biopsy results. Currently MRI is the gold standard in the radiologic diagnosis of diabetic foot osteomyelitis. This study suggests that 99mTc labeled WBC SPECT/CT is a suitable substitute.