

Financial Impact of MRI in Treatment of Foot and Ankle Osteomyelitis

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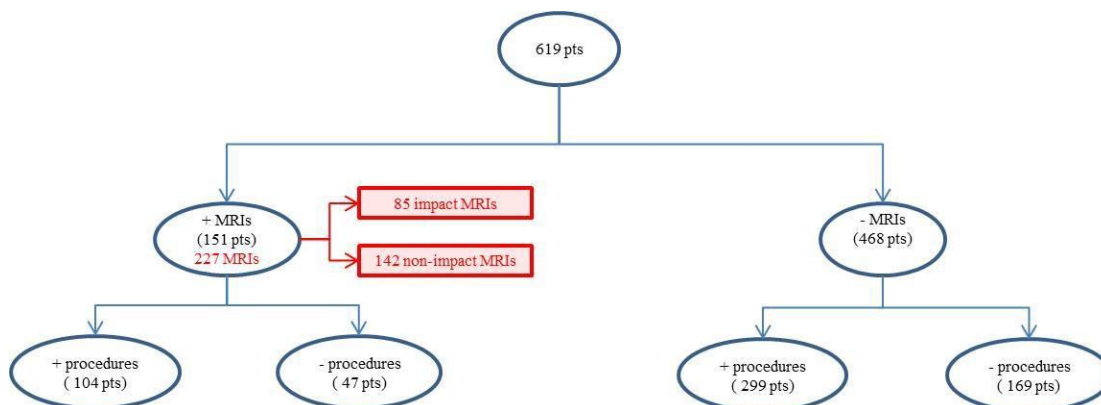
Keywords: osteomyelitis, financial impact, MRI, magnetic resonance imaging

Introduction/Purpose: Osteomyelitis of the foot and ankle is a common condition with a high economic burden in the United States, particularly in the context of diabetes mellitus. The timely and accurate diagnosis of osteomyelitis is important to initiate treatment and possibly reduce overall healthcare costs. Plain radiographs are the initial study of choice given their widespread availability and low cost. Magnetic resonance imaging (MRI) is generally considered the most sensitive imaging modality for detecting osteomyelitis, however it is associated with significant cost and may not change overall treatment as compared to plain radiographs. The purpose of our retrospective study is to determine whether the use of MRI at our institution changed clinical decision making and calculate the financial impact in patients with foot and ankle osteomyelitis.

Methods: We retrospectively identified patients at our tertiary care, academic center treated for a diagnosis of osteomyelitis using ICD-9 codes 730.07, 730.17, and 730.27. Demographic data including age, sex, race and ethnicity and patient comorbidities was collected. The use of plain radiographs, MRI, and any operative procedures up to 2 years after the index encounter for each patient were identified. An impact MRI was defined as an MRI that led to an operative procedure within the same admission encounter. The cost of an impact MRI was estimated using the equation: (average MRI cost)*(total MRIs/impact MRIs). Chi-squared test was used to statistically compare patients that underwent procedures in the MRI group vs. those in non-MRI group.

Results: 619 patients undergoing osteomyelitis treatment between January 2009 and September 2015 at our institution were identified, of which 40.4% were female and 59.6% were male. 151 patients had a total of 227 MRIs of the lower extremity performed vs. 468 patients that did not have MRIs performed. Of the MRI cohort, 104/151 patients (68.9%) had subsequent operative procedures, whereas in the non-MRI cohort 299/468 patients (63.9%) had subsequent operative procedures ($p = 0.26$). Of the 227 MRIs performed, 85 were deemed impactful MRIs and 142 were deemed non-impactful MRIs. Average MRI cost at our institution for the lower extremity with and without contrast was \$5069.75. Using our previous definition, the cost of an impact MRI was calculated to be effectively \$13,539.21.

Conclusion: MRI can be an effective modality in aiding the clinical diagnosis of osteomyelitis, however, it can be an unnecessary cost when not used to guide treatment. In our study, we did not find a significant difference in the operative rate between patients undergoing MRIs vs. those that did not. We also found that the effective cost of an MRI that led to a change in treatment was \$13,539, almost 2.7 times higher than the average cost of an MRI at our institution.



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