

Publication

A novel standardized algorithm for evaluating patients with painful total knee arthroplasty using combined single photon emission tomography and conventional computerized tomography

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SPECT/CT is a promising diagnostic modality in patients with painful total knee arthroplasty (TKA). The purpose of this study is to introduce a novel standardized SPECT/CT algorithm and evaluate its clinical application and reliability. A novel SPECT/CT localization scheme consisting of 9 tibial, 9 femoral and 4 patellar regions on standardized axial, coronal and sagittal slices is proposed. It was piloted in 18 consecutive patients with post TKA pain. The tracer activity on SPECT/CT was recorded using a color-coded scale (0-10). The inter- and intra-observer reliability was assessed for localization and tracer activity. The prosthetic component position was assessed in the CT images after 3D reconstruction using standardized frames of reference. The median inter- and intra-observer differences and ranges of the measured angles were calculated along with the ICC values for inter- and intra-observer reliability. The localization scheme showed very high inter- and intra-observer reliabilities for all regions. The measurement of component position was highly reliable in all cases with sufficient visibility of anatomical landmarks. The median inter-observer difference between alignment measurements for tibial and femoral components was less than 3 degrees (range 0 degrees -6 degrees). The median intra-observer variability for these was less than 2 degrees (range 0 degrees -5 degrees). The SPECT/CT algorithm presented is both reliable and useful in the management of patients with painful TKA. It combines biomechanical and metabolic data (tracer localization) providing an extra dimension to the understanding of this difficult condition. The clinical value of SPECT/CT in patients with unexplained pain following TKA should be further investigated.

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