AB119. Improving the diagnostic quality of anteroposterior radiographs for the detection of radiolucent lines in cementless total knee arthroplasty

Áine Lucey, John Tristan Cassidy, Timothy Murray, Finbarr Condon, Sinead O'Dwyer

Department of Trauma Orthopaedics, University of Limerick, Dooradoyle, Limerick, Ireland

Background: Component loosening is a common cause of failure in total knee arthroplasty (TKA) with progressive radiolucent lines often associated with this complication. In order for radiographs to serve as a useful tool for identifying such complications, high quality images are required. With no study to date referencing inclusion criteria for radiographic quality when detecting the prevalence of radiolucent lines it's possible that a false representation of the true prevalence of such radiolucency below the tibial component may have been reported in the literature.

Methods: A total of 365 anteroposterior (AP) radiographs from 89 patients across 100 primary cementless low contact stress DePuy TKAs were assessed to identify their diagnostic quality for the detection of radiolucent lines (RLLs) under the tibial component of the prosthesis. The radiographs were assessed using a set of criteria that were developed in order to determine the degree of craniocaudal tilt exhibited in the AP view which may obscure the view of bone-prosthetic interface and therefore presence of RLLs. These criteria were introduced at the time of imaging and a further 36 radiographs were assessed. Fifty high quality AP radiographs were independently assessed by three separate reviewers to identify the presence of RLLs. The level of agreement across reviewers was analysed using Cohen's Kappa coefficient for interrater reliability.

Results: The 66% of AP radiographs were suboptimal for the detection of RLLs due to excessive craniocaudal tilt. Introduction of criteria at time of imaging decreased the number of suboptimal AP radiographs for the detection of RLLs to 41%. The 7% of TKAs had a complete series of post-operative images which met the criteria. Orthopaedic SPr and Radiology SPr showed moderate and low levels of agreement when compared to the Consultant Orthopaedic Surgeon.

Conclusions: The majority of AP radiographs exhibited excessive craniocaudal tilt, obscuring the view of the bone-prosthetic interface and were suboptimal for the detection of RLLs under the tibial component of the prosthesis. The introduction of a set of criteria, outlining an optimal AP radiograph, was successful in improving their quality. There is a need for an imaging protocol to be introduced in order to ensure true AP views can be obtained in a reproducible manner. Even in high quality images which exhibited little to no craniocaudal tilt disagreement as to what constitutes an RLL remains.

Keywords: Anteroposterior radiographs (AP radiographs); total knee arthroplasty (TKA); radiolucent lines (RLLs)