The Reliability of a New Computed Tomography Imaging Grading System of Lumbar Facet Arthropathy

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Purpose of the study: Our goal is to report a new classification for facet arthropathy and to compare it with the currently established classifications. In our previous study we determined that both Pathrea and Fujiwara classification revealed only a “fair” intra and inter-observer reliability. We intend to analyze all parameters pertinent to facet arthropathy and select the most reliable criteria to create a reproducible, simple and clinically significant classification. We also intend to compare the results between attending spine surgeons, fellows and radiologists.

Methods: A total of 7 fellowship-trained orthopedic spine surgeons and 2 orthopedic spine fellows, 3 fellowship trained physiatrist and 2 fellowship trained radiologists evaluated 50 levels from L3-L4 through L5-S1 on parallel axial MRI (T1 and T2) and CT images. The degree of osteoarthritis was graded on a 8-point scale based on the presence of joint narrowing, osteophyte formation, subchondral cysts, sclerosis, effusion, synovial cysts, fragmentation and fusion. The 4 criterias with highest reliability were selected. One point was given for the presence of the radiographic criteria, giving a total of 4 points maximum. Grading was performed during 2 sessions. Weighted kappa statistics were used to describe inter- and intraobserver agreement.

Summarize the findings: The radiographic criteria selected with higher intra-rater reliability were; joint narrowing (0.55), osteophyte formation (0.68), subchondral cysts (0.62) and fusion (0.62). CT had a higher intra-rater reliability when compared to MRI (0.51 vs. 0.31). The new classification mean inter-rater reliability among attendings, fellows and radiologists were 0.4, 0.26, 0.35.

Conclusions: Previously established grading systems for facet arthropathy have only fair agreement. We report a simpler method of grading facet arthropathy with a significantly higher reproducibility. This is classification can vital in the decision of utilizing a total disc arthroplasty in the lumbar spine. Orthopaedic spine surgeon attendings have a higher agreement percentage and kappa values compared to fellowship trained radiologists and spine fellows.
Figure 1: Inter-rater reliability Kappa coefficient