349

RECOVERY FROM TJR FOR OA: THE SIGNIFICANCE OF SELF-RATED HEALTH AND MENTAL WELL-BEING

A.V. Perruccio1, E.M. Badley1, S. Hogg-Johnson2, A.M. Davis1
1Toronto Western Res. Inst.; Univ. of Toronto, Toronto, ON, Canada; 2Inst. of Work and Hlth.; Univ. of Toronto, Toronto, ON, Canada

Purpose: Self-rated health (SRH) is a strong predictor of health outcomes, health care utilization and mortality. While physical aspects of health, predominantly pain and disability in activities of daily living, have been found to be strong predictors of SRH, studies have failed to simultaneously take account of other relevant aspects of health, particularly mental and social (e.g. social interactions) health. The purpose of this study was to examine the association between physical, mental and social dimensions of health and SRH in a cohort of individuals within 6 months of undergoing total joint replacement (TJR) surgery for hip or knee osteoarthritis (OA).

Methods: Participants (hip: n=215; knee: n=234) completed measures pre-surgery and at 3 and 6 months post-surgery associated with physical: HOOS/KOOS (pain, physical function, sport/rec); mental: POMS (fatigue), HADS (anxiety and depression); and social health: LLFDI (disability limitation), passive/active recreation, community access. Using structural equation modeling, confirmatory factor analyses was used to investigate 3 latent variables characterized as physical, mental and social health. SRH was regressed on each of these latent variables both within and across time points. The latent health variables were also regressed on prior SRH. Measures of overall model fit were assessed.

Results: Hip group: age range from 31-86 years (mean=62) with 57% female; Knee group: age range from 35-88 years (mean=64) with 63% female. 90% of the sample completed the baseline questionnaire within 3 weeks prior to surgery. The effects of physical and social health on SRH were fully mediated through mental well-being; mental well-being was the only significant latent health predictor of SRH, both within and across time points. With simultaneous adjustment for prior physical, mental and social health, comorbidity and sociodemographic characteristics, SRH significantly predicted future health status for all three of the health dimensions. Worse prior SRH predicted less improvement both at 3 and 6 months post-surgery.

Conclusions: While physical health has always been perceived as one of the major determinants of SRH, our results point to the importance of mental well-being, largely ignored in previous research, in understanding the relationship between physical health and SRH. These results are particularly intriguing given that this is a sample of individuals undergoing TJR surgery, for which pain and limited physical function are significant indicators. Since SRH is a significant predictor of a number of health outcomes, including TJR outcomes, our study suggests that care, treatment and management modalities should consider a broad range of health dimensions, not only physical aspects of health.

350

AUTOMATED QUANTIFICATION AND DIAGNOSIS OF THE SEVERITY OF THE KNEE ON PLAIN RADIOGRAPHS: THE ROAD STUDY

H. Oka, T. Akune, S. Muraki, K. Nakamura, H. Kawaguchi, N. Yoshimura
22nd Century Med. and Res. Ctr., and Sensory and Motor System Med., Univ. of Tokyo, Tokyo, Japan

Purpose: Although radiographs are used as the golden standard to assess the structural severity of knee osteoarthritis (OA), the Kellgren/Lawrence (KL) grading system and other categorical methods have the limit in reproducibility and reliability caused by the intra- and interobserver variabilities. Here we have developed an automated quantification program KOACAD (knee osteoarthritis computer-aided diagnosis) to measure OA parameters on plain knee radiographs. The present study investigated the association of the KL grade with major parameters of knee OA by applying the KOACAD system to the baseline data of the ROAD (Research on Osteoarthritis Against Disability) study and sought to determine factors associated with OA and their cut-off values for automated diagnosis of knee OA.

Methods: From the baseline data of the 3,040 participants in the ROAD cohort, this study analyzed 5,844 knees without surgery (2,076 knees in men and 3,768 knees in women), ranging in age from 23-94 years (mean 70.2 yrs.). Anteroposterior standing radiographs were taken and images were downloaded into Digital Imaging and Communication in Medicine (DICOM) format files. The radiographic severity of the knee was determined by the KL grading system. Six major OA parameters: medial and lateral joint space area (JSA), medial and lateral minimum joint space width (mJSW), osteophyte area (OPA), and tibiofemoral angle (TFA) were measured by the KOACAD system. Logistic regression analysis was used to determine odds ratio (OR) and associated confidence interval (CI) after adjustment for age and sex. Receiver operating characteristic (ROC) curve analysis was performed to determine cut-off values of OA parameters.

Results: The number of knees with each KL grade (0, 1, 2, 3, 4) was 1,048, 1,952, 2029, 614 and 201, respectively. The mean values of OA parameters with each KL grade (0, 1, 2, 3, 4) were as follows: medial JSA (112.3±28.4, 97.8±30.0, 88.5±24.1, 75.8±28.7, 37.1±34.5 mm²; mean±S.D.), lateral JSA (124.8±40.0, 112.4±30.5, 107.2±28.9, 111.8±33.4, 118.4±43.9 mm²), medial mJSW (3.5±0.8, 3.1±0.8, 2.8±0.8, 1.9±0.9, 0.7±1.0 mm), lateral mJSW (4.4±1.1, 4.2±1.0, 4.1±1.1, 4.0±1.2, 3.9±1.6 mm), OPA (0.0±0.0, 0.6±2.3, 2.7±6.0, 10.1±16.0, 17.8±19.0 mm²), and TFA (175.6±3.0, 176.0±3.0, 176.8±3.3, 178.6±4.8, 184.0±6.9 degree). Logistic regression analysis showed that low medial mJSW (OR=1.99 and 4.11, 95%CI=1.82-2.81 and 3.85-5.07), high OPA (OR= 1.20 and 1.10, 95%CI= 1.18-1.23 and 1.09-1.12) and high TFA (OR= 1.08 and 1.02, 95%CI= 1.06-1.11 and 1.06-1.08) were significantly associated with KL≥2 and KL≥3 knee OA, respectively. ROC curve analysis was performed to determine cut-off values of parameters for KL≥2 and KL≥3 knee OA. The value (area under the curve, sensitivity, specificity) of medial mJSW for KL≥2 and KL≥3 OA was 2.7 and 2.2mm (0.739 and 0.856, 58.3 and 76.2%, 79.0 and 83.9%), respectively, and those of OPA and TFA were 1.0 and 2.5 mm² (0.663 and 0.767, 40.0 and 63.3%, 92.2 and 85.8%) and 178.1 and 179.3degree (0.639 and 0.729, 42.7 and 54.9%, 79.0 and 84.8%), respectively.

Conclusions: This study determined cut-off values of radiographic parameters of knee OA in a large scale population-based samples. The KOACAD system has realized automated diagnosis of KL≥2 and KL≥3 radiographic knee OA without intra- and inter-observer variabilities. This system is useful as an objective and accurate method for measurement of the structural severity of the knee, and can be a surrogate measure for the development of disease-modifying drugs for OA, just as bone mineral density is in osteoporosis.