

Medial Joint Space Narrowing and Kellgren-Lawrence Progression following Intraarticular Corticosteroid Injections compared to Hyaluronic Acid Injections and Nontreated Patients

PURPOSE

Osteoarthritis (OA) is a common degenerative disorder with an increasing global prevalence and economic burden, accounting for 4.3% of all hospitalization costs in the United States. Radiographic progression of knee OA has been shown to correlate with poor clinical outcomes. Currently, corticosteroid (CS) injections and hyaluronic acid (HA) injections are given for symptomatic treatment of osteoarthritis. However, the long-term effect of intraarticular joint injections on OA progression is heavily debated. To better understand the possible effect, we conducted a case-control study comparing the radiographic progression of OA in CS, HA, and control patients by utilizing the data from the OA Initiative.

METHODS AND MATERIALS

7314 knees were identified based on the presence of imaging at baseline and 48-months. Following exclusion criteria, 210 knees were identified that received CS injections, 59 HA injections, and 6827 control. 50 patients per group were matched for various confounding factors including age, sex, BMI, comorbidities, surgery, and semi-quantitative imaging outcomes at baseline. ANCOVA testing was done utilizing 48-month semi-quantitative imaging outcomes as dependent variables and confounding variables as covariates. Imaging outcomes included joint space narrowing, Kellgren Lawrence (KL) grade, osteophyte formation in tibia/femur medial/lateral compartment, and sclerosis in tibia/femur medial/lateral compartment.

RESULTS

At 48-months, average KL grade in the CS group was 2.79 ± 0.832 , HA 2.11 ± 1.35 , and control 2.37 ± 1.202 ($p < 0.001$). Intragroup comparison showed significant difference in KL grade at 48-months between CS and HA patients ($p = 0.008$) and significant difference between CS and control patients ($p = 0.004$). Medial compartment joint space narrowing in the CS group was 1.56 ± 1.02 , HA 1.11 ± 1.16 , and control 1.18 ± 1.12 ($p < 0.001$), with significant difference between the CS and control groups ($p < 0.001$). Other dependent variables were not significant.

CONCLUSIONS

Patients with intraarticular CS injections have increased medial joint space narrowing and Kellgren Lawrence progression of knee osteoarthritis when compared to patients with HA injections and nontreated patients. This suggests a detrimental effect of CS on OA progression and caution in the use of CS for clinical management. In addition, our study suggests the possible benefit of HA injections over CS for OA management, due to the lack of radiographic progression seen in patients receiving HA injections.

CLINICAL RELEVANCE/APPLICATIONS

Corticosteroid injections increase the radiographic progression of osteoarthritis when compared to hyaluronic acid injections and nontreated patients, suggesting caution in the use for clinical management.

Impact of Intra-Articular Knee Injections on the Progression of Knee Osteoarthritis: Data From the Osteoarthritis Initiative (OAI) Cohort

PURPOSE

To evaluate the association between the type of intra-articular knee injection (corticosteroid, hyaluronic acid) and progression of knee osteoarthritis (OA) compared to controls, assessed semi-quantitatively using whole-organ magnetic resonance imaging scores (WORMS) over 2 years.

METHODS AND MATERIALS

Methods and Materials Participants (n=60: 36 female, age 62.2 [45.0, 79.0] years, BMI 28.3 [18.9, 38.3] kg/m²) from the Osteoarthritis Initiative (OAI) cohort who received a single injection of corticosteroid (n=8), hyaluronic acid (n=12), and controls (n=40) propensity-score matched on age, sex, BMI, Kellgren-Lawrence (KL) grade, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and Physical Activity Scale for the Elderly (PASE) were selected at the timepoint when the injection was administered. 3T MRIs obtained at baseline, 2 years prior, and 2 years after the injection were semi-quantitatively graded using WORMS for the meniscus, bone marrow lesions, cartilage, joint effusion, and ligaments. Progression of OA was quantified using the difference in WORMS between baseline and 2-year follow-up. Linear regression models, adjusted for age, sex, BMI, KL grade, WOMAC, PASE, were used to identify association between the type of injection (corticosteroid vs controls, hyaluronic acid vs controls) and progression of WORMS. A p-value < 0.05 was considered statistically significant.

RESULTS

Significant association was found between corticosteroid injection and post-injection progression of WORMS over 2 years for the knee overall (p=0.03), lateral meniscus (p=0.02), lateral cartilage (p=0.03), and medial cartilage (p=0.002). No significant association (p > 0.05) was found between hyaluronic acid injection and post-injection progression of WORMS over 2 years. No significant association was found between either injection type and progression of pain over 2 years quantified by WOMAC (p > 0.05). No significant difference (p > 0.05) was found in progression of WORMS over the 2 years prior to injection for corticosteroid and hyaluronic acid injections.

CONCLUSIONS

Corticosteroid knee injections were significantly associated with the progression of knee OA assessed semi-quantitatively using WORMS as an outcome. Hyaluronic acid knee injections, however, did not show a significant association with the progression of knee OA.

CLINICAL RELEVANCE/APPLICATIONS

While both corticosteroid and hyaluronic acid injections are said to help with symptomatic pain relief in knee OA, in this study, hyaluronic acid injections did not show any progression of knee OA up to 2 years post-injection while progression was demonstrated with corticosteroid injections.