ASSOCIATION BETWEEN PAIN SEVERITY AND HEALTHCARE UTILIZATION IN AN OSTEOARTHRITIS POPULATION: AN 18-YEAR RETROSPECTIVE COHORT STUDY

J. Graham1, T. Novosat2, H. Sun3, B. Piper4, 5, J. Boscuro, V. Duboski1, M. Kern1, E. Wright1, R. Robinson5, E. Casey1, C. Beck1, J. Hall1, P. Schepman5, 6, Geisinger Center for Pharmacy Innovation and Outcomes, Danville, United States of America; Geisinger, Interventional Pain, Danville, United States of America; Geisinger, Department of Population Health Sciences, Danville, United States of America; Geisinger Commonwealth School of Medicine, Department of Medical Education, Scranton, United States of America; Geisinger, Biostatistics Core, Danville, United States of America; Geisinger, Biostatistics Core, Danville, United States of America; Geisinger, Department of Population Health Sciences, Danville, United States of America; Eli Lilly & Co., Lilly Research Labs, Indianapolis, United States of America; Pfizer, Inc., Global Medical Affairs, New York, United States of America; Pfizer, Inc., Global Medical Affairs, Indianapolis, United States of America; Pfizer, Inc., Global Medical Affairs, New York, United States of America

Background: Osteoarthritis (OA) is a common disease that varies in severity among patients. A standardized definition to classify patients into different severity levels is lacking, however, due to the disease’s complex pathogenesis and presentation. Prior studies have shown associations between pain severity and higher healthcare resource utilization (HRU) and costs. We investigated an association between pain severity and higher healthcare resource utilization by examining the use of specific OA-related treatments across pain intensity levels in a large, integrated health system’s OA population over an 18-year period.

Objectives: Our aim was to compare use of medications and other treatments among OA patients experiencing mild, moderate, or severe pain.

Methods: This was a retrospective study of electronic health records from 2001 to 2018 at Geisinger, an integrated health system in Pennsylvania. Patients were included with a diagnosis code for OA (ICD-9: 715.1, ICD-10 M19.15) on at least one visit with a diagnosis code for OA (true-positive) or an OA-specific procedure (arthroscopy or arthroplasty). We examined pain scores (0-10 scale, with 10 being worst pain) taken after the first OA diagnosis date and defined pain episodes starting on the pain score’s date and lasting for 90 days. If a new pain score was measured before 90 days elapsed, the episode was extended for an additional 90 days, with this process repeated as necessary. Each episode was categorized as mild (pain score 0-3), moderate (4-6), or severe (7-10) based on initial score, and was deemed continuous if pain score could continuously be categorized in the same category. Descriptive statistics were used to describe treatment utilization during each patient’s mild, moderate and severe episodes. Percentages of patients who had any use of 10 medication types (tramadol, non-tramadol opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), injectable corticosteroids, acetaminophen, salicylates, duloxetine, homeopathic medications, other topical medications, and anti-inflammatory drugs (NSAIDs)) were compared across pain episode types. Percentages of patients with knee or hip surgeries, spine or joint imaging procedures (x-ray, computed tomography or magnetic resonance) and consults to OA-related care (pain management, orthopedics or physical medicine and rehabilitation) were also compared. All analyses used logistic regression with p-values <0.05 considered significant.

Results: We identified 290,897 patients with OA, representing 34% of the health system population in 2018. On average, females were 49 years old and mean BMI of 30.5 kg/m2. A total of 801,144 pain episodes were defined, with 75% of patients having at least one pain score. The two most frequently occurring pain scores were 0 (17%) and 5 (13%), and pain episodes were classified as 43% mild, 32% moderate and 25% severe. Significantly higher percentages of patients used certain medication types (NSAIDs, injectable corticosteroids, non-tramadol opioids, both of which were more common in both moderate and severe pain episodes). This is a pain intensity-related effect as compared to mild episodes, but other medication types were less likely to be used as pain severity increased (acetaminophen, salicylates, homeopathic medications, other OTC medications). Knee or hip surgeries, imaging, and consuls to OA-related specialists were all consistently significantly more likely to occur in patients during moderate or severe pain episodes versus mild episodes (relative risk ratios of 1.76, 1.25 and 1.36 for moderate vs mild, respectively, and 2.00, 1.44 and 1.46 for severe vs mild, all p-values <0.05).

Conclusion: While pain is generally recognized to be a subjective measure that could be influenced by other unmeasured factors and can be confounded with treatment effectiveness, it is nevertheless the primary symptom of OA. It is important to understand the relationship between pain intensity and treatment utilization, and our results support an overall association between pain and utilization but provide new details on the extent to which it depends on specific utilization type.

Acknowledgements: This study was supported by a grant from Pfizer Inc. and Eli Lilly and Company. A portion of this work was presented at the 2020 ACR/ARHP Annual Meeting (Abstract #POS1089).
estimating equations (GEE) were used to model the relationship between outcomes and antibiotic use by time interaction.

Results: A total of 515 new antibiotic users were matched with 515 non-users. After matching, all standardized differences of means were less than 0.05 indicating that covariates were well balanced between groups. No association between the use of antibiotic and changes in WOMAC pain and function scores was found (Table 1). No associations were also observed in multiple stratified analyses based on different duration of antibiotic use, particular classes of antibiotics, or different baseline WOMAC pain or disability levels.

Table 1. Longitudinal analysis (with treatment*time interaction) of WOMAC subcategories and antibiotics use

<table>
<thead>
<tr>
<th>β coefficient</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMAC Pain</td>
<td>-0.008</td>
<td>(-0.08 to 0.07)</td>
</tr>
<tr>
<td>WOMAC Function</td>
<td>-0.014</td>
<td>(-0.24 to 0.21)</td>
</tr>
</tbody>
</table>

Conclusion: These findings do not support the effects of antibiotics on knee OA pain or disability. More research is needed on the role of microbiota and its modulation in OA.

REFERENCES:

Disclosure of Interests: None declared.

DOI: 10.1136/annrheumdis-2021-eular.963

POST0101 KNEE JOINT DISTRACTION RESULTS IN MRI CARTILAGE THICKNESS INCREASE UP TO TEN YEARS AFTER TREATMENT

M. Jansen1, S. Mastbergen1, T.D. Turmezei2,3, J.W. Mackay1,4, F. Lafeber1.
1UMC Utrecht, Department of Rheumatology & Clinical Immunology, Utrecht, Netherlands; 2Norfolk & Norwich University Hospital, Department of Radiology, Norwich, United Kingdom; 3University of East Anglia, Norwich Medical School, Norwich, United Kingdom; 4University of Cambridge, Department of Radiology, Cambridge, United Kingdom

Background: Knee joint distraction (KJD) is a joint-preserving treatment option for younger (age <65 years) knee osteoarthritis (OA) patients. It has shown clinical improvement for up to nine years after treatment. Radiographs and MRI scans have previously shown cartilage regeneration activity, especially in the first two years after treatment. However, MRIIs have not been evaluated more than five years after this treatment.

Methods: Patients (n=20) with end-stage knee OA, indicated for KJD, 3T MRIs with 3D spoiled gradient recalled imaging sequence with fat suppression (SPGR-Is) were acquired before and one, two, five, seven and ten years after surgical treatment. Stradview v6.0 was used for semi-automatic cartilage segmentation; wRRegSurf v18 was used for surface registration. MATLAB R2020a and the SurfStatMATLAB package were used for data analysis and visualization. For changes over time, linear mixed models were used. Two separate linear regression models were used to test for difference in baseline Kellgren-Lawrence grade and sex on the changes over time. Statistical significance was calculated with statistical parametric mapping; p-value <0.05 was considered statistically significant. Since KJD has previously shown significant results mostly in the patients' most affected compartment (MAC), patients were separated in two groups based on whether their MAC was the medial or lateral compartment.

Results: The MAC was predominantly the medial side (median MAC n=18; lateral n=2). The 18 patients with a median MAC all had MRIIs scans at baseline, one and two years after treatment. After two years, some patients were lost to follow-up, decreasing data availability at five (n=15), seven (n=11) and ten years (n=7). Figure 1 (top) shows the average cartilage thickness at the different time points for all median MAC patients together. One and two years after treatment the cartilage in the medial weight-bearing region was on average thicker than before treatment. While from five years after treatment the cartilage thickness gradually decreased, even at ten years the medial cartilage thickness seemed slightly higher than pre-treatment. Figure 1 (bottom) shows cartilage thickness changes compared to baseline for patients with a medial MAC. Patients with a lateral MAC showed a similar pattern, with the biggest changes showing on the lateral side. As indicated by the dark blue areas, the medial femoral cartilage thickness increase, which was up to 0.5mm after one year and 0.6mm after two years, was largely statistically significant at both these time points. While the medial tibia showed an increase of up to 0.5 mm at these time points as well, this was not statistically significant at two years. Surprisingly, long-term results showed areas of the lateral (less affected) compartment were significantly thicker, up to 0.7mm, compared to pre-treatment in both the femur and tibia compared to baseline. Kellgren-Lawrence grade and sex were shown to influence the changes, albeit not statistically significantly. Patients with a higher Kellgren-Lawrence grade and male sex showed a higher short-term (one and two year) but a lower long-term (seven and ten year) cartilage thickness increase.

Conclusion: KJD treatment results in significant short-term cartilage regeneration in the most affected compartment. While after two years this initial gain in cartilage thickness is gradually lost, likely as a result of natural progression, even ten years after treatment the cartilage is thicker than before treatment. In the less affected compartment, a delayed cartilage response seems to take place, with significantly increased cartilage thickness in these in the long term. In conclusion, long-term results of young OA patients indicate for TKA, KJD results in femoral and tibial cartilaginous tissue regeneration both short- and long-term and in both sides of the joint.

Disclosure of Interests: None declared.

DOI: 10.1136/annrheumdis-2021-eular.1321

POST0102 SUBCHONDRAL BONE NORMALIZATION AFTER KNEE JOINT DISTRACTION TREATMENT AS MEASURED WITH CT

M. Jansen1, A. Ooms1, T.D. Turmezei2,3, J.W. Mackay1,4, S. Mastbergen1, F. Lafeber1. 1UMC Utrecht, Department of Rheumatology & Clinical Immunology, Utrecht, Netherlands; 2Norfolk & Norwich University Hospital, Department of Radiology, Norwich, United Kingdom; 3University of East Anglia, Norwich Medical School, Norwich, United Kingdom; 4University of Cambridge, Department of Radiology, Cambridge, United Kingdom

Background: In addition to cartilage degeneration, knee osteoarthritis (OA) causes bone changes, including cortical bone thickening, subchondral bone density decrease, and bone shape changes as a result of widening, flattening, and condylar osteophyte formation. Knee joint distraction (KJD) is a joint-preserving treatment for younger (<65 years) knee OA patients that has been shown to reverse OA cartilage degradation. On radiographs, KJD showed a decrease in subchondral bone density and an increase in osteophyte formation. However, these bone changes have never been evaluated with a 3D imaging technique.

Objectives: To evaluate cortical bone thickness, subchondral trabecular bone density and bone shape changes before KJD and one year after KJD treatment.

Methods: 19 KJD patients were included in an extended imaging protocol undergoing a CT scan before and one year after treatment. Stradview v6.0 was used for semi-automatic tibia and femur segmentation from axial thin-slice...