

“The Effectiveness of Corticosteroid injections in the time leading up to a Total Knee Arthroplasty”



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Introduction:

Knee pain and disability associated with osteoarthritis (OA) of the knee affects up to 10% of adults above the age of 55 in the USA. Total knee arthroplasty (TKA) is the only curative procedure for knee OA. Therefore, much of the research and procedures focusing on knee OA has been aimed at pain management. Non-operative treatments include intra-articular (IA) injections of corticosteroids to reduce pain and inflammation. Although this is not a curative option, these injections can typically relieve pain for at least two weeks with some studies showing pain reduction for up to 16-24 weeks. The safety and effectiveness of frequent IA corticosteroid injections is of great concern to physicians and patients. However, when compared to normal saline injections, IA corticosteroid injections every 3 months for two years did not appear to cause significant destruction to the joint or narrowing of the capsular space and resulted in less pain.

There is limited data regarding the optimal dose and frequency of IA corticosteroid injections needed to maximally relieve knee OA pain without causing harmful effects. The major aim of this study is to investigate the relationship between the frequency of IA corticosteroid injections (number of injections per year) in patients with symptomatic knee OA and self-reported knee problems (using the Knee Osteoarthritis and Outcomes Score [KOOS]) assessed at the first IA corticosteroid injection and immediately prior to undergoing TKA. Additionally, we will examine the relationship between the frequency of IA corticosteroid injections the KOOS score and time to TKA. Lastly, we will examine the relationship between the frequency of IA corticosteroid injections and KOOS scores as well as the need for revision surgery 6 months after TKA to assess the safety of frequent intra-articular injections prior to TKA. Only patients who have undergone unilateral primary TKA and received at least one IA corticosteroid injection will be included in this study. Those who have received other types of injections including Hyaluronic Acid injections in addition to at least one IA corticosteroid injection will be included in a separate group of mixed type injections.

Research Questions:

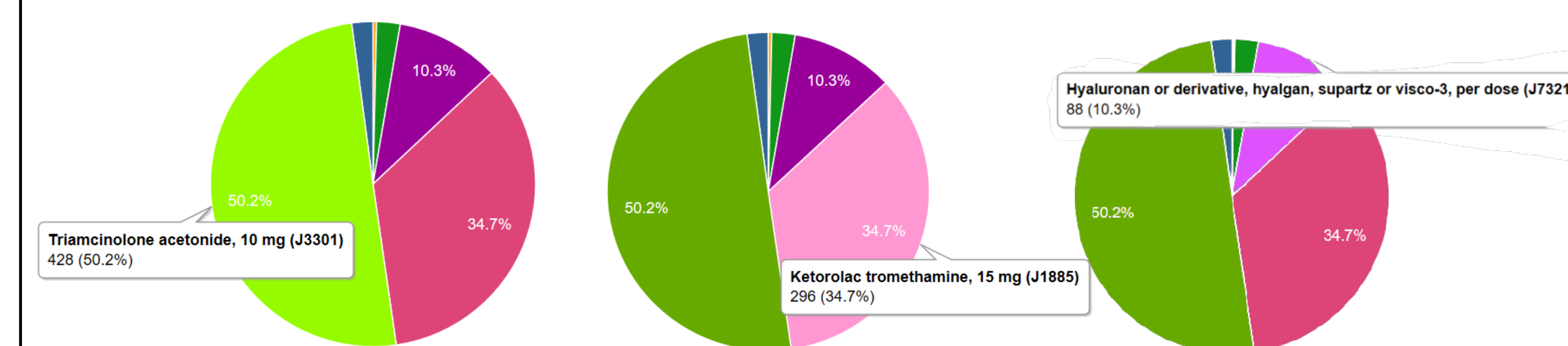
1. What is the relationship between the frequency of IA corticosteroid injections (number per year after first injection) and time to TKA?
2. What is the relationship between the frequency of IA corticosteroid injections received (number per year after first injection) and KOOS subscale scores assessed at first injection visit and immediately prior to TKA?
3. What is the relationship between the frequency of IA corticosteroid injections (number per year after first injection) and 6-month postoperative efficacy (KOOS) and safety (need for revision TKA)?

Hypothesis:

1. A higher frequency of IA corticosteroid injections will be associated with a longer time from treatment initiation to TKA than a lower frequency of treatment.
2. A higher frequency of IA corticosteroid injections will be associated with significantly better pain relief (change in pain from treatment initiation to TKA) prior to TKA than a lower frequency of treatment.
3. A higher frequency of IA corticosteroid injections will not be associated with worse postoperative efficacy (KOOS) and safety (need for revision surgery) 6 months after TKA than a lower frequency of treatment.

Intra-articular Injections

We included many types on intra-articular injections in our study. Total number of injections was 853 injections and included various different types of corticosteroid injections and hyaluronic injections. Triamcinolone acetate, Ketorolac tromethamine, and Hyaluronic and derivatives were the most utilized types of injection used during this study. Out of 853 injections, the majority of the injections was the corticosteroid subtype of Triamcinolone acetate 10mg making up 428 (50%) of all injections included in the study.



Quantities and types of injections used include:

- Hyaluronan or derivative, euflexxa, per dose (3, 0.4%)
- Hyaluronan or derivative, gelsyn-3, 0.1 mg (20, 2.3%)
- Hyaluronan or derivative, hyalgan, supartz or visco-3, per dose (88, 10.3%)
- Ketorolac tromethamine, 15 mg (296, 34.7%)
- Triamcinolone acetate, 10 mg (428, 50.2%)
- Other (18, 2.1%)

The KOOS

The Knee injury and Osteoarthritis Outcome Score (KOOS) assesses patient pain (9 items), other symptoms (7 items), function in daily living (17 items), function in sport and recreation (5 items), and knee related quality of life (4 items). Scores range from 0 to 100 with a score of 0 indicating the worst possible knee symptoms and 100 indicating no knee symptoms. The KOOS is a joint-specific score reported by the patient that can help assess changes in joint pathology over time, before and after treatment. For our purposes, we used the KOOS for the knee joint to determine changes in patient-reported pain and symptoms before and after Total Knee Arthroplasty as a measure of efficacy of treatment.

Symptoms - Answer these questions thinking of your knee symptoms during the last week.

S1. Do you have swelling in your knee?
 Never (0) Rarely (1) Sometimes (2) Often (3) Always (4)

S2. Do you feel grinding, hear clicking, or any other type of noise when your knee moves?
 Never (0) Rarely (1) Sometimes (2) Often (3) Always (4)

S3. Does your knee catch or hang up when moving?
 Never (0) Rarely (1) Sometimes (2) Often (3) Always (4)

S4. Can you straighten your knee fully?
 Always (0) Often (1) Sometimes (2) Rarely (3) Never (4)

S5. Can you bend your knee fully?
 Always (0) Often (1) Sometimes (2) Rarely (3) Never (4)

An example of part of the KOOS for symptom assessment of the knee joint
<https://www.orthotoolkit.com/kooos/#:-:text=Scores%20range%20from%200%20to%20100%20with%20a%20or%20without%20treatment.%20Roos%20%20Ewa%20M%20C%20er%20al.>

Conclusions:

This project will expand research on intra-articular injections and the safety and effectiveness of these injections. Our team has been working diligently to collect data on patients who have had intra-articular injections and subsequently undergone total knee arthroplasty. Currently, we are working on data analysis to look at the statistical significance of our study. We aim to expand to our research to look at how patient demographics, social determinants of health, and health behaviors are associated with osteoarthritis pain, treatment regimens and TKA outcomes.

References:

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