



## The Risk of a Deep Infection Associated With Intraarticular Injections Before a Total Knee Arthroplasty



Nirav H. Amin, MD <sup>a</sup>, Didi Omiyi, MD <sup>b</sup>, Bozena Kuczynski, PA <sup>b</sup>, Fred D. Cushner, MD <sup>c</sup>, Giles R. Scuderi, MD <sup>d,e</sup>

<sup>a</sup> Loma Linda University, Loma Linda, California

<sup>b</sup> Lenox Hill Hospital, New York, New York

<sup>c</sup> Northshore-LIJ Orthopedic Institute, Department of Orthopedics, Southside Hospital, Bay Shore, NY

<sup>d</sup> Northshore LIJ Orthopedic Institute, New York, NY

<sup>e</sup> Hofstra University–Northshore-LIJ College of Medicine, Hempstead, NY

### ARTICLE INFO

#### Article history:

Received 18 June 2015

Accepted 10 August 2015

#### Keywords:

injections

infections

total knee arthroplasty

steroids

viscosupplementation

### ABSTRACT

The aim of the study is to identify the risks associated with an intraarticular injection before a total knee arthroplasty (TKA). A total of 1628 patients were retrospectively studied over a 7-year period. The patients were divided into 2 groups: patient who received an intraarticular injection before a TKA and patients who did not receive an injection before a TKA. There were 16 deep infections identified (0.98%). Ten deep infections were identified in the patients who did not receive an injection before a TKA (1.18%), and 6 deep infections were identified in patients who received an injection before a TKA (0.77%). There does not appear to be a correlation with the timing of the injection before surgery and increased risk of infection.

© 2016 Elsevier Inc. All rights reserved.

Greater than 27 million Americans are affected by osteoarthritis (OA) in the United States, with an economic impact ranging from \$3.4 to \$13.2 billion job-related costs to the American economy [1,2]. The spectrum of treatment for OA ranges from pain medication, physical therapy, intraarticular steroid injections, and viscosupplementation, to surgical interventions [3]. Although intraarticular injections have been used for decades, conclusive effects of the injections remain controversial [4]. Several adverse effects have been reported regarding tendon rupture, articular cartilage effects [5], and infections [6,7]. Based on these reactions, the potential consequence of an injection should not be taken casually [7–9]. According to the literature, up to 30% of patients undergoing a total knee arthroplasty (TKA) will have an intraarticular steroid injection before surgery [8–11]. The American Academy of Orthopedic Surgeons, American College of Rheumatology, and the British Society for Rheumatology all support the use of steroid injections for short-term pain relief based on level 1 evidence [11].

Despite the widespread use of injections to treat OA, there are no current guidelines regarding the timing of injection and the safety in relationship to a TKA. To our knowledge, no study has compared the timing and efficacy of intraarticular steroids and viscosupplementation injections in patients who have undergone a TKA. We, retrospectively,

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to <http://dx.doi.org/10.1016/j.arth.2015.08.001>.

No financial biases exist for any authors.

Reprint requests: Nirav H. Amin, MD, Loma Linda University, 11406 Loma Linda Drive, Suite 214A, Loma Linda, CA 92354.

<http://dx.doi.org/10.1016/j.arth.2015.08.001>

0883-5403/© 2016 Elsevier Inc. All rights reserved.

analyzed a large data set, with a 2.5-year to 7-year follow-up to determine the rate of infections in patients who have undergone an injection (steroid or viscosupplementation) before a TKA compared to a control group during the same time interval.

### Methods

Initially, after obtaining an institutional review board to retrospectively review all the medical records of TKA completed from February 2008 to September 2012 by 2 senior surgeons, the patients were separated into 3 categories: no injection, steroid injection, or viscosupplementation injection. Injections were performed by surgeons, rheumatologists, or primary care physicians before surgery. If the patient received both a steroid and viscosupplementation injection in the past, the patient was placed into the group in which they received the latest injection. We subsequently divided the injection group into subcategories based on the timing of the injection before a TKA. The subgroups were divided into 3-month intervals from 0 to 3 months, 3 to 6 months, 6 to 9 months, 9 to 12 months, and greater than 12 months. During that time interval, the patients who received an injection greater than 12 months before a TKA and/or no injection were grouped into the control group. The mean age of the patients was 64.14 years (range, 32–91 years). The mean age patients receiving injections before a TKA was 63.82 years (range, 36–89 years).

Data were extrapolated from medical records to identify the patients who developed a deep infection after their index surgery. All records were reviewed by analyzing laboratory values, office notes, operating room notes, and consultation notes to correctly identify patients with surgical site infections.

A deep infection was defined by the Musculoskeletal Infection Society criteria using laboratory values (complete blood count, erythrocyte rate, sedimentation rate, and C-reactive protein), purulent drainage from the surgical incision, or positive microbiology from a knee aspiration per the 2 senior surgeons.

The exclusion criteria were superficial incisional infections, which involved the skin, and/or subcutaneous tissue.

Data were compiled, and proportions of infections in each group (injection before a TKA and no injection before a TKA) were calculated. The statistical analysis was completed using an odds ratio and relative risk with a 95% confidence interval (CI).  $P < .05$  was set as the threshold for statistical significance. The statistical analysis was performed using an open source statistical software (<http://www.medcalc.org/>).

**Results**

A total of 1628 patients' medical records were reviewed to identify patients who received an intraarticular injection before a TKA. A total of 783 patients (48%) received an intraarticular injection before a TKA. The control group included 845 patients (52%) who had no injection before a TKA. Within the 783 patients, 360 patients received intraarticular steroids prior, and 423 patients received viscosupplementation before a TKA.

There were no differences between the injection group (6/783; 0.77%) and noninjection group (10/845; 1.18%) in the total number of deep prosthetic infections (Table 1). The relative risk of the injection group was 0.6475 with a  $P$  value of .398 (95% CI, 0.2364–1.7733). The odds ratio of a deep infection in the injection group vs the control group was 1.544 with a  $P$  value of .4022 (95% CI, 0.5587–4.2692).

There were no differences between the steroid injection group (4/360; 1.11%) and the control group (10/845; 1.18%) (Table 2) in a deep injection risk. The relative risk of the steroid injection compared to the control group was 0.9389 with a  $P$  value of .9146 (0.2964–2.9740). There were no differences between the viscosupplementation group (2/423; 0.47%) and the control group (10/845; 1.18%) in deep prosthetic infections. The odds ratio of a deep infection in the steroid group vs the control group was 0.9382 with a  $P$  value of .9146 (95% CI, 0.2923–3.0113). The relative risk of the viscosupplementation group compared to the control group was 0.3995 with a  $P$  value of .2348 (95% CI, 0.0879–1.8153). The odds ratio of a deep infection in the viscosupplementation group vs the control group was 0.3967 with a  $P$  value of .2340 (95% CI, 0.0865–1.8186). In comparison between with the steroid injection group and the viscosupplementation group, the exact (Fisher) test value of a 2-tailed  $P$  value equals .4226.

The average time for a deep infection to develop in the control was 14 months (range, 1–60 months). If 2 outliers are excluded (40 and 60 months), the average time was 5 months (range, 1–18 months). The average time for a deep infection to develop in the injection group was 8.67 months (range, 1–14 months). Within the time frame of 0 to 3 months (2/143; 1.4%), 3 to 6 months (0/174), 6 to 9 months (0/107), 9 to 12 months (3/170; 1.76%), and greater than 12 months (1/183; 0.55%), no differences in deep prosthetic infections were found in the injection group compared to the control group (Tables 3–5).

**Discussion**

Intraarticular injections for patients with OA of the knee are standard practice for pain relief [3,11,12]. Although the efficacy of injections remains controversial, one of the posited adverse effects is an increased

**Table 1**  
Total Number of Patients.

	Patients	No. of Infections	
No injection	845	10	1.18%
TKA with injection before TKA	783	6	0.77%
Total no. of patients	1628	16	0.98%

**Table 2**  
Steroid vs Viscosupplementation Group.

	Patients	No. of Infections	
Steroid	360	4	1.11%
Viscosupplementation	423	2	0.47%
Total	783	6	0.77%

risk of infection in patients who eventually progress to a TKA [7]. Because current literature relies on small sample sizes and anecdotal evidence, it remains unclear as to the true effect of the type of injection and associated risks with an infection. To our knowledge, this is the first and largest study analyzing the effects of an injection using steroids and viscosupplementation. In our study, 1.18% (10/845) of TKA in the control group had an infection after a TKA, whereas 0.77% (6/783) had an infection with an injection of either steroid or viscosupplementation in the knee, with an overall infection rate of 0.98% (16/1628). Pulido et al [13] reported a periprosthetic joint infection developing in 0.7% (63/9245) of patients who underwent a TKA or total hip arthroplasty, similar to our reported data. When comparing the infection rates of the patients who underwent a steroid injection before a TKA (4/360; 1.11%) and patients who underwent a viscosupplementation injection before a TKA (2/423; 0.47%) vs patient who did not receive an injection, the relative risk of a deep infection was not statistically significant. The exact (Fisher) test value of a 2-tailed  $P$  value equals .4226 between the intraarticular injection group (steroid and viscosupplementation) and a deep infection and is, therefore, not considered to be statistically significant.

Papavasiliou et al [7] were the first known study, to our knowledge, which demonstrated a significant increase in deep prosthetic infections after TKA in patients, who underwent a steroid injection before a TKA. The study did not find a correlation with number of injections or the timing before a TKA [14]. Initially, 420 patients' medical records were reviewed, and 6 were noted have a deep infection (1.4%). The sample size of the study was reduced by retrospectively reviewing patients who had a TKA with AGC (Bioment Ltd, Swindon, UK). Within the final study group, 54 patients received a steroid injection before a TKA, whereas 90 patients had no hospital record of a steroid injection. Three deep infections were found within the 54 patients who had received an injection before the TKA with a Biomet AGC prosthesis [7]. Considering the power of the study, along with the number of biases related to the timing of the injection and number of injections, it would be

**Table 3**  
Infection Rates Within Time Intervals.

	TKA With Prior Injections	Infections of TKA With Prior Injection	Time From Injection to TKA	
<b>Time frame (0–3 mo)</b>				
Steroid	93	2	3 mo × 2	2.15%
Viscosupplementation	50	0	N/A	0%
Total in time frame	143	2	N/A	1.4
<b>Time frame (3–6 mo)</b>				
Steroid	83	0	N/A	0%
Viscosupplementation	91	0	N/A	0%
Total in time frame	174	0	N/A	0%
<b>Time frame (6–9 mo)</b>				
Steroid	50	0	N/A	0%
Viscosupplementation	57	0	N/A	0%
Total in time frame	107	0	N/A	0%
<b>Time frame (9–12 mo)</b>				
Steroid	74	1	12 mo	1.35%
Viscosupplementation	96	2	12 mo × 2	2.08%
Total in time frame	170	3	N/A	1.76%
<b>Time frame (&gt;12 mo)</b>				
Steroid	57	1	N/A	1.75%
Viscosupplementation	126	0	N/A	0%
Total in time frame	183	1	N/A	0.55%

Download English Version:

<https://daneshyari.com/en/article/6208796>

Download Persian Version:

<https://daneshyari.com/article/6208796>

[Daneshyari.com](https://daneshyari.com)