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CORR Insights®: The John N. Insall Award: Do Intraarticular Injections Increase the Risk of Infection After TKA?

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Where Are We Now?

Nearly 27 million people are affected by osteoarthritis in the United States alone. Choosing an appropriate treatment plan for patients with this condition can be a challenge [8]. The spectrum of treatment ranges from nonoperative treatment including nonsteroidal medication, analgesics, weight loss, physical therapy and intraarticular injections, to surgical intervention, such as TKA for the arthritic knee. Many patients, desiring to avoid surgery, choose nonoperative care. It has been reported that up to 30% of patients undergoing a TKA will have an intraarticular corticosteroid injection prior to surgery [1, 9]. Despite the frequent use of intraarticular corticosteroid injections, there are no surgeon guidelines regarding the timing and the safety of injections prior to TKA. While many surgeons recommend a delay between intraarticular injection and surgery, there is conflicting information about whether injections before surgery increase the risk of infection afterwards [9, 10], and if so, what a safe waiting period might be between an injection and the eventual TKA [1].

The recent article by Bedard and colleagues, in an effort to resolve this issue, queried the Humana insurance database. They identified 54,081 patients (35%) who had an intraarticular injection in the ipsilateral knee before TKA and 54,081 (65%) who had no injections. The authors found that ipsilateral intraarticular corticosteroid injection before surgery was associated with a higher risk of postoperative infection in TKA. These results appeared to be time-dependent, in that patients who received injections within 6 months of TKA seemed to be at greater risk of having a postoperative infection.

Despite the lack of clear evidence to support the efficacy of intraarticular corticosteroid and hyaluronic acid injections for the treatment of osteoarthritis, both remain a common treatment modality. Since the introduction of the Clinical Practice Guidelines for the nonarthroplasty management of knee osteoarthritis from the American Academy of Orthopedic Surgeons in 2008, the percentage of patients who received intraarticular injections of corticosteroids

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and hyaluronic acid has been trending downward [6], yet both remain in common use for patients with knee osteoarthritis.

Where Do We Need To Go?

Prosthetic joint infection is a devastating complication following TKA. While multiple risk factors can predispose a patient to periprosthetic joint infection, modifiable risk factors, such as intraarticular corticosteroid and hyaluronic acid injections before surgery need to be evaluated. While the efficacy of these intraarticular remains controversial, one of the postulated adverse effects is an increased risk of infection in patients who eventually go onto TKA. Since the risk of periprosthetic infection following TKA is not taken lightly, delaying surgery based upon the timing of an intraarticular injection should be considered. Most of the current evidence relies on anecdotal evidence, clinical series of varying size, and more recently, database observational studies, which report conflicting results and suggestions [1, 2, 5, 9–13].

The challenge in analyzing the impact of a single variable on a complex problem, such as prosthetic joint infection following intraarticular corticosteroid injection prior to TKA is that there are numerous risk factors that impact the outcome. It is known that risk factors for periprosthetic infection include age, gender, prior surgery and preexisting comorbidities such as obesity, diabetes, congestive heart failure, congestive heart failure, chronic pulmonary disease, peripheral vascular disease and anemia. It is also important to recognize, the variability in reporting prosthetic joint infections. Insurance databases rely on codes extracted from invalidated medical records that can erroneously report higher complication rates. A case in point is that the Humana database used by Bedard and colleagues reported the proportion of TKAs developing any post-operative infection between 3.6% and 4.4%, while the rate of infected TKA in the United States hovers around 1% [7, 12]. This begs for accurate collection and analysis of relevant data.

How Do We Get There?

Observational studies performed from a healthcare database are a valuable resource and have the advantage of their large size, longitudinal perspective and practice-based information related to a specific intervention, as in this case the relationship of intraarticular injections before TKA and postoperative infection. However, the lack of detailed clinical information in the database makes these studies prone to misinterpretation and unsuitable for exploring important questions about disease and risk factors, causation, and treatment [4]. For this reason, it is also important to consider the results of large clinical series, systemic literature reviews, and meta-analyses in drawing conclusions on a specific treatment modality, which may be influenced by confounding variables and selection bias.

At this time, patients in need of an intraarticular corticosteroid injection prior to TKA, should be counseled on the potential risks and benefits of the injection. While there are reports that the timing of injection does not correlate with a higher risk of periprosthetic infection, at least a 3-month interval should be considered when possible [1]. This time interval, based upon a reasonable evaluation of the literature, provides a safe time period between intraarticular corticosteroid injections and TKA. Further research is needed with a prospective multivariate analysis to better determine the risk between preoperative intraarticular corticosteroid injections and postoperative infection in TKA. This would be a challenging study since at least 2000 patients would be needed in each cohort to show a 50% increase in infection following intraarticular corticosteroid injection [3] An alternative approach is the

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continued use of a meta-analysis that has the ability to improve the power of small or inconclusive studies and offers the opportunity to critically evaluate and statistically combine results of comparable studies. Studies based on insurance databases are susceptible to confounding biases that need to be kept in mind as we interpret the results. Patients will continue to receive intraarticular corticosteroid injections before TKA, and it is our responsibility to continue investigating the safety and efficacy of this course of treatment for knee arthritis.

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