

Intra-articular injections of the Knee and Chronic Post-Surgical Pain After Total Knee Arthroplasty

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Background

Recommendations for when to stop additional intra-articular knee injections in patients with knee severe osteoarthritis are unclear. Recent publications have discussed risk factors for infection but there is little data describing the risk factors for chronic post-surgical pain. In this study we evaluated the lifetime number of injections as well as the doses of triamcinolone and doses of hyaluronic acid as risk factors for chronic post surgical pain after total knee arthroplasty.

Methods

A retrospective study evaluated 50 patients who underwent total knee arthroplasty. Specifically, their medical histories, injection histories, and surgical histories were obtained. Risk factors for developing chronic post surgical pain 1 year after total knee arthroplasty were evaluated. Continuous variable were analyzed using two sided t-tests and categorical variables were evaluated using Chi square analysis. Further spearman correlations were obtained between injection characteristics and presence of knee pain 1 year after total knee arthroplasty. Steroid dosing was converted into triamcinolone equivalents.

Table 1: Population characteristics in patient with and without chronic post surgical pain 1 year after total knee arthroplasty.

| | Pain Relief 1 year after TKA | Chronic Post Surgical Pain | P value |
|---|------------------------------|----------------------------|---------|
| Mean age (years) | 66 | 67 | 0.85 |
| Male | 10 | 5 | 0.028* |
| Female | 32 | 3 | 0.028* |
| Average BMI | 33.5 | 32.2 | 0.47 |
| Chronic Medical Conditions | | | |
| Hypertension | 19 | 5 | 0.37 |
| Hyperlipidemia | 23 | 5 | 0.68 |
| Coronary Artery Disease | 6 | 0 | 0.25 |
| Chronic Kidney Disease | 14 | 1 | 0.32 |
| Rheumatoid Arthritis | 7 | 0 | 0.24 |
| Osteoarthritis | 1 | 2 | 0.006* |
| Injections | | | |
| Total number of injections (mean) | 2.5 | 5 | 0.33 |
| Average dose of triamcinolone (mg) prior to TKA | 51.35 | 176 | 0.048* |
| Average dose hyaluronic acid (units) prior to TKA | 12 | 48 | 0.19 |
| Physical Therapy | | | |
| Inpatient duration (days) | 2.25 | 3.2 | 0.4 |
| Outpatient duration (days) | 40.8 | 47.6 | 0.46 |

Table 2: Spearman correlations observed between injection characteristics and presence of chronic post surgical pain.

| | Chronic Post Surgical Pain |
|----------------------------------|----------------------------|
| Correlations | |
| Number of total injections | $r = 0.96, p < 0.001$ |
| Dose of lifetime triamcinolone | $r = 0.98, p < 0.001$ |
| Dose of lifetime hyaluronic acid | $r = 0.89, p < 0.001$ |

Results

Significant risk factors for chronic post surgical pain 1 year after total knee arthroplasty included: female gender, history of osteoarthritis, and average lifetime dose of triamcinolone. There was no significant difference for lifetime dose of hyaluronic acid. Furthermore, the number of total injections, dose of corticosteroid, and lifetime dose of hyaluronic acid received showed good correlation with the rate of persistent pain reported.

Conclusion

The amount of injections and doses of injectate could explain chronic post surgical pain in some patients after total knee arthroplasty. There are currently no recommendations for when to stop additional injections and to recommend surgical options instead. Further studies with larger populations are needed to evaluate dose thresholds and to consider other complications that are seen less frequently (i.e. infection).

Resources

1. Mokdad, Ali H., et al. "The state of US health, 1990-2016: burden of diseases, injuries, and risk factors among US states." *Jama* 319.14 (2018): 1444-1472.
2. Brown, Greg A. "AAOS clinical practice guideline: treatment of osteoarthritis of the knee: evidence-based guideline." *JAAOS-Journal of the American Academy of Orthopaedic Surgeons* 21.9 (2013): 577-579.
3. Carlson, Victor Rex, et al. "Compliance with the AAOS guidelines for treatment of osteoarthritis of the knee: a survey of the American association of hip and knee surgeons." *JAAOS-Journal of the American Academy of Orthopaed*