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Review Article

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Visco-Supplementation in Knee OA: A Step Toward Effective, Long-Term Pain Relief

Reuven Lexier* and Sahil Patel

Lexier Medical Management Services Inc., Toronto, Ontario Canada

***Corresponding Author**
Reuven Lexier, Lexier Medical Management Services Inc., Toronto, Ontario Canada

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1. Introduction

Knee osteoarthritis (OA) is a chronic degenerative joint disease characterized by inflammation, structural changes, and the progressive destruction of articular cartilage, leading to pain, functional limitations, and reduced quality of life [1,2]. It is one of the leading causes of disability worldwide, affecting over 560 million people globally, with the knee being the most commonly affected joint [1,3]. The pathophysiology of knee OA is multifactorial, involving mechanical stress, genetic susceptibility, and systemic factors such as age, sex, and nutrition [4,5]. Despite its high prevalence and burden, treatment options remain limited, often focusing on symptom management rather than disease modification [5,6].

Current treatment modalities for knee OA include lifestyle modifications, physical therapy, pharmacologic interventions (e.g., NSAIDs, corticosteroids), and surgical options such as total knee replacement (TKR) [2,4]. However, these approaches have limitations. Pharmacologic treatments, while effective for short-term pain relief, are associated with systemic side effects and do not address the underlying disease progression [2,6]. Surgical interventions, though definitive, are invasive, costly, and not suitable for all patients, particularly those with mild to moderate OA or those who wish to delay surgery [2,7]. This gap in treatment options has led to the exploration of alternative therapies, including intra-articular hyaluronic acid (HA) injections, also known as viscosupplementation [1,8].

Viscosupplementation aims to restore the viscoelastic properties of synovial fluid, reduce inflammation, and potentially slow cartilage degeneration [2,4]. Despite its widespread use, the effectiveness and safety of viscosupplementation remain controversial, with conflicting evidence from clinical trials and meta-analyses [1,5]. Some studies suggest that HA injections can provide symptomatic relief and delay the need for TKR, particularly in patients with mild to moderate OA [7,8]. However, others argue that the clinical benefits are minimal and outweighed by the risk of adverse events [1,5]. This controversy highlights the need for further research to clarify the role of viscosupplementation in knee OA management and to identify the patient populations most likely to benefit.

The aim of this study was to evaluate the effectiveness of viscosupplementation, specifically Synvisc 1, in patients with mild to moderate knee OA. By analyzing treatment outcomes, including pain relief, functional improvement, and the need for additional interventions, this study seeks to contribute to the growing body of evidence on viscosupplementation and inform clinical decision-making for patients who are not candidates for surgical interventions.

2. Methods

This study utilized a retrospective chart review design to evaluate the effectiveness of visco-supplementation in patients with knee osteoarthritis (OA). Data were extracted from patient records at a single clinical practice over a 3-year period (2021–2024). The study focused on analyzing treatment outcomes, patient demographics, and clinical variables related to knee OA. The setting for this study was a single clinical practice specializing in orthopedic care and joint pain management, serving a diverse patient population that provided a representative sample of individuals with knee OA.

The study included 31 patients diagnosed with knee OA, confirmed radiologically. Inclusion criteria were age ≥ 40 years, radiologically confirmed mild to moderate knee OA (Kellgren-Lawrence grades I–III), and completion of at least one course of visco-supplementation treatment. Patients were excluded if they had severe knee OA (Kellgren-Lawrence grade IV), previous knee

arthroplasty or other surgical interventions, or incomplete medical records or missing follow-up data. Variables of interest included patient demographics (age, sex, and body mass index), OA severity (mild vs. moderate), effusion volume (measured in cubic centimeters using aspiration records), and treatment details (type of visco-supplementation, number of injections, treatment intervals, and duration). Treatment outcomes were assessed based on patient-reported pain relief and clinical notes documenting the need for additional interventions.

Data were extracted from electronic health records (EHRs) by trained research staff using a standardized data collection form. Effusion volume was measured using ultrasound or aspiration records, and OA severity was confirmed using radiological reports. Descriptive statistics were used to summarize the data, with continuous variables (e.g., age, effusion volume) reported as means, medians, and ranges, and categorical variables (e.g., sex, OA severity) reported as percentages. Treatment effectiveness was calculated as the proportion of patients achieving lasting pain relief without additional interventions.

The statistical analysis was limited to descriptive methods, including means, medians, ranges, and percentages, to summarize demographic and clinical variables. Subgroup analyses were conducted to compare outcomes between mild and moderate OA patients; however, inferential statistics were not performed due to the small sample size and retrospective nature of the study. As a result, the observed differences in treatment effectiveness (e.g., 89.5% success in mild OA vs. 66.7% in moderate OA) and effusion volume (e.g., 10.5 cc in mild OA vs. 22.45 cc in moderate OA) should be interpreted with caution, as their statistical significance could not be determined. Future studies with larger sample sizes should incorporate inferential statistical methods, such as chi-square tests or independent t-tests, to validate these findings and provide more robust evidence.

3. Results

The study cohort consisted of 31 patients with knee OA, with a mean age of 63.7 years (range: 45–82 years). The majority of patients were male (74.2%). OA severity was classified as mild in 61.3% of patients and moderate in 38.7%, with radiological confirmation obtained for all patients using the Kellgren-Lawrence grading system.

The average effusion volume across the cohort was 16 cc (range: 5–35 cc). Patients with mild OA had an average effusion volume of 10.5 cc, while those with moderate OA had an average of 22.45 cc. Synvisc 1 was the primary treatment used, administered in 20 cases (64.5%). The median time between injections was 153 days (range: 90–210 days), and the average duration from the first to the last injection was 6.2 months (range: 3–12 months).

Visco-supplementation was effective in providing lasting pain relief for 82% of patients. The remaining 18% required additional interventions, including Depomedrol/Xylocaine injections or oral anti-inflammatories. Subgroup analysis revealed that 89.5% of mild OA patients achieved lasting pain relief with visco-supplementation alone, compared to 66.7% of moderate OA patients. Among moderate OA patients, 33.3% required additional treatments to achieve pain relief.

In summary, the study demonstrated that visco-supplementation, particularly with Synvisc 1, was effective in managing knee OA symptoms in the majority of patients. However, a subset of patients, particularly those with moderate OA, required additional treatments to achieve pain relief. These findings highlight the potential of visco-supplementation as a viable treatment option for mild to moderate knee OA, while also emphasizing the need for personalized treatment plans.

4. Discussion

The findings of this retrospective chart review align with and contribute to the growing body of literature on visco-supplementation for knee osteoarthritis (OA). Our study demonstrated that 82% of patients experienced lasting pain relief with visco-supplementation, primarily using Synvisc 1, while 18% required additional treatments. These results are consistent with some existing evidence but also highlight areas of controversy and the need for further research.

4.1. Effectiveness of Visco-Supplementation

The effectiveness of viscosupplementation in our cohort (82% success rate) supports the findings of several studies. For instance, one study highlights that Hylan G-F20 (Synvisc) may delay the need for total knee replacement (TKR) and improve pain and function in knee OA patients [4]. Similarly, another study emphasizes that viscosupplementation is an effective local treatment for OA, improving both pain and function while reducing the need for anti-inflammatory treatments [2]. However, our findings contrast with a study, which concluded that viscosupplementation offers only a clinically irrelevant reduction in pain intensity and is associated with an increased risk of serious adverse events (SAEs) [1]. This discrepancy may be due to differences in study design, patient selection, or treatment protocols. Our study focused on a specific clinical practice with a small sample size, which may have influenced outcomes.

4.2. Clinical Implications and Patient Selection

Our results emphasize the importance of patient selection in determining the success of viscosupplementation. As one study noted, viscosupplementation is effective in mild to moderate knee OA but is not a viable alternative to surgery in advanced cases [8]. This aligns with our cohort, where 61.3% of patients had mild OA and 38.7% had moderate OA. Additionally, another study emphasizes the need for individualized treatment decisions, which is reflected in our findings that 23% of patients required additional treatments such as Depomedrol/Xylocaine or anti-inflammatories [3]. This suggests that while viscosupplementation is effective for many, it may not be sufficient for all patients, particularly those with more severe symptoms or comorbidities.

4.3. Delaying Total Knee Replacement

Our study did not directly measure the impact of viscosupplementation on delaying TKR, but the literature provides compelling evidence in this regard. Two studies highlight that HA injections significantly delay the need for TKR, with multiple courses of treatment extending the time-to-TKR by several years [7,9]. This is particularly relevant for patients who are not candidates for surgery or wish to postpone it. Our findings, combined with these studies, suggest that viscosupplementation could play a valuable role in managing knee OA and reducing the burden on surgical resources.

4.4. Limitations and Future Directions

Our study has several limitations, including its retrospective design, small sample size (n=31), and single-center setting. These factors limit the generalizability of our findings and highlight the need for larger, prospective studies. One study emphasizes the importance of identifying risk factors for OA progression and tailoring treatments to individual phenotypes, which could improve outcomes. Additionally, two other studies discuss emerging advancements in viscosupplementation, such as tribosupplementation and enhanced formulations combining HA with glucocorticoids or antioxidants [5,6,10]. These innovations may address some of the limitations of current treatments and warrant further investigation.

4.5. Economic Implications

In addition to its clinical benefits, viscosupplementation may have significant economic implications, particularly in reducing the need for costly surgical interventions like total knee replacement (TKR). Studies have shown that HA injections can delay TKR by several years, with multiple courses of treatment extending the time-to-TKR by up to 3.6 years [7,9]. This delay not only improves patients' quality of life but also reduces the financial burden on healthcare systems. For example, one study reported that patients receiving HA injections had a median delay of 1.6 years before requiring TKR compared to those who did not receive HA [9]. These findings suggest that viscosupplementation could serve as a cost-effective alternative for patients with mild to moderate knee OA, particularly those who are not surgical candidates or wish to postpone surgery. However, further cost-effectiveness analyses are needed to compare viscosupplementation with other non-surgical treatments, such as corticosteroids or physical therapy, to determine its place in the broader OA treatment landscape.

5. Conclusion

In summary, this study supports the use of viscosupplementation, particularly Synvisc 1, as an effective treatment for mild to moderate knee OA in the majority of patients. Our findings align with existing evidence that viscosupplementation can provide lasting pain relief and improve functional outcomes, particularly in patients with mild OA [2,4]. However, the variability in treatment response, especially among patients with moderate OA, stresses the importance of personalized treatment plans and careful patient selection [3,8]. These results contribute to the ongoing debate about the role of viscosupplementation in knee OA management and highlight its potential as a viable alternative for patients who are not candidates for surgical interventions. Future research should focus on larger, diverse cohorts, standardized treatment protocols, and emerging therapies, such as enhanced HA formulations or tribosupplementation, to optimize outcomes and address the limitations of current treatments [5,6]. By advancing our understanding of viscosupplementation, we can better tailor therapies to individual patient needs and improve the overall management of knee OA.

Reference

1. Pereira, T. V., Jüni, P., Saadat, P., Xing, D., Yao, L., Bobos, P., ... & da Costa, B. R. (2022). Viscosupplementation for knee osteoarthritis: systematic review and meta-analysis. *bmj, 378*.
2. Webb, D., & Naidoo, P. (2018). Viscosupplementation for knee osteoarthritis: a focus on Hylan GF 20. *Orthopedic research and reviews*, 73-81.
3. Trojian, T. H., Concoff, A. L., Joy, S. M., Hatzenbuehler, J. R., Saulsberry, W. J., & Coleman, C. I. (2016). AMSSM scientific statement concerning viscosupplementation injections for knee osteoarthritis: importance for individual patient outcomes. *British journal of sports medicine, 50*(2), 84-92.
4. Peck, J., Slovek, A., Miro, P., Vij, N., Traube, B., Lee, C., ... & Abd-Elsayed, A. (2021). A comprehensive review of viscosupplementation in osteoarthritis of the knee. *Orthopedic Reviews, 13*(2), 25549.
5. Perruccio, A. V., Young, J. J., Wilfong, J. M., Power, J. D., Canizares, M., & Badley, E. M. (2024). Osteoarthritis year in review 2023: Epidemiology & therapy. *Osteoarthritis and cartilage, 32*(2), 159-165.
6. Siddiq, M. A. B., Oo, W. M., & Hunter, D. J. (2024). New therapeutic strategies in osteoarthritis. *Joint Bone Spine, 91*(6), 105739.
7. Altman, R., Lim, S., Steen, R. G., & Dasa, V. (2015). Hyaluronic acid injections are associated with delay of total knee replacement surgery in patients with knee osteoarthritis: evidence from a large US health claims database. *PloS one, 10*(12), e0145776.
8. Conrozier, T., Raman, R., Chevalier, X., Henrotin, Y., Monfort, J., Diraçoglù, D., ... & Migliore, A. (2021). Viscosupplementation for the treatment of osteoarthritis. The contribution of EUROVISCO group. *Therapeutic advances in musculoskeletal disease, 13*, 1759720X211018605.
9. Altman, R., Fredericson, M., Bhattacharyya, S. K., Bisson, B., Abbott, T., Yadalam, S., & Kim, M. (2016). Association between hyaluronic acid injections and time-to-total knee replacement surgery. *The Journal of knee surgery, 29*(07), 564-570.
10. DeMoya, C. D., Joenathan, A., Lawson, T. B., Felson, D. T., Schaer, T. P., Bais, M., ... & Grinstaff, M. W. (2024). Advances in viscosupplementation and tribosupplementation for early-stage osteoarthritis therapy. *Nature Reviews Rheumatology, 20*(7), 432-451.