

Visco-Supplementation Post Knee Arthroscopy

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Abstract

Background: The incidence of articular cartilage injuries in ACL injury and chronic meniscal tear are very high (16-46%). So there is need of more studies to see the role of visco-supplementation in such cases to improve the outcome of the procedure. The purpose of this study was to review the literature on the effects and safety of visco-supplementation when used after knee joint arthroscopy procedure.

Methods: A systematic review of literature on role of visco-supplementation after arthroscopy procedure was performed using Medline (2000-2019), PubMed (2000-2019), U.S national library of medicine.

Results: Most of the studies done are of level 1 evidence. But, most of the studies are showing positive results when visco-supplementation after arthroscopy procedure in terms of decrease in pain in the initial phase, enables faster patient recovery and generates a faster return and better quality to the activities of daily living.

Conclusion: Current literature supports immediate use of visco-supplementation after arthroscopic procedure. However more studies are necessary to support the use of visco-supplementation beyond OA. We recommend the use of visco-supplementation post ACL and meniscal reconstruction procedure where there is significant articular damage. It should be used in the cases of meniscectomy where there is persistent pain after surgery.

Keywords: Viscosupplementation, Arthroscopy, Knee.

Introduction

Incidence of articular cartilage pathologies are commonly associated with knee injuries like ACL tear, meniscus tear and knee dislocations is reported to be around 60-66%[1]. These cartilage lesion can range from varying grades starting from chondral fibrillation, to fissures to chondral defects and in some case osteochondral lesions. Treating such ligament and meniscus injuries without treating cartilage lesions leads to decreased patients satisfaction and function outcome.

Significant cartilage lesions like chondral defects and OCD are delt with specific procedures like micro fracture and osteochondral grafting. However smaller lesion are often wilfully neglected and but these may be progressive lesion which may lead to joint arthritis and may be a reason for persistent pain even after arthroscopic procedure.

Exogenous hyaluronic acid injections have

been clinically used to mitigate the macerated functions of the depolymerized endogenous hyaluronic acid of osteoarthritis patient. Although the exogenous hyaluronic acid does not restore and replace the full properties and activities of the depolymerized endogenous hyaluronic acid of the synovial fluid but it may induce satisfactory pain relief via several mechanisms. These mechanisms include synthesis of proteoglycan and/or glycosaminoglycan, anti-inflammatory effect, and visco-elasticity maintenance [2].

Hence there seems to be usefulness of visco-supplementation in cases treated for primary meniscus and ligament pathology with significant cartilage damage.

The purpose of this study was to review the literature on the effects and safety of visco-supplementation when used after knee joint arthroscopy procedure.

Material and Methods

A systematic review of literature on role of visco-supplementation after arthroscopy procedure was performed using Medline (2000-2019), PubMed (2000-2019), U.S national library of medicine. The following search terms were utilised: knee arthroscopy, ACL reconstruction, visco-supplementation, knee chondral injury, meniscectomy, Hyaluronic acid. The following literature search strategy included in following:

- Vissco-supplementation post ACL reconstruction
- Role of hyaluronic acid knee
- Role of hyaluronic acid post knee arthroscopy procedures
- Hyaluronic acid in post meniscectomy patients.

Results

After thoroughly going through the literature, we found 11 studies appropriate for this review.

In 2002 Chen et al.[3] reported on 77 patients with OA receiving sodium hyaluronate after knee arthroscopy. In this Level I study one group received sodium hyaluronate and the other

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group received no injections. Knee muscle strength index and patient VAS pain score were statistically better in the hyaluronate group ($P < .05$). It was concluded that hyaluronic acid was a positive factor in the rehabilitation of these patients with knee OA after arthroscopy.

In 2006 Mathies [4] assessed the use of Viscosel (0.5% sodium hyaluronate, TRB Chemedica International, Geneva, Switzerland) immediately after arthroscopic surgery. Ten milliliters of sodium hyaluronate was injected immediately after arthroscopic partial meniscectomy. Joint swelling was judged to be less at day 12 ($P = 0.0093$) and day 28 ($P = 0.0072$). Diclofenac intake was less in the sodium hyaluronate group as well as at postoperative days 3 and 7. No adverse events were reported. The authors concluded that the use of Viscosel may be of benefit in reducing postoperative pain and swelling.

In 2007 Hempfling [5] reported the results of a randomized, controlled, double-blind study of 80 patients undergoing arthroscopic knee joint lavage with Ringer's lactate. Forty of the patients also received 10 ml of hyaluronan. Both the control and study groups had positive effects at 3 months, but the treatment effect was maintained in the hyaluronan group for up to 1 year

Ulucay et al. [6] in 2007 published a

prospective, randomized, controlled study of 77 patients with knee OA receiving either hylan G-F 20, Orthovisc (sodium hyaluronate; Anika Therapeutics, Woburn, MA), or Adant (synthetic hyaluronic acid; Tedec-Meiji Failma, Madrid, Spain) 3 weeks after arthroscopic surgery. Patients in all groups showed statistically significant improvements from baseline at week 3 after injection.

In 2007 Huang et al. [7] reported a prospective, randomized, controlled study of 120 patients undergoing isolated anterior cruciate ligament reconstruction. The study attempted to determine the optimum time for hyaluronan injection. The active groups received 2 ml of hylan G-F 20 at week 4, 8, or 12 after reconstruction, whereas the control group received saline solution. The authors concluded that hyaluronan therapy resulted in more functional muscle rehabilitation. The group receiving hyaluronan at week 8 had the most improved clinical results 1 year after surgery.

Zietz and Selesnick [8] in 2008 published a small, prospective, multicenter, open-label study of 15 active, athletic patients with knee OA who underwent knee arthroscopy for mechanical symptoms. If patients reported residual pain or activity limitations postoperatively, they were treated with hylan

G-F 20 with a mean initiation of treatment 3.4 months after arthroscopy. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and International Knee Documentation Committee scores significantly improved at baseline and at 3 and 6 months postoperatively compared with scores before arthroscopy. The authors also reported improved activity levels associated with hylan G-F 20 administration at 3 months' follow-up.

Huskin et al. [9] in 2008 published a multicenter, prospective, open-label study evaluating the safety and efficacy of hylan G-F 20 in patients with knee OA presenting with pain after arthroscopic meniscectomy. The study was performed in several centers in Belgium, France, and Spain and was the first study to prospectively evaluate the efficacy and safety of intra-articular injections of hylan G-F 20 in patients with symptomatic knee OA not responding to simple analgesics 4 to 12 weeks after arthroscopic meniscectomy. At the time of initial surgery, arthroscopic procedures, in addition to meniscectomy, included resection of unstable flaps and superficial mechanical shaving. To be eligible for the study, OA had to be shown at the time of surgery. Patients with Outerbridge grade I, II, and III OA were enrolled in the study, whereas those with grade IV OA were excluded. Of those enrolled, 84% of the knees showed patellofemoral grade I OA, whereas 16% had grade II changes. Medial and lateral OA changes were mostly limited to grade I, although 40% had grade II medial changes and 20% had grade II lateral changes. The mean time to viscosupplementation after surgery was 53 days (range, 27 to 107 days). The initial study population consisted of 62 patients, but only 43 patients completed the study. Statistically significant improvement was noted in mean VAS pain score while walking, which was reduced from 65.0 mm to 28.0 mm at week 26 ($P < .0001$). WOMAC scores, VAS walking pain scores, physician global assessment, and patient assessment all showed statistically significant positive results at all other time points. The authors concluded that visco-supplementation with hylan G-F 20 had a favorable risk-benefit profile in patients with symptomatic knee OA presenting with persistent pain after arthroscopic meniscectomy.

In 2014 Ayrton et al. [10] studied Results

Table 1: Showing Different studies for Visco-Supplementation Post Knee Arthroscopy

Author	Follow-up	Number Of Injection	Type of study	Findings
Chen et al.(2002) ^[3]	6 Months	3(Once a week)	Level I study: hyaluronan post scope	VAS scores increased in hyaluronan patients
Mathies(2006) ^[4]	4 Weeks	1	Viscosel post meniscectomy	Decreased effusion and pain
Hempfling(2007) ^[5]	2 Years	1	Level I study: hyaluronan v control	Decreased pain up to 1 year
Ulucay et al.(2007) ^[6]	3 Weeks	3(Once a week)	Level I study: hylan G-F 20, Orthovisc, Adant, and S/P scope	Improved pain relief
Huang et al.(2007) ^[7]	16 Weeks	3(Once a week)	Level I study: hyaluronan post anterior cruciate ligament repair v saline solution	Hyaluronan increased results
Zietz and Selesnick(2008) ^[8]	6 weeks	3(Once a week)	Level I multicenter study	Increased VAS scores post scope for OA
Huskin et al. (2008) ^[9]	52 weeks	3(Once a week)	Level I multicenter study	VAS scores increased in hyaluronan patients
Ayrton et al.(2014) ^[10]	60 days	4(Once a week)	-	Decreased effusion and pain I early stage
Sanjeev Anand et al.(2014) ^[11]	6 Weeks	1	-	WOMAC scores favoring the study group
Filardo et al.(2016) ^[12]	180 Days	1	Randomized Controlled Trial. Level I	No significant difference case vs. control
Di Marteno A et al.(2016) ^[13]	1 Year	1	Randomized Controlled Trial. Level I	No significant difference case vs. control

evaluation of the use of intra-articular sodium hyaluronate in the post-operative knee arthroscopy. Ninety-eight patients with meniscal lesions were studied. The participants were randomly divided into two groups of 49. The first group was treated with intra-articular sodium hyaluronate 20 mg (Polireumim, TRB Pharma) in the immediate post-operative period and, subsequently, with a weekly application for four consecutive weeks. They concluded that the use of hyaluronic acid in the post-operative of knee arthroscopy is justified because it leads to a decrease in pain in the early stage, enabling faster recovery of the patient.

In 2014 Sanjeev Anand et al.[11] studied Effect of Sodium Hyaluronate on Recovery after Arthroscopic Knee Surgery There was a statistically significant difference in pain scores favoring the study group compared with the control group at 3 and 6 weeks postoperatively ($p < 0.05$), and a statistically significant difference in WOMAC scores favoring the study group compared with the control group at 3 and 6 weeks postoperatively ($p < 0.01$). Synovial fluid replacement with sodium hyaluronate following arthroscopic knee surgery conferred statistically significant improvements in pain and function scores compared with Bupivacaine in the short term (3–6 weeks).

In 2016 Filardo et al. [12] did a Randomized Controlled Trial to see the effect of Early Viscosupplementation After Arthroscopic Partial Meniscectomy. They concluded from their study that Early postoperative viscosupplementation did not provide

significant clinical benefits after arthroscopic meniscectomy. Despite the lack of major adverse events, the administration of a single HA injection at the end of the surgical procedure is not a successful strategy to provide either faster functional recovery or symptomatic improvement after meniscectomy.

In 2016 Di Marteno A et al. [13] did a Randomized Controlled Trial to see effect of Early Visco-supplementation After Anterior Cruciate Ligament Reconstruction. They concluded that no adverse events and had some positive findings in terms of active ROM recovery and transpatellar circumference reduction. However, the early postoperative application of visco-supplementation did not lead to significant improvement in clinical scores after ACL reconstruction.

Discussion

This review is not intended as a formal meta-analysis of the literature regarding visco-supplementation after arthroscopic surgery but rather is intended to report the relevant literature that has been published to date in this area. Visco-supplementation has become a major treatment available for the management of symptomatic OA of the knee. Expansion of its indications for use has occurred in countries throughout the world. However, experience documented in randomized, double-blind studies showing the efficacy and safety of the combination of arthroscopy and visco-supplementation has now been published.

Currently not much of studies have been done for visco-supplementation after

arthroscopy reconstruction procedure. Most of the studies done are of less follow-up time, Level 1 and there is no specific timing and number of visco-supplementation injection after arthroscopic procedure.

Current recommendation are for use of visco-supplementation for treating patients after arthroscopy procedure. If a patient has had an arthroscopic procedure for mechanical problems and is found to have Outerbridge grade I to III OA changes intraoperatively. We usually give 1 injection of visco-supplementation after 4–6 weeks of surgery. We do not recommend visco-supplementation after ACL reconstruction and meniscal repair in cases where there is no significant articular damage seen.

Conclusion

Current literature supports immediate use of visco-supplementation after arthroscopic procedure as it leads to decrease in pain in the initial phase, enables faster patient recovery and generates a faster return and better quality to the activities of daily living. It should be used in the cases of meniscectomy where there is persistent pain after surgery, in such cases visco-supplementation shows good results. The number of injection vary from 1–6 depending upon manufacturer recommendation.

However more studies are necessary to support the use of visco-supplementation beyond OA.

References

- Gergo Merkley, Jakob Ackermann, Chirstian Lattermann. Articular Cartilage Defects: Incidence, Diagnosis, and Natural History. Operative Techniques in Sports Medicine. 2018 Sep;26(3): 156–161..
- Stern R, Jedrzejak MJ. Hyaluronidases: their genomics, structures, and mechanisms of action. Chem Rev. 2006 Sep;106(3):818–839..
- Chen, Y., Peng, D., Sun, C.J., Wang, W.C., Li, J.Y., and Zhang, W. Clinical study on sodium hyaluronate intra-articular injection in treatment of degenerative osteoarthritis of knee. (in Chinese) Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2002 Jan;16:19–20..
- Mathies, B. Effects of Viscosial, a synovial fluid substitute, on recovery after arthroscopic partial meniscectomy and joint lavage. Knee Surg Sports Traumatol Arthrosc. 2006 Jan;14: 32–39..
- Hempfling, H. Intra-articular hyaluronic acid after knee arthroscopy: A two-year study. Knee Surg Sports Traumatol Arthrosc. 2007 May;15: 537–546..
- Ulucay, C., Altintas, F., Ugutmen, E., and Beksac, B. The use of arthroscopic debridement and viscosupplementation in knee osteoarthritis. Acta Orthop Traumatol Turc. 2007 Nov; 41: 337–342..
- Huang, M.H., Yang, R.C., and Chou, P.H. Preliminary effects of hyaluronic acid on early rehabilitation of patients with isolated anterior cruciate ligament reconstruction. Clin J Sport Med. 2007 July; 17: 242–250..
- Zietz, P.M. and Selesnick, H. The use of hylan G-F 20 after knee arthroscopy in an active patient population with knee osteoarthritis. Arthroscopy. 2008 April; 24:416–422..
- Huskin, J.P., Vandekerckhove, B., Delince, P. et al. Multicentre, prospective, open study to evaluate the safety and efficacy of hylan G-F 20 in knee osteoarthritis subjects presenting with pain following arthroscopic meniscectomy. Knee Surg Sports Traumatol Arthrosc. 2008 June;16:747–752..
- Arytonde Paula Pereira Junior A, Fasolin RP, Sossa FA, de Almeida Lira Neto O, Navarro MS, Milani A. Results evaluation of the use of intra-articular sodium hyaluronate in the post-operative knee arthroscopy. Rev Bras Ortop. 2014 Feb;49(1):37–43..

11. AnandS, Singiseti K, Srikanth KN, BamforthC, Asumu T, Buch K. Effect of Sodium Hyaluronate on Recovery after Arthroscopic Knee Surgery. J Knee Surg. 2016 Aug;29:502–509..

12. Filardo G, Di Matteo B, Tentoni F, Cavicchioli A, Di MartinoA, Lo Presti M, Iacono F, Kon E, Marcacci M. No Effects of Early Viscosupplementation After Arthroscopic Partial Meniscectomy: A Randomized Controlled Trial. Am J Sports Med. 2016

Dec;44(12):3119-3125..

13. Di Martino A, Tentoni F, Di Matteo B, Cavicchioli A, Lo Presti M, Filardo G, Zaffagnini S, Marcacci M, Kon E. Early Viscosupplementation After Anterior Cruciate Ligament Reconstruction: A Randomized Controlled Trial .Am J Sports Med. 2016 Oct;44(10):2572-2578.

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