Study in the sodium hyaluronate attenuating the functional recovery and thermal hyperalgesia by alterations the inflammation and collagen fiber in the osteoarthritis rats

Jin-Hee Han, In-Duk Oh, Myung-Soo Jang, Jun-Young Chung, Jae-Woo Yi

Department of Anesthesiology and Pain Medicine, Kyung Hee Medical Center,
Kyung Hee University College of Medicine, Seoul, Republic of Korea

Introduction

Osteoarthritis (OA) is a complex disease of the entire joint, affecting the cartilage, bone and synovial membranes. Inflammation of articular cavity is accompanied to pathological changes that have a critical impact on neuropathic pain and locomotion disorders. The sodium hyaluronate (SH) is similar to a substance that occurs naturally in the joint. It may work by acting as a lubricant and shock absorber in the joint, helping the knee to move smoothly, thereby lessening pain. However, current studies have limited information about mechanisms of this SH. Therefore, we investigated the effects of sodium hyaluronate on locomotor function, hyperalgesia degree, and expressions of inflammation and collagen fibers (type I and II) in the articular cavity following osteoarthritis rats.

Material & Methods

Animals & grouping

Male Sprague-Dawley rats (10 weeks, 250 ± 10 g)
N = 50 (n=10 in each group)

CON	OA	OA-10mg/ml SH	OA-15mg/ml SH	OA-20mg/ml SH
-----	----	---------------	---------------	---------------

Induction of osteoarthritis

OA induced rats received an intra-articular injection of monosodium iodoacetate (MIA; 3 mg/kg, volume: 60 ul) in right knee joint.

Fig. 1. Induction of OA

Experimental schedule

○ = Weight load test / Walking track analysis

Functional tests

Fig. 2. Weight load test

Fig. 3. Plantar test

Fig. 4. Walking track analysis

Data analysis

Hematoxylin & eosin (H&E) staining
Masson's trichrome (MT) staining
Immunohistochemistry of collagen fiber I and II
SPSS (ver. 21.0), One-way ANOVA, Duncan's Post-hoc

Results.1 Functional & Pain tests

Results.2 Histology & Collagen fiber I,II

Conclusion

These results showed that SH facilitates functional recovery and inhibits pain susceptibility by suppressing inflammation, and modulating collagen fibers in OA. We suggest that SH might be considered as a new therapeutic intervention for functional recovery and pain control in OA.