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THE ROLE OF HYALURON CHONDRO DRUG IN OSTEOARTHROSIS

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Abstract:

Osteoarthritis (OA) leads to significant pain and disability. For pain relief, a tailored approach using non-pharmacological and pharmacological therapies is recommended. If adequate symptom relief is not achieved with acetaminophen, other pharmacological options include non-steroidal anti-inflammatory drugs (NSAIDs), topical analgesics, intra-articular corticosteroids and intra-articular hyaluronic acid (HA) viscosupplementation. Most of these therapies generally do not improve functional ability or quality of life or are associated with tolerability concerns.

Keywords: Osteoarthritis, Knee, Disease-modifying, hyaluron chondro, pain

In OA patients, concentration and molecular weight (MW) of HA are reduced, diminishing elastoviscosity of the synovial fluid, joint lubrication and shock absorbancy, and possibly anti-inflammatory, analgesic and chondroprotective effects. In knee OA, viscosupplementation with 3–5 weekly intra-articular HA injections diminishes pain and improves disability, generally within 1 week and for up to 3–6 months and is well tolerated. HAs have comparable efficacy as NSAIDs, with less gastrointestinal adverse events, and compared with intra-articular corticosteroids, benefits last generally longer. High MW hylans provide comparable benefits versus HA, albeit with an increased risk of immunogenic adverse events. In mild-to-moderate hip OA, intra-articular injection of HA moderately improved pain and function, generally for up to 3 months with no serious adverse events. Efficacy in other joints is being evaluated. Viscosupplementation with intra-articular Sinovial® (other trade names: Yaral®, Intragel®) injections (an HA of low-medium MW) relieves pain and improves function in OA of the knee, and other joints including the carpometacarpal joint of the thumb and the shoulder. HA viscosupplementation, including use of Sinovial®, is a valuable treatment approach for OA patients, if other therapies are contraindicated or have failed.

The purpose of this article was to study the effect of hyaluronic acid (HA) on chondrocyte apoptosis in a rat osteoarthritis in vitro model (exposure to IL-1β) and explore its mechanism. A rat in vitro model of osteoarthritis (OA) was established using 10 ng/mL IL-1β as a modulating and chondrocyte apoptosis inducing agent. Different doses of HA (10, 20, and 40 μg/mL) were added 1 h prior to the addition of IL-1β to a monolayer culture of freshly isolated juvenile rat chondrocytes. The ratio of

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apoptotic cell death was surveyed by Annexin V-FITC and propidium iodide double-labeling FACS analysis. The mitochondrial membrane potential of chondrocytes was evaluated by rhodamine-123 fluorescence. The mitochondrial function was evaluated through detecting the ATP production by a luciferase assay. The reverse transcription polymerase chain reaction (RT-PCR) was performed to measure mRNA expression levels of inducible oxide synthase (iNOS). HA could inhibit IL-1β-induced chondrocyte apoptosis in our cell culture model system.

It was showed that addition of HA to the medium was able in a dose-dependent way to reduce the impairment of the mitochondrial membrane potential and to restore mitochondrial ATP production.

Objective. Although available nonsurgical pharmacotherapies for treatment of osteoarthritis (OA) are considered to be solely symptom-modifying agents, recent advances have been made in the search for agents that may modify disease progression. Intra-articular hyaluronan (HA) therapy is one symptom-modifying approach that has been found to be safe and effective for reducing pain due to OA of the knee. Presented here is a review of the evidence that HAs may also modify the rate of OA disease progression in addition to providing symptomatic efficacy.

Results. Evidence for disease-modifying activity of HAs stems from

1) the complex biochemical effects of HAs in the synovium and extracellular matrix of the articular cartilage, including interactions between exogenously administered HA and articular cartilage, subchondral bone, matrix proteoglycans, and collagens;

2) the effects of HA administration in animal models of OA, including total or partial meniscectomy and anterior cruciate ligament transectomy;

3) results of clinical trials using one HA, Hyalgan® (sodium hyaluronate, molecular weight 500–730 kDa) that evaluated structural outcomes, such as joint-space width, chondrocyte density and vitality, and arthroscopic evaluation of chondropathy.

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