Chapter 10
Intra-articular Hyaluronic Acid Therapy
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Historical Aspects

In 1936, Karl Meyer and associates, while working with patients with rheumatoid arthritis at Columbia University, New York, isolated and characterized the active part of the synovial fluid of the swollen joints. They named the polysaccharide thus isolated hyaluronic acid (HA). HA is a linear polysaccharide that is composed of repeating disaccharide units of glucoronic acid and N-acetylglucosamine.

In the 1940s HA was isolated in almost all animal species, and in the 1950s it was shown to be associated with a number of diseases, including rheumatoid arthritis, osteoarthritis, certain malignancies, and skin diseases. In the 1960s and 1970s, the function of HA and its place in clinical practice became better defined. HA was first used as a visco-elastic product in surgical procedures on eyes. Later on, a Japanese product for osteoarthritis of the knee joint was introduced, after which several such products entered the market.

In 1997, the Food and Drug Administration (FDA) approved HA visco-supplementation therapy for the treatment of osteoarthritis.

Definition

Intra-articular injections of HA involve injections of hyaluronate into the joint in an attempt to improve the elasticity and viscosity of the synovial fluid and thereby reduce pain. HA is used in a series of injections into the joint at weekly intervals for 3–5 weeks. Studies suggest that the beneficial effects may last from 12 to 26 weeks.

Rationale of the Procedure

HA plays a fundamental role in the synovial joints, where it is present in both the cartilage matrix and the synovial fluid. It is synthesized by chondrocytes in
the cartilage, and fibroblasts in the synovial lining. It plays a crucial role in determining the mechanical properties of articular cartilage. The high molecular weight and high concentration of HA in the joint provide a high visco-elastic solution that can act as a lubricant during slow movements, and as a shock absorber during rapid movements of the joints. Exogenous HA acts by its own presence, as well as by stimulation of endogenous HA production. Besides having mechanical benefits, HA has been found to be associated with a variety of anti-inflammatory effects in degenerative arthritis.

The synovial fluid from osteoarthritic joints has been found to have lower viscosity and elasticity than the synovial fluid of normal joints. This characteristic has led to the development of viscosupplementation therapy for degenerative arthropathy of the joints.

In a few available comparative studies with other products, HA appeared equivalent to methyl predisolone 40 mg (for 3 weeks) and to a single injection of triamcilonone 40 mg, as far as the pain-relieving effect was concerned. HA differs from other therapies in that it provides a sustained effect after treatment is discontinued [1-4].

Indications

Since the changes in hemophilic arthropathy are similar to those of degenerative arthropathy, one can safely use viscosupplementation therapy for hemophilic joints also. This therapy is useful for pain relief. However, it is not recommended as a first-line therapy for pain caused by degenerative arthropathy. An adequate trial with analgesics and physiotherapy should be done before opting for this therapy.

To sum up, viscosupplementation therapy is indicated only for moderate cases of degenerative arthropathy in patients who have failed to respond to non-invasive interventions and who have a reasonable degree of mobility.

Contraindications

- Inflammatory arthritis.
- Gross stiffness of the joint.
- Advanced hemophilic arthropathy (stage V of the Arnold and Hilgartner scale of hemophilic arthropathy).

Surgical Technique

Intra-articular injection of HA should be treated as a surgical procedure and not as one that can be performed in the doctor’s office. The utmost care should be taken as far as asepsis is concerned.