Hyaluronic Acid
A Review of its Pharmacology and Use as a Surgical Aid in Ophthalmology, and its Therapeutic Potential in Joint Disease and Wound Healing

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Hyaluronic acid is a naturally occurring polysaccharide with distinct physicochemical properties which underlie its application as a viscoelastic tool in ophthalmological surgery. In cataract surgery the role of hyaluronic acid in facilitating procedures and protecting the corneal endothelium is well established. Some benefit has also been gained with the use of hyaluronic acid in penetrating keratoplasty, trabeculectomy, retinal reattachment and trauma surgery, although its efficacy in these indications is less well-defined in the published literature.

In addition to its lubricating and cushioning properties, demonstration of some in vitro anti-inflammatory activity and a possible disease-modifying effect for hyaluronic acid in animals has prompted its investigation as a treatment in osteoarthritis and, to a much lesser extent, in rheumatoid arthritis. Hyaluronic acid 20mg, as weekly intra-articular injections for 3 to 7 weeks, improved knee pain and joint motion in patients with osteoarthritis. Although this occurred to a greater degree than with placebo in most comparisons, the effects of hyaluronic acid was similar to those of placebo in the largest trial. In the few available comparisons with other agents, hyaluronic acid appeared equivalent to methylprednisolone 40mg (for 3 weeks) and to a single injection of triamcinolone 40mg. Hyaluronic acid was distinguished from other therapies by providing a sustained effect after treatment discontinuation. Together with its very good tolerability profile, these properties justify further study of hyaluronic acid in patients with osteoarthritis.

Some limited evidence of improvement in patients with rheumatoid arthritis, and a possible healing effect of hyaluronic acid on tympanic membrane perforations, represent additional areas of interest for future investigation.

In summary, hyaluronic acid is a well-established adjunct to cataract surgery and may prove to be a promising option in the treatment of patients with osteoarthritis. Its very good tolerability provides further impetus for examination of its potential role in an extended scope of arthritic and ophthalmological indications, and in wound healing.

Physical and Pharmacodynamic Properties, and Rationale for Clinical Use

Hyaluronic acid is a naturally occurring glycosaminoglycan which, by virtue of its viscosity, elasticity and other rheological properties, acts as a lubricating and shock absorbing fluid in joints and as an ocular lubricant. The compound also exerts some mediatory effects on cellular activity (see below). Hyaluronic acid is available in formulations of various molecular weight and concentration.

The physicochemical properties of high molecular weight hyaluronic acid provide the rationale for its use as an adjunct in ophthalmic surgery, in preventing collapse of the anterior chamber and facilitating manipulation of ocular tissues. Additionally, in animal models of cataract surgery in