VIEWS | COLUMN

Nutraceuticals and Osteoarthritis

There is some evidence for benefits of antioxidant supplements in pain relief and function in knee OA. These supplements with the most evidence include curcumin, avocado-soya bean unsaponifiables, Boswellia and several preparations used in Ayurvedic and C

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There is some evidence for benefits of antioxidant supplements in pain relief and function in knee OA. These supplements with the most evidence include curcumin, avocado-soya bean unsaponifiables, Boswellia and several preparations used in Ayurvedic and Chinese medicine. These should be tested further and used, at least, to decrease the use of NSAIDs which have more adverse effects.

Arthritis may have originated before man itself since it also afflicts other primates. The disease causes disability due to pain and inflammation in joints. There are many different types of arthritis of which rheumatoid arthritis and osteoarthritis (OA) are the most common. Rheumatoid arthritis is an autoimmune disease that affects mainly small joints such as those in the fingers of the hand. OA affects large joints such as hips and knees and also those in the hands.

OA is a leading cause of disability with an unknown cause or cure. Several pharmacological agents have been used for management of OA. Temporary pain relief and hence improvement in function may be obtained with analgesics but this is not specific to OA. NSAIDs are used orally and topically because they have some anti-inflammatory and analgesic effects. They are also strongly recommended by AAOS. However, they may have severe adverse effects upon prolonged use.

These issues have been discussed in recent reviews and will not be retraced here. There are several commercial preparations such Instaflex, Sierrasil, hyaluronic acid and Aquamin of limited proven usefulness. However, the combination of glucosamine and chondroitin sulfate is the most promising. This treatment may be efficacious for pain relief, functional improvement

and also result in less joint space narrowing. Herbs have been used for such treatment since ancient times in Indian medicine (Ayurvedic) and Chinese medicine. Most of these herbs have antioxidant properties: they contain compounds or chemicals that can modulate oxidative metabolism which is altered during OA.

Many in vitro studies are available in this area. However, the human body is more complex than the cells cultured in defined growth media. Oxidative stress may play a role in several diseases but the benefits of different antioxidant supplements may be unique to each one. We recently reviewed the literature on the benefits of antioxidants in vision health and in obesity-diabetes II. In vision health, the antioxidant supplements containing vitamin C, vitamin E, lutein, zeaxanthin, zinc and copper have a reasonable probability of retarding age related macular degeneration but the benefits in other eye diseases are questionable. In obesity and diabetes 2, there are marginal benefits of supplementation with zinc, lipoic acid, carnitine, cinnamon, green tea, and possibly vitamin C plus E. Some of the antioxidants are beneficial for obesity and others are better for glucose level regulation.

ANTIOXIDANT SUPPLEMENTS AND OA

The role of ROS in the pathophysiology of knee OA provides for the rationale that suppressing the ROS levels with the appropriate antioxidant supplements may retard the progress of the disease. What remain to be discussed are the reality of the observations on the effects of such supplements on prevention and/ or management of OA. The effects of food intake and various vitamins and related compounds on OA has been examined and reviewed. One concludes that nutritional habits involving fruits, fruit juices and vitamin supplements may be beneficial in the long run but they may not help once OA has already been initiated. Several antioxidant supplements derived from turmeric, avocado, Boswellia and other herbs will be discussed.

TURMERIC

Curcumin, a compound with antioxidant properties, was isolated from turmeric about 200 years ago. The properties of curcumin and its potential role in the therapy of several chronic diseases including arthritis, cancer and neuronal disorders have been explored. The rationale for its use in OA comes from several in vitro studies. Curcumin inhibited the matrix degradation of articular explants and chondrocytes . It decreased the production of MMP-3, −9 and −13 via c-Jun-N-terminal kinases, nuclear factor kappa-beta (NFκβ), and the JAK/ STAT pathways. It also restored type II collagen and glycosaminoglycan synthesis.

AVOCADO-SOYA EXTRACT

Avocado and soybean oils are used for manufacturing soap and the unsaponifiable fraction from these oils is termed avocado/soybean unsaponifiable (ASU). ASU has been tested in the management of OA.

BOSWELLIA

Resins from trees of Boswellia serrata, and other species of this genus, have been used for arthritis and other diseases in Ayurvedic medicine since ancient times in India where it is termed shallaki or salai. Boswellia resins contain several different boswellic acids such as betaboswellic acid, keto-betaboswellic acid, and acetyl-ketobeta boswellic acid (AKBA). AKBA is an inhibitor of the lipoxygenase pathway and is suggested to have antiinflammatory properties.

AYURVEDIC AND CHINESE MEDICINES

Several herbal products containing antioxidants are used in Ayurvedic medicine. For example, roots of Withania somniferum are used to prepare ashwagandha. It contains withanaloids, most importantly withaferin A. Tinospora cordifolia (Guduchi) is considered a divine herb and it contains diterpenoids termed tinosporides. Emblica officinalis (or Phyllanthus emblica) is termed amla or amlaki and is rich in vitamin C and emblicanins A and B. Zingiber officinale (Ginger) root is not only used extensively in cooking but also has several medicinal antioxidants. The analysis of volatile oils of fresh and dried ginger showed camphene, p-cineole, α-terpineol, zingiberene and pentadecanoic acid as major components.

RECOMMENDATIONS

This review shows that there is some evidence for benefits of antioxidant supplements in pain relief and function in knee OA. These supplements with the most evidence include curcumin, avocado-soya bean unsaponifiables, Boswellia and several preparations used in Ayurvedic and Chinese medicine. These should be tested further and used, at least, to decrease the use of NSAIDs which have more adverse effects. Ancient medicine should be tested as such rather than proprietary products made from them. It should be assessed whether diet with turmeric and black pepper results in sufficient levels of serum curcumin. Promotion of dietary habits may be more economical and of longer term benefit than the development of products made from extracts used in ancient medicine.

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