The Unresolved Problem of Treating Articular Cartilage Lesions

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It is well known that lesions in the articular cartilage fail to spontaneously heal. Partial thickness or full thickness articular lesions are very common. They may be secondary to trauma with osteochondral or chondral fractures, bone osteonecrosis that causes destruction of the cartilage above it, and osteoarthritis (a degeneration of articular cartilage) that might be primary or secondary. Defects in the joint cartilage, predominantly in weight-bearing joints, will cause secondary osteoarthritis with a clinical presentation of pain, stiffness and disability.

Dr. Robinson and his group [1] describe their experience with autologous chondrocyte transplantation for the reconstruction of isolated articular joint defects in a relatively small group and with a short follow-up. At present, this technique is the most up to date in preventing deterioration of damaged joints by cartilage repair.

Although the effect of this technique on the progression of joint cartilage damage to osteoarthritis should be confirmed in long-term studies, the early results are encouraging. Biopsies have shown that within 12 months, chondrocyte transplantation produces cartilage tissue with a major component resembling normal hyalin cartilage [2]. Cartilage transplantation is the only clinical method used by orthopedic surgeons who have succeeded in producing hyalin but not fibrocartilage, which is mechanically inferior. Many other methods are being implemented to prevent osteoarthritis secondary to cartilage damage, the most popular being osteotomy around the joint when malalignment of the joint is present [3,4]. This method has been extremely successful, especially when there is minimal damage to the articular cartilage. The realignment of the joint will prevent further pressure on the overload part of the joint and arrest degeneration of the cartilage. It is essential that this operation be performed even when clinical symptoms are minimal. Ilizarov studies have shown us another way to prevent articular cartilage degeneration through the use of joint distraction, which temporarily decreases joint contact pressure and may enhance some cartilage repair [5].

There is also clinical experience, albeit limited, with the use of autologus periosteum or perichondrium implantation to replace local lesions and form new cartilage [6,7]. Notable also is the application of growth factors to stimulate cartilage formation in osteochondral defects [8] with or without the implementation of artificial matrices [9].

An alternative method to repair the damaged joint after cartilage destruction is transplantation of the osteochondral autograft harvested from the non-weight-bearing area of the joint, such as the lateral sides of the femoral condyle of the knee, into the defect of the weight-bearing zone [10]. Use of this method is very limited however since it is suitable for relatively small defects only. Neither is there evidence that the autograft integrates into the surrounding area or that it will prevent osteoarthritis.

Another route is to use osteochondral allograft where we can match the size of the affected area with cadaver donor grafts. This method was popularized by Gross [11] in Toronto and was used specifically for post-traumatic cases of the knee. He presented good long-term clinical results.

Other methods applied by orthopedic surgeons are debridement of the damaged articular cartilage until the subchondral bone, using drilling abrasion or microfracture techniques. Although these arthroscopic methods will produce only fibrocartilage in the affected area, the clinical results may be sound for many years [12–14]. It is crucial that all the above mentioned methods be combined with osteotomy of the joint if there is a malalignment.

Clinical use of autologus chondrocyte transplantation is becoming increasingly popular in Sweden, where it was first used [15], as well as in Germany and the USA. Research was initiated at the Hospital for Joint Diseases in New York and further developed at the University of Gothenburg and Sahlgrenska University Hospital in Sweden.

The Genzyme Patient Registry [16] (Genzyme being the company that first developed the technique) includes 3 year patient outcomes for patients treated outside of Sweden, in 583 sites including Israel. The overall data indicate that the procedure is safe and effective. There is an overall improvement of approximately 74% in the clinical evaluation (pain and effusion) and a 77% overall

improvement in the patient evaluation. Most of the clinical experience deals with the knee. The average cost of the procedure in the USA is $26,0000. Robinson and his team [1] are probably correct in believing that the cost will be considerably less in Israel.

The future of cartilage repair probably lies in gene therapy, which promises much for improving treatment of conditions affecting the muscoloskeletal system. Candidate genes for cartilage repair are gene-controlling growth factors, which enhance the repair by stimulating condrocyte proliferation and matrix production. Another method could be the insertion of genes that would inhibit the degeneration process in the joint [17,18]. The first orthopedic clinical application of gene therapy was the transfer of anti-arthritic genes to patients with rheumatoid arthritis. Beginning with one patient in 1996, another nine patients have completed the treatment protocol with encouraging results [19]. The road to massive clinical use, however, is still hard and long.

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Capsule

HIV vertical transmission

North American and European studies of at least 100 mother-child pairs were included in a meta-analysis to evaluate the relation between elective cesarean section and vertical transmission of HIV-1. The primary analysis included data on 8,533 mother-child pairs. After adjustment for receipt of antiretroviral therapy, maternal stage of disease, and infant birth weight, the likelihood of HIV-1 vertical transmission was decreased by approximately 50% with elective cesarean section compared with other modes of delivery, and by approximately 87% with both elective cesarean section and receipt of anti-retroviral therapy during the prenatal, intrapartum and neonatal periods compared with other modes of delivery and the absence of therapy.

Among mother-child pairs receiving antiretroviral therapy during the prenatal, intrapartum, and neonatal periods, rates of vertical transmission were 2.0% among the 196 mothers who underwent elective cesarean section and 7.3% among the 1,255 mothers with other modes of delivery. The results of this meta-analysis suggest that elective cesarean section reduces the risk of HIV-1 transmission from mother to child independently of the effects of treatment with zidovudine.

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