Bölüm
10

KIKIRDAK DOKU MÜHENDİSLİĞİ VE YENİ TEKNİKLER

Altuğ YÜCEKUL[1]

GİRİŞ

Eklem kıkırdağının rejenerasyonu, kıkırdak biçimlenmesini başlatan faktörlerin, kıkırdağın olgunlaşmasında ve iyileşmesindeki bilinmeyenler nedeniyle, tam olarak aydınlatılamamıştır. Avasküler yapısı, seyrek hücre nüfusu içermesi, kondrositlerin düşük mitotik aktivitesi (1) gibi sebeplerden, yaralanma, hastalık veya aşınma nedeniyle hasar gören eklem kıkırdağının çok kısıtlı bir iyileşme potansiyeli bulunmaktadır. Tedavi edilmemiş bir veya birden fazla kıkırdak hasarı varlığında, lezyonların derin laserasyonlar yarattığı ve kendiliğinden iyileşme potansiyelinin olmadığı gösterilmiştir (2). Bu nedenlerle kıkırdak rejenerasyonu, günümüz tıbbında en zorlayıcı konulardan birini oluşturmaktadır.

Sağlıklı eklem kıkırdağı; su, kıkırdağın kompresif kuvvetini sağlayan proteoglikanlar ve tensil kuvvetini sağlayan tip 2 kollajenleri içeren hyalin kıkırdağı üretebilen, kolumnar büyüme modeline sahip kondrositler ile karakterizedir. Tam kat olmnayan kıkırdak defektlerinin derinlikleri, subkondral kemiğe ulaşamadığında, inflamatuar cevap oluşturmamakta, iyileşme görülmemekte ve vaskülerite de olmadığı için defekt zamanla büyümektedir. Tam kat eklem defektlerinin iyileşme ve restorasyonunu gösteren çalışmalarda ise, iyileşme dokusunun, makromoleküler ve biyomekanik karakterlerinin eksik olduğu, sürecin ilk olarak fibrin tıkaç ile başladığı (3), andiferansiye mezenkimal kök hücrelerin migrasyonu ve diferansiasyonu için yüzeyin yüklerden korunması gerektiği (4) ve bütün süreçlerin, eklem yüzeyinde, tip 2 yerine tip 1 kollajenden zengin fibrokartilaj doku oluşumuyla neticelendiği gösterilmiştir (5). Günümüzde uygulanan tedavi ile hedeflenen ise eklem kıkırdağının tam yük taşıma kapasitesine geri döndürebilecek, defektin çevresindeki kıkırdak dokular ile birleşecek, tip 2 kollajen ve çeşitli pro-

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gelişim göstermektedir. Osteokondral oto-allogreft transferinden, otolog ve allo kondrosit implantasyonuna genişleyen yelpazede sitokin, kök hücre ve doku mühendisliği yapıları kullanılarak gerçekleştirilen rejeneratif yaklaşımların endikasyonları ve birbirine üstünlüklerini gösteren yönleri bilinmemektedir (58). Kıkırdak doku mühendisliği konusunda daha ileri ve kapsamlı çalışmalara ihtiyaç bulunmaktadır. Literatürdeki çalışmaların çoğu preklinik araştırmalar olup, kıkırdağın biyolojik tamirinin klinik olarak uygulanabilir hale gelebilmesi için, en iyi hücre kaynağı, en iyi toplama yöntemi, en etkin doz, uygun endikasyonlar gibi soruların randomize kontrollü çalışmalar ile aydınlatılması gerekmektedir.

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