Bölüm 1

3 BOYUTLU YAZICILARIN KARACİĞER CERRAHİSİNDE VE DOKU MÜHENDİSLİĞİNDE KULLANIMI

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GİRİŞ

Karaciğer hastalıkları nedeniyle her yıl dünya genelinde yaklaşık iki milyon insan hayatını kaybetmektedir. Bu ölümlerin yarısı siroz komplikasyonlarından; kalan yarısı ise viral hepatitler ve hepatoselüler karsinomdan kaynaklanmaktadır. Siroz ve karaciğer kanseri nedeniyle gerçekleşen ölümlerin sayısı, tüm ölümlerin %3,5' ine denk gelmektedir. (1) Akut ve kronik karaciğer yetmezliğinde definitif tedavi yöntemi karaciğer naklidir. Karaciğerin ve safra yollarının primer benign ya da malign tümörleri, karaciğerin kistik hastalıkları ile karaciğer metastazları ise hepatik rezeksiyon endikasyonları arasında sayılabilir (2).

Son yıllarda bir takım öncül çalışmada, karaciğer hastalıklarının cerrahi tedavisinde 3D (üç boyutlu) yazıcıların kullanımının geleneksel tedavi yöntemlerine katkılar sağladığına dair kanıtlar sunulmuştur (3,4,5). Bir takım çalışmalar ise karaciğer doku üretimi üzerine odaklanmıştır. 3D yazıcılardan karaciğer cerrahisinde ve doku mühendisliği uygulamalarında yararlanmayı hedefleyen bu çalışmalar özünde iki ana gruba ayrılabilir: (6)

1) Hücrelerin yer almadığı 3D uygulamalar
2) Karaciğer hücrelerinin yer aldığı 3D biyobasım uygulamaları

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lit ettiği için ilaç araştırmalarında yararlı bulunmuştur (47,49). Özellikle hayvan modelleriyle toksisitesi değerlendirilemeyen ilaçların, insan hepatositleri barındıran hepatosit iskeleleri taşıyan farelerde denenmesi yoluyla potansiyel klinik riskler ve hepatotoksisitenin tahmin edilebilmesi mümkündür (50,51).

SONUÇ

3D baskıyla oluşturulmuş modellerin karaciğer hastalıklarının tedavisinde değişik amaçlarla kullanım şekillerine ilişkin literatür özetlenmiştir. Üç boyutlu yaklaşım; cerrahi ekiplere karaciğer cerrahisinin preoperatif aşamasında optimal cerrahi planlamayı yapma fırsatı sunmuştur. Hastalarda, cerrahi süresi kısalmış ve komplikasyon oranları düşmüştür. Bu modellerle medikal eğitimin değişik aşamasındaki öğrenciler, karaciğer anatomisini daha kolay bir şekilde öğrenebilmiştir. 3D biyoyazıcılarla oluşturulmuş iskele modelleri, doku mühendisliği uygulamalarına ciddi katkılar sunmuş ve bir gün yapay karaciğer üretimini sağlayarak donör yetersizliği kaynaklı ölümlere son vermeyi amaç edinmiş çabalara ön ayak olmuştur.

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