

BÖLÜM 19

Radyasyona Spesifik Organ Sistem Yanıtları, Normal Doku Genel Tepkileri



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GİRİŞ

Tüm dünyada kanser tedavisinin en önemli basamaklarından biri olan radyoterapi, yüksek doz iyonizan radyasyonun kullanıldığı bir tedavi şeklidir. Radyoterapi uygulaması bilindiği üzere tümörlü dokuya maksimum radyasyon dozunu uygulamayı hedeflerken, tümör çevresinde ki normal dokuların bu radyasyon dozundan maksimum korunabilmesi esasına dayanır. Bu nedenle iyonizan radyasyonun normal doku üzerine etkilerini bilmek, tedavi dozu, fraksiyon şeması ve akut, subakut ya da geç dönem yan etki yönetimi açısından önemlidir. Bu bölümde iyonizan radyasyona bağlı spesifik organ yanıtlarını incelemek ve moleküler düzeyde radyasyonun etkilerini irdeleyerek Radyasyon Onkolojisi bilim dalının günlük pratiğine katkı sağlama

amaç edinilmiştir. Yüksek doz radyasyon uygulaması sonrası, normal doku hasarının klasik olarak parankimal veya vasküler endotelial hücrelerin tükenmesinden kaynaklandığı düşünülmese rağmen, doku hasarı sorumlusunun birincil hedeflerin parankimal mi yoksa endotelial progenitor hücreler mi olduğu net değildir (1). Ancak endotelial hücre kaybının bu patogeneizde önemli bir rol oynadığını söylemek mümkündür (2).

Radyasyona bağlı doku hasarı vasküler endotelial hücre, doku ve progenitor hücre ölümüyle başlar. Bu da ikincil reaktif süreçlerin gelişmesi ile ilerler ve çok daha fazla hücre kaybı, doku hasarı, fibrozis, nekroz ve fonksiyonel defisit oluşumu ile sonuçlanır (Şekil 1). Meydana gelen bu değişiklikler ise radyasyon doku hasarının tespit edilebilen ve görülebilen en önemli göstergeleridir.

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jik hasarın ciddiyetinin kaptopril tedavisi ile azaltılabileceğini göstermiştir. En önemlisi, ACE inhibitörlerinin böbrek hasarının tedavisinde koruyucu etkisi, tedavi sürekli olmadığında veya ACE inhibitörlerinin hemodinamik olmayan dozlarda kullanıldığında bile korunmuştur (83). Günümüzde insanlarda kullanılan bir lipofilik ACE inhibitörü olan ramipril kullanımının geç gecikmiş beyin hasarına karşı nöroproteksiyon sağladığı gösterilmiştir (84). Radyasyona maruz kaldıktan haftalar sonra (yüksek tek doz radyasyondan sonra 2 haftaya kadar) ramipril uygulandığında bile fonksiyonel ve histopatolojik korumanın gözlemlendiğini belirtmek önemlidir (85).

SONUÇ

Radyoterapi kanser tedavisinin en önemli tedavi seçeneklerinden biridir. Bir radyasyon onkoloğu tümör hücresine yüksek doz reçete ederek maksimum etkinlik sağlamayı hedefler. Hiçkuşkusuz tümör komşuluğundaki normal dokularda bu reçete edilen iyonizan radyasyondan etkilenir. Bu durum klinik pratiklerimizde gördüğümüz yan etki ve semptomlara neden olur. Bu nedenle iyonizan radyasyonun hücrel ve moleküler düzeyde incelenmesi büyük önem taşır.

AKILDA TUTULACAKLAR

- Doku ve organlar radyasyona maruz kaldıktan kısa bir süre sonra, bir dizi sitokin ve kemokin başlatılır.
- ROS geçici olarak moleküler oksijenden daha reaktif bir durumdadır.
- Aşırı ROS üretimi fibroz ve hatta neoplastik dönüşüm dahil olmak üzere ciddi doku hasarına yol açabilir
- Derideki radyasyon hasarı, artık farklılaşmış fonksiyonel hücrelerin yerini alamayan ve homeostaz kaybına neden olan doku kök hücrelerinin azalmış işleyişinden dolayıdır.
- Endotelial apoptozun aracılık ettiği yaralanma olan mikrovasküler hasar, GI hasarın akut fazının gelişiminde önemli ve erken bir rol oynar.

- Akciğerdeki radyasyona bağlı doku hasarında miyofibroblast, aktive edildiğinde fibroze aracılık eden anahtar bir hücredir.
- Spermatogenez çok radyosensitiftir. 0.1 Gy de geçici, 5-8 Gy de ise kalıcı kısırlık gelişir.
- Radyasyon mesane ürotelyal hücrelerin bozulmasına, bu da idrar plazma bariyerinin bozulmasına neden olur.
- Sinusoidal endotelial hücre apoptozu, radyasyona bağlı karaciğer hasarında birincil olay olarak kabul edilir.

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