

## Kritik Travma Hastasında Ekstrakorporeal Tedavi Yöntemlerinin Yönetimi

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Travma, her 10 ölümün birinden sorumlu olup, 44 yaş altı hastalarda en sık ölüm nedenidir (1). Dünya Sağlık Örgütü, travmanın dünya çapında yılda 5,1 milyon ölüme neden olduğunu tahmin etmektedir (2). Travmaya bağlı ölümlerin çoğu yaralanmadan hemen sonra, kan kaybı veya merkezi sinir sistemi hasarı sonucu meydana gelse de çoklu organ yetmezliği, travma hastalarında morbidite ve mortaliteyi önemli ölçüde artıran geç dönem komplikasyonlarından biridir (3). Travma tanılı hastalarda ekstrakorporeal kan saflaştırma tedavisi, organ yetmezliği olan hastalarda yapay destek amaçlı veya sepsis ve diğer kritik hastalıklara sebep olan humoral mediyatörlerin eliminasyonu endikasyonu ile kullanılmaktadır.

Travma tanılı kritik hastalarda, organ yetmezliği için yapay destek olarak çeşitli ekstrakorporeal kan saflaştırma yöntemleri uygulanır. Son yirmi yılda, teknolojik gelişmelerle birlikte ekstrakorporeal organ deste-

ği ve kan saflaştırma teknikleri giderek daha fazla kullanılmaya başlanmıştır. Akut böbrek hasarının (ABH) tedavisi için sürekli renal replasman tedavisi (CRRT), ve akciğer destek amaçlı veno-arteriyel ekstrakorporeal membran oksijenasyonu (ECMO) birçok travma merkezinde yaygın olarak kullanılmaktadır, ayrıca CRRT çeşitli kritik hastalıklara neden olan birçok humoral mediyatörlerin eliminasyonu için ABH olmaksızın uygulanabilmektedir (4).

### Travmada Akut Böbrek Yetmezliği

ABH, travma hastalarında organ yetmezliğinin yaygın bir nedenidir. Travma sonucu oluşan ABH, her 10 travma hastasından birinde ve yoğun bakım ihtiyacı olan hastaların dörtte birinde meydana gelir ve böbrek fonksiyonunda ani bir bozulma ile karakterize bir dizi

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sendrom (HRS) geliştiği bilinmektedir (97). HRS yakın zamanda bozulmuş böbrek fonksiyonu, kardiyovasküler fonksiyonda belirgin değişiklikler ve sempatik sinir sistemi ve renin-anjiyotensin hiperaktivitesi ile karakterize siroz, asit ve karaciğer yetmezliği olan hastalarda ortaya çıkan geri dönüşümlü bir sendrom olarak tanımlanır. Şiddetli renal vazokonstriksiyon, glomerüler filtrasyon hızında azalmaya yol açar. Karaciğer veya kombine karaciğer-böbrek ekstrakorporeal tedavilerinin etkinliği tam olarak bilinmemekle birlikte yapılan çalışmalar CVVH'nin karaciğer nakli yapılmış hastalarda olumlu sonuçlar sağladığı ancak kronik karaciğer fonksiyon bozukluğu olan hastalarda kreatinin, laktat değerlerinde anlamlı değişiklik sağlamadığı ve mortalite üzerinde olumlu etkisi olmadığını göstermektedir (98). Karaciğer ekstrakorporeal tedavi sırasında, pıhtılaşma faktörlerinin dikkatli takibi ve düşük doz heparin kullanımı ve sitratlı hemodiyalizden kaçınılması gerekmektedir. Travma veya sepsis sonucu gelişen akut karaciğer yetmezliği tanılı hastalarda yüksek hacimli plazma değişiminin (üç gün boyunca, günlük 1-2L ila 8-10L) standart tıbbi tedavi ile karşılaştırıldığında hastanede yatış süresi ve mortaliteyi azalttığı gösterilmiştir (99). Ayrıca bu hastalarda yüksek hacimli plazma değişiminin bilirubin, amonyak, alanin aminotransferaz (ALT) ve INR düzeylerini önemli ölçüde düşürdüğü, ABH oluşumu ve RRT ihtiyacını azalttığı izlenmiştir (100).

Karaciğer ekstrakorporeal tedavi yöntemlerinin, akut karaciğer yetmezliği veya karaciğer transplantasyon hazırlığı süresi boyunca karaciğer fonksiyonunu etkin bir şekilde koruyabildiği bilinmektedir (100). Karaciğere spesifik ekstrakorporeal tedavi yöntemleri arasında albümin diyalizi (MARS), fraksiyone plazma ayırma ve adsorpsiyonu (Prometheus), plazmayı ayırıp insan veya hayvan hepatositleri ile doldurulmuş biyoreaktörlerin

perfüzyonu ile kombine eden sistemler (ekstrakorporeal karaciğer destek cihazı, Vital therapies) sayılabilir. MARS ve Prometheus birçok klinikte kullanılmaktadır ve büyük vaka serilerinde ve randomize çalışmalarda denenmişlerdir: Her ikisinin de akut karaciğer yetmezliği ve kronik karaciğer yetmezliği üzerine gelişen akut karaciğer yetmezliğinde mortalite üzerinde olumlu etkileri olmadığı gösterilmiştir (100). Bununla birlikte, karaciğer travmalarında iyileşme sürecinde veya transplantasyona kadar olan sürede alternatif tedavi olarak kullanılabilirler.

## Ekstrakorporeal Tedavide Gelecek

Yeni ekstrakorporeal tedaviler ve kan saflaştırma teknikleri, günümüzde klasik böbrek destek endikasyonlarının ötesinde çoklu organ desteği sağlamak amacıyla tasarlanmıştır. Entegre cihazlar (yeni CRRT makineleri) sayesinde çeşitli teknikler uygulanabilmekte ve eş zamanlı çoklu organ desteği sağlanabilmektedir. Yeni makineler, hasta ihtiyaçlarına ve çoklu organ yetmezliğinin şiddetine bağlı olarak böbrek, kalp, karaciğer ve akciğer fonksiyonlarının desteğiyle birlikte kullanılabilen çok sayıda özellik ve farklı devreler ve filtreler içerir.

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