KARBONMONOKSİT ZEHİRLENMESİ PATOFİZYOLOJİSİ

Taylan ZAMAN [2]

Giriş

Karbonmonoksit (CO) zehirlenmesinin patofizyolojisi karmaşık, birbiri içine geçmiş kompleks mekanizmalar içermektedir. CO'nun hemoglobine bağlanması ile başlayan hipoksik süreç, hemoglobinden bağımsız olarak da hücre içi farklı mekanizmalar ile devam eder.

Karbonmonoksit Etki Mekanizmaları

CO kandaki hemoglobine (Hb) yüksek afinite ile bağlanır ve karboksihemoglobin (COHb) oluşturur. 10 ppm kadar düşük oranlarda CO'ya maruz kalmak, yaklaşık % 2 COHb seviyelerine yol açabilir [(1)]. Dünya Sağlık Örgütü, dakikada 6 ppm'den yüksek seviyelerin potansiyel olarak toksik olduğunu ileri sürmektedir [(2)]. Sigara içmeyenlerde % 2 veya daha fazla, sigara içenlerde % 10 veya daha fazla COHb seviyeleri anormal kabul edilir ve zehirlenme bulguları görülebilir [(2, 3)].

İnsan vücudunda bulunan CO, fizyolojik miktarlarda bir nörotransmitter olarak işlev görür [(4)]. Düşük seviyelerdeki karbonmonoksit, inflamasyonu modüle eder[(5)], apoptoz[(6)], hücre proliferasyonu[(7)] ve mitokondriyal biyogenezi up-regüle eder[(8)]. Karbonmonoksit maruziyeti arttıkça zehirlenme ortaya çıkar[(5)].

CO, vücutta demir atomu içeren proteinlere bağlanmaya meyillidir. COHb oluşturarak, hemoglobinde konformasyon değişiklikleri yapar ve hemoglobin disosiasyon eğrisini sola kaydırır [(9)]. Bunun sonucunda kanın oksijen taşıma kapasitesi azalır ve periferik dokulara oksijen salınımı azalır. CO'nun hemoglobine olan afinitesi oksijene göre 200 kattan daha fazladır [(10)]. Bu nedenle, CO seviyesindeki küçük artışlar bile zehirlenmeye neden olabilir (Haldane etkisi). Doku içinde CO ayrıca iskelet ve miyokardiyal miyoglobin gibi hem içeren diğer proteinlere de bağlanır. Doku ve kandaki eliminasyon süreleri farklı olduğundan[(11, 13)], doku hasarı da gecikmeli olarak gelişebilir.

[2] Uzman Doktor, SBÜ Gülhane Eğitim ve Araştırma Hastanesi, Sualtı Hekimliği ve Hiperbarik Tıp Kliniği, taylanzaman@gmail.com

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