

KARBON MONOKSİT, ÇAKMAK GAZI VE DİĞER İNHALER GAZ ZEHİRLENMELERİ

Fatma Nihal ÖZMEN¹

Karbon Monoksit Zehirlenmeleri

Karbonmonoksit (CO) zehirli bir gazdır . Gazın renksiz ve kokusuz olması zehirlenmeleri farketmeyi zorlaştırmakta ve böylece kazayla ya da intihar amaçlı zehirlenmeye neden olmaktadır.Zehirlenmelerin yaklaşık %63'ü soba, %30'sofben, %7'si doğalgaz nedeniyle olur.(1)

En çok rastlanan CO kaynakları şunlardır:

- ◆ Sobaldan sızan gazlar
- ◆ Bacasız ısıtıcılar (Gazlı Japon sobaları, LPG tüplü ısıtıcılar).
- ◆ Doğalgaz / LPG'li şofben ve kombilerden sızmalar
- ◆ Otomobil egzoz gazları
- ◆ Sigara dumani
- ◆ Jeneratörler (1)

Patoloji

Karboksihemoglobinemi (COHb) derecesi, ortamdaki nispi CO ve oksijen miktarlarının, maruz kalma süresinin ve dakika ventilasyonunun bir sonucudur. CO, hemoglobine afinitesi Ph:07.45 te oksijene göre 220 kat daha fazladır. Bu sebeple COHb'e bağlanarak molekülün oksijen taşıma kapasitesini etkiler. COHb'in oksijen taşımاسını 2 yolla etkiler .Birincisi CO, oksijenin hemoglobine bağlanması kompetitif olarak inhibe eder. Oksijen transportunu ve dokulara

¹ Uzm. Dr. Fatma Nihal ÖZMEN, Iğdır Devlet Hastanesi, Acil Tıp Bölümü
nihalyol@hotmail.com

İnhalasyonla maruziyet sırasında hasta ortamdan uzaklaştırılıp, solunum açısından değerlendirilmeli . Hava yolu güvenliği sağlanamazsa mekanik ventilasyon desteği düşünülmeli. Özellikle aspirasyon pnömonisi ve merkezi sinir sistemi baskılanması olasılığı dikkate alınmalıdır.Literatürde ARDS gelişen hasta surfaktan uygulaması, takipne ve solunum sıkıntısı olan hastalara budezonid ve nitrik oksid tedavisi ile olumlu sonuçlar gösteren raporlar mevcuttur(66).

Cilt ve göz kontaminasyonu da inhalasyonla zehirlenmelerde göz ardı edilmemelidir. Hastanın üstünden değişik şekerli bir koku gelebilir.Kontamine kiyafetler çıkarıp değiştirilip,cilt sabun ve su ile yıkanır. Göze temas halinde en az 15 dakika göz yıkanır ve gözde batma,yanma,ağrı,şişme,bulanık görme gelişirse bir göz hastalıkları uzmanından görüş alınabilir(37).

KAYNAKLAR

1. Şençan İ.T.C Sağlı Bakanlığı Türkiye Halk Sağlığı Kurumu Türkiye Karbonmonoksit Zehirlenmelerinin Önlenmesi Programı ve Eylem Planı,Ankara 2015-2018;1:51-52.
2. Piantodosi CA.Carbon monoxide poisoning:Undersea Hyperbaric Med 31:167-77,2004.
3. Weaver LK.Carbonmonoxide Poisonong N Engl J Med.360:1217-25,2009
4. Brown SD,Piantodosi CA.In Vivo Binding of Carbon Monoxide to Cytochrome C Oxidase in Rat Brain Journal of Applied Physiology.68:604-610,1990.
5. Hardy KR,ThomSR.Pathophysiology and Treatment of Carbon Monoxide Poisoning,J Toxicol Clin Toxicol 1994;32:613
6. Vogel SN,Sultan TR,Ten EyckRP.Cyonide Poisoning,Clin Toxicol 1981;18:367.
7. Tritapepe L,Macchiorelli G,Rocco M,et al.Functional and Ultrastructural Evidence of Myocardial Stunning Aftre Acute Carbon Monoxide Poisoning,Crit Care Med 1998;26:797.
8. Thom SR,Bhopale UM,Fisher D,et al.Delayed Neuropathology After Carbon MONOXİDE Poisoning Is IMMÜNE Medicated Proc Natl Acad Sci USA 2004 :101:13660.
9. Thom SR,Xu YA,Ischiropoulos H.Vascular Endothelial Cells Generate Peroxynitrite İn Response To Carbon Monoxide Exposure .Chm Res Toxicol 1997;10-1023.
10. Harper A,Croft-Bakr J.Carbon Monoxide Undetected by Both Patients and Their Doctors Age Ageing 2004 ;33:105.
11. Kao LW,Nanagas KA.Carbon Monoxide Poisoning Emerg Med Clin North Am 2004;22:895.
12. Tomaszewski C.Carbon Monoxide Poisoning,Early Awareness and İntervention Can Save Lives.Postgrade Med., N Engl JMed 1999;105:39.
13. Ernst A,Zibrank JD.Carbon Monoxide Poisoning.N Engl J Med 1998;339:1603.
14. Thom SR,Carbon Monoxide-Mediated Brain Lipoid Peroxidation In The Rat.JAppl

- PHYSIOL (1985)1990;68:997.
15. Kandis H,Katırcı Y,Karapolat BS.Karbon Monoksit Zehirlenmesi.Düzce Üniversitesi Tıp Fakültesi Dergisi 2009;11(3):54-60.
 16. Thom SR,Taber RL,Mendiguren II,et al.dElayed Neuropsychologic Sequelac Aftr Carbon Monoxide Poisoning Prevention By Treatment With Hyperbaric oxygen. Ann Emerg Med 1995;25:474.
 17. Hampson NB,Little CE.Hyperbaric Treatment Of Patients With Carbon Monoxide Poisoning In the United States,Under sea Hyperb Med 2005;32:21.
 18. Seger D,Welch L.Carbon Monoxide Controversies Neuropsychologic Testing,Mechanism Of Toxicity, and Hyperbaric Oxygen.Ann Emerg Med 1994;24:242.
 19. O'Mallory GF.Noninvasiv Carbon Monoxide MEasurement Is Not Accurated.Ann Emerg Med 2006;48:477
 20. Touger M,Birnbaum A,Weng J,et al.Performance of The Rad -57 Pulse-oximeter Compared With Standard Labaratory Carboxyhemoglobin Measuremen.Ann Emerg Med 2010;56:382.
 21. Satran D,Henry CR,Adkinson C,et al.Cardiovasculer Manifestattions Of Moderate to Severe Crbon Monoxide Poisoning,J Am Call Cardiol 2005;45:1513.
 22. Weaver LK.Carbon Mnoxide Poisoning N Engl J Med 2009;360:1217-25.
 23. Kandis H,Katırcı Y,Çakır Z,Aslan Ş,Uzkeser M,Bilir Ö.Acil Servse Karbonmonoksit İntoksikasyonu ile Başvuran Olgularda Geriye Dönük Analizi,Akademik Acil Tıp Dergisi 2007; 5;21-9.
 24. Katırcı Y.Karbonmonoksitle zehirlenen Hastalarda Nöropsikiyatrik Bozuklukların Sıklığı ve İlişkili Etmenler .Uzmanlık Tezi Erzurum 2005.
 25. Kavak N,Doğan B,Sultanoğlu H,Kavak RP,Özdemir M. Clinical and Magnetic Resonance Imaging Findings of Patients with Acute Carbon Monoxide Poisoning.Konuralp Medical Journey 2020;12(3):443-450.
 26. Burney RE, Wu SC, Nemiroff MJ, et al. Mass carbonmonoxide poisoning: Clinical effects and results of treatment in 184 victims. Ann Emerg Med 1982;11:394-9.
 27. Weaver LK. Hyperbaric oxygen therapy for carbon monoxide poisoning. Undersea Hyperb Med 2014; 41(4):339-54.
 28. Huang CC,Ho Ch,Chen YC,Et Al.Hyperbaric Oxygen Therapy Is Associated With Lower Short and Long Term Mortalityi In Patients With Carbon Monoxide Poisoning,Chest 2017;152:943.
 29. Ellenhorn's Medical Toxicology:Diagnosis and Treatment of Human POisoning,2nd ED,Ellnhern MJ Schonwold S,Ordog G,Wasserberger J(EDS),Williams & Wilkury,- Baltimore 1997.
 30. Koren G,Sherau T,Pastuszak A,Et Al.A Multicenter,Prospective Study Of Fetal Outcome Following Accidntal Carbon Monoxide Poisoning In Pregnancy,Regrad Toxi-cal 1991;5:397.
 31. Elkharnat D,Raphael JC,Karach JM,et al.Acute Carbon Monoxide Intoxication And Hyperbaric Oxygen In Pregnancy,Intensive Care Med 1991;17:289.
 32. Ziser A,Shupak A,Holpern P,Et Al.Delayed Hyperbaric OxygenTreatment For Acut

- Carbon Monoxide Poisoning,Br Med J(Clin Res Ed)1984;289:960.
- 33. Goulan M,Borois,Rapin M,Et Al.Carbon Monoxide Poisoning and Acute Anoxia Due To Breathing Coalgas And Hydrocarbons.J Hyperbar Med 1986;1:23.
 - 34. Fisher JA,Rucker J,Sommer LZ,et al.Isocapnic Hyperpnea Accelerate Carbon Monoxide Elimination.Am J Respir Crit Care Med 1999;159:1289.
 - 35. Meert KL,Heiderman SM,Sarnaik AP.Outcome Of Children With Carbon Monoxide Poisoning Treated With Normobaric Oxygen.J Trauma 1998;44:149-54.
 - 36. Cho CH,Chiv NC,Ho CS,Perg CC.Carbon Monoxide POisoning In Children .Pediatr Neonatal 2008;49:121-25.
 - 37. Waisman D,Shupak A,Weisz G,elamed Y.Hyperbaric Oxygen Therapy In The Pediatric Patient:The Experience Of The Israel Noval Medical Intitue Pediatrics 1998;102:E53.
 - 38. Tunçok Y,Kalyoncu Kİ.TC Sağlık Baknlığı Birinci Basamağa Yönelik Zehirlenmeler Tani Ve Tedavi Rehberleri In. Ankara:Yücel Ofset Matbaacılık 2007:113-7.
 - 39. Kurtzman TL,Otsuka KN,Wahl RA.Inhalant Abuse by Adolescents.J Adolesc Health 2001;28:170-180.
 - 40. Williams JF,Storck M.Inhalant Abuse.Pediatrics 2007;119:1009-1017.
 - 41. Kubota T,Miyata A,Acute Inhalational Exposure to Chlorodifluoromethane (freon 22):Areport of 43 Cases.J Toxicol Clin Toxicol 2005;43:305-308.
 - 42. Howard MO,Bowen SE,Garland EL,Perras BE,Vughn MG.Inhalant Use and Inhalant Use Disorders in the United States.Addict Sci Clin Pract 2011;6:18-31.
 - 43. Himmel HM.Mechanism Involved In Cardiac Sensitization By Volatile Anesthetics:General Applicability To Halogenated Hydro Carbons.Crit Rev Toxicol 2008;38:773-803.
 - 44. Ikeda N,Takahashi H,Umetsu K,Suzuki T.The Course Of Respiration And Circulation In Toluene-Sniffing.Forensic Sci int 1990;44:151-158.
 - 45. MULLER sp,Wolra P,Wunsher U,Pankow D.Cardiototoxicity Of Chlorodibromomethane And Trichloromethane In Rats And Isolated Rat Cardiac Myocytes. Arch Toxicol 1997;71:766-777.
 - 46. Zhou Y,Wu HJ,Zhong YH,Sun HY,Wang TM,Li GR.IonicMechanism Underlying Cardiac Toxicity Of The Organochloride Solvent Trichloromethane.Toxicology 2011;290:295-304.
 - 47. Kaufman JD,Silverstein MA,Moure-Eroso R.Atrial Fibrillation And Sudden Death Related To Occupational Solvent Exposure.Am J Ind Med 1994;25:731-735.
 - 48. Streicher HZ,Gabow PA,Mass AH,Kano D,Kaehry WD.Syndroms Of Tolvene Sniffing In Adults.Ann Intern Med 1981;94:758-762.
 - 49. El-Menyar AA,El-Tawil M,Alsuwaidi J.A Teenager With Angiographically Normal Epicardial Coronar Arterias And Acute Myocardial Infarction After Butane Inhalation .Eur J Med 2005;12:137-141.
 - 50. Gentura T,Tille-Leblanc I,Birolleau S,Said F,Saelans T,Boudoux L,et al.Fire –Eater’s Lung :Seventeen Cases And AReview Of The Literature Medicine (Baltimore)2001;80:291-297.

51. Lucas GN.Kerosene Oil Poisoning In Children : Hospital -Based Prospective Study In Sri-Lanka.India J pediatr 1994;61:683-687.
52. Lifshitz M,Sofer S,Gonodischer R.Hydrocarbon Poisoning In Children :A 5 Year Retrospective Study.Wildernes Environ Med 2003;14:78-82.
53. Sen V,Kelekci S,Selimoglu Sen H,Yolbas I,Gunes A,Abakay O,Fuat Gurkan M,An Evoluation Of Cases Of Pneumonia In Toluent Occured Secondary To Hydrocarbon Exposure In Childrenfevr Rev Med Pharmacol SCİ 2013;17:9-12.
54. Khilnani GC,Hadda V.Lipoid Pneumonia an un common entity.India J med Sci 2009;63:474-480
55. Zanetti G,Machiari E,Gasperetto TD,Escuissato DL,Soares souza A.Jr.lipoid pneumonia in children following aspiration of mineral oil used in the treatment of constipation:high resolution ct findings in 17 patients pediatr radiol 2007;37:1135-1139.
56. Baron SE,Horomati LB,Rivera VT.Radiological and Clinical Findings in Acute and Chronic Exogenous Lipoid Pneumonia.J Thorac Imaging 2003;18:217-224.
57. Schikler KN,Lane EE,Seitz K,Collins WM.Solvent Abuse Assosiated Pulnoray Abnormalaities.Adv Alcohol Subst Abuse 1984;3:75-81.
58. Bale AS,Tu Y,Carpenter-Hyland EP,Chandler LJ,Wood word JJ,Woodword JJ.Alterations in Glutamaterjic and Gabaergic ion Channel Activity in Hippocampal Nurans Following Exposure to the Abused İnhalant Toluene.Neuroscience 2005;130:197-206.
59. Zhvania MG,Chilachava LR,Japaridze NJ,Gelazonia LK,Lardkipanidze TG.Immediate and Persisting Effect of Toluene Chronic Exposure on Hippocampal Cell Loss in Adolescent and Adult Rats.Brain Res Bull 2012;87:187-192.
60. Aydin K,Sencer S,Demir T,Ogel K,Tunaci A,Minareci O.Cranial MR Findings in Chronic Toluene Abuse by Inhalation AJNR Am J Neuroradiol 2002;23:1173-1179.
61. Dice WH,Ward G,Kelley J,Kilpatrick WR.Pulmonary Toxicity Following Gastrointestinal Ingestion of Kerosene.Ann Emerg Med 1982;11:138-142.
62. Khanna P,Deugen SC,Arora VK,Shah A.Hydrocarbon Pneumonitis Followiing Diesel Siphonage.Indian J Chest Dis Allied SCI 2004;46:129-132
63. Heard K.The Changing Indications of Gastrointestinal Decontamination in Poisoning.Clin Lab Med 2006;26:1-12,vii.
64. Holstege C,Meekings P.Decontamination of the Poisoned Patient .In:Roberts JR,Hedges JR,eds.Clinical Procedures in Emergency Medicine,5 th edition.Philadelphia,- PA:Elsevier 2009.pp760-772.
65. Kopec KT,Brent J,Banner W,Ruha AM,Leikin JB.Management of Cardiac Dysrhtmi-as Following Hydrocarbon Abuse:Clinical Toxicology Teaching Case From NACCT Acute and Intensive Care Symposium.J Toxicol Clin 2014;52:141-145.
66. Patel R,Benjamin J,Renal Disease Associated With Toluene Inhalation.J Toxicol Clin Toxicol 1986;24:213-223.
67. Horoz OO,Yildizdas D,Yilmaz HL.Surfactant Therapy in Acute Respiratory Distress Syndrome Due to Hydrocarbon Aspiration.Singapore Med J 2009;50:e130-e132.