

BÖLÜM 13

OBEZİTE VE ACİL TIP (METABOLİK SENDROM)

Aktuğ ÇAKMAKÇI¹

GİRİŞ VE EPİDEMİYOLOJİ

Obezite, aşırı yağlanma olarak tanımlanan; kardiyovasküler hastalıklar, 13 farklı kanser türü, tip 2 diabetes mellitus, obstruktif uyku apnesi ve kronik respiratuar sistem hastalıkları gibi birçok bulaşıcı olmayan hastalıkla bağlantılı olan karmaşık multifaktöriyel bir hastalıktır (1-3). Kilo fazlalığı ve obezite, erişkinlerin yaklaşık %60'ını etkilemekteyken her 3 çocuktan bir tanesi (erkek çocukların %29'u ve kız çocukların %27'si) kilo fazlalığı veya obezite ile yaşamını sürdürmektedir (4, 5).

Obezite 1975 yılından buyana, dünyada üç kat artış göstermiştir. Son çalışmalar Dünya Sağlık Örgütü (DSÖ) Avrupa Bölgesi'nde obezitenin yıllık 1.2 milyon ölüme sebebiyet verdiğini ve bu sayının toplam ölümlerin %13'ünden sorumlu olduğunu ve tüm maluliyetlerin yaklaşık %7'sine sebebiyet verdiğini göstermektedir(6). DSÖ Avrupa Bölgesi ülkelerinde kiloluluk ve obezite üzerine yapılan araştırmada Türkiye, toplumda yaklaşık %67'lik kilo fazlalığı ve %33 oranında obezite prevalansı ile birinci sırada yer almıştır (7).

Aşırı yağlanma genellikle kişinin kilosunun boyuna oranlanması ile oluşan ve kg/m^2 ile ifade edilen antropometrik ölçüm yöntemleriyle saptanan ve "vücut kitle indeksi" (VKİ) ile ifade edilen metotla ölçülür. Her ne kadar VKİ yağlanmanın direk ölçümünü yapamasa da, girişimsel olmayan ve ölçümü özel-pahalı ekipman gerektirmeyen pratik bir yaklaşım olarak öne çıkmaktadır (6, 8-10). Tablo 1'de gösterildiği gibi aşırı kiloluluk ($\geq 25 \text{ kg/m}^2$) ve obeziteyi ($\geq 30 \text{ kg/m}^2$) tanımlayan eşik değerlerin erişkinlerde yaş ve cinsiyetten bağımsız olduğu ve mortalite dahil sağlık sorunlarıyla alakalı olduğu bulunmuştur (11). Hastalıklar ile kuvvetli ilişkisi saptanmış olsa da, VKİ yağ dokusu ve diğer dokuların oransal ayrımını yapamaz (12).

¹ Uzm. Dr., Edirne Sultan 1.Murat Devlet Hastanesi Acil Tıp Bölümü, cakmakciaktug@hotmail.com

KAYNAKLAR

1. Ajzen I, Aruppillai T, Phillip P, et al. Massachusetts Medical Society.(2017). Health Effects of Overweight and Obesity in 195 Countries over 25 Years. *The New England Journal of Medicine*.377(1):13-27.
2. Lauby-Secretan B, Scoccianti C, Loomis D, et al. Mednarodna agencija za raziskave delovne skupine za priročnik o raku. Telesna debelost in stališče raka delovne skupine IARC. *N Engl J Med*. 2016;375(8):794-8.
3. Brock JM, Billeter A, Müller-Stich BP, et al. Obesity and the lung: what we know today. *Respiration*. 2020;99(10):856-66.
4. Organization WH. Monitoring noncommunicable disease commitments in Europe 2021: are we on track to reach targets 10 years after the Moscow Declaration and First United Nations High-Level Meeting? : World Health Organization. Regional Office for Europe; 2021.
5. Organization WH. Fifteenth Meeting of the WHO European Action Network on Reducing Marketing Pressure on Children, 19 May 2021: meeting report. World Health Organization. Regional Office for Europe; 2022.
6. Organization WH. WHO European regional obesity report 2022. 2022.
7. Murtagh E, Collaboration NRF. Worldwide trends in children's and adolescents' body mass index, underweight, overweight and obesity, in comparison with adults, from 1975 to 2016: A pooled analysis of 2,416 population-based measurement studies with 128.9 million participants (Pre-published version). 2017.
8. Townsend N. Public health mini-guides: Obesity: Elsevier Health Sciences; 2014.
9. Grima M, Dixon JB. Obesity: Recommendations for management in general practice and beyond. *Australian family physician*. 2013;42(8):532-41.
10. Ryan DH. Guidelines for obesity management. *Endocrinology and Metabolism Clinics*. 2016;45(3):501-10.
11. Organization WH. Physical status: The use of and interpretation of anthropometry, Report of a WHO Expert Committee: World Health Organization; 1995.
12. Friedman JM. Causes and control of excess body fat. *Nature*. 2009;459(7245):340-2.
13. Browning LM, Mugridge O, Dixon AK, et al. Measuring abdominal adipose tissue: comparison of simpler methods with MRI. *Obesity facts*. 2011;4(1):9-15.
14. Ross R, Leger L, Morris D, et al. Quantification of adipose tissue by MRI: relationship with anthropometric variables *J Appl Physiol*. 1992;72:787-95.
15. Poulitot M-C, Després J-P, Lemieux S, et al. Waist circumference and abdominal sagittal diameter: best simple anthropometric indexes of abdominal visceral adipose tissue accumulation and related cardiovascular risk in men and women. *The American journal of cardiology*. 1994;73(7):460-8.
16. Sowers JR. Obesity as a cardiovascular risk factor. *The American journal of medicine*. 2003;115(8):37-41.
17. McGill Jr HC, McMahan CA, Herderick EE, et al. Obesity accelerates the progression of coronary atherosclerosis in young men. *Circulation*. 2002;105(23):2712-8.
18. McFarlane SI, Banerji M, Sowers JR. Insulin resistance and cardiovascular disease. *The Journal of Clinical Endocrinology & Metabolism*. 2001;86(2):713-8.
19. Suk S, Sacco R, Boden-Albala B, et al. Northern Manhattan Stroke Study. Abdominal obesity and risk of ischemic stroke. *Stroke*. 2003;34(7).
20. Larsson B, Svärdsudd K, Welin L, et al. Abdominal adipose tissue distribution, obesity, and risk of cardiovascular disease and death: 13 year follow up of participants in the study of men born in 1913. *Br Med J (Clin Res Ed)*. 1984;288(6428):1401-4.
21. Calle EE, Kaaks R. Overweight, obesity and cancer: epidemiological evidence and proposed mechanisms. *Nature Reviews Cancer*. 2004;4(8):579-91.
22. Withrow D, Alter DA. The economic burden of obesity worldwide: a systematic review of the

- direct costs of obesity. *Obesity reviews*. 2011;12(2):131-41.
23. Grundy SM, Cleeman JI, Daniels SR, et al. Diagnosis and management of the metabolic syndrome: an American Heart Association/National Heart, Lung, and Blood Institute scientific statement. *Circulation*. 2005;112(17):2735-52.
 24. Wilson PW, D'Agostino RB, Parise H, et al. Metabolic syndrome as a precursor of cardiovascular disease and type 2 diabetes mellitus. *Circulation*. 2005;112(20):3066-72.
 25. Alberti KGMM, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus. Provisional report of a WHO consultation. *Diabetic medicine*. 1998;15(7):539-53.
 26. Cameron AJ, Shaw JE, Zimmet PZ. The metabolic syndrome: prevalence in worldwide populations. *Endocrinology and Metabolism Clinics*. 2004;33(2):351-75.
 27. Grundy SM. Obesity, metabolic syndrome, and cardiovascular disease. *The Journal of Clinical Endocrinology & Metabolism*. 2004;89(6):2595-600.
 28. Halberg N, Wernstedt-Asterholm I, Scherer PE. The adipocyte as an endocrine cell. *Endocrinology and metabolism clinics of North America*. 2008;37(3):753-68.
 29. Cinti S, Mitchell G, Barbatelli G, et al. Adipocyte death defines macrophage localization and function in adipose tissue of obese mice and humans. *Journal of lipid research*. 2005;46(11):2347-55.
 30. Lau DC, Dhillon B, Yan H, et al. Adipokines: molecular links between obesity and atherosclerosis. *American Journal of Physiology-Heart and Circulatory Physiology*. 2005;288(5):H2031-H41.
 31. Trayhurn P, Wood IS. Adipokines: inflammation and the pleiotropic role of white adipose tissue. *British journal of nutrition*. 2004;92(3):347-55.
 32. Saleem U, Khaleghi M, Morgenthaler NG, et al. Plasma carboxy-terminal proinsulin (C-peptide): a novel marker of insulin resistance and metabolic syndrome. *The Journal of Clinical Endocrinology & Metabolism*. 2009;94(7):2558-64.
 33. Tsimikas S, Willeit J, Knoflach M, et al. Lipoprotein-associated phospholipase A2 activity, ferritin levels, metabolic syndrome, and 10-year cardiovascular and non-cardiovascular mortality: results from the Bruneck study. *European heart journal*. 2009;30(1):107-15.
 34. Jacobs M, Van Greevenbroek M, Van Der Kallen C, et al. Low grade inflammation can partly explain the association between the metabolic syndrome and either coronary artery disease or severity of peripheral arterial disease: the CODAM study. *European journal of clinical investigation*. 2009;39(6):437-44.
 35. Miles JM, Jensen MD. Counterpoint: visceral adiposity is not causally related to insulin resistance. *Diabetes care*. 2005;28(9):2326-8.
 36. Boden G, Lebed B, Schatz M, et al. Effects of acute changes of plasma free fatty acids on intramyocellular fat content and insulin resistance in healthy subjects. *Diabetes*. 2001;50(7):1612-7.
 37. Krauss RM. Lipids and lipoproteins in patients with type 2 diabetes. *Diabetes care*. 2004;27(6):1496-504.
 38. Deepa R, Velmurugan K, Arvind K, et al. Serum levels of interleukin 6, C-reactive protein, vascular cell adhesion molecule 1, and monocyte chemoattractant protein 1 in relation to insulin resistance and glucose intolerance—the Chennai Urban Rural Epidemiology Study (CURES). *Metabolism*. 2006;55(9):1232-8.
 39. Guldiken S, Demir M, Arikan E, et al. The levels of circulating markers of atherosclerosis and inflammation in subjects with different degrees of body mass index: soluble CD40 ligand and high-sensitivity C-reactive protein. *Thrombosis research*. 2007;119(1):79-84.
 40. Ridker PM, Buring JE, Cook NR, et al. C-reactive protein, the metabolic syndrome, and risk of incident cardiovascular events: an 8-year follow-up of 14 719 initially healthy American women. *Circulation*. 2003;107(3):391-7.
 41. Diamant M, Lamb HJ, van de Ree MA, et al. The association between abdominal visceral fat and carotid stiffness is mediated by circulating inflammatory markers in uncomplicated type 2 diabetes. *The Journal of Clinical Endocrinology & Metabolism*. 2005;90(3):1495-501.

42. Zuliani G, Volpato S, Blè A, et al. High interleukin-6 plasma levels are associated with low HDL-C levels in community-dwelling older adults: the InChianti study. *Atherosclerosis*. 2007;192(2):384-90.
43. Alessi M-C, Juhan-Vague I. PAI-1 and the metabolic syndrome: links, causes, and consequences. *Arteriosclerosis, thrombosis, and vascular biology*. 2006;26(10):2200-7.
44. Alessi M, Juhan-Vague I. Contribution of PAI-1 in cardiovascular pathology. *Archives des Maladies du Coeur et des Vaisseaux*. 2004;97(6):673-8.
45. Xydakis AM, Case CC, Jones PH, et al. Adiponectin, inflammation, and the expression of the metabolic syndrome in obese individuals: the impact of rapid weight loss through caloric restriction. *The Journal of Clinical Endocrinology & Metabolism*. 2004;89(6):2697-703.
46. Lee H-S, Lee M, Joung H. Adiponectin represents an independent risk factor for hypertension in middle aged Korean women. *Asia Pacific journal of clinical nutrition*. 2007;16(1).
47. Hutley L, Prins JB. Fat as an endocrine organ: relationship to the metabolic syndrome. *The American journal of the medical sciences*. 2005;330(6):280-9.
48. Bravata DM, Wells CK, Concato J, et al. Two measures of insulin sensitivity provided similar information in a US population. *Journal of Clinical Epidemiology*. 2004;57(11):1214-7.
49. Vessby B, Uusitupa M, Hermansen K, et al. Substituting dietary saturated for monounsaturated fat impairs insulin sensitivity in healthy men and women: The KANWU Study. *Diabetologia*. 2001;44(3):312-9.
50. Gill H, Mugo M, Whaley-Connell A, et al. The key role of insulin resistance in the cardiometabolic syndrome. *The American journal of the medical sciences*. 2005;330(6):290-4.
51. Lewis GF, Steiner G. Acute effects of insulin in the control of VLDL production in humans. Implications for the insulin-resistant state. *Diabetes care*. 1996;19(4):390-3.
52. Malhotra A, Kang BP, Cheung S, et al. Angiotensin II promotes glucose-induced activation of cardiac protein kinase C isozymes and phosphorylation of troponin I. *Diabetes*. 2001;50(8):1918-26.
53. Briones AM, Nguyen Dinh Cat A, Callera GE, et al. Adipocytes produce aldosterone through calcineurin-dependent signaling pathways: implications in diabetes mellitus-associated obesity and vascular dysfunction. *Hypertension*. 2012;59(5):1069-78.
54. Abate N, Chandalia M, Snell PG, et al. Adipose tissue metabolites and insulin resistance in nondiabetic Asian Indian men. *The Journal of Clinical Endocrinology & Metabolism*. 2004;89(6):2750-5.
55. Martin LJ, North KE, Dyer T, et al. editors. Phenotypic, genetic, and genome-wide structure in the metabolic syndrome. *BMC genetics*; 2003: BioMed Central.
56. Borissoff JI, Joosen IA, Versteyleen MO, et al. Elevated levels of circulating DNA and chromatin are independently associated with severe coronary atherosclerosis and a prothrombotic state. *Arterioscler Thromb Vasc Biol*. 2013;33(8):2032-40.
57. Hansson GK. Inflammation, atherosclerosis, and coronary artery disease. *New England journal of medicine*. 2005;352(16):1685-95.
58. Charmandari E, Tsigos C, Chrousos G. Endocrinology of the stress response 1. *Annual review of physiology*. 2005;67(1):259-84.
59. Wang C-N, McLeod RS, Yao Z, et al. Effects of dexamethasone on the synthesis, degradation, and secretion of apolipoprotein B in cultured rat hepatocytes. *Arteriosclerosis, thrombosis, and vascular biology*. 1995;15(9):1481-91.
60. Wong ND. Intensified screening and treatment of the metabolic syndrome for cardiovascular risk reduction. *Preventive cardiology*. 2005;8(1):47-54.
61. Deen D. Metabolic syndrome: time for action. *American family physician*. 2004;69(12):2875-82.
62. Badimon L, Cubedo J. Risk factors' management to impact on acute coronary syndromes. *Int J Cardiol*. 2016;217 Suppl:S7-9.
63. Park HS, Song Y-M, Cho S-I. Obesity has a greater impact on cardiovascular mortality in youn-

- ger men than in older men among non-smoking Koreans. *International journal of epidemiology*. 2006;35(1):181-7.
64. Badimon L, Cubedo J. Risk factors' management to impact on acute coronary syndromes. *International Journal of Cardiology*. 2016;217:S7-S9.
 65. Arslanian-Engoren C, Patel A, Fang J, et al. Symptoms of men and women presenting with acute coronary syndromes. *The American journal of cardiology*. 2006;98(9):1177-81.
 66. Franklin K, Goldberg RJ, Spencer F, et al. Implications of diabetes in patients with acute coronary syndromes: the Global Registry of Acute Coronary Events. *Archives of Internal Medicine*. 2004;164(13):1457-63.
 67. Kenchaiah S, Evans JC, Levy D, et al. Obesity and the risk of heart failure. *New England Journal of Medicine*. 2002;347(5):305-13.
 68. Mehra MR, Uber PA, Park MH, et al. Obesity and suppressed B-type natriuretic peptide levels in heart failure. *Journal of the American College of Cardiology*. 2004;43(9):1590-5.
 69. Williams J. The patient with morbid obesity. *Tintinalli's Emergency Medicine: A Comprehensive Study Guide [Internet]* 9th ed New York, NY: McGraw-Hill Education. 2020.
 70. Eichinger S, Hron G, Bialonczyk C, et al. Overweight, obesity, and the risk of recurrent venous thromboembolism. *Archives of internal medicine*. 2008;168(15):1678-83.
 71. Paneni F, Beckman JA, Creager MA, et al. Diabetes and vascular disease: pathophysiology, clinical consequences, and medical therapy: part I. *European heart journal*. 2013;34(31):2436-43.
 72. Karaca Ü, Schram M, Houben A, et al. Microvascular dysfunction as a link between obesity, insulin resistance and hypertension. *Diabetes research and clinical practice*. 2014;103(3):382-7.
 73. Hossain P, Kawar B, El Nahas M. Obesity and diabetes in the developing world—a growing challenge. *New England journal of medicine*. 2007;356(3):213-5.
 74. Bonadonna RC, Leif G, Kraemer N, et al. Obesity and insulin resistance in humans: a dose-response study. *Metabolism*. 1990;39(5):452-9.
 75. Lazarus R, Sparrow D, Weiss ST. Effects of obesity and fat distribution on ventilatory function: the normative aging study. *Chest*. 1997;111(4):891-8.
 76. Rubinstein I, Zamel N, DuBarry L, et al. Airflow limitation in morbidly obese, nonsmoking men. *Annals of internal Medicine*. 1990;112(11):828-32.
 77. Resta O, Foschino-Barbaro M, Legari G, et al. Sleep-related breathing disorders, loud snoring and excessive daytime sleepiness in obese subjects. *International journal of obesity*. 2001;25(5):669-75.
 78. Sériès F. Upper airway muscles awake and asleep. *Sleep medicine reviews*. 2002;6(3):229-42.
 79. Kessler R, Chaouat A, Schinkewitch P, et al. The obesity-hypoventilation syndrome revisited: a prospective study of 34 consecutive cases. *Chest*. 2001;120(2):369-76.
 80. Daniels SR. The consequences of childhood overweight and obesity. *The future of children*. 2006;16(1):47-67.
 81. Nieman CT, Manacci CF, Super DM, et al. Use of the Broselow tape may result in the underresuscitation of children. *Academic emergency medicine*. 2006;13(10):1011-9.
 82. Krieser D, Nguyen K, Kerr D, et al. Parental weight estimation of their child's weight is more accurate than other weight estimation methods for determining children's weight in an emergency department? *Emergency Medicine Journal*. 2007;24(11):756-9.
 83. Crandall CS, Gardner S, Braude DA. Estimation of total body weight in obese patients. *Air medical journal*. 2009;28(3):139-45.
 84. Pickering TG, Hall JE, Appel LJ, et al. Recommendations for blood pressure measurement in humans and experimental animals: part 1: blood pressure measurement in humans: a statement for professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. *Hypertension*. 2005;45(1):142-61.
 85. Erstad BL. Improving medication dosing in the obese patient. *Clinical drug investigation*. 2017;37(1):1-6.

86. Erstad BL. Dosing of medications in morbidly obese patients in the intensive care unit setting. *Intensive care medicine*. 2004;30(1):18-32.
87. Pai MP, Paloucek FP. The origin of the “ideal” body weight equations. *Annals of Pharmacotherapy*. 2000;34(9):1066-9.
88. Marik PE, Baram M, Vahid B. Does central venous pressure predict fluid responsiveness?: A systematic review of the literature and the tale of seven mares. *Chest*. 2008;134(1):172-8.
89. Merrer J, De Jonghe B, Golliot F, et al. Complications of femoral and subclavian venous catheterization in critically ill patients: a randomized controlled trial. *Jama*. 2001;286(6):700-7.
90. Fujiki M, Guta CG, Lemmens HJ, et al. Is it more difficult to cannulate the right internal jugular vein in morbidly obese patients than in nonobese patients? *Obesity surgery*. 2008;18(9):1157-9.
91. Mills CN, Liebmann O, Stone MB, et al. Ultrasonographically guided insertion of a 15-cm catheter into the deep brachial or basilic vein in patients with difficult intravenous access. *Annals of emergency medicine*. 2007;50(1):68-72.
92. Miller J, Phil D. Imaging and obese patients. *Radiology Rounds*. 2005;3:1-4.
93. Yakushiji H, Goto T, Shirasaka W, et al. Associations of obesity with tracheal intubation success on first attempt and adverse events in the emergency department: an analysis of the multicenter prospective observational study in Japan. *PLoS One*. 2018;13(4):e0195938.
94. Cartagena R. Preoperative evaluation of patients with obesity and obstructive sleep apnea. *Anesthesiology Clinics of North America*. 2005;23(3):463-78.
95. Dixon BJ, Dixon JB, Carden JR, et al. Preoxygenation is more effective in the 25° head-up position than in the supine position in severely obese patients: a randomized controlled study. *The Journal of the American Society of Anesthesiologists*. 2005;102(6):1110-5.
96. Gaszynski T. Anesthetic complications of gross obesity. *Current Opinion in Anesthesiology*. 2004;17(3):271-6.
97. Collins JS, Lemmens HJ, Brodsky JB. Obesity and difficult intubation: where is the evidence? *The Journal of the American Society of Anesthesiologists*. 2006;104(3):617-.
98. Collins JS, Lemmens HJ, Brodsky JB, et al. Laryngoscopy and morbid obesity: a comparison of the “sniff” and “ramped” positions. *Obesity Surgery*. 2004;14(9):1171-5.
99. Adams J, Murphy P. Obesity in anaesthesia and intensive care. *British journal of anaesthesia*. 2000;85(1):91-108.
100. Standards UbtCo, Parameters P, Apfelbaum JL, et al. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology*. 2013;118(2):251-70.
101. Langeron O, Masso E, Huraux C, et al. Prediction of difficult mask ventilation. *The Journal of the American Society of Anesthesiologists*. 2000;92(5):1229-36.
102. Jabre P, Combes X, Leroux B, et al. Use of gum elastic bougie for prehospital difficult intubation. *The American journal of emergency medicine*. 2005;23(4):552-5.
103. Levitan RM, Chudnofsky C, Sapre N. Emergency airway management in a morbidly obese, noncooperative, rapidly deteriorating patient. *The American journal of emergency medicine*. 2006;24(7):894-6.
104. Rehm CG, Wanek SM, Gagnon EB, et al. Cricothyroidotomy for elective airway management in critically ill trauma patients with technically challenging neck anatomy. *Critical Care*. 2002;6(6):1-5.
105. Sagarin MJ, Barton ED, Chng Y-M, et al. Airway management by US and Canadian emergency medicine residents: a multicenter analysis of more than 6,000 endotracheal intubation attempts. *Annals of emergency medicine*. 2005;46(4):328-36.
106. Brower RG, Ware LB, Berthiaume Y, et al. Treatment of ARDS. *Chest*. 2001;120(4):1347-67.
107. Joseph B, Hadeed S, Haider AA, et al. Obesity and trauma mortality: Sizing up the risks in motor vehicle crashes. *Obesity Research & Clinical Practice*. 2017;11(1):72-8.
108. Arbabi S, Wahl WL, Hemmila MR, et al. The cushion effect. *Journal of Trauma and Acute Care Surgery*. 2003;54(6):1090-3.