

Bölüm 19

GAUCHER HASTALIĞI

Elif BAYRAKTAR²¹

GİRİŞ

Splenomegali, daima önemli bir bulgu olarak ele alınmalı ve mutlaka incelenmelidir. Splenomegali yapan major nedenleri konjestif, malignite, infeksiyon, inflamasyon, hematolojik ve malign olmayan infiltratif olmak üzere 6 grupta toplayabiliriz. Gaucher hastalığı, neimann-pick, mukopolisakkaridozlar gibi lizozomal depo hastalıkları malign olmayan infiltratif grupta yer alır (1).

Metabolizmal hastalıklarda klinik tablo farklılıklar gösterebilmektedir. Spektrumun bir ucunda çok hafif bulgularla seyreden hastalar bulunurken, diğer ucunda masif organomegali ile birlikte ağrılı kemik krizleri ile yaşam kalitesi düşen hastalar yer almaktadır. Bazen de açıklanamayan splenomegali, metabolik hastalıklarda hastalığın tanısını koymada çıkış noktası olabilir. Nitekim gaucher hastalığını 1882 yılında ilk kez tanımlayan Phillippe Ernest Gaucher de, açıklanamayan masif splenomegalisi olan 32 yaşında bir kadın hasta tariflemiş ve otopsi sırasında dalakta gözlenen büyük ve anormal hücreler saptamıştır (2).

Son yıllarda geliştirilen yeni tedavi yöntemleri, metabolik hastalıkların bazılarının kaderini değiştirmiştir ve yaşam süresini artırmıştır. Eskiden pediatristlerin görebildiği bu hastalıklarla iç hastalıkları uzmanları da karşılaşmaya başlamıştır. Bu bölümde yetişkinlerde ortaya çıkan lizozomal depo hastalığı gaucher hastalığından bahsedilmiştir.

21 Uzman Doktor, Erzurum Bölge Eğitim ve Araştırma Hastanesi, namelif@hotmail.com

KAYNAKLAR

1. Thipphavong S, Duigenan S, Schindera ST, et al. Nonneoplastic, benign, and malignant splenic diseases: cross-sectional imaging findings and rare disease entities. *American Journal of Roentgenology*. 2014;203(2):315-22.
2. Mistry PK, Lopez G, Schiffmann R, et al. Gaucher disease: Progress and ongoing challenges. *Molecular genetics and metabolism*. 2017;120(1-2):8-21.
3. Rosenbloom BE, Weinreb NJ. Gaucher disease: a comprehensive review. *Critical Reviews™ in Oncogenesis*. 2013;18(3).
4. Vaccaro AM, Motta M, Tatti M, et al. Saposin C mutations in Gaucher disease patients resulting in lysosomal lipid accumulation, saposin C deficiency, but normal prosaposin processing and sorting. *Human molecular genetics*. 2010;19(15):2987-97. doi: 10.1093/hmg/ddq204.
5. Brill N, Mandlebaum F, Libman E. Primary splenomegaly-Gaucher type. *American Journal of the Medical Sciences*. 1905;129:491.
6. Brady RO, Kanfer JN, Shapiro D. Metabolism of glucocerebrosides II. Evidence of an enzymatic deficiency in Gaucher's disease. *Biochemical and biophysical research communications*. 1965;18(2):221-5.
7. Grabowski GA. Phenotype, diagnosis, and treatment of Gaucher's disease. *Lancet (London, England)*. 2008;372(9645):1263-71. doi: 10.1016/S0140-6736(08)61522-6.
8. Stirnemann J, Vigan M, Hamroun D, et al. The French Gaucher's disease registry: clinical characteristics, complications and treatment of 562 patients. *Orphanet journal of rare diseases*. 2012;7(1):77. doi: 10.1186/1750-1172-7-77
9. Stenson PD, Mort M, Ball EV, et al. The Human Gene Mutation Database: building a comprehensive mutation repository for clinical and molecular genetics, diagnostic testing and personalized genomic medicine. *Human genetics*. 2014;133(1):1-9.
10. Pastores GM, Hughes DA. *Gaucher disease*. GeneReviews®[Internet]: University of Washington, Seattle; 2018.
11. Lee RE. The fine structure of the cerebroside occurring in Gaucher's disease. *Proceedings of the National Academy of Sciences of the United States of America*. 1968;61(2):484. doi: 10.1073/pnas.61.2.484.
12. Ferreira CR, Gahl WA. Lysosomal storage diseases. *Translational science of rare diseases*. 2017;2(1-2):1-71.
13. Kaplan P, Andersson HC, Kacena KA, et al. The clinical and demographic characteristics of non-neuronopathic Gaucher disease in 887 children at diagnosis. *Archives of pediatrics & adolescent medicine*. 2006;160(6):603-8. doi: 10.1001/archpedi.160.6.603.
14. Hill SC, Reinig J, Barranger J, et al. Gaucher disease: sonographic appearance of the spleen. *Radiology*. 1986;160(3):631-4. doi: 10.1148/radiology.160.3.3526400.
15. Neudorfer O, Hadas-Halpern I, Elstein D, et al. Abdominal ultrasound findings mimicking hematological malignancies in a study of 218 Gaucher patients. *American journal of hematology*. 1997;55(1):28-34. doi: 10.1002/(SICI)1096-8652(199705)55:1<28::AID-AJH5>3.0.CO;2-5.
16. Stirnemann J, Belmatoug N, Camou F, et al. A review of Gaucher disease pathophysiology, clinical presentation and treatments. *International journal of molecular sciences*. 2017;18(2):441.
17. Regenboog M, Bohte AE, Somers I, et al. Imaging characteristics of focal splenic and hepatic lesions in type 1 Gaucher disease. *Blood Cells, Molecules, and Diseases*. 2016;60:49-57. doi: 10.1016/j.bcmd.2016.06.009
18. Taddei TH, Dziura J, Chen S, et al. High incidence of cholesterol gallstone disease in type 1 Gaucher disease: characterizing the biliary phenotype of type 1 Gaucher disease. *Journal of inherited metabolic disease*. 2010;33(3):291-300. doi: 10.1007/s10545-010-9070-1
19. Rosenbaum H. Hemorrhagic aspects of Gaucher disease. *Rambam Maimonides medical journal*. 2014;5(4). doi: 10.5041/RMMJ.10173

20. Gillis S, Hyam E, Abrahamov A, et al. Platelet function abnormalities in Gaucher disease patients. *American journal of hematology*. 1999;61(2):103-6. doi: 10.1002/(SICI)1096-8652(199906)61:2<103::AID-AJH5>3.0.CO;2-V
21. Amir G, Ron N. Pulmonary pathology in Gaucher's disease. *Human pathology*. 1999;30(6):666-70. doi: 10.1016/S0046-8177(99)90092-8
22. Mistry PK, Sirrs S, Chan A, et al. Pulmonary hypertension in type 1 Gaucher's disease: genetic and epigenetic determinants of phenotype and response to therapy. *Molecular genetics and metabolism*. 2002;77(1-2):91-8. doi: 10.1016/S1096-7192(02)00122-1
23. Santoro D, Rosenbloom BE, Cohen AH. Gaucher disease with nephrotic syndrome: response to enzyme replacement therapy. *American Journal of Kidney Diseases*. 2002;40(1):e4. 1-e4. doi: 10.1053/ajkd.2002.33935.
24. Wenstrup R, Roca-Espiau M, Weinreb N.J., et al. Skeletal aspects of Gaucher disease: a review. *The British journal of radiology*. 2002;75(suppl_1):A2-A12. doi: 10.1259/bjr.75.suppl_1.750002.
25. Clarke LA, Hollak CE. The clinical spectrum and pathophysiology of skeletal complications in lysosomal storage disorders. *Best practice & research Clinical endocrinology & metabolism*. 2015;29(2):219-35. doi: 10.1016/j.beem.2014.08.010.
26. Marcucci G, Zimran A, Bembi B, et al. Gaucher disease and bone manifestations. *Calcified tissue international*. 2014;95(6):477-94. doi: 10.1007/s00223-014-9923-y.
27. Pastores GM, Wallenstein S, Desnick RJ, et al. Bone density in type 1 Gaucher disease. *Journal of Bone and Mineral Research*. 1996;11(11):1801-7. doi: 10.1002/jbmr.5650111125.
28. Zver S, Bracko M, Andoljsek D. Primary bone angiosarcoma in a patient with Gaucher disease. *International journal of hematology*. 2010;92(2):374-7. doi: 10.1007/s12185-010-0643-4
29. Kenan S, Abdelwahab IF, Hermann G, et al. Osteoblastoma of the humerus associated with type-i gaucher's disease: a case report. *The Journal of bone and joint surgery British volume*. 1996;78(5):702-5.
30. Bembi B, Ciana G, Mengel E, et al. Bone complications in children with Gaucher disease. *The British journal of radiology*. 2002;75(suppl_1):A37-A44. doi: 10.1259/bjr.75.suppl_1.750037.
31. Tajima A, Yokoi T, Ariga M, et al. Clinical and genetic study of Japanese patients with type 3 Gaucher disease. *Molecular genetics and metabolism*. 2009;97(4):272-7. doi: 10.1016/j.ymgme.2009.05.001.
32. Tylki-Szymańska A, Vellodi A, El-Beshlawy A, et al. Neuronopathic Gaucher disease: demographic and clinical features of 131 patients enrolled in the International Collaborative Gaucher Group Neurological Outcomes Subregistry. *Journal of Inherited Metabolic Disease: Official Journal of the Society for the Study of Inborn Errors of Metabolism*. 2010;33(4):339-46. doi: 10.1007/s10545-009-9009-6
33. Kraoua I, Sedel F, Caillaud C, et al. A French experience of type 3 Gaucher disease: Phenotypic diversity and neurological outcome of 10 patients. *Brain and Development*. 2011;33(2):131-9. doi: 10.1016/j.braindev.2010.02.005.
34. Abdelwahab M, Blankenship D, Schiffmann R. Long-term follow-up and sudden unexpected death in Gaucher disease type 3 in Egypt. *Neurology Genetics*. 2016;2(2):e55. doi: 10.1212/NXG.0000000000000055.
35. Cindik N, Ozçay F, Süren D, et al. Gaucher disease with communicating hydrocephalus and cardiac involvement. *Clinical cardiology*. 2010;33(1):E26-E30. doi: 10.1002/clc.20348.
36. Mignot C, Doummar D, Maire I, et al. Type 2 Gaucher disease: 15 new cases and review of the literature. *Brain and Development*. 2006;28(1):39-48. doi: 10.1016/j.braindev.2005.04.005.
37. Sidransky E, Nalls MA, Aasly JO, et al. Multicenter analysis of glucocerebrosidase mutations in Parkinson's disease. *New England Journal of Medicine*. 2009;361(17):1651-61.
38. Gegg ME, Burke D, Heales SJ, et al. Glucocerebrosidase deficiency in substantia nigra of parkinson disease brains. *Annals of neurology*. 2012;72(3):455-63.

39. Murphy KE, Gysbers AM, Abbott SK, et al. Reduced glucocerebrosidase is associated with increased α -synuclein in sporadic Parkinson's disease. *Brain*. 2014;137(3):834-48.
40. Lopez G, Kim J, Wiggs E, et al. Clinical course and prognosis in patients with Gaucher disease and parkinsonism. *Neurology Genetics*. 2016;2(2):e57.
41. Weinreb NJ, Lee RE. Causes of death due to hematological and non-hematological cancers in 57 US patients with type 1 Gaucher Disease who were never treated with enzyme replacement therapy. *Critical Reviews™ in Oncogenesis*. 2013;18(3).
42. Rosenbloom BE, Weinreb NJ, Zimran A, et al. Gaucher disease and cancer incidence: a study from the Gaucher Registry. *Blood*. 2005;105(12):4569-72.
43. de Fost M, Vom Dahl S, Weverling G, et al. Increased incidence of cancer in adult Gaucher disease in Western Europe. *Blood Cells, Molecules, and Diseases*. 2006;36(1):53-8.
44. Taddei TH, Kacena KA, Yang M, et al. The underrecognized progressive nature of N370S Gaucher disease and assessment of cancer risk in 403 patients. *American journal of hematology*. 2009;84(4):208-14.
45. Arends M, van Dussen L, Biegstraaten M, et al. Malignancies and monoclonal gammopathy in Gaucher disease; a systematic review of the literature. *British journal of haematology*. 2013;161(6):832-42.
46. Koprivica V, Stone DL, Park JK, et al. Analysis and classification of 304 mutant alleles in patients with type 1 and type 3 Gaucher disease. *The American Journal of Human Genetics*. 2000;66(6):1777-86. doi: 10.1086/302925.
47. Barness LA, Wiederhold S, Chandra S, et al. Clinicopathological conference: One-year-old infant with hepatosplenomegaly and developmental delay. *American journal of medical genetics*. 1987;28(2):411-31.
48. Hollak C, van Weely S, Van Oers M, et al. Marked elevation of plasma chitotriosidase activity. A novel hallmark of Gaucher disease. *The Journal of clinical investigation*. 1994;93(3):1288-92. doi: 10.1172/JCI117084.
49. Van Dussen L, Hendriks E, Groener J, et al. Value of plasma chitotriosidase to assess non-neuronopathic Gaucher disease severity and progression in the era of enzyme replacement therapy. *Journal of inherited metabolic disease*. 2014;37(6):991-1001. doi: 10.1007/s10545-014-9711-x.
50. Bargagli E, Bennett D, Maggiorelli C, et al. Human chitotriosidase: a sensitive biomarker of sarcoidosis. *Journal of clinical immunology*. 2013;33(1):264-70. doi: 10.1007/s10875-012-9754-4
51. Aguilera B, Ghauharali-van der Vlugt K, Helmond MT, et al. Transglycosidase activity of chitotriosidase improved enzymatic assay for the human macrophage chitinase. *Journal of Biological Chemistry*. 2003;278(42):40911-6. doi: 10.1074/jbc.M301804200.
52. Gordon S. Alternative activation of macrophages. *Nature reviews immunology*. 2003;3(1):23. doi: 10.1038/nri978.
53. Deegan PB, Moran MT, McFarlane I, et al. Clinical evaluation of chemokine and enzymatic biomarkers of Gaucher disease. *Blood Cells, Molecules, and Diseases*. 2005;35(2):259-67. doi: 10.1016/j.bcmd.2005.05.005.
54. Dekker N, van Dussen L, Hollak CE, et al. Elevated plasma glucosylsphingosine in Gaucher disease: relation to phenotype, storage cell markers, and therapeutic response. *Blood*. 2011;118(16):e118-e27. doi: 10.1182/blood-2011-05-352971.
55. Rolfs A, Giese A-K, Grittner U, et al. Glucosylsphingosine is a highly sensitive and specific biomarker for primary diagnostic and follow-up monitoring in Gaucher disease in a non-Jewish, Caucasian cohort of Gaucher disease patients. *PloS one*. 2013;8(11):e79732. doi: 10.1371/journal.pone.0079732.
56. Mekinian A, Stirnemann J, Belmatoug N, et al. Ferritinemia during type 1 Gaucher disease: mechanisms and progression under treatment. *Blood Cells, Molecules, and Diseases*. 2012;49(1):53-7. doi: 10.1016/j.bcmd.2012.04.002.

57. Aerts JM, Kallemeijn WW, Wegdam W, et al. Biomarkers in the diagnosis of lysosomal storage disorders: proteins, lipids, and inhibodies. *Journal of inherited metabolic disease.* 2011;34(3):605-19. doi: 10.1007/s10545-011-9308-6.
58. Goker-Alpan O. Therapeutic approaches to bone pathology in Gaucher disease: past, present and future. *Molecular genetics and metabolism.* 2011;104(4):438-47. doi: 10.1016/j.ymgme.2011.08.004.
59. Andersson HC, Charrow J, Kaplan P, et al. Individualization of long-term enzyme replacement therapy for Gaucher disease. *Genetics in Medicine.* 2005;7(2):105. doi: 10.1097/01.GIM.0000153660.88672.3C.
60. Grabowski GA, Kacena K, Cole JA, et al. Dose-response relationships for enzyme replacement therapy with imiglucerase/alglucerase in patients with Gaucher disease type 1. *Genetics in Medicine.* 2009;11(2):92. doi: 10.1097/GIM.0b013e31818e2c19.
61. Mistry PK, Deegan P, Vellodi A, et al. Timing of initiation of enzyme replacement therapy after diagnosis of type 1 Gaucher disease: effect on incidence of avascular necrosis. *British journal of haematology.* 2009;147(4):561-70.
62. Weiss K, Gonzalez AN, Lopez G, et al. The clinical management of type 2 Gaucher disease. *Molecular genetics and metabolism.* 2015;114(2):110-22. doi: 10.1016/j.ymgme.2014.11.008.
63. Belmatoug N, Burlina A, Giraldo P, et al. Gastrointestinal disturbances and their management in miglustat-treated patients. *Journal of inherited metabolic disease.* 2011;34(5):991. doi: 10.1007/s10545-011-9368-7.
64. Belmatoug N, Di Rocco M, Fraga C, et al. Management and monitoring recommendations for the use of eliglustat in adults with type 1 Gaucher disease in Europe. *European journal of internal medicine.* 2017;37:25-32. doi: 10.1016/j.ejim.2016.07.011.
65. Kristinsson SY, Gridley G, Hoover RN, et al. Long-term risks after splenectomy among 8,149 cancer-free American veterans: a cohort study with up to 27 years follow-up. *haematologica.* 2014;99(2):392-8. doi: 10.3324/haematol.2013.092460.
66. Cox T, Aerts J, Belmatoug N, et al. Management of non-neuronopathic Gaucher disease with special reference to pregnancy, splenectomy, bisphosphonate therapy, use of biomarkers and bone disease monitoring. *Journal of inherited metabolic disease.* 2008;31(3):319-36. doi: 10.1007/s10545-008-0779-z.
67. Baris HN, Hubshman MW, Bar-Sever Z, et al. Re-evaluation of bone pain in patients with type 1 Gaucher disease suggests that bone crises occur in small bones as well as long bones. *Blood Cells, Molecules, and Diseases.* 2016;60:65-72. doi: 10.1016/j.bcmd.2015.05.003.