

BÖLÜM 7

TİROİD FIRTINASI

Mehmet ÜNALDI'

GİRİŞ

Tiroid fırtınası, tirotoksikozun şiddetli klinik belirtileri ile karakterize, nadir görülen, yaşamı tehdit eden bir durumdur (1). Amerika Birleşik Devletleri (ABD) ve Japonya'dan yapılan araştırmalarda, tiroid fırtınası insidansı yılda 100.000 kişi başına sırasıyla 0,57-0,76 ve 0,20 ve yılda 100.000 hastaneye yatışında hasta başına 4,8 ile 5,6 idi (2-4). ABD'de yapılan bir araştırmada, tirotoksikozlu yatan hastaların % 16' sına tiroid fırtınası teşhisi konmuştur (4). Tiroid veya tiroid dışı cerrahi, travma, enfeksiyon, akut iyot yükü veya doğum gibi akut bir olayla tetiklenebilir. Tiroidde yönelik spesifik tedaviye ek olarak, yoğun bakım ünitesinde (YBÜ) destekleyici tedavi ve herhangi bir tetikleyici faktörün tanınması ve tedavisi, tiroid fırtınasının mortalite oranı %10-30 olması nedeniyle oldukça önemlidir (2,5-8).

Uzun süredir tedavi edilmemiş hipertiroidizmi olan hastalarda (Graves hastalığı, toksik multinodüler guatr, soliter toksik adenom) tiroid fırtınası gelişebilmesine rağmen, sıklıkla tiroid veya tiroid dışı cerrahi, travma, enfeksiyon, akut iyot yükü gibi akut bir olay ya da amiodaron kullanımı, doğum gibi nedenlerle de tetiklenmektedir. Ek olarak, antitiroid ilaçların düzensiz kullanımı veya kesilmesi, tiroid fırtınasının yaygın olarak bildirilen bir tetikleyicisidir (2,3,5,8,9). Tiroid dışı cerrahi veya hipertiroidizm için tiroidektomi uygulanan hipertiroid hastalarının uygun preoperatif hazırlığının yapılması, cerrahi olarak indüklenen tiroid fırtınasının prevalansında dramatik bir azalmaya yol açmıştır (10).

Bazı faktörlerin neden tiroid fırtınasının gelişmesine neden olduğu açık değildir. Hipotezler, serum tiroid hormon seviyelerinde hızlı bir artış oranını, katekolaminlere artan tepkiyi veya tiroid hormonuna artan hücrel tepkileri içerir (1). Tiroid hormonu fazlalığının derecesi (tiroksin [T4] ve triiyodotironin [T3] yükselmesi, tiroid uyarıcı hormonun, TSH, baskılanması) tipik olarak kompli-

1 Uzm. Dr., Kocaeli Derince Eğitim Araştırma Hastanesi, drmun@hotmail.com

üzerinde sitokinlerin direkt tirotoksik etkisi için hiçbir kanıt bulunmamaktadır (51,52).

Covid-19 vakaları hipotiroidizm, tirotoksikozis, non tiroidal sendromu içeren çeşitli tiroid hastalık oluşumlarını sunmuştur (53,54). Subakut tiroidit ve Graves hastalığının ilk fazı esnasında gözlenen tirotoksikozis Covid-19 nedenlidir (55,56). Bir başka çalışmada Covid-19'un Graves hastalığı gibi otoimmün hastalıkları tetikleyebileceği bulunmuştur. Tiroid fırtınasının önemi nedeniyle Covid-19 hastalarında bu durumu değerlendirmek gereklidir (53-56). Angela ve arkadaşları Covid-19'lu bir hastada Burch-Wartofsky kriterlerine göre tanımlanmış ilk dökümente edilmiş tiroid fırtınası vakasını sunmuşlardır (57). Sullivan ve arkadaşları geçmişte Graves hastalığı öyküsü bulunan 24 yaşındaki hastada Covid-19 ilişkili tiroid fırtınası olgusunu vaka raporu olarak sunmuşlardır (58).

SONUÇ

Tiroid fırtınası, tirotoksikozun şiddetli klinik belirtileri ile karakterize, nadir görülen, yaşamı tehdit eden bir durumdur. Uzun süredir tedavi edilmemiş hipertiroidizmi olan hastalarda tiroid fırtınası gelişebilmesine rağmen, sıklıkla tiroid veya tiroid dışı cerrahi, travma, enfeksiyon, akut iyot yükü gibi akut bir olay ya da amiodaron kullanımı, doğum gibi nedenler ve ek olarak antitiroid ilaçların düzensiz kullanımı veya kesilmesi, tiroid fırtınasının yaygın olarak bildirilen bir tetikleyicisidir.

KAYNAKLAR

1. Sarlis NJ, Gourgiotis L. Thyroid emergencies. *Reviews in Endocrine and Metabolic Disorders*;2003; 4:129.
2. Akamizu T, Satoh T, Isozaki O, et al. Diagnostic criteria, clinical features, and incidence of thyroid storm based on nationwide surveys. *Thyroid*; 2012; 22:661.
3. Akamizu T. Thyroid Storm: A Japanese Perspective. *Thyroid*; 2018; 28:32.
4. Galindo RJ, Hurtado CR, Pasquel FJ, et al. National Trends in Incidence, Mortality, and Clinical Outcomes of Patients Hospitalized for Thyrotoxicosis With and Without Thyroid Storm in the United States, 2004-2013. *Thyroid*; 2019; 29:36.
5. Swee du S, Chng CL, Lim A. Clinical characteristics and outcome of thyroid storm: a case series and review of neuropsychiatric derangements in thyrotoxicosis. *EndocrinePractice*; 2015; 21:182.
6. Angell TE, Lechner MG, Nguyen CT, et al. Clinical features and hospital outcomes in thyroid storm: a retrospective cohort study. *Journal of Clinical Endocrinology and Metabolism*; 2015; 100:451.
7. Ono Y, Ono S, Yasunaga H, et al. Factors Associated With Mortality of Thyroid Storm: Analysis Using a National Inpatient Database in Japan. *Medicine (Baltimore)*; 2016; 95:e2848.
8. Bourcier S, Coutrot M, Kimmoun A, et al. Thyroid Storm in the ICU: A Retrospective Multi-center Study. *Critical Care Medicine*; 2020; 48:83.
9. Rivas AM, Larumbe E, Thavaraputta S, et al. Unfavorable Socioeconomic Factors Underlie

- High Rates of Hospitalization for Complicated Thyrotoxicosis in Some Regions of the United States. *Thyroid*;2019; 29:27.
10. Maurer E, Vorländer C, Zielke A, et al. Short-Term Outcomes of Surgery for Graves' Disease in Germany. *Journal of Clinical Medicine*; 2020; 9.
 11. Brooks MH, Waldstein SS. Free thyroxine concentrations in thyroid storm. *Annals of Internal Medicine*; 1980; 93:694.
 12. Ngo SY, Chew HC. When the storm passes unnoticed--a case series of thyroid storm. *Resuscitation*;2007; 73:485.
 13. Nayak B, Burman K. Thyrotoxicosis and thyroid storm. *Endocrinology and Metabolism Clinics of North America*; 2006;35:663.
 14. Burch HB, Wartofsky L. Life-threatening thyrotoxicosis. Thyroid storm. *Endocrinology and Metabolism of Clinics North America*; 1993; 22:263.
 15. Ferrari SM, Fallahi P, Galetta F, et al. Thyroid disorders induced by checkpoint inhibitors. *Reviews in Endocrine and Metabolic Disorders*; 2018; 19:325.
 16. Chiha M, Samarasinghe S, Kabaker AS. Thyroid storm: an updated review. *Journal of Intensive Care Medicine*; 2015; 30:131.
 17. Ross DS, Burch HB, Cooper DS, et al. 2016 American Thyroid Association Guidelines for Diagnosis and Management of Hyperthyroidism and Other Causes of Thyrotoxicosis. *Thyroid*;2016; 26:1343.
 18. Satoh T, Isozaki O, Suzuki A, et al. 2016 Guidelines for the management of thyroid storm from The Japan Thyroid Association and Japan Endocrine Society (First edition). *Endocrine Journal*; 2016; 63:1025.
 19. Milner MR, Gelman KM, Phillips RA, et al. Double-blind crossover trial of diltiazem versus propranolol in the management of thyrotoxic symptoms. *Pharmacotherapy*; 1990; 10:100.
 20. Brunette DD, Rothong C. Emergency department management of thyrotoxic crisis with esmolol. *American Journal of Emergency Medicine*; 1991; 9:232.
 21. Isozaki O, Satoh T, Wakino S, et al. Treatment and management of thyroid storm: analysis of the nationwide surveys: The taskforce committee of the Japan Thyroid Association and Japan Endocrine Society for the establishment of diagnostic criteria and nationwide surveys for thyroid storm. *Clinical Endocrinology (Oxf)*; 2016; 84:912.
 22. Walter RM Jr, Bartle WR. Rectal administration of propylthiouracil in the treatment of Graves' disease. *American Journal of Medicine*; 1990; 88:69.
 23. Yeung SC, Go R, Balasubramanyam A. Rectal administration of iodide and propylthiouracil in the treatment of thyroid storm. *Thyroid*; 1995; 5:403.
 24. Jongjaroenprasert W, Akarawut W, Chantasart D, et al. Rectal administration of propylthiouracil in hyperthyroid patients: comparison of suspension enema and suppository form. *Thyroid*; 2002; 12:627.
 25. Hodak SP, Huang C, Clarke D, et al. Intravenous methimazole in the treatment of refractory hyperthyroidism. *Thyroid*; 2006; 16:691.
 26. Gregoire G, Aris-Jilwan N, Ninet B, et al. Intravenous administration of propylthiouracil in treatment of a patient with Graves' disease (abstract). *77th Annual Meeting, The Endocrine Society*, 1995, Abstract P3-464.
 27. Kandil E, Khalek MA, Thethi T, et al. Thyroid storm in a patient with fulminant hepatic failure. *Laryngoscope*; 2011; 121:164.
 28. Vyas AA, Vyas P, Phillipon NL, et al. Successful treatment of thyroid storm with plasmapheresis in a patient with methimazole-induced agranulocytosis. *Endocrine Practice*; 2010; 16:673.
 29. Panzer C, Beazley R, Braverman L. Rapid preoperative preparation for severe hyperthyroid Graves' disease. *Journal of Clinical Endocrinology and Metabolism*; 2004; 89:2142.
 30. Langlely RW, Burch HB. Perioperative management of the thyrotoxic patient. *Endocrinology and Metabolism Clinics of North America*; 2003; 32:519.
 31. Benua RS, Becker DV, Hurley JR. Thyroid storm. In: Bardin CW (ed), *Current Therapy in En-*

ocrinology and Metabolism. St. Louis: Mosby; 1994. p.75.

32. Kinoshita H, Yasuda M, Furumoto Y, et al. Severe duodenal hemorrhage induced by Lugol's solution administered for thyroid crisis treatment. *Internal Medicine*; 2010; 49:759.
33. Park JM, Seok Lee I, Young Kang J, et al. Acute esophageal and gastric injury: complication of Lugol's solution. *Scandinavian Journal of Gastroenterology*; 2007; 42:135.
34. Roti E, Robuschi G, Gardini E, et al. Comparison of methimazole, methimazole and sodium ipodate, and methimazole and saturated solution of potassium iodide in the early treatment of hyperthyroid Graves' disease. *Clinical Endocrinology (Oxf)*; 1988; 28:305.
35. Baeza A, Aguayo J, Barria M, et al. Rapid preoperative preparation in hyperthyroidism. *Clinical Endocrinology (Oxf)*; 1991; 35:439.
36. Tsatsoulis A, Johnson EO, Kalogera CH, et al. The effect of thyrotoxicosis on adrenocortical reserve. *European Journal of Endocrinology*; 2000; 142:231.
37. Senda A, Endo A, Tachimori H, et al. Early administration of glucocorticoid for thyroid storm: analysis of a national administrative database. *Critical Care*; 2020; 24:470.
38. Solomon BL, Wartofsky L, Burman KD. Adjunctive cholestyramine therapy for thyrotoxicosis. *Clinical Endocrinology (Oxf)*; 1993; 38:39.
39. Kaykhaei MA, Shams M, Sadegholvad A, et al. Low doses of cholestyramine in the treatment of hyperthyroidism. *Endocrine*; 2008; 34:52.
40. Tsai WC, Pei D, Wang TF, et al. The effect of combination therapy with propylthiouracil and cholestyramine in the treatment of Graves' hyperthyroidism. *Clinical Endocrinology (Oxf)*; 2005; 62:521.
41. Petry J, Van Schil PE, Abrams P, et al. Plasmapheresis as effective treatment for thyrotoxic storm after sleeve pneumonectomy. *Annals of Thoracic Surgery*; 2004; 77:1839.
42. Koball S, Hickstein H, Gloger M, et al. Treatment of thyrotoxic crisis with plasmapheresis and single pass albumin dialysis: a case report. *Artificial Organs*; 2010; 34:E55.
43. Muller C, Perrin P, Faller B, et al. Role of plasma exchange in the thyroid storm. *Therapeutic Apheresis and Dialysis*; 2011; 15:522.
44. Carhill A, Gutierrez A, Lakhia R, et al. Surviving the storm: two cases of thyroid storm successfully treated with plasmapheresis. *BMJ Case Reports*; 2012; 2012.
45. Tiekens K, Paramasivan AM, Goldner W, et al. Therapeutic Plasma Exchange as a bridge to total Thyroidectomy in patients with severe thyrotoxicosis. *AACE Clinical Case Reports*; 2020; 6:e14.
46. Wu D, Yang XO. TH17 responses in cytokine storm of COVID-19: an emerging target of JAK2 inhibitor Fedratinib. *Journal of Microbiology, Immunology, and Infection* 2020 53 368–370.
47. Prompetchara E, Ketloy C, Palaga T. Immune responses in COVID-19 and potential vaccines: lessons learned from SARS and MERS epidemic. *Asian Pacific Journal of Allergy and Immunology* 2020 38 1–9. (<https://doi.org/10.12932/AP-200220-0772>)
48. Leow MK, Kwek DS, Ng AW, et al. Hypocortisolism in survivors of severe acute respiratory syndrome (SARS). *Clinical Endocrinology* 2005 63 197–202. (<https://doi.org/10.1111/j.1365-2265.2005.02325.x>)
49. Wei L, Sun S, Xu CH, et al. Pathology of the thyroid in severe acute respiratory syndrome. *Human Pathology*; 2007; 38 95–102. (<https://doi.org/10.1016/j.humpath.2006.06.011>)
50. Lania A, Sandri MT, Cellini M, et al. Thyrotoxicosis in patients with COVID-19: the THRYCOV study. *European Journal of Endocrinology*; 2020; 183, 381–387
51. Croce L, Gangemi D, Ancona G et al. The cytokine storm and thyroid hormone changes in COVID-19. *Journal of Endocrinological Investigation*; 2021; 44:891–904.
52. Asfuroglu Kalkan E, Ates I. A case of subacute thyroiditis associated with Covid-19 infection. *J Endocrinol Invest*. 2020;43(8):1173–1174.
53. Ippolito S, Dentali F, Tanda ML. SARS-CoV-2: a potential trigger for subacute thyroiditis? Insights from a case report. *J Endocrinol Invest*. 2020;43(8):1171–1172
54. Scappaticcio L, Pitoia F, Esposito K, et al. Impact of COVID-19 on the thyroid gland: an update. *Rev Endocr Metab Disord*. 2020;1-13. <https://doi.org/10.1007/s11154-020-09615-z>

55. Bellastella G, Maiorino MI, Esposito K. Endocrine complications of COVID-19: what happens to the thyroid and adrenal glands? *J Endocrinol Invest.* 2020;43(8):1169-1170.
56. Mateu-Salat M, Urgell E, Chico A. SARS-COV-2 as a trigger for autoimmune disease: report of two cases of Graves' disease after COVID-19. *J Endocrinol Invest.* 2020;43(10):1527-1528.
57. Angela NR, Ruaa YA, Ruchi G. Thyroid storm in a patient with COVID-19. *AACE Clinical Case Reports.* 2021; 360-362
58. Sullivan K, Helgeson J, McGowan A. COVID-19 associated thyroid storm:a case report. *Clinical Practice and Cases in Emergency Medicine.* 2021;5(4):412-414.