

44. BÖLÜM

MULTİPL ENDOKRİN NEOPLAZİ TİP2B (TİP 3) VE FAMILİYAL MEDÜLLER TİROİD KANSERİ

Abdülkadir KOÇANOĞLU¹

GİRİŞ

Multipl endokrin neoplazi tip 2 (MEN2) genel popülasyonda otuz bin de bir görülen otozomal dominant olarak kalıtılan, nadir bir kanser sendromudur. MEN2'de genel olarak medüller tiroid kanseri, feokromasitoma ve paratiroid hiperplazi görülür.

MEN2B, MEN2A ve familial medüller tiroid kanserine 10. kromozom üzerinde taşınan RET proto-onkogeninde ki mutasyon neden olur. (1,2) MEN2B görülen hastalar tüm MEN 2 vakalarının %6'sı civarındadır. (3) MEN2B ve MEN2A aynı genlerle kalıtılır. Otozomal dominant sendromlardır. MEN2B'de medüller tiroid kanseri ve feokromasitoma MEN2A'ya benzer olarak görülür. Ancak paratiroid hiperplazisi MEN2B'de görülmez. Bunlara ek olarak önemli klinik farklılıkları vardır. MEN2B'li hastalarda, tipik olarak dudakları ve dili tutan mukozal nöromalar ve bağırsak ganglionöromaları görülür. Kronik kabızlık ve megakolon gibi kolon fonksiyon bozuklukları yaygındır. Bu hastaların çoğunda gelişim anormallikleri, Marfanoid görünüm ve miyelinli bu nedenle kalınlaşmış kornea sinirleri vardır.

MEN2B'li hastaların % 95'inde bulunan en yaygın mutasyon RET proto-onkogeninin tirozin kinaz domaininde 918. kodonda ki metionin ile threonin yer değiştirmesidir. (M918T) Geri kalan hastalar ise genellikle RET A833F mutasyonu taşırlar. (4,5,6) MEN2B'li hastalarda mutasyonların % 90'ından fazlasının de novo olarak ortaya çıktığı tahmin edilmektedir. (2,7)

¹ Uzm. Dr. , SBÜ, Dışkapı Yıldırım Beyazıt Eğitim ve Araştırma Hastanesi, Tıbbi Onkoloji Kliniği, kadirkoçanoğlu@hotmail.com

profilaktik total tiroidektomiye verilebilir.(40) Özellikle M918T mutasyonu taşıyanlarda erken yaşlarda profilaktik total tiroidektomi önerilmektedir.(8) MEN2B ilişkili tümörler özellikle agresif seyirlidir. 10 yaşından önce metastatik hale gelebilirler bu nedenle MEN2B ilişkili RET mutasyonu taşıyıcıları feokromasitoma ve MTK açısından yakın takip edilmelidir.(40)

KAYNAKLAR

1. Carlson KM, Dou S, Chi D, Scavarda N, Toshima K, Jackson CE, Wells SA Jr, Goodfellow PJ, Donis-Keller H. Single missense mutation in the tyrosine kinase catalytic domain of the RET protooncogene is associated with multiple endocrine neoplasia type 2B. *Proc Natl Acad Sci USA*. 1994;91(4):1579–1583.
2. Castinetti F, Moley J, Mulligan L, Waguespack SG. A comprehensive review on MEN2B. *Endocr Relat Cancer*. 2018;25(2): T29–T39.
3. Znaczo A, Donnelly DE, Morrison PJ. Epidemiology, clinical features, and genetics of multiple endocrine neoplasia type 2B in a complete population. *Oncologist* 2014; 19:1284.
4. Hofstra RMW, Landsvater RM, Ceccherini I, Stulp RP, Stelwagen T, Luo Y, Pasini B, Höppener JW, van Amstel HK, Romeo G, et al. A mutation in the RET proto-oncogene associated with multiple endocrine neoplasia type 2B and sporadic medullary thyroid carcinoma. *Nature*. 1994;367(6461):375–376.
5. Eng C, Smith DP, Mulligan LM, Nagai MA, Healey CS, Ponder MA, Gardner E, Scheumann GF, Jackson CE, Tunnacliffe A, et al. Point mutation within the tyrosine kinase domain of the RET proto-oncogene in multiple endocrine neoplasia type 2B and related sporadic tumours. *Hum Mol Genet*. 1994;3(2): 237–241.
6. Gimm O, Marsh DJ, Andrew SD, Frilling A, Dahia PL, Mulligan LM, Zajac JD, Robinson BG, Eng C. Germline dinucleotide mutation in codon 883 of the RET proto-oncogene in multiple endocrine neoplasia type 2B without codon 918 mutation. *J Clin Endocrinol Metab*. 1997;82(11):3902–3904.
7. Brauckhoff M, Machens A, Lorenz K, Bjoro T, Varhaug JE, Dralle H. Surgical curability of medullary thyroid cancer in multiple endocrine neoplasia 2B: a changing perspective. *Ann Surg*. 2014; 259(4):800–806.
8. Wells SA Jr, Asa SL, Dralle H, Elisei R, Evans DB, Gagel RF, Lee N, Machens A, Moley JF, Pacini F, Raue F, Frank-Raue K, Robinson B, Rosenthal MS, Santoro M, Schlumberger M, Shah M, Waguespack SG; American Thyroid Association Guidelines Task Force on Medullary Thyroid Carcinoma. Revised American Thyroid Association guidelines for the management of medullary thyroid carcinoma. *Thyroid*. 2015;25(6):567–610.
9. O’Riordain DS, O’Brien T, Crotty TB, et al. Multiple endocrine neoplasia type 2B: more than an endocrine disorder. *Surgery* 1995;118:936–942.
10. Eng C, Mulligan LM. Mutations of the RET proto-oncogene in the multiple endocrine neoplasia type 2 syndromes, related sporadic tumors, and Hirschsprung disease. *Hum*

- Mutat 1997;9:97–109.
11. Pham BN, Villanueva RP. Ganglioneuromatous proliferation associated with juvenile polyposis coli. *Arch Pathol Lab Med* 1989;113:91–94.
 12. Mendelsohn G, Diamond MP. Familial ganglioneuromatous polyposis of the large bowel: report of a family with associated juvenile polyposis. *Am J Surg Pathol* 1984;8:515–520.
 13. Scurry J. Ganglion cells in colonic mucosa. *J Paediatr Child Health* 1990;26:280–282.
 14. Bahau M, Laurendeau I, Pelet A, et al. Tandem duplication within the neurofibromatosis type 1 gene (NF1) and reciprocal t(15;16) (q26.3;q12.1) translocation in familial association of NF1 with intestinal neuronal dysplasia type B (IND B). *J Med Genet* 2000;37:146–150.
 15. Nguyen L, Niccoli-Sire P, Caron P, et al. Pheochromocytoma in multiple endocrine neoplasia type 2: a prospective study. *Eur J Endocrinol* 2001;144:37–44.
 16. Ponder BAJ. Multiple endocrine neoplasia type 2. In: Scriver CR, Beaudet AL, Sly WS, et al, eds. *The metabolic & molecular bases of inherited disease*. Volume 1. New York: McGraw-Hill, 2001:931–942.
 17. Yip L, Cote GJ, Shapiro SE, et al. Multiple endocrine neoplasia type 2: evaluation of the genotype-phenotype relationship. *Arch Surg* 2003;138:409–416.
 18. Nasir MA, Yee RW, Piest KL, et al. Multiple endocrine neoplasia type III. *Cornea* 1991;10:454-9.
 19. Bard LA. Genetic counseling of families with Marfan syndrome and other disorders showing a marfanoid habitus. *Ophthalmology* 1979;86:1764-93.
 20. Saltzman CL, Herzenberg JE, Phillips WA, et al. Thick lips, bumpy tongue, and slipped capital femoral epiphysis - a deadly combination. *JT Pediatr Orthop* 1988;8:219-22.
 21. Gorlin RJ, Vickers RA. Multiple mucosal neuromas, pheochromocytoma, medullary carcinoma of the thyroid and marfanoid body build with muscle wasting. Reexamination of a syndrome of neural crest migration. *Birth Defects* 1971;7(6):69-72.
 22. Morrison PJ, Nevin NC, Hughes AE, Hadden DR, Russell CFJ. Presymptomatic screening in MEN 2A with linked DNA markers. *Lancet* 1991;337:299.
 23. Norum RA, Lafreniere RG, O'Neal LW, et al. Linkage of the multiple endocrine neoplasia type 2B gene (MEN2B) to chromosome 10 markers linked to MEN2A. *Genomics* 1990;8:313-17.
 24. Mulligan LM, Kwok JBJ, Healey CS, et al. Germ-line mutations of the RET proto-oncogene in multiple endocrine neoplasia type 2A. *Nature* 1993;363:458-60.
 25. Donis-Keller H, Dou S, Chi D, et al. Mutations in the RET proto-oncogene are associated with MEN 2A and FMTC. *Hum Mol Genet* 1993;2:851-6.
 26. Carlson KM, Bracamontes J, Jackson CE, et al. Parent-of-origin effects in multiple endocrine neoplasia type 2B. *Am J Hum Genet* 1994; 55:1076.
 27. Smith DP, Houghton C, Ponder BA. Germline mutation of RET codon 883 in two cases of de novo MEN 2B. *Oncogene* 1997; 15:1213.
 28. Jasim S, Ying AK, Waguespack SG, et al. Multiple endocrine neoplasia type 2B with a RET proto-oncogene A883F mutation displays a more indolent form of medullary thyroid carcinoma compared with a RET M918T mutation. *Thyroid* 2011; 21:189.

29. Miyauchi A, Futami H, Hai N, et al. Two germline missense mutations at codons 804 and 806 of the RET proto-oncogene in the same allele in a patient with multiple endocrine neoplasia type 2B without codon 918 mutation. *Jpn J Cancer Res* 1999; 90:1.
30. Menko FH, van der Luijt RB, de Valk IA, et al. Atypical MEN type 2B associated with two germline RET mutations on the same allele not involving codon 918. *J Clin Endocrinol Metab* 2002; 87:393.
31. Cranston AN, Carniti C, Oakhill K, et al. RET is constitutively activated by novel tandem mutations that alter the active site resulting in multiple endocrine neoplasia type 2B. *Cancer Res* 2006; 66:10179.
32. Elisei R, Bottici V, Luchetti F, et al. Impact of routine measurement of serum calcitonin on the diagnosis and outcome of medullary thyroid cancer: experience in 10,864 patients with nodular thyroid disorders. *J Clin Endocrinol Metab*. 2004;89(1):163-168.
33. Alevizaki M, Saltiki K, Rentziou G, et al. Medullary thyroid carcinoma: the influence of policy changing in clinical characteristics and disease progression. *Eur J Endocrinol*. 2012;167(6):799-808.
34. Pacini F, Martino E, Romei C, Ceccherini I, Basolo F, Iaconni P. Treatment of preclinical medullary thyroid carcinoma in MEN 2A gene carrier. *Lancet*. 1994;344(8929):1084-1085.
35. Wells SA Jr, Skinner MA. Prophylactic thyroidectomy, based on direct genetic testing, in patients at risk for the multiple endocrine neoplasia type 2 syndromes. *Exp Clin Endocrinol Diabetes*. 1998;106(1):29-34.
36. Brandi ML, Gagel RF, Angeli A, et al. Guidelines for diagnosis and therapy of MEN type 1 and type 2. *J Clin Endocrinol Metab* 2001; 86:5658.
37. Mulligan LM, Eng C, Healey CS, et al. Specific mutations of the RET proto-oncogene are related to disease phenotype in MEN 2A and FMTC. *Nat Genet* 1994; 6:70.
38. Mulligan LM, Ponder BA. Genetic basis of endocrine disease: multiple endocrine neoplasia type 2. *J Clin Endocrinol Metab* 1995; 80:1989.
39. Romei C, Mariotti S, Fugazzola L, et al. Multiple endocrine neoplasia type 2 syndromes (MEN 2): results from the ItaMEN network analysis on the prevalence of different genotypes and phenotypes. *Eur J Endocrinol* 2010; 163:301.
40. Morrison PJ, Hadden DR, Hughes AE, Russell CFJ, Nevin NC. Gene probe analysis in an informative family with the MEN2A syndrome. Improvement in carrier risk estimations. *QJMed* 1991;78:597-603.