Bölüm
30

KAROTİS CİSİM TÜMÖRLERİ

Fehim Can SEVİL[1]

GİRİŞ

Baş boyun tümörlerinin yaklaşık olarak % 0,5 ini oluşturan (1) karotis cisim tümörü ilk defa İsviçreli Albrecht von Haller tarafından 1743 yılında tanımlanmıştır (2). Yavaş büyüme eğiliminde olan ve genellikle asemptomatik olan karotis cisim tümörleri nadir tümörler arasında sayılmaktadır. 1971 yılında yaklaşık 500 vaka sunulmuş olmasına karşın 1980 lerde bu sayı bin vakaya ulaşmıştır (3). 1950 yılında Monro karotis cisim tümörünün tanısını koymaktaki ilk adımın bu tümörden şüphelenmek olduğunu söylemiştir (4). R.M. Mulligan 1950 yılında damar duvarındaki adventisyadan köken alan parasempatik sinir sistemiyle ilişkili olan kemoreseptör hücrelerin bir neoplazmı olduğunu tanımlamıştır. Bu tümörün ektoderme yerleşik nöral krestten köken aldığını bildirmiştir (2).

Nadir görülen bir tümör olması nedeniyle süregelen dönemde etiyoloji, klinik, biyolojik davranışları, hormonal etkileri ve malignite özellikleri tam olarak değerlendirilememiştir. Scudder 1903 yılında ilk başarılı carotis cisim tümör cerrahisi vakasını yayınlamıştır (5). Cerrahi olarak gelişen süreçte önemli yol alınsa da birçok konu tartışılmaya devam etmektedir.

EPİDEMİYOLOJİ VE ETİYOLOJİ

Baş ve boyunun paragangliomaları nadir görülen vasküler tümörlerdir. Nöral krestten köken alan ve sempatik zincir boyunca uzanan otonomik ganglionlarla ilişkili olan paraganlialardan oluşur(6,7).Baş boyun tümörlerinin yaklaşık %0,5 ini oluşturan karotis cisim tümörleri oldukça nadir tümörlerdir ve tüm vücut tümörlerinin %0,012 sini oluştururken insidansı 100000 de birdir(8). Sıklıkla 45-54

[1] Opr.Dr.Fehim Can SEVİL, T.C. Sağlık Bakanlığı Sağlık Bilimleri Üniversitesi Erzurum Bölge Eğitim Ve Araştırma Hastanesi Kalp Ve Damar Cerrahisi Kliniği, fhm_can@hotmail.com

5. C. L. Scudder, "TUMOR OF THE INTERCAROTID BODY," *Am. J. Med. Sci.*, 1903.
6. F. Bougrine *et al.*, "[An exceptional carotid tumor]," *J Mal Vasc*, 2008.
7. M. Idrissi *et al.*, "Masse cervicale chez un adulte," *Feuill. Radiol.*, 2010.
8. G. A. Chiu, A. I. Edwards, S. Akhtar, J. C. Hill, and I. M. Hanson, "Carotid body paraganglioma manifesting as a malignant solitary mass on imaging: a case report," *Oral Surgery, Oral Med. Oral Pathol. Oral Radiol. Endodontology*, 2010.
9. A. Burgess, M. Calderon, M. Jafif-Cojab, D. Jorge, and R. Balanza, "Bilateral carotid body tumor resection in a female patient," *Int. J. Surg. Case Rep.*, 2017.
10. Z. Q. Jin, W. He, D. F. Wu, M. Y. Lin, and H. T. Jiang, "Color Doppler Ultrasound in Diagnosis and Assessment of Carotid Body Tumors: Comparison with Computed Tomography Angiography," *Ultrasound Med. Biol.*, 2016.
11. A. Ifeoluwa, I. Lázár, É. Szövördi, and T. Karosi, "Management of carotid body tumor in pediatric patients: A case report and review of the literature," *Int. J. Pediatr. Otorhinolaryngol.*, 2017.
12. "Atlas of tumor pathology. Sect. II, Fasc. 6, Tumors of the Peripheral Nervous System, by Arthur Purdy Stout, M.D., New York City. 60 cents. Sect. III, Fasc. 9, Teratomas, by Rupert A. Willis, D.Sc., M.D., F.R.C.P., Leeds. 50 cents. Sect. IV, Fasc. 16, Tum," *Br. J. Surg.*, 2007.
13. S. Vhora, T. Takemae, K. Hongo, and S. Kobayashi, "Carotid body tumour: microvascular Doppler flowmeter for shunt placement," *J. Clin. Neurosci.*, 1994.
14. P. Pałasz, Ł. Adamski, and M. Studniarek, "Paragangliomas: À Propos of Two Cases. Diagnostics and Treatment," *Polish J. Radiol.*, 2015.
15. R. J. Ellis, D. Patel, T. Prodanov, N. Nilubol, K. Pacak, and E. Kebebew, "The presence of SDHB mutations should modify surgical indications for carotid body paragangliomas," *Ann. Surg.*, 2014.
16. C. A. Koch, A. O. Vortmeyer, Z. Zhuang, F. M. Brouwers, and K. Pacak, "New insights into the genetics of familial chromaffin cell tumors," in *Annals of the New York Academy of Sciences*, 2002.
17. A. Ikeda *et al.*, "Multi-institutional survey of carotid body tumors in Japan," *Oncol. Lett.*, 2018.
18. C. A. Hinojosa, L. J. Ortiz-Lopez, J. E. Anaya-Ayala, V. Orozco-Sevilla, and A. E. Nunez-Salgado, "Comparison of retrocarotid and caudocranial dissection techniques for the surgical treatment of carotid body tumors," *J. Vasc. Surg.*, 2015.
19. H. Lv, X. Chen, S. Zhou, S. Cui, Y. Bai, and Z. Wang, "Imaging findings of Malignant bilateral carotid body Tumors: A case report and review of the Literature," *Oncology Letters*. 2016.
20. J. I. Torrealba, F. Valdés, A. H. Krämer, R. Mertens, M. Bergoeing, and L. Mariné, "Management of carotid bifurcation tumors: 30-year experience," *Ann. Vasc. Surg.*, 2016.
21. G. S. Georgiadis, M. K. Lazarides, A. Tsalkidis, P. Argyropoulou, and A. Giatromanolaki, "Carotid body tumor in a 13-year-old child: Case report and review of the literature," *J. Vasc. Surg.*, 2008.
22. G. Y. Kim *et al.*, "New predictors of complications in carotid body tumor resection," in *Journal of Vascular Surgery*, 2017.
23. J. S. Kohn, K. B. Raftery, and E. R. Jewell, "Familial carotid body tumors: A closer look," *J. Vasc. Surg.*, 1999.
24. A. Dahan, D. Nieuwenhuijs, and L. Teppema, "Plasticity of central chemoreceptors: Effect of bilateral carotid body resection on central CO2 sensitivity," *PLoS Med.*, 2007.
25. C. Metheetrairut, C. Chotikavanich, P. Keskool, and N. Suphaphongs, "Carotid body tumor: a 25-year experience," *Eur. Arch. Oto-Rhino-Laryngology*, 2016.
26. M. G. Moore, J. L. Netterville, W. M. Mendenhall, B. Isaacson, and B. Nussenbaum, "Head and Neck Paragangliomas: An Update on Evaluation and Management.," *Otolaryngol. -- Head Neck Surg.*, 2016.
27. J. M. Scanlon, J. J. Lustgarten, S. B. Karr, and J. I. Cahan, "Successful devascularization of carotid body tumors by covered stent placement in the external carotid artery," *J. Vasc. Surg.*, 2008.

28. S. Bercin, T. Muderris, E. Sevil, F. Gul, A. Kilicarslan, and M. Kiris, "Efficiency of preoperative embolization of carotid body tumor," *Auris Nasus Larynx*, 2015.
29. A. H. Power *et al.*, "Impact of preoperative embolization on outcomes of carotid body tumor resections," *J. Vasc. Surg.*, 2012.
30. W. R. Shamblin, W. H. ReMine, S. G. Sheps, and E. G. Harrison, "Carotid body tumor (chemodectoma). Clinicopathologic analysis of ninety cases.," *Am. J. Surg.*, 1971.
31. J. H. van Bockel, "Rare Vascular Diseases: A Practical Guide for the Vascular Specialist J. J. Earnshaw (ed.) 218 × 276 mm. Pp. 302. Illustrated. 2005. tfm Publishing: Shrewsbury.," *Br. J. Surg.*, 2005.
32. A. Chedid and W. Jao, "Hereditary tumors of the carotid bodies and chronic obstructive pulmonary disease," *Cancer*, 1974.
33. M. G. Z. Ghali, V. M. Srinivasan, E. Hanna, and F. DeMonte, "Overt and Subclinical Baroreflex Dysfunction After Bilateral Carotid Body Tumor Resection: Pathophysiology, Diagnosis, and Implications for Management," *World Neurosurgery*. 2017.
34. M. S. Sajid, G. Hamilton, D. M. Baker, and on behalf of Joint Vascular Research Group, "A Multicenter Review of Carotid Body Tumour Management," *European Journal of Vascular and Endovascular Surgery*. 2007.
35. V. Robertson, F. Poli, B. Hobson, A. Saratzis, and A. Ross Naylor, "A Systematic Review and Meta-Analysis of the Presentation and Surgical Management of Patients With Carotid Body Tumours," *European Journal of Vascular and Endovascular Surgery*. 2019.
36. D. Ma, M. Liu, H. Yang, X. Ma, and C. Zhang, "Diagnosis and surgical treatment of carotid body tumor: A report of 18 cases," *J. Cardiovasc. Dis. Res.*, 2010.
37. Y. Darouassi *et al.*, "Carotid Body Tumors: A Case Series and Review of the Literature," *Ann. Vasc. Surg.*, 2017.
38. J. K. Limberg *et al.*, "Effect of Bilateral Carotid Body Resection on Cardiac Baroreflex Control of Blood Pressure during Hypoglycemia," *Hypertension*, 2015.
39. L. O. Bobadilla-Rosado *et al.*, "Surgical Management of Bilateral Carotid Body Tumors," *Ann. Vasc. Surg.*, vol. 57, pp. 187–193, 2019.
40. O. Martinelli *et al.*, "Carotid body tumors: Radioguided surgical approach," *Ital. J. Vasc. Endovasc. Surg.*, 2009.
41. S. M. Naik *et al.*, "Paragangliomas of the Carotid Body: Current Management Protocols and Review of Literature," *Indian Journal of Surgical Oncology*. 2013.
42. F. E. Kafie and J. A. Freischlag, "Carotid body tumors: The role of preoperative embolization," *Ann. Vasc. Surg.*, 2001.
43. S. de Franciscis *et al.*, "Resection of carotid body tumors reduces arterial blood pressure. An underestimated neuroendocrine syndrome," *Int. J. Surg.*, 2014.
44. M. Makeieff, J. Thariat, E. Reyt, and C. A. Righini, "Treatment of cervical paragangliomas," *European Annals of Otorhinolaryngology, Head and Neck Diseases*. 2012.
45. G. Boscarino, "An evaluation on management of carotid body tumour (CBT). A twelve years experience," *G. di Chir. - J. Surg.*, 2014.
46. S. Behuria, T. K. Rout, and S. Pattanayak, "Diagnosis and management of schwannomas originating from the cervical vagus nerve," *Annals of the Royal College of Surgeons of England*. 2015.
47. J. M. Panneton and B. W. Rusnak, "Cervical sympathetic chain schwannomas masquerading as carotid body tumors," *Ann. Vasc. Surg.*, 2000.
48. D. M. Zeitler, J. Glick, and G. Har-El, "Preoperative embolization in carotid body tumor surgery: Is it required?," *Ann. Otol. Rhinol. Laryngol.*, 2010.
49. M. Muhm *et al.*, "Diagnostic and therapeutic approaches to carotid body tumors: Review of 24 patients," *Arch. Surg.*, 1997.
50. B. Amato *et al.*, "Surgical resection of carotid body paragangliomas: 10 years of experience," *Am. J. Surg.*, 2014.

51. I. B. Rosen, J. A. Palmer, M. Goldberg, and R. A. Mustard, "Vascular problems associated with carotid body tumors," *Am. J. Surg.*, 1981.
52. P. Patetsios *et al.*, "Management of carotid body paragangliomas and review of a 30-year experience," *Ann. Vasc. Surg.*, 2002.
53. M. Konishi, P. Piazza, S.-H. Shin, S. Sivalingam, and M. Sanna, "The use of internal carotid artery stenting in management of bilateral carotid body tumors," *Eur. Arch. Oto-Rhino-Laryngology*, 2011.
54. Y. J. Chiu, H. L. Hsu, S. T. Lai, and C. P. Hsu, "Hybrid treatment of a carotid body tumor," *Interdiscip. Neurosurg. Adv. Tech. Case Manag.*, 2017.
55. M. S. Persky, A. Setton, Y. Niimi, J. Hartman, D. Frank, and A. Berenstein, "Combined endovascular and surgical treatment of head and neck paragangliomas - A team approach," *Head Neck*, 2002.
56. N. Toyota *et al.*, "Comparison of small intestinal submucosa-covered and noncovered nitinol stents in sheep iliac arteries: A pilot study," *J. Vasc. Interv. Radiol.*, 2002.
57. M. Cejna *et al.*, "Biocompatibility and performance of the Wallstent and the Wallgraft, Jostent, and Hemobahn stent-grafts in a sheep model," *J. Vasc. Interv. Radiol.*, 2002.
58. P. Piazza, F. Di Lella, A. Bacciu, G. Di Trapani, H. Ait Mimoune, and M. Sanna, "Preoperative protective stenting of the internal carotid artery in the management of complex head and neck paragangliomas: Long-term results," *Audiol. Neurotol.*, 2013.
59. P. M. Schick *et al.*, "Arterial catheter embolization followed by surgery for large chemodectoma.," *Surgery*, 1980.
60. T. R. Vogel, A. Y. Mousa, V. Y. Dombrovskiy, P. B. Haser, and A. M. Graham, "Carotid body tumor surgery: Management and outcomes in the nation," *Vasc. Endovascular Surg.*, 2009.
61. J. P. Leonetti, J. J. Donzelli, F. N. Littooy, and B. P. Farrell, "Perioperative strategies in the management of carotid body tumors," *Otolaryngol. - Head Neck Surg.*, 1997.
62. R. S. Jackson, J. A. Myhill, T. A. Padhya, J. C. McCaffrey, T. V. McCaffrey, and R. S. Mhaskar, "The effects of preoperative embolization on carotid body paraganglioma surgery: A systematic review and meta-analysis," in *Otolaryngology - Head and Neck Surgery (United States)*, 2015.
63. S. Abu-Ghanem, M. Yehuda, N. N. Carmel, A. Abergel, and D. M. Fliss, "Impact of preoperative embolization on the outcomes of carotid body tumor surgery: A meta-analysis and review of the literature," *Head Neck*, 2016.
64. S. Wiegand, I. Kureck, R. Chapot, A. M. Sesterhenn, S. Bien, and J. A. Werner, "Early side effects after embolization of a carotid body tumor using Onyx," *J. Vasc. Surg.*, 2010.
65. A. Casasco *et al.*, "Devascularization of craniofacial tumors by percutaneous tumor puncture," *Am. J. Neuroradiol.*, 1994.
66. D. G. Abud, C. Mounayer, G. Benndorf, M. Piotin, L. Spelle, and J. Moret, "Intratumoral injection of cyanoacrylate glue in head and neck paragangliomas," *Am. J. Neuroradiol.*, 2004.
67. M. S. A. Elhammady, H. Farhat, H. Ziayee, and M. A. Aziz-Sultan, "Direct percutaneous embolization of a carotid body tumor with Onyx," *J. Neurosurg.*, 2008.
68. T. T. Knight, J. A. Gonzalez, J. M. Rary, and D. S. Rush, "Current concepts for the surgical management of carotid body tumor," *Am. J. Surg.*, 2006.
69. C. Offergeld *et al.*, "Head and neck paragangliomas: clinical and molecular genetic classification.," *Clinics (Sao Paulo).*, 2012.
70. T. Demir, I. Uyar, H. B. Demir, M. Sahin, and G. Gundogdu, "Five-Year follow-up of a patient with bilateral carotid body tumors after unilateral surgical resection," *Am. J. Case Rep.*, 2014.
71. D. Doig *et al.*, "Incidence, impact, and predictors of cranial nerve palsy and haematoma following carotid endarterectomy in the international carotid stenting study," *Eur. J. Vasc. Endovasc. Surg.*, 2014.
72. N. D. Niemeijer, E. P. M. Corssmit, R. H. A. M. Reijntjes, G. J. Lammers, J. G. van Dijk, and R. D. Thijs, "Sleep-Mediated Heart Rate Variability after Bilateral Carotid Body Tumor Resection," *Sleep*, 2015.

73. S. Mathis *et al.*, "Posterior reversible encephalopathy syndrome and reversible cerebral vasoconstriction syndrome after bilateral carotid paraganglioma resection: A case report," *Cephalalgia*, 2017.
74. G. De Toma *et al.*, "Baroreflex failure syndrome after bilateral excision of carotid body tumors: An underestimated problem," *J. Vasc. Surg.*, 2000.
75. P. Gilbo *et al.*, "Radiotherapy for benign head and neck paragangliomas: A 45-year experience," *Cancer*, 2014.
76. I. Lalya *et al.*, "[Efficacy of first-line radiation for non-resectable carotid paraganglioma].," *Effic. la Radiother. en Prem. Intent. d'un paragangliome carotidien non resecable.*, 2011.