Bölüm 2

Yüksek Dereceli Glial Tümörler

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Epidemiyoloji, Risk Faktörleri

Primer santral sinir sistemi tümörleri 100.000 kişinin yaklaşık 30'unda görülür (1). 2020 yılı için tahmin edilen yeni vaka sayısı 23.890, ölüm sayısı 18.020'dir (2). Son dekatda insidansı artmaktadır. Yaş arttıkça görülme sıklığı artar. Primer malign beyin tümörlerinin çoğu yüksek dereceli glial tümörlerdir (YDGT). Bunların %75'ini gioblastomlar (GB) oluşturur. Diğer YDGT anaplastik astrositom ve anaplastik oligodendrogliomadır.

Cep telefonlarının ve diğer elektromanyetik alanların beyin tümörüne neden olup olmadığı merak edilen konular arasındadır. Güncel meta-analiz en az 10 yıl süre cep telefonu kullanımının düşük dereceli tümör riskini 2.22 kat arttırdığını ancak YDGT riskini etkilemediğini göstermiştir (3). Bir başka çalışma 1620 saat üzerindeki maruziyetin glioma riskini 1.4 kat arttırdığı belirtilmiştir (4). Dünya Sağlık Örgütü, radyofrekans elektromanyetik alanları insanlar için muhtemel kanserojen olarak sınıflandırmıştır. Fakat çalışma metodlarındaki problemler ve yanlılık nedeniyle elektromanyetik alanların insan sağlığına kısa ve uzun dönemde bir etkisinin olup olmadığı hala belirsizdir. İyonize radyasyon ise özellikle menenjiom olmak üzere gliomlar ve diğer beyin tümörleri için en iyi bilinen risk faktörüdür (5). Nörofibromatozis tip 1, Turcot Sendromu ve TP53 tümör süpresör gen mutasyonu gibi kalıtsal hastalıklar da diğer etyolojik faktörler arasındadır. YDGT'de erken tanının sağkalımı iyileştirdiği ya da proflaktik stratejilerin insidansını azalttığına dair veri yoktur (6).

Evreleme, Tanı

Glial tümörlerin histopatolojik derecelendirmesinde 4 faktöre bakılır. Bunlar atipi, mitoz, endotelyal proliferasyon ve nekrozdur. Derece 3 tümör atipi ve mitoz içerirken, GB'da bunlara ek olarak endotelyal proliferasyon ve/veya nekroz eşlik eder (7). WHO 2016 yılında gliomları histopatolojik özeliklerin yanı sıra moleküler genetik özelliklerini de göze alarak yeniden sınıflandırmıştır. Bu sınıflamaya göre gliomlar öncelikle lokalize ve diffuz olmak üzere 2'ye ayrılır. Derece 3 diffuz infiltratif gliomlarda öncelikle IDH mutasyonuna bakılır. ***IDH mutant gliomlar,*** 1p19q kodelesyonu var ise oligodendroglioma yok ise

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Kaynaklar

1. Ostrom QT, Gittleman H, Truitt G, ve ark. CBTRUS statistical report: primary brain and other central nervous system tumors diagnosed in the United States in 2011–2015. Neuro-oncology 2018(20):iv1-iv86
2. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. CA Cancer J Clin 2020(70):7-30
3. Yang M, Guo W, Yang C, ve ark. Mobile phone use and glioma risk: A systematic review and meta-analysis. PloS one 2017(12):e0175136
4. Li XZ, Li YB, Cao Y, ve ark. Prognostic implications of resection extent for patients with glioblastoma multiforme: a meta-analysis. Journal of neurosurgical sciences 2017(61):631-9
5. Stupp R, Hegi ME, Mason WP, ve ark. Effects of radiotherapy with concomitant and adjuvant temozolomide versus radiotherapy alone on survival in glioblastoma in a randomised phase III study: 5-year analysis of the EORTC-NCIC trial. The lancet oncology 2009(10):459-66
6. Dixit S, Baker L, Walmsley V, ve ark. Temozolomide-related idiosyncratic and other uncommon toxicities: a systematic review. Anti-cancer drugs 2012(23):1099-106
7. Collignon FP, Holland EC, Feng S. Organ donors with malignant gliomas: an update. American Journal of Transplantation 2004(4):15-21
8. Bell EH, Pugh SL, McElroy JP, ve ark. Molecular-based recursive partitioning analysis model for glioblastoma in the temozolomide era: a correlative analysis based on NRG oncology RTOG 0525. JAMA oncology 2017(3):784-92
9. Barker FG, 2nd, Chang SM, Gutin PH, ve ark. Survival and functional status after resection of recurrent glioblastoma multiforme. Neurosurgery 1998(42):709-20; discussion 20-3
10. Park JK, Hodges T, Arko L, ve ark. Scale to predict survival after surgery for recurrent glioblastoma multiforme. Journal of clinical oncology : official journal of the American Society of Clinical Oncology 2010(28):3838-43
11. Bailey P. The results of roentgen therapy on brain tumors. Am. J. Roentgenol 1925(13):48
12. Walker MD, Alexander E, Jr., Hunt WE, ve ark. Evaluation of BCNU and/or radiotherapy in the treatment of anaplastic gliomas. A cooperative clinical trial. Journal of neurosurgery 1978(49):333-43
13. Kristiansen K, Hagen S, Kollevold T, ve ark. Combined modality therapy of operated astrocytomas grade III and IV. Confirmation of the value of postoperative irradiation and lack of potentiation of bleomycin on survival time: a prospective multicenter trial of the Scandinavian Glioblastoma Study Group. Cancer 1981(47):649-52
14. Nelson D, Diener-West M, Horton J, ve ark. Combined modality approach to treatment of malignant gliomas--re-evaluation of RTOG 7401/ECOG 1374 with long-term follow-up: a joint study of the Radiation Therapy Oncology Group and the Eastern Cooperative Oncology Group. NCI monographs: a publication of the National Cancer Institute 1988(279-84
15. Chan JL, Lee SW, Fraass BA, ve ark. Survival and failure patterns of high-grade gliomas after three-dimensional conformal radiotherapy. Journal of Clinical Oncology 2002(20):1635-42
16. Werner-Wasik M, Scott CB, Nelson DF, ve ark. Final report of a phase I/II trial of hyperfractionated and accelerated hyperfractionated radiation therapy with carmustine for adults with supratentorial malignant gliomas: Radiation therapy oncology group study 83-02. Cancer: Interdisciplinary International Journal of the American Cancer Society 1996(77):1535-43
17. Scott C, Curran W, Yung W, ve ark. Long term results of RTOG 9006: a randomized trial of hyperfractionated radiotherapy (RT) to 72.0 Gy and carmustine vs. standard RT and carmustine for malignant glioma patients with emphasis on anaplastic astrocytoma (AA) patients. ***Proc. Proc Am Soc Clin Oncol***, ***1998***, 17:401:
18. Souhami L, Seiferheld W, Brachman D, ve ark. Randomized comparison of stereotactic radiosurgery followed by conventional radiotherapy with carmustine to conventional radiotherapy with carmustine for patients with glioblastoma multiforme: report of Radiation Therapy Oncology Group 93-05 protocol. International Journal of Radiation Oncology* Biology* Physics 2004(60):853-60
19. Miralbell R, Mornex F, Greiner R, ve ark. Accelerated radiotherapy, carbogen, and nicotinamide in glioblastoma multiforme: report of European Organization for Research and Treatment of Cancer trial 22933. Journal of clinical oncology 1999(17):3143-9
20. Hegi ME, Diserens A-C, Gorlia T, ve ark. MGMT gene silencing and benefit from temozolomide in glioblastoma. New England Journal of Medicine 2005(352):997-1003

21. Stupp R, Mason WP, Van Den Bent MJ, ve ark. Radiotherapy plus concomitant and adjuvant temozolomide for glioblastoma. New England journal of medicine 2005(352):987-96
22. Alnahhas I, Alsawas M, Rayi A, ve ark. Characterizing benefit from temozolomide in MGMT promoter unmethylated and methylated glioblastoma: a systematic review and meta-analysis. Neuro-oncology advances 2020(2):vdaa082
23. Herrlinger U, Schäfer N, Steinbach JP, ve ark. Bevacizumab Plus Irinotecan Versus Temozolomide in Newly Diagnosed O6-Methylguanine-DNA Methyltransferase Nonmethylated Glioblastoma: The Randomized GLARIUS Trial. Journal of clinical oncology : official journal of the American Society of Clinical Oncology 2016(34):1611-9
24. Gilbert MR, Wang M, Aldape KD, ve ark. Dose-dense temozolomide for newly diagnosed glioblastoma: a randomized phase III clinical trial. Journal of clinical oncology : official journal of the American Society of Clinical Oncology 2013(31):4085-91
25. Blumenthal DT, Gorlia T, Gilbert MR, ve ark. Is more better? The impact of extended adjuvant temozolomide in newly diagnosed glioblastoma: a secondary analysis of EORTC and NRG Oncology/RTOG. Neuro-oncology 2017(19):1119-26
26. Balana C, Vaz MA, Manuel Sepúlveda J, ve ark. A phase II randomized, multicenter, open-label trial of continuing adjuvant temozolomide beyond 6 cycles in patients with glioblastoma (GEINO 14-01). Neuro-oncology 2020(22):1851-61
27. Salzberg M, Kirson E, Palti Y, ve ark. A pilot study with very low-intensity, intermediate-frequency electric fields in patients with locally advanced and/or metastatic solid tumors. Onkologie 2008(31):362-5
28. Kirson ED, Gurvich Z, Schneiderman R, ve ark. Disruption of cancer cell replication by alternating electric fields. Cancer research 2004(64):3288-95
29. Stupp R, Taillibert S, Kanner A, ve ark. Effect of tumor-treating fields plus maintenance temozolomide vs maintenance temozolomide alone on survival in patients with glioblastoma: a randomized clinical trial. Jama 2017(318):2306-16
30. Omuro A, Beal K, Gutin P, ve ark. Phase II study of bevacizumab, temozolomide, and hypofractionated stereotactic radiotherapy for newly diagnosed glioblastoma. Clinical cancer research : an official journal of the American Association for Cancer Research 2014(20):5023-31
31. Henson JW, Gaviani P, Gonzalez RG. MRI in treatment of adult gliomas. The lancet oncology 2005(6):167-75
32. Chang S, Zhang P, Cairncross JG, ve ark. Phase III randomized study of radiation and temozolomide versus radiation and nitrosourea therapy for anaplastic astrocytoma: results of NRG Oncology RTOG 9813. Neuro-oncology 2017(19):252-8
33. van den Bent M, Erridge S, Vogelbaum M, ve ark. PL3. 3 Second interim and first molecular analysis of the EORTC randomized phase III intergroup CATNON trial on concurrent and adjuvant temozolomide in anaplastic glioma without 1p/19q codeletion. Neuro-Oncology 2019(21):iii3
34. Roa W, Brasher PM, Bauman G, ve ark. Abbreviated course of radiation therapy in older patients with glioblastoma multiforme: a prospective randomized clinical trial. Journal of clinical oncology : official journal of the American Society of Clinical Oncology 2004(22):1583-8
35. Wick W, Platten M, Meisner C, ve ark. Temozolomide chemotherapy alone versus radiotherapy alone for malignant astrocytoma in the elderly: the NOA-08 randomised, phase 3 trial. The Lancet. Oncology 2012(13):707-15
36. Perry JR, Laperriere N, O'Callaghan CJ, ve ark. Short-Course Radiation plus Temozolomide in Elderly Patients with Glioblastoma. The New England journal of medicine 2017(376):1027-37
37. Minniti G, Scaringi C, Lanzetta G, ve ark. Standard (60 Gy) or short-course (40 Gy) irradiation plus concomitant and adjuvant temozolomide for elderly patients with glioblastoma: a propensity-matched analysis. International journal of radiation oncology, biology, physics 2015(91):109-15
38. Lombardi G, De Salvo GL, Brandes AA, ve ark. Regorafenib compared with lomustine in patients with relapsed glioblastoma (REGOMA): a multicentre, open-label, randomised, controlled, phase 2 trial. The Lancet. Oncology 2019(20):110-9
39. Brem H, Piantadosi S, Burger PC, ve ark. Placebo-controlled trial of safety and efficacy of intraoperative controlled delivery by biodegradable polymers of chemotherapy for recurrent gliomas. The Polymer-brain Tumor Treatment Group. Lancet (London, England) 1995(345):1008-12
40. Gutin PH, Iwamoto FM, Beal K, ve ark. Safety and efficacy of bevacizumab with hypofractionated stereotactic irradiation for recurrent malignant gliomas. International journal of radiation oncology, biology, physics 2009(75):156-63

41. Kazmi F, Soon YY, Leong YH, ve ark. Re-irradiation for recurrent glioblastoma (GBM): a systematic review and meta-analysis. J Neurooncol 2019(142):79-90
42. Paulino AC, Mai WY, Chintagumpala M, ve ark. Radiation-induced malignant gliomas: is there a role for reirradiation? International journal of radiation oncology, biology, physics 2008(71):1381-7
43. Kong DS, Lee JI, Park K, ve ark. Efficacy of stereotactic radiosurgery as a salvage treatment for recurrent malignant gliomas. Cancer 2008(112):2046-51
44. Ghose A, Lim G, Husain S. Treatment for glioblastoma multiforme: current guidelines and Canadian practice. Current oncology 2010(17):52
45. Minniti G, Amelio D, Amichetti M, ve ark. Patterns of failure and comparison of different target volume delineations in patients with glioblastoma treated with conformal radiotherapy plus concomitant and adjuvant temozolomide. Radiotherapy and Oncology 2010(97):377-81
46. Tsien CI, Brown D, Normolle D, ve ark. Concurrent temozolomide and dose-escalated intensity-modulated radiation therapy in newly diagnosed glioblastoma. Clinical cancer research 2012(18):273-9
47. Voynov G, Kaufman S, Hong T, ve ark. Treatment of recurrent malignant gliomas with stereotactic intensity modulated radiation therapy. American journal of clinical oncology 2002(25):606-11
48. Levin VA, Bidaut L, Hou P, ve ark. Randomized double-blind placebo-controlled trial of bevacizumab therapy for radiation necrosis of the central nervous system. International Journal of Radiation Oncology* Biology* Physics 2011(79):1487-95
49. Rowe LS, Butman JA, Mackey M, ve ark. Differentiating pseudoprogression from true progression: analysis of radiographic, biologic, and clinical clues in GBM. Journal of neuro-oncology 2018(139):145-52
50. Hofmaier J, Kantz S, Söhn M, ve ark. Hippocampal sparing radiotherapy for glioblastoma patients: a planning study using volumetric modulated arc therapy. Radiation Oncology 2016(11):1-8