CHAPTER 3

Vascular Dementia

Digdem GOVERTİ [1]

INTRODUCTION

Vascular dementia (VaD) does not have a clear diagnostic criterion, except that it is inherent in many different subtypes(1). VaD represents clinically cognitive impairment directly related to vascular damage to the brain with various potential contributing factors (2). Although modern criteria allow for multi-site therapeutic studies, the definition of dementia was mostly based on Alzheimer's disease (AD). Therefore, the symptoms of cognitive impairment mostly included memory loss. However, advanced neuroimaging tools, such as computed tomography (CT) and magnetic resonance imaging (MRI) show that the hallmarks of VaD in the brain were very prevalant. Sub-clinical infarcts and white matter lesions by MRI were seen in, respectively 17 % and up to 90 % of individuals (3,4). The clinical presentation of VaD can be caused by localized larger vascular injury and cumulative cerebral small vessel disease (SVD).

EPIDEMOLOGY

The new definitions without memory impairment instead of the standard definition of VaD and the usage of vascular cognitive impairment as a new term affect the prevalence and incidence rates. The prevalence of VaD is increasing globally because of aging of the population, and it is estimated to affect 7.6% of individuals aged 60 years or older worldwide(5). The incidence and prevalence of VaD vary according to geographic location, age, sex, and comorbidities, in-

[1] Asis Prof., MD, Kocaeli University Faculty of Medicine, digdem.goverti@gmail.com, ORCID iD: 0000-0002-1012-3202

A study of nimodipine in subcortical VaD found that there are some advancements in memory (38). According to a review, cerebrolysin had positively effect on cognition and global outcome in VaD, but that wider usage of it was not recommended because of some limitations of the study (39).

CONCLUSION

There is still uncertainity about definiton and treatment of VaD. The clinical diagnostic criteria has been improved for clinical trials, but further studies are needed. Studies such as biomarker, PET imaging, tau and amyloid-related CSF markers in AD also offer opportunities for mixed type of dementias. These studies are important to differenciate neurodejenerative and vascular pathologies and verification the diagnosis of VaD. VaD and its mechanisms are needed much further studies compared to AD. One thing which is learned from the studies is that memantin and cholinesteraz inhibitors are not appropriate for VaD treatment. The cornersto nes of the management of VaD are that focusing on management comorbities, vascular risk factors, recognition of non-cognitive symptoms, and provide the support for patients and carers.

REFERENCES

1. JT O. T. A,"Vascular dementia,". Lancet (London, England). 2015;386(10004):1698-706. DOI:https://doi.org/10.1016/S0140-6736(15)00463-8
2. Furie KL, Kasner SE, Adams RJ, Albers GW, Bush RL, Fagan SC, vd. Guidelines for the prevention of stroke in patients with stroke or transient ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2011;42(1):227-76. https://doi.org/10.1161/STR.0000000000000024
3. Bots ML, Breteler MMB, Hofman A, Grobbee DE, Van Swieten JC, van Gijn J, vd. Cerebral white matter lesions and atherosclerosis in the Rotterdam Study. The Lancet. 1993;341(8855):1232-7. https://doi.org/10.1016/0140-6736(93)91144-BGet rights and content
4. Prabhakaran S, Wright CB, Yoshita M, Delapaz R, Brown T, DeCarli C, vd. Prevalence and determinants of subclinical brain infarction: the Northern Manhattan Study. Neurology. 2008;70(6):425-30. DOI: https://doi.org/10.1212/01.wnl.0000277521.66947.e5
5. Prince M, Bryce R, Albanese E, Wimo A, Ribeiro W, Ferri CP. The global prevalence of dementia: a systematic review and metaanalysis. Alzheimer's & dementia. 2013;9(1):63-75. https://doi.org/10.1016/j.jalz.2012.11.007
6. Savva GM, Stephan BC, Group ASVDSR. Epidemiological studies of the effect of stroke on incident dementia: a systematic review. Stroke. 2010;41(1):e41-6. https://doi.org/10.1161/STROKEAHA.109.559880
7. Zhu YC, Dufouil C, Tzourio C, Chabriat H. Silent brain infarcts: a review of MRI diagnostic criteria. Stroke. 2011;42(4):1140-5. https://doi.org/10.1161/STROKEAHA.110.600114

8. Leys D, Hénon H, Mackowiak-Cordoliani MA, Pasquier F. Poststroke dementia. The Lancet Neurology. 2005;4(11):752-9. DOI:https://doi.org/10.1016/S1474-4422(05)70221-0
9. Pendlebury ST, Rothwell PM. Prevalence, incidence, and factors associated with pre-stroke and post-stroke dementia: a systematic review and meta-analysis. The Lancet Neurology. 2009;8(11):1006-18. DOI:https://doi.org/10.1016/S1474-4422(09)70236-4
10. Peters R, Beckett N, Forette F, Tuomilehto J, Clarke R, Ritchie C, vd. Incident dementia and blood pressure lowering in the Hypertension in the Very Elderly Trial cognitive function assessment (HYVET-COG): a double-blind, placebo controlled trial. The Lancet Neurology. 2008;7(8):683-9. DOI:https://doi.org/10.1016/S1474-4422(08)70143-1
11. Bir SC, Khan MW, Javalkar V, Toledo EG, Kelley RE. Emerging concepts in vascular dementia: a review. Journal of Stroke and Cerebrovascular Diseases. 2021;30(8):105864. https://doi.org/10.1016/j.jstrokecerebrovasdis.2021.105864
12. Ramos AR, Dib SI, Wright CB. Vascular dementia. Current translational geriatrics and experimental gerontology reports. 2013;2:188-95. DOI 10.1007/s13670-013-0054-5
13. Vasdekis SN, Tsivgoulis G, Athanasiadis D, Andrikopoulou A, Voumvourakis K, Lazaris AM, vd. Cerebrovascular reacivity assessment in patients with carotid artery disease: a combined TCD and NIRS study. Journal of Neuroimaging. 2012;22(3):261-5. https://doi.org/10.1111/j.1552-6569.2011.00595.x
14. Teodorczuk A, O'Brien JT, Firbank MJ, Pantoni L, Poggesi A, Erkinjuntti T, vd. White matter changes and late-life depressive symptoms: longitudinal study. The British Journal of Psychiatry. 2007;191(3):212-7. doi:10.1192/bjp.bp.107.036756
15. Chabriat H, Joutel A, Dichgans M, Tournier-Lasserve E, Bousser MG. Cadasil. The Lancet Neurology. 2009;8(7):643-53. DOI:https://doi.org/10.1016/S1474-4422(09)70127-9
16. Dwyer R, Skrobot OA, Dwyer J, Munafo M, Kehoe PG. Using Alzgene-like approaches to investigate susceptibility genes for vascular cognitive impairment. Journal of Alzheimer's Disease. 2013;34(1):145-54. DOI: 10.3233/JAD-121069
17. Iadecola C. The pathobiology of vascular dementia. Neuron. 2013;80(4):844-66. http://dx.doi.org/10.1016/j.neuron.2013.10.008
18. Liu H, Yang M, Li GM, Qiu Y, Zheng J, Du X, vd. The MTHFR C677T polymorphism contributes to an increased risk for vascular dementia: a meta-analysis. Journal of the neurological sciences. 2010;294(1-2):74-80. https://doi.org/10.1016/j.jns.2010.04.001
19. Gold G, Bouras C, Canuto A, Bergallo MF, Herrmann FR, Hof PR, vd. Clinicopathological validation study of four sets of clinical criteria for vascular dementia. American Journal of Psychiatry. 2002;159(1):82-7. https://doi.org/10.1176/appi.ajp.159.1.82
20. Kalaria RN. Neuropathological diagnosis of vascular cognitive impairment and vascular dementia with implications for Alzheimer's disease. Acta neuropathologica. 2016;131(5):659-85. DOI 10.1007/s00401-016-1571-z
21. Stebbins GT, Nyenhuis DL, Wang C, Cox JL, Freels S, Bangen K, vd. Gray matter atrophy in patients with ischemic stroke with cognitive impairment. Stroke. 2008;39(3):785-93. https://doi.org/10.1161/STROKEAHA.107.507392
22. Ylikoski R, Jokinen H, Andersen P, Salonen O, Madureira S, Ferro J, vd. Comparison of the Alzheimer's Disease Assessment Scale Cognitive Subscale and the vascular dementia assessment scale in differentiating elderly individuals with different degrees of white matter changes. Dementia and geriatric cognitive disorders. 2007;24(2):73-81. https://doi.org/10.1159/000103865
23. Lees R, Selvarajah J, Fenton C, Pendlebury ST, Langhorne P, Stott DJ, vd. Test accuracy of cognitive screening tests for diagnosis of dementia and multidomain cognitive impairment in stroke. Stroke. 2014;45(10):3008-18. https://doi.org/10.1161/STROKEAHA.114.005842
24. Lyketsos CG, Lopez O, Jones B, Fitzpatrick AL, Breitner J, DeKosky S. Prevalence of neuropsychiatric symptoms in dementia and mild cognitive impairment: results from the cardiovas-

cular health study. Jama. 2002;288(12):1475-83. doi:10.1001/jama.288.12.1475
25. Santos MAO, Bezerra LS, Correia C da C, Bruscky IS. Neuropsychiatric symptoms in vascular dementia: epidemiologic and clinical aspects. Dementia & Neuropsychologia. 2018;12:40-4. https://doi.org/10.1590/1980-57642018dn12-010006
26. Panza F, Frisardi V, Capurso C, D'Introno A, Colacicco AM, Imbimbo BP, vd. Late-life depression, mild cognitive impairment, and dementia: possible continuum? The American Journal of Geriatric Psychiatry. 2010;18(2):98-116. https://doi.org/10.1097/JGP.0b013e3181b0fa13
27. Okura T, Plassman BL, Steffens DC, Llewellyn DJ, Potter GG, Langa KM. Prevalence of neuropsychiatric symptoms and their association with functional limitations in older adults in the United States: the aging, demographics, and memory study. Journal of the American Geriatrics Society. 2010;58(2):330-7. https://doi.org/10.1111/j.1532-5415.2009.02680.x
28. Jokinen H, Lipsanen J, Schmidt R, Fazekas F, Gouw AA, Van Der Flier WM, vd. Brain atrophy accelerates cognitive decline in cerebral small vessel disease: the LADIS study. Neurology. 2012;78(22):1785-92. DOI: https://doi.org/10.1212/WNL.0b013e3182583070
29. Zarow C, Wang L, Chui HC, Weiner MW, Csernansky JG. MRI shows more severe hippocampal atrophy and shape deformation in hippocampal sclerosis than in Alzheimer's disease. International Journal of Alzheimer's Disease. 2011;2011. https://doi.org/10.4061/2011/483972
30. Marchant NL, Reed BR, DeCarli CS, Madison CM, Weiner MW, Chui HC, vd. Cerebrovascular disease, beta-amyloid, and cognition in aging. Neurobiology of aging. 2012;33(5):1006-e25. https://doi.org/10.1016/j.neurobiolaging.2011.10.001
31. Mattsson N, Zetterberg H, Hansson O, Andreasen N, Parnetti L, Jonsson M, vd. CSF biomarkers and incipient Alzheimer disease in patients with mild cognitive impairment. Jama. 2009;302(4):385-93. doi:10.1001/jama.2009.1064
32. Jagtap A, Gawande S, Sharma S. Biomarkers in vascular dementia: A recent update. Biomarkers and Genomic Medicine. 2015;7(2):43-56. https://doi.org/10.1016/j.bgm.2014.11.001
33. Yusuf S, Sleight P, Pogue J ft, Bosch J, Davies R, Dagenais G. Effects of an angiotensin-converting-enzyme inhibitor, ramipril, on cardiovascular events in high-risk patients. The New England journal of medicine. 2000;342(3):145-53. https://doi.org/10.1056/nejm200001203420301
34. Vieira JR, Elkind MS, Moon YP, Rundek T, Boden-Albala B, Paik MC, vd. The metabolic syndrome and cognitive performance: the Northern Manhattan Study. Neuroepidemiology. 2011;37(3-4):153-9. https://doi.org/10.1159/000332208
35. Shepherd J, Blauw GJ, Murphy MB, Bollen EL, Buckley BM, Cobbe SM, vd. Pravastatin in elderly individuals at risk of vascular disease (PROSPER): a randomised controlled trial. The lancet. 2002;360(9346):1623-30. DOI:https://doi.org/10.1016/S0140-6736(02)11600-X
36. Erkinjuntti T, Gauthier S, Bullock R, Kurz A, Hammond G, Schwalen S, vd. Galantamine treatment in Alzheimer's disease with cerebrovascular disease: responder analyses from a randomized, controlled trial (GAL-INT-6). Journal of psychopharmacology. 2008;22(7):761-8. ttps://doi.org/10.1177/0269881107083
37. Orgogozo JM, Rigaud AS, Stöffler A, Möbius HJ, Forette F. Efficacy and safety of memantine in patients with mild to moderate vascular dementia: a randomized, placebo-controlled trial (MMM 300). Stroke. 2002;33(7):1834-9. https://doi.org/10.1161/01.STR.0000020094.08790.49
38. Pantoni L, Basile AM, Pracucci G, Asplund K, Bogousslavsky J, Chabriat H, vd. Impact of age-related cerebral white matter changes on the transition to disability–the LADIS study: rationale, design and methodology. Neuroepidemiology. 2005;24(1-2):51-62. https://doi.org/10.1159/000081050
39. Chen N, Yang M, Guo J, Zhou M, Zhu C, He L. Cerebrolysin for vascular dementia. Cochrane Database of Systematic Reviews. 2013;(1). https://doi.org/10.1002/14651858.CD008900.pub2