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**Abstract**

Cognitive Impairment and Dementia are not rare conditions in patients with stroke. The close link between cerebrovascular disease and dementia appears a clear public health problem. With an ischemic stroke, the onset of vascular dementia could be triggered, mostly in those patients with a pre-existing cognitive decline. The underlying mechanisms of post-stroke cognitive impairment are not known in detail. Neurodegeneration and vascular factors are activated, with coexistence, when also overlap, of these two pathological mechanisms within the neuro-vascular unit. Several works have found that acute stroke can cause changes in brain volume affecting cognitive abilities frequently, but not constantly, as found in Alzheimer's disease patients. This review analyzes previous data on the role of stroke in initiating or promoting neurodegenerative dementia.

**Keywords:** Stroke; Cerebrovascular disease; Dementia; Neurodegenerative disorders; Neuroimaging

## Introduction

Stroke is the second most frequent cause of death in the world a er ischemic heart disease [1] and represents the principal cause of acquired disability [2], with patients remaining physically dependent in the 50% of the cases and approximately two-thirds having di erent neurological impairment a er 5 years from stroke [3]. In addition, the close link between stroke and dementia is well-de ned, with a prevalence of one patient in 10 with a pre-stroke dementia condition, and one in 10 who develop dementia a er a rst cerebrovascular event and on in three who develop dementia with the recurrence of stroke events [4]. Several factors have been associated with post-stroke cognitive de cits. Pendlebury and Rothwell reviewed 73 cohort studies on post-stroke dementia including a total of 7511 patients and founded that most predictors of post-stroke dementia were related to the stroke itself (hemorrhagic stroke, le hemisphere stroke, dysphasia, stroke severity and infarct volume), the number of strokes (previous stroke, multiple infarcts and recurrent stroke) and the complications of stroke (incontinence, early seizures, acute confusion, hypoxic ischemic episodes and hypotension) [5]. Other factors included demographic features (older age, low educational attainment, previous cognitive decline and premorbid disability) [5]. Dementia syndromes diagnosed a er a stroke are usually considered to be vascular in origin. However, stroke and degenerative dementia are probably strictly dependent, especially Alzheimer's disease (AD), more than expected by chance: in some cases, patients with post-stroke dementia show a progressive onset and course, which suggests an underlying degenerative process [6]. erefore, dementia occurring a er stroke may be the consequence of the e ects of stroke on already existing degenerative processes: when a stroke occurs at a pre-clinical stage of AD, the period of time required for its clinical expression may be shortened by the stroke itself. Some studies demonstrated that changes in brain volume and cognitive performance could be connected with a stroke event, although generally with a di erent pattern (site and function involved) seen in Alzheimer's disease [7-10].

## Pre-Stroke Dementia

Cognitive impairment is not easily detected before stroke. Previous studies found a Pre-Stroke Dementia prevalence of 14% in hospital based setting and 9% in population based studies. Nonetheless, the underlying mechanism has not yet been clearly de ned [5]. e majority of studies on 5(r)137esm h h-Sctete sg1%a in hsh generally

***Corresponding author:** Salvatore Caratozzolo, Department of Clinical and Experimental Science, University of Brescia, Brescia, Italy, Tel: +393930406304; E-mail: salvatore.caratozzolo@hotmail.com

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on the validity of the informant questionnaire on cognitive decline in the elderly (IQCODE). International Journal of Geriatric Psychiatry 11: 131-139.

16. Jorm AF, Christensen H, Korten AE, Jacomb PA, Henderson AS (2000) Informant ratings of cognitive decline in old age: Validation against change on cognitive tests over 7 to 8 years. Psychological Medicine 30: 981-985.
17. Thomas LD, Gonzales MF, Chamberlain A, Beyreuther K, Masters CL, et al. (1994) Comparison of clinical state, retrospective informant interview and the neuropathologic diagnosis of Alzheimer's disease. International Journal of Geriatric Psychiatry 9: 233-236.
18. Rockwood K, Howard K, Thomas VS, Mallery L, MacKnight C, et al. (1998) Retrospective diagnosis of dementia using an informant interview based on the brief cognitive rating scale. Int Psychogeriatr 10: 53-60.
19. Thomas LD (1996) Neuropsychological correlates of amyloid precursor protein in Alzheimer's disease. Int J Nurs Pract 2: 29-32.
20. Koistinaho M, Koistinaho J (2005) Interactions between Alzheimer's disease and cerebral ischemia--focus on . Brain Res Brain Res Rev 48: 240-250.
21. Bennett DA, Schneider JA, Bienias JL, Evans DA, Wilson RS (2005) Mild cognitive impairment is related to Alzheimer disease pathology and cerebral infarctions. Neurology 64: 834-841.
22. Del Ser T, Hachinski V, Merskey H, Munoz DG (2005) Alzheimer's disease with and without cerebral infarcts. J Neurol Sci 231: 3-11.
23. Lee MJ, Seo SW, Na DL, Kim C, Park JH, et al. (2014) Synergistic effects of ischemia and b-amyloid burden on cognitive decline in patients with subcortical vascular mild cognitive impairment. JAMA Psychiatry 71: 412-422.
24. Gerhard A, Schwarz J, Myers R, Wise R, Banati RB (2005) Evolution of microglial activation in patients after ischemic stroke: A [11C](R)-PK11195 PET study. NeuroImage 24: 591-595.
25. Thiel A, Heiss WD (2011) Imaging of microglia activation in stroke. Stroke 42: 507-512.
26. Hughes JL, Beech JS, Jones PS, Wang D, Menon DK, et al. (2010) Mapping selective neuronal loss and microglial activation in the salvaged neocortical penumbra in the rat. NeuroImage 49: 19-31.
27. Okello A, Edison P, Archer HA, Turkheimer FE, Kennedy J, et al. (2009) Microglial activation and amyloid deposition in mild cognitive impairment: a PET study. Neurology 72: 56-62.
28. Mok V, Leung EY, Chu W, Chen S, Wong A, et al. (2010) Pittsburgh compound B binding in poststroke dementia. J Neurol Sci 290: 135-137.
29. Thiel A, Cechetto DF, Heiss WD, Hachinski V, Whitehead SN (2014) Amyloid burden, and links to cognitive decline after ischemic stroke. Stroke 45: 2825-2829.
30. Breteler MM, van Swieten JC, Bots ML, Grobbee DE, Claus JJ, et al. (1994) Cerebral white matter lesions, vascular risk factors and cognitive function in a population-based study: The Rotterdam study. Neurology 44: 1246-12552.
31. Smith CD, Snowdon DA, Wang H, Markesbery WR (2000) White matter volumes and periventricular white matter hyperintensities in aging and dementia. Neurology 54: 838-842.
32. Breteler MM, Claus JJ, Grobbee DE, Hofman A (1994) Cardiovascular disease and distribution of cognitive function in elderly people: The Rotterdam study. BMJ 308: 1604-1608.
33. Knopman D, Boland LL, Mosley T, Howard G, Liao D, et al. (2001) Cardiovascular risk factors and cognitive decline in middle-aged adults. Neurology 56: 42-48.
34. Viswanathan A, Rocca WA, Tzourio C (2009) Vascular risk factors and dementia: How to move forward? Neurology 72: 368-374.
35. van Exel E, Gussekloo