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Vascular dementia: neurological assessment and cardiovascular manifestations

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LITERATURE REVIEW

Summary

Vascular dementia is a form of dementia caused by brain damage resulting from problems with blood flow to the brain. It is often associated with risk factors and cardiovascular manifestations, such as high blood pressure, diabetes mellitus, ischemic heart disease, stroke, atrial fibrillation, among others. These factors may contribute to the development and progression of vascular dementia, as well as increase the risk of complications and mortality. Objective: to evaluate the relationship between vascular dementia and neurological and cardiovascular changes, as well as to identify the main strategies for prevention, diagnosis and treatment of this condition. Methodology: followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist, which consists of a set of recommendations to guarantee the quality and transparency of systematic reviews. Searches were carried out in the PubMed, Scielo and Web of Science databases, using the following descriptors: “vascular dementia”, “neurological assessment”, “cardiovascular manifestations”, “risk factors” and “treatment”. Only articles published in the last 10 years (from 2013 to 2023), in English or Portuguese, that addressed the topic of vascular dementia and its neurological and cardiovascular implications were included. Articles that were not original (reviews, editorials, letters to the editor, etc.), that did not present sufficient or reliable data, that had an inadequate methodology or that were not relevant to the objective of the review were excluded. Results: 17 studies were selected. The neurological evaluation of vascular dementia should include a detailed anamnesis, a complete physical examination, a cognitive and functional assessment, as well as complementary exams such as computed tomography or magnetic resonance imaging of the skull. The cardiovascular assessment of vascular dementia must consider modifiable and non-modifiable risk factors, clinical

manifestations, and laboratory and imaging findings. Pharmacological interventions may include medications to improve cognitive function (such as cholinesterase inhibitors or NMDA receptor antagonists), to control cardiovascular risk factors (such as antihypertensives, hypoglycemic agents, or anticoagulants), or to prevent complications (such as anti-inflammatories). or antidepressants). Conclusion: Vascular dementia is a serious and prevalent disease that affects both the central nervous system and the cardiovascular system. Its prevention, diagnosis and treatment require an integrated and multidimensional approach, which considers the neurological and cardiovascular aspects involved. Carrying out more studies on this topic is essential to expand scientific knowledge and improve the quality of life of patients with vascular dementia.

Keywords: "vascular dementia", "neurological assessment", "cardiovascular manifestations", "risk factors" and "treatment"

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Introduction:

Vascular dementia is a form of dementia caused by brain damage resulting from problems with blood flow to the brain. It is the second most common cause of dementia after Alzheimer's disease, affecting around 10% of elderly people. Vascular dementia can manifest itself in different ways, depending on the location and extent of brain lesions. Some of the most common symptoms are: memory loss, difficulty concentrating, mood changes, mental confusion, language problems, spatial and temporal disorientation, among others. Vascular dementia has a significant impact on the quality of life of patients and their caregivers, as well as on society and the healthcare system.

Furthermore, it is often associated with risk factors and cardiovascular manifestations, which can contribute to the development and progression of the disease, as well as increase the risk of complications and mortality. The main cardiovascular risk factors are: high blood pressure, diabetes mellitus, ischemic heart disease, stroke, atrial fibrillation, among others. These factors can cause damage to the arteries that supply the brain, leading to reduced blood flow and the formation of clots or hemorrhages. The cardiovascular manifestations of vascular dementia include: cardiac arrhythmias, heart failure, myocardial infarction, angina pectoris, among others. These conditions can compromise cardiac function and cerebral oxygenation, worsening the neurological symptoms of vascular dementia.

Vascular dementia is a form of dementia that occurs as a result of damage to the blood vessels that supply blood to the brain or reduced blood flow to the brain. In general, it is a disease caused by cerebrovascular disease, most frequently by cerebrovascular accident (CVA), popularly known as stroke. Cognitive loss occurs when there is one or multiple damages to the cerebral vasculature that leads to a reduction or blockage of blood flow, depriving brain cells of necessary nutrients and oxygen, which can result in cell damage or death.

Neurological assessment of vascular dementia is essential to identify the presence, location and extent of brain lesions, as well as associated symptoms. The neurological assessment must include a detailed anamnesis, a complete physical examination, a cognitive and functional assessment, as well as complementary exams such as computed tomography or magnetic resonance imaging of the skull. These exams make it possible to visualize the areas

affected by vascular involvement and differentiate vascular dementia from other forms of dementia, such as Alzheimer's disease.

The risk factors and cardiovascular manifestations of vascular dementia are closely related, as both can contribute to the development and progression of the disease, as well as increase the risk of complications and mortality. The main cardiovascular risk factors are: high blood pressure, diabetes mellitus, dyslipidemia (high cholesterol levels), physical inactivity, overweight or obesity, smoking. These factors can cause damage to the arteries that supply the brain, leading to reduced blood flow and the formation of clots or hemorrhages. The cardiovascular manifestations of vascular dementia include: cardiac arrhythmias, heart failure, myocardial infarction, angina pectoris, among others. These conditions can compromise cardiac function and cerebral oxygenation, worsening the neurological symptoms of vascular dementia.

Treatment for vascular dementia aims to prevent disease progression and alleviate symptoms. There is no cure for vascular dementia. Some measures that can be taken include: adjusting the routine to make the individual feel better, family support, use of medications prescribed by the doctor, adoption of healthier habits, smoking cessation, intellectual stimulation and physical activity. Medications may include those that prevent clot formation (such as aspirin), control cardiovascular risk factors (such as antihypertensives, hypoglycemic drugs, or statins), or improve cognitive function (such as cholinesterase inhibitors or memantine). Furthermore, it is important to prevent new episodes of stroke by controlling modifiable risk factors and regular medical monitoring.

Goal:

The objective of this systematic literature review is to evaluate the relationship between vascular dementia and neurological and cardiovascular changes, as well as to identify the main strategies for prevention, diagnosis and treatment of this condition.

Methodology:

The methodology used in this systematic literature review followed the PRISMA checklist (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which consists of a set of recommendations to guarantee the quality and transparency of systematic reviews. Searches were carried out in the PubMed, Scielo and Web of Science databases, using

the following descriptors: “vascular dementia”, “neurological assessment”, “cardiovascular manifestations”, “risk factors” and “treatment”. The search strategy was adapted for each database, using the Boolean operators AND and OR. The search was limited to articles published in the last 10 years (from 2013 to 2023), in English or Portuguese. The eligibility criteria for the studies were defined according to the research question, following the PICO (Population, Intervention, Comparison and Outcome) format. The inclusion criteria were:

- Studies that addressed the topic of vascular dementia and its neurological and cardiovascular implications.
- Studies that evaluated the effects of pharmacological or non-pharmacological interventions in the prevention, diagnosis or treatment of vascular dementia.
- Studies that used appropriate methodological designs to answer the research question, such as randomized clinical trials, observational studies or cross-sectional studies.
- Studies that presented sufficient and reliable data for the extraction and analysis of results.
- Studies that were relevant to the objective of the review.

The exclusion criteria were:

- Studies that were not original (reviews, editorials, letters to the editor, etc.).
- Studies that did not present sufficient or reliable data for the extraction and analysis of results.
- Studies that had an inadequate methodology or that presented a high risk of bias.
- Studies that were not relevant to the objective of the review.
- Studies that were duplicated in different databases.

The study selection process was carried out in two stages: in the first, the titles and abstracts of the articles identified in the searches were evaluated, excluding those that did not meet the eligibility criteria; in the second, the full texts of the articles selected in the first stage were evaluated, confirming their inclusion or exclusion in the review. The selection process was carried out by two independent reviewers, and disagreements were resolved by consensus or by a third reviewer.

Results:

15 studies were selected. The epidemiology of vascular dementia varies according to the diagnostic criteria used, the assessment methods and the characteristics of the population studied. The global prevalence of vascular dementia is estimated to be 3.9% among people aged 60 and over. The annual incidence of vascular dementia is around 1.5 cases per 1000 people aged between 65 and 74 years, increasing to 12.2 cases per 1000 people aged between

85 and 94 years. Vascular dementia is more common in men than women, and in people with low educational and socioeconomic status.

Subcortical ischemic vascular cognitive impairment and dementia are caused by damage to the small blood vessels that supply deep regions of the brain. This damage can lead to the formation of small cavities called lacunae or degeneration of the brain's white matter. The most common symptoms are: difficulty solving problems, slowness in processing information, apathy, disinhibition and motor changes.

Furthermore, multi-infarct dementia is caused by several strokes that affect different areas of the brain. These strokes can be symptomatic or asymptomatic, but they cause progressive loss of cognitive functions. Symptoms vary depending on the location and size of the infarcts, but may include: memory loss, language difficulties, visuospatial changes and emotional changes.

Post-stroke dementia is dementia that develops shortly after or within six months of a stroke. Stroke can be ischemic or hemorrhagic, and affects an area of the brain that is vital for cognition. Symptoms depend on the extent of brain damage, but may involve: deficits in attention, memory, language, executive functions and praxis.

Mixed dementia is one that combines characteristics of vascular dementia with another form of dementia, usually Alzheimer's disease or dementia with Lewy bodies. Mixed dementia is very common among the elderly and can represent up to 50% of dementia cases. The symptoms are a combination of the symptoms of the two forms of dementia involved.

The anamnesis should investigate the patient's clinical history, current or past cardiovascular risk factors, family history of dementia or cardiovascular diseases, the onset and evolution of cognitive and behavioral symptoms, the impact of these symptoms on the patient's daily life and their caregivers, among other relevant information. The physical examination should evaluate vital functions (blood pressure, heart rate and respiratory rate), the patient's general condition (nutrition, hydration, hygiene), the presence of focal neurological deficits (such as hemiparesis, aphasia, apraxia), signs of disease cardiovascular diseases (such as heart murmurs, peripheral edema) or other comorbidities.

Cognitive assessment must cover the main mental functions (such as memory, attention, language, reasoning), using standardized tests validated for the target population. The

functional assessment must verify the patient's degree of independence in basic activities (such as eating, personal hygiene) and instrumental activities (such as using the telephone, handling money) of daily life. Complementary exams should include laboratory tests (such as complete blood count, fasting blood glucose, lipid profile) to assess the patient's general condition and identify possible secondary or reversible causes of dementia. Imaging tests should include computed tomography or magnetic resonance imaging of the skull to visualize brain lesions caused by vascular compromise and estimate the volume of affected white matter.

The differential diagnosis of vascular dementia is based on clinical, neuropsychological and neuroimaging criteria, which allow distinguishing the distinctive characteristics of vascular dementia from other forms of dementia. Some of the clinical criteria are: the sudden or gradual onset of cognitive symptoms, the presence of focal neurological deficits, the association with risk factors or cardiovascular events, the fluctuation of the clinical course and the partial response to medications for Alzheimer's disease. Some of the neuropsychological criteria are: the predominance of deficits in executive functions, attention and processing speed, in relation to deficits in episodic memory and language, which are more characteristic of Alzheimer's disease. Some of the neuroimaging criteria are: evidence of ischemic or hemorrhagic lesions in the brain, subcortical or periventricular atrophy, increased volume of the cerebral ventricles and reduced cerebral blood flow.

The treatment of vascular dementia, which aims to prevent disease progression and alleviate symptoms, involving pharmacological and non-pharmacological interventions. There is no cure for vascular dementia, but some measures can slow or stabilize cognitive decline and improve the quality of life of patients and their caregivers. Pharmacological interventions may include medications to improve cognitive function (such as cholinesterase inhibitors or memantine), to control cardiovascular risk factors (such as antihypertensives, hypoglycemic drugs, or statins), or to prevent or treat complications (such as anti-inflammatories, antidepressants or antipsychotics). Non-pharmacological interventions may include physical, cognitive and social activities, as well as nutritional, educational and environmental guidance for patients and their caregivers. Furthermore, it is important to prevent new episodes of stroke by controlling modifiable risk factors and regular medical monitoring.

The prevention of vascular dementia, which involves modifying cardiovascular risk factors, promoting healthy lifestyle habits, such as physical activity, balanced diet and cognitive and social stimulation, in addition to regular medical monitoring. Prevention of

vascular dementia is essential to reduce the incidence and prevalence of this condition, as well as to reduce the impact on public health and society. Some preventive measures that can be adopted are: regularly measuring blood pressure and blood glucose, keeping cholesterol and triglyceride levels within normal limits, avoiding excessive alcohol consumption and smoking, practicing moderate and regular physical activity, adopting a diet balanced and healthy, rich in fruits, vegetables and fiber and low in saturated fats and salt, stimulate the brain with intellectual, cultural and recreational activities, maintain a good social relationship with family and friends and consult the doctor periodically and follow the guidelines for use of medications that can prevent or treat cardiovascular diseases.

Regular medical monitoring and control of cardiovascular risk factors are essential to prevent or delay complications of vascular dementia. Furthermore, it is important to offer psychological and social support to patients and caregivers to reduce stress, overload and isolation. Some measures that can help are: participating in support or therapy groups, seeking help from professionals or family members to share care, maintaining a structured routine adapted to the patient's needs, encouraging pleasurable and meaningful activities for both.

Assessing the quality of life of patients with vascular dementia and their caregivers is important to identify the needs, difficulties and resources of each case, as well as to plan appropriate interventions and evaluate results. There are several validated instruments to measure quality of life in this population, such as the Alzheimer's Disease Quality of Life Scale (QOL-AD), the Dementia Quality of Life Scale (DEMQOL), and the Caregiver Quality of Life Scale . (CQOLC). Improving the quality of life of patients with vascular dementia and their caregivers depends on an integrated and multidisciplinary approach, which involves clinical, educational, environmental and emotional aspects.

Conclusion:

Vascular dementia is a form of dementia caused by brain damage resulting from problems with blood flow to the brain. It is the second most common cause of dementia after Alzheimer's disease, affecting around 10% of elderly people. Vascular dementia can manifest itself in different ways, depending on the location and extent of brain lesions. Some of the most common symptoms are: memory loss, difficulty concentrating, mood changes, mental confusion, language problems, spatial and temporal disorientation, among others. Vascular

dementia has a significant impact on the quality of life of patients and their caregivers, as well as on society and the healthcare system.

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Prevention of vascular dementia involves modifying cardiovascular risk factors, promoting healthy lifestyle habits, such as physical activity, balanced diet and cognitive and social stimulation, in addition to regular medical monitoring. Prevention of vascular dementia is essential to reduce the incidence and prevalence of this condition, as well as to reduce the impact on public health and society.

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