

Vascular Dementia: Definitions, Origins, Symptoms, Diagnosis and Treatments

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Abstract: Vascular dementia corresponding to intellectual degradation significant enough to disrupt daily life, attributed to cerebral lesions of vascular origin. They are the second cause of dementia after Alzheimer's disease in the defeated countries. Their diagnosis is made difficult, on the one hand by the diversity of lesions potentially responsible for cognitive disorders and on the other hand by their frequent association with Alzheimer's disease. No treatment, other than preventive treatment, has been validated in vascular dementia. Several concepts have attempted or are attempting to characterize vascular dementias ("multiple infarct dementias", "vascular cognitive impairment", "vascular cognitive impairment").

Keywords: Alzheimer's disease, cerebral blood flow, cognitive dysfunction, small vessel disease, stroke.

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INTRODUCTION

Unlike Alzheimer's disease, which mainly causes memory problems, vascular dementia is characterized more by difficulties in reasoning and planning actions as well as by mood fluctuations.

In this article, we present all the essential information you need to know to better understand this form of dementia of vascular origin: its symptoms, its causes, the means to diagnose it and the solutions that can be put in place to improve the daily lives of patients.

What is Vascular Dementia?

Vascular dementia is a decline in cognitive functions that follows brain damage of vascular origin. The main cognitive functions affected by this form of dementia are: memory; thought; judgment; and learning [1].

The Different forms of Vascular Dementia

It is possible to classify different forms of vascular dementia according to: the type of lesion present in the brain (narrowing, blockage or hemorrhage of a blood vessel); the size of the affected

blood vessel (small, medium or large); and the location of the lesion(s) within the brain [2].

In this way, we can distinguish different forms of vascular dementia such as:

- Multiple infarct dementias (also known as subcortical vascular dementia) which is characterized by multiple fillings in medium-sized blood vessels within the brain [3];
- Binswanger's dementia (also known as subcortical vascular dementia) which is characterized by blockages of small blood vessels present in the white matter of the brain [4];
- Hereditary vascular dementia which is characterized by the blockage of very small blood vessels and which is caused by the mutation of genes [5];

What is the difference between Vascular Dementia and Alzheimer's disease?

Alzheimer's disease and vascular dementia differ in several respects. First of all, Alzheimer's disease is linked to the degeneration of certain neurons (primarily those located in the hippocampus, a cerebral structure strongly involved in memorization) while

vascular dementia is caused by a damage to the cerebral vascular system. In this way: while Alzheimer's disease sets in insidiously, vascular dementia arises suddenly, mainly following a cerebrovascular accident (or stroke) [6].

In Alzheimer's disease, the first symptoms generally affect memory, whereas in vascular dementia, the symptoms are more varied and memory is not affected until very late. The main difficulties experienced by a person who suffers from vascular dementia mainly concern executive functions (ability to reason, to plan and perform actions, to be attentive, etc.) [7].

In addition, it should be noted that people with vascular dementia necessarily suffer from another pathology which is the cause of vascular disorders (such as atherosclerosis, diabetes, arterial hypertension, etc.) [8]. On the other hand, people with Alzheimer's disease do not necessarily suffer from another pathology. Finally, in Alzheimer's disease, the symptoms develop gradually, whereas in vascular dementia, they evolve suddenly, in stages and in a completely unpredictable way.

Some Figures on Vascular Dementia

According to several studies, vascular disorders are the second leading cause of dementia in the elderly. Indeed, vascular dementia would represent between 10 and 20% of all dementias combined. Since cerebrovascular accidents (CVAs) affect men more often than women, it can be considered that vascular dementia has a certain male prevalence [9]. Generally, it appears after the age of 70. In some cases, the first symptoms of vascular dementia can appear within three months of a stroke [10]. In other cases, symptoms of vascular dementia may come on suddenly and be linked to other health conditions that affect blood flow (such as high blood pressure, being overweight, type 2 diabetes, or low cholesterol) [11].

What Causes Vascular Dementia?

Most of the time, it is the succession of a cerebrovascular accident (or several micro strokes) which is at the origin of the degradation of the cerebral tissue. Over time, this deterioration can eventually lead to the development of vascular dementia [12]. However, in other cases, vascular dementia can also appear in conjunction with other types of vascular lesions or a rare genetic disease that affects blood vessels such as CADASIL syndrome, for example (Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy) [13].

Thus, several risk factors can play a very important role in the occurrence of vascular dementia, such as:

- Arterial hypertension, which corresponds to an abnormal increase in blood pressure in the arterial walls;

- Atrial fibrillation, which corresponds to a heart disorder causing abnormal acceleration of the heart;
- Atherosclerosis, which is characterized by deposits of fatty substance in the walls of the arteries and which causes a decrease in blood flow;
- Dyslipidemia, which is characterized by an abnormally high level of lipids (and in particular cholesterol) in the blood;
- Diabetes, which corresponds to an abnormally high level of sugar (glucose) in the blood;
- A lifestyle that is not very healthy: smoking, obesity (or a diet particularly rich in bad fats), sedentary lifestyle.

As the pathologies listed above can damage the blood vessels located within the brain, they risk causing excessive blood clotting or, on the contrary, the formation of blood clots in certain parts of the latter. The brain is then deprived of food and oxygen, which leads to the weakening, or even the total disappearance, of the neurons located in the brain regions affected by these blood disorders.

What are the Symptoms of Vascular Dementia?

Cognitive and Behavioral Disorders

Vascular dementia is mainly characterized by:

- Slowing of thought (bradypsychia);
- Difficulty in reasoning, planning actions and performing complex tasks (such as operating certain devices);
- Visuo-spatial difficulties (perception disorders) or a certain agnosia (difficulty recognizing familiar objects or faces);
- Language disorders, whether read, spoken or written (however less important than those present in Alzheimer's disease);
- Memory problems (however less important than those present in Alzheimer's disease);
- Mood swings (withdrawal, anxiety, irritability, lack of motivation, depression);
- Greater fatigue;
- Difficulty managing emotions (crying or laughing in inappropriate situations, for example).

It is the difficulties in planning, reasoning and carrying out certain tasks that are the most disabling on a daily basis [14]. In addition, cognitive functions can be more or less impacted depending on the area of the brain that is affected by blood disorders. This means that most of the time, people with vascular dementia keep some of their cognitive abilities completely unscathed. In cases where they are aware of their cognitive difficulties, they may be prone to depression. The psychological dimension is therefore very important to consider in the management of vascular dementia [15].

Physical and Motor Disorders

In addition, if the person with vascular dementia has strokes, they may also suffer from physical symptoms such as:

- Weakening or paralysis of a limb (such as a leg, arm or part of the face, for example);
- Motor slowing;
- Difficulty coordinating movements;
- Aphasia (total or partial loss of ability to understand language and speak);
- Homonymous hemianopsia (loss of vision in half of the visual field of one eye or both eyes) or blindness (total loss of vision);
- Urinary incontinence;
- Swallowing disorders.

In the context of hereditary vascular dementia, people who have it can also suffer from:

- Migraine;
- Hair loss;
- Weakening of the vertebrae and the discs between them;
- Other strokes.

How to Diagnose Vascular Dementia?

To diagnose vascular dementia, we use [16]:

- A clinical examination (identification of the symptoms through questions to the person who is suffering and their relatives, taking into account the medical history then examination of the symptoms);
- Physical examinations (exercises and tasks to be performed);
- A mental state observation test (questions and cognitive tasks to be performed);
- Computed tomography (to obtain thin-section images of brain tissue) to check the general condition of the brain and determine the nature of the lesions present within it;
- Magnetic resonance imaging (MRI) to identify the possible presence of a stroke, to distinguish it (ischemic or hemorrhagic stroke) and to rule out other causes (such as another form of dementia or Alzheimer's disease).

In some cases, a neuropsychological test may also be requested. Indeed, as the latter is particularly complete, it will make it possible to analyze all the cognitive functions with precision and thus rule out other pathologies with similar symptoms (such as other forms of dementia). When the diagnosis of vascular dementia is made, doctors usually ask the person who has it to undergo a series of tests to detect the possible presence or the possible risk of stroke [17].

Blood tests can also help identify the presence of:

- Diabetes;
- Dyslipidemia;

- Other vascular disorders that can eventually cause a stroke.

In addition, genetic tests can also make it possible to detect a possible hereditary vascular dementia.

What is the difference between Ischemic Stroke and Hemorrhagic Stroke?

An ischemic stroke (or cerebral infarction) occurs when a clot blocks a blood vessel in the brain. As this clot interferes with blood circulation, it prevents neurons from receiving oxygen and the nutrients necessary to function properly. In 85% of cases, the stroke is of ischemic origin. A hemorrhagic vascular accident occurs following the rupture of a blood vessel (also called hemorrhage), which extends throughout an entire part of the brain. As a cerebral hemorrhage can also lead to an interruption of blood circulation in the brain, it is capable of causing an absence of oxygen and nutrient supply within the neurons. In 15% of cases, the stroke is of hemorrhagic origin [18].

What Evolution and what Life Expectancy with Vascular Dementia?

In vascular dementia, the disease progresses in stages and the symptoms suddenly intensify. When vascular dementia has been present for some time, it can be confused with Alzheimer's disease (to the extent that memory problems begin to be present). It is estimated that in 61% of cases of vascular dementia, the life expectancy of the sufferer is around 5 years (due to concomitant blood disorders) [19].

What is the Treatment for Vascular Dementia?

Strictly speaking, there is no treatment that can cure vascular dementia. But one of the best ways to soothe the symptoms of vascular dementia and prevent it from getting worse is to prevent vascular risks in general.

Thus, after the diagnosis of vascular dementia, the person who suffers from it can obtain advice (in hygiene and dietetics, for example) from health professionals (such as a neurologist or a cardiologist) in order to prevent vascular risks; stabilize the progression of the disease: and limit the intensity of symptoms.

This advice could, for example, consist of: implement smoking cessation; adopt a more balanced diet adapted to the disease; put in place the means to control blood pressure, cholesterol and blood sugar on a daily basis; establish the practice of regular physical activity [20].

Drug Treatments

But even if no drug is currently able to cure vascular dementia, some treatments can help slow the progression of the disease and reduce certain cognitive symptoms. In some cases, drugs such as

anticholinesterases and memantine can be effective if and only if the vascular dementia is associated with a neurodegenerative disease such as Alzheimer's disease (mixed dementia).

Also, when vascular dementia is associated with depression, antidepressants can also help alleviate mood and behavioral disorders [21].

Non-Drug Methods

In addition, other non-drug solutions can also be considered: to soothe cognitive disorders: the person can regularly perform cognitive stimulation sessions with the help of an occupational therapist or a speech therapist; to alleviate mood disorders: the person can benefit from psychological follow-up with a psychiatrist or a clinical psychologist.

CONCLUSION

The current revision of the criteria for vascular dementia highlights the concept of cognitive disorders of vascular origin where impairment of executive functions predominates over memory disorders, and where dementia is no longer mandatory. A classification according to the etiopathogenic mechanisms should make it possible to constitute more homogeneous groups of patients in order to evaluate the effectiveness of new molecules, since the therapies tried so far have had only one modest effect.

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