

Exploring the Narrative Account of Vascular Dementia: Prequels, Sequels, Parasequels and Consequels in Neurodegenerative Development

Kok Hwee Chia ¹

¹Merlion Paediatric Therapy Clinic, 360 Dunearn Road, Singapore

Abstract – This paper explores the narrative account of vascular dementia, using prequels, sequels, parasequels and consequels to illustrate its neurodegenerative development. It analyzes vascular aphasia, lethologica, prosopagnosia, and Charles Bonnet's Syndrome, unravelling the progression of vascular dementia. Drawing from literature and clinical observations, it examines the condition's narrative arc, showcasing diverse manifestations and trajectories. By conceptualizing vascular dementia narratively, the paper offers insights into cognitive impairment's evolving nature and the interplay of neurological symptoms. Understanding this narrative framework enhances clinical comprehension and promotes holistic approaches to diagnosis, treatment, and caregiver support.

Keywords – aphasia, Charles Bonnet's syndrome, lethologica, prosopagnosia, vascular dementia.

1. Introduction

In general, dementia is described as a syndromic disorder characterized by a decline in cognitive function, affecting memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgment [1].

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Corresponding author: Kok Hwee Chia,
Merlion Paediatric Therapy Clinic, 360 Dunearn Road,
Singapore

Email: chiakokhwee@gmail.com

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It is often progressive and interferes significantly with daily functioning [2]. Today, dementia is the fastest-growing public health problem, affecting around 50 million people throughout the world. According to the World Health Organization [3], approximately 10 million new cases emerge annually, with projections indicating a threefold increase by 2050. Dementia stands as a significant contributor to disability and dependency among the elderly, profoundly impacting the lives of those affected, along with their caregivers and families.

Dementia encompasses several main types, each with distinct symptoms and causes. Alzheimer's Disease (AD) is the most prevalent [4], marked by amyloid plaques and tau tangles in the brain, resulting in memory loss and cognitive decline [5]. Vascular Dementia (VaD) stems from reduced blood flow to the brain [6], often due to strokes, manifesting in planning difficulties and memory loss [7]. Lewy Body Dementia (LBD) is characterized by abnormal protein deposits, leading to hallucinations and cognitive fluctuations [8]. Frontotemporal Dementia (FTD) involves damage to the frontal and temporal lobes, causing changes in personality and language abilities [9]. Mixed Dementia (MxD) occurs when multiple types coexist, such as AD and VaD [10], [11]. Creutzfeldt-Jakob Disease (CJD), a rare and fatal disorder, results from abnormal prion proteins, leading to rapid cognitive decline and movement disorders [12], [13].

2. Vascular Dementia & Its Causes

Vascular Dementia (VaD), first coined by Oskar Fischer, a German psychiatrist, in 1898 [14], and the second most prevalent form of dementia worldwide after Alzheimer's Disease, accounts for about 10% of cases [15], [16] and constitutes approximately 20% of all dementia cases, characterized by a decline in cognitive function due to impaired blood flow to the brain, often associated with a history of stroke [17], [18].

Initially referred to as multi-infarct dementia [19], it was believed to result from cumulative tissue damage caused by ischemic strokes [20], [21], [22], [23]. However, diverse characteristics have led to various measures for diagnosis [24], [25], with the California Alzheimer's Disease Diagnostic and Treatment Centers (ADDTC) criteria [26] and National Institute of Neurological Disorders and Stroke-Association Internationale pour la Recherche et l'Enseignement en Neurosciences (NINDS-AIREN) criteria [27] being most clinically useful. Diagnosis involves assessing cognitive decline in multiple domains, functional independence, history of stroke [28], [29], [30], and cardiovascular risk factors, including atrial fibrillation, diabetes, hyperlipidemia, hypertension, and smoking [31]. Neuropathological confirmation may be necessary for definitive diagnosis [32].

Impaired blood flow to the brain, caused by factors such as atherosclerosis [33], [34], small vessel disease [35], [36], stroke [37], [38], microinfarcts [5], [39], cerebral hemorrhage [35] [40], and chronic hypoperfusion [41], [42], can lead to decreased oxygen and nutrient supply, culminating in cognitive decline and the eventual onset of VaD. These factors either narrow blood vessels, damage them, or cause blockages, disrupting blood flow and leading to tissue damage and cognitive impairment.

The latest edition of the DSM-5 has replaced the term 'vascular dementia' with 'major neurocognitive disorder' [43]. It is linked to reduced blood flow to the brain, often due to stroke or small vessel disease, and shows signs like memory loss, confusion, and impaired judgment. In the ICD-10-CM, the diagnostic code for VaD is F01.0 [44], with new codes for various types of VaD [45]. The ICD-11, effective since January 2022 [46], offers different diagnostic codes, but F01.0 remains widely used without specific updates.

3. Nosological Extensions from Vascular Dementia

In this paper, the author has chosen to delve into four neurological impairments linked to VaD, specifically aphasia (vascular aphasia) [47], [48], Charles Bonnet's Syndrome (CBS) [49], [50], lethologica [51], [52], and prosopagnosia [53], [54]. These conditions, while not typically considered co-existing with VaD, can complicate its manifestations, impacting various aspects of perception and cognition. As mentioned earlier, VaD, characterized by cognitive decline due to brain blood vessel damage, often stemming from conditions like stroke or small vessel disease, leads to issues such as memory loss, reasoning difficulties, and communication challenges.

The author underscores the role of impaired blood flow to the brain, resulting from cardiovascular conditions like hypertension, diabetes, smoking, and high blood cholesterol, in contributing to VaD.

There are four nosological extensions from VaD and they are briefly described as follows: Aphasia (or vascular aphasia) entails difficulties in language comprehension and production, impacting both spoken and written communication due to damage to language areas of the brain [47], [48]. Lethologica, a temporary inability to recall words or phrases, contrasts with VaD, a cognitive disorder caused by reduced blood flow to the brain [51], [52]. Charles Bonnet's Syndrome (CBS) involves visual hallucinations in individuals with visual impairment, potentially caused by damage to visual processing areas [49], [50], which can disrupt the magnocellular pathway responsible for processing motion and spatial information [55]. Prosopagnosia impairs facial recognition that might lead to the delusions of Capgras Syndrome [56], [57], [58] and may also exacerbate challenges in social interactions [53], [54]. Both CBS and prosopagnosia can co-occur alongside VaD due to common risk factors such as aging or cardiovascular challenges.

4. The Staging System of Vascular Dementia

Currently, there is no universally agreed-upon staging system for VaD like some other forms of dementia, such as Alzheimer's disease. Nonetheless, the Dementech Neurosciences Clinical Academic Centre (DNCAC) [59] in London, UK, has proposed a 7-stage model for VaD progression. These stages encompass the evolving symptoms and cognitive decline: (i) Cognitive changes; (ii) Mild cognitive impairment (MCI); (iii) Early stage; (iv) Moderate stage; (v) Severe stage; (vi) End-stage; and (vii) Advanced or palliative care stage. These stages offer clinicians and caregivers' valuable insights into the progression of VaD symptoms, facilitating tailored interventions and support at each stage to enhance the individual's quality of life.

5. The Narrative Account of Vascular Dementia

The DNCAC's 7-stage model of progression in VaD illustrates the degeneration of the condition over time. In contrast, the narrative account of VaD, abbreviated as NAVaD, presents a conceptualization of the condition's progression through a series of events depicted as a story or narrative account. The NAVaD approach emphasizes the role of vascular factors, such as strokes or small vessel disease, in causing cognitive decline and dementia, highlighting how these insults disrupt brain function and leads to cognitive impairment in a stepwise manner.

Unlike the structured framework of the DNCAC's 7-stage model, the narrative account captures the unique experiences, behaviors, and interactions of patients with VaD within the context of their daily lives, emphasizing the importance of managing vascular risk factors to prevent or delay the onset of VaD.

There is still a need to keep a narrative account of the degenerative progress of a patient with VaD because it offers a more holistic understanding of the individual's journey. There are no two patients with VaD alike. Hence, the NAVaD allows the inclusion of subjective experiences, emotional responses, and contextual factors that may not be fully captured by a standardized staging system. This rich narrative helps healthcare professionals tailor care plans, provide personalized support, and better comprehend the individual's changing needs and challenges throughout the course of the disease.

The NAVaD approach intertwines with prequel, sequel, parasequel, and consequel forms consisting of the four selected nosological extensions from VaD as discussed earlier, namely aphasia, lethologica, Charles Bonnet's Syndrome (CBD) and prosopagnosia. The four terms - prequel, sequel, parasequel and consequel - are used here to describe different types of narrative continuations or extensions, which are briefly explained below:

- **Prequel:** This is a narrative account that takes place before the events of an existing condition or situation. In fiction, it explores events or characters that precede those in the original work. For example, *The Hobbit* is a prequel to *The Lord of the Rings* trilogy, as it chronicles events that happened before the commencement of the journey of the hobbit Frodo.
- **Sequel:** This is a narrative account that continues the main storyline from where the original story left off. Again, in fiction, it follows the events and characters after the conclusion of the original work. For instance, *The Empire Strikes Back* is a sequel to *Star Wars: A New Hope*, continuing the story of Luke Skywalker, Princess Leia, and Darth Vader.
- **Parasequel:** This term is used to describe a separate narrative account that exists within the same main storyline of the original narrative account, just like in fiction, as another artistic or literary work (usually a film, book, or video game) but is not a direct sequel or prequel. It might focus on different condition or situations that intersect with the VaD. Essentially, it is a narrative account that is parallel to the main storyline.
- **Consequel:** The term consequel is a less commonly used term that combines elements of both prequels and sequels. It refers to a narrative

account that takes place concurrently with the events of the original account, providing an alternate perspective or exploring events that happen simultaneously. The consequel can offer new insights or fill in gaps in the original narrative account. An example of a consequel could be a companion novel or a spin-off series that follows different characters during the same timeframe as the original work.

In summary, while prequels, sequels, parasequels and consequels all involve extending a narrative account of a client with VaD, they differ in terms of their temporal relationship to the original story and the focus of their narrative continuation.

Here is an example of a hypothetical case of a client diagnosed with VaD and how the NAVaD approach can be used in recording or reporting the case through a series of narrative accounts over a period of time, from prequel through sequel and parasequel to consequel. For the ease of narrative illustration here, let us call the client John – the protagonist in this case study.

- **Prequel - Vascular Aphasia:** The protagonist, John, is struggling with language comprehension and expression. Initially, it is mild, causing occasional difficulty in finding words or understanding speech. Over time, it worsens, impacting his ability to communicate effectively.
- **Sequel – Lethologica:** As John's vascular aphasia progresses, he starts experiencing lethologica, where he frequently forgets names and specific words. This exacerbates his communication challenges, leading to frustration and isolation as he struggles to convey his thoughts and ideas.
- **Parasequel – Prosopagnosia:** Simultaneously, John develops prosopagnosia, the inability to recognize familiar faces. He soon develops Capgras delusion - a psychiatric disorder - in which John holds the belief that a close friend, family member, or significant other has been substituted by an identical impostor. This adds another layer of difficulty to his interactions, as he struggles to identify friends, family, and even himself in the mirror. Social situations become increasingly stressful and confusing.
- **Consequel - Charles Bonnet's Syndrome:** As John's cognitive decline continues, he begins experiencing Charles Bonnet's Syndrome (CBS), where he starts hallucinating vivid, complex visual images. These hallucinations further disrupt his perception of reality, making it challenging to distinguish between what is real and what is not.
- **Main Storyline - Vascular Dementia:** Throughout these unique experiences, underlying VaD silently progresses, causing damage to John's brain due to reduced blood flow.

The combination of vascular aphasia, lethologica, CBS and prosopagnosia, along with other VaD symptoms, such as memory loss and impaired judgment, paints a complex and challenging picture of John's cognitive decline.

- Conclusion of the Narrative Account: John's journey through these intertwined neurodegenerative disorders serves as a poignant reminder of the multifaceted nature of dementia. It highlights the interconnectedness of cognitive functions and the profound impact that VaD, along with its accompanying conditions, can have on an individual's life.

6. Practical Application of the NAVaD Approach

Using NAVaD approach as a practical case study offers a comprehensive framework for understanding and monitoring a patient's neurodegeneration over time. This approach integrates various aspects of a vascularly demented patient's history, cognitive decline, and neuroimaging findings into a cohesive narrative, facilitating both diagnosis and ongoing management. It can be applied in assessment and management of the neuro-degenerative disorder to provide a comprehensive account as follows:

- Initial assessment: The narrative account begins with a detailed assessment of the patient's medical history, including risk factors for VaD such as hypertension, diabetes, smoking, and previous strokes (see [60] for an example). Understanding the patient's vascular risk profile helps in contextualizing their cognitive symptoms.
- Clinical presentation: The narrative account considers the patient's presenting symptoms, which often include executive dysfunction, attention deficits, and impairment in activities of daily living. By tracking the progression of these symptoms over time, clinicians can identify patterns of cognitive decline characteristic of VaD.
- Neuroimaging: Neuroimaging plays a crucial role in the narrative account by providing objective evidence of vascular pathology in the brain [61], [62]. MRI scans may reveal infarcts, white matter hyperintensities, or cerebral microbleeds, which contribute to the overall vascular burden and help, corroborate the diagnosis of VaD.
- Cognitive testing: Serial cognitive testing, such as the Mini-Mental State Examination (MMSE) [63], is an essential component of monitoring disease progression in VaD. The narrative account incorporates standardized neuropsychological assessments to quantify changes in

cognitive function over time, allowing clinicians to track the trajectory of neurodegeneration.

- Functional status: Assessing changes in the patient's functional status is integral to the NAVaD approach. Declines in instrumental activities of daily living (IADLs) [64], such as managing finances or medication adherence, may precede more severe cognitive impairment, providing important prognostic information for the narrative account.
- Risk factor management: Another key aspect of the narrative account in the NAVaD approach is the management of vascular risk factors to mitigate further cognitive decline [65]. This may involve aggressive control of hypertension, glycemic control in diabetes, smoking cessation, and lipid-lowering therapy to reduce the risk of recurrent strokes and vascular events.
- Multidisciplinary approach: Given the complex interplay between vascular pathology and cognitive decline, the NAVaD approach advocates for a multidisciplinary approach involving gerontologists, neuropsychologists, geriatricians, neurologists, and other specialists [66], [67], including gerontological counselors, geriatric nurses and palliative care specialists. This collaborative effort ensures comprehensive assessment and personalized management tailored to the individual patient's needs.
- Longitudinal monitoring: Finally, the NAVaD approach (via the narrative account) emphasizes the importance of longitudinal monitoring to track disease progression and treatment response over time. Regular follow-up visits enable clinicians to adjust management strategies based on evolving clinical and neuroimaging findings, optimizing outcomes for patients with VaD.

In summary, the NAVaD approach provides a practical framework for understanding and monitoring neurodegeneration in affected patients. By integrating clinical, neuroimaging, and functional data into a cohesive narrative account, this approach over a period of time facilitates accurate diagnosis, personalized management, and longitudinal record as well as assessment of disease progression. The narrative account is also useful for providing a psychoecosystemic autopsy, which is an investigative approach that examines the psychological, ecological, and systemic factors contributing to the death of a patient with VaD. It seeks to understand how individual mental health, environmental influences, and systemic factors interacted to lead to the outcome, and, more importantly, to improve the care and support services for patients with VaD.

7. Implications of the NAVaD Approach

The narrative account of vascular dementia (NAVaD) proposes that cognitive decline results from the cumulative effects of multiple vascular insults rather than a single large stroke. There are four implications of the NAVaD approach as listed and briefly described below:

- **Individualized treatment approaches:** It is crucial to note that understanding VaD as a result of multiple vascular insults allows tailored treatment plans based on the unique history and risk factors of each patient.
- **Preventive strategies:** Recognizing the role of vascular risk factors highlights the importance of preventive measures such as lifestyle changes and managing conditions like hypertension, diabetes, and high cholesterol to reduce the risk of VaD.
- **Early intervention:** Identifying vascular insults early and addressing them promptly can potentially slow down the progression of cognitive decline.
- **Interdisciplinary care:** The NAVaD approach emphasizes the need for an interdisciplinary collaboration among neurologists, geriatricians, cardiologists, and other specialists to manage vascular risk factors effectively.

8. Limitations of the NAVaD Approach

In addition, the author has also identified four key limitations of the NAVaD approach as mentioned below:

- **Complexity of diagnosis:** The NAVaD approach adds complexity to the diagnosis of VaD as it requires detailed assessment of vascular risk factors and their cumulative effects on cognition.
- **Limited treatment options:** While preventive measures can help reduce the risk of VaD, treatment options for slowing its progression are limited compared to other forms of dementia like Alzheimer's Disease.
- **Overlap with other conditions:** Vascular insults may also contribute to other neurodegenerative disorders, leading to overlap in clinical presentation and complicating diagnosis and treatment.
- **Need for longitudinal studies:** Longitudinal studies are necessary to validate the NAVaD approach and better understand the temporal relationship between vascular insults and cognitive decline over time.

9. Conclusion

The condition of VaD presents a significant challenge in the landscape of age-related cognitive decline, constituting a substantial portion of dementia cases globally. The NAVaD approach emerges as a valuable tool for comprehensively understanding and managing this complex condition. By emphasizing the role of vascular factors and integrating various neurological impairments, such as vascular aphasia, lethologica, prosopagnosia, and Charles Bonnet's Syndrome (CBS), the NAVaD approach provides a cohesive framework for clinicians and researchers alike.

In addition, the NAVaD approach underscores the multifactorial nature of VaD, highlighting the cumulative impact of vascular insults on cognitive function. Through its narrative account, the NAVaD approach offers insights into disease progression, facilitating accurate diagnosis, personalized management, and longitudinal assessment for a patient with VaD. Furthermore, it emphasizes the importance of addressing vascular risk factors to mitigate cognitive decline and delay the onset of VaD.

However, it is also important to acknowledge the limitations of the narrative account established through the NAVaD approach, including its reliance on clinical data and neuroimaging findings, which may not always capture the full spectrum of disease manifestations. Additionally, while the NAVaD approach provides a valuable conceptual framework, further research is needed to validate its utility in diverse clinical settings and populations.

Despite these challenges, the NAVaD approach holds promise as a practical tool for guiding clinical decision-making and advancing our understanding of VaD, and also to improve treatment and management for patients with VaD by going through their comprehensive record of narrative accounts open for a psychoecodsystemic autopsy. By integrating the multiple facets of the neuro-degenerative disease into a cohesive narrative account, the NAVaD approach promises a holistic approach to managing the complexities of VaD and improving patient outcomes in the face of this significant health concern.

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