

The neurological illness of Friedrich Nietzsche

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Abstract

Background : Friedrich Nietzsche (1844-1900), one of the most profound and influential modern philosophers, suffered since his very childhood from severe migraine. At 44 he had a mental breakdown ending in a dementia with total physical dependence due to stroke. From the very beginning, Nietzsche's dementia was attributed to a neurosyphilitic infection. Recently, this tentative diagnosis has become controversial.

Objective : To use historical accounts and original materials including correspondence, biographical data and medical papers to document the clinical characteristics of Nietzsche's illness and, by using this pathography, to discuss formerly proposed diagnoses and to provide and support a new diagnostic hypothesis.

Materials : Original letters from Friedrich Nietzsche, descriptions by relatives and friends, and medical descriptions. Original German sources were investigated. Biographical papers published in medical journals were also consulted.

Results : Nietzsche suffered from migraine without aura which started in his childhood. In the second half of his life he suffered from a psychiatric illness with depression. During his last years, a progressive cognitive decline evolved and ended in a profound dementia with stroke. He died from pneumonia in 1900. The family history includes a possible vascular-related mental illness in his father, who died from stroke at 36.

Conclusions : Friedrich Nietzsche's disease consisted of migraine, psychiatric disturbances, cognitive decline with dementia, and stroke. Despite the prevalent opinion that neurosyphilis caused Nietzsche's illness, there is lack of evidence to support this diagnosis. Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) accounts for all the signs and symptoms of Nietzsche's illness. This study adds new elements to the debate and controversy about Nietzsche's illness. We discuss former diagnoses, comment on the history of a diagnostic mistake, and integrate for the first time Nietzsche's medical problems.

Key words : Nietzsche ; history of neurology ; CADASIL ; hypothesis.

Introduction

Friedrich Wilhelm Nietzsche (further called Nietzsche) was born October 15, 1844 in Röcken,

Saxony, Germany (1). He is considered as one of the most influential modern thinkers of the last two centuries. He had and still has a major impact on many philosophers, artists, novelists and many intellectual and artistic movements. He is the author of many books like "Die Fröhliche Wissenschaft" ("The Gay Science"), "Also sprach Zarathustra" ("Thus Spoke Zarathustra"), "Jenseits von Gut und Böse" ("Beyond Good and Evil"), and "Ecce Homo". Nietzsche suffered from many health problems. Ever since his early youth he tried to find explanations for these health problems and described them exhaustively in his correspondence. Eventually, Nietzsche developed a mental illness at age 44 and died at the age of 56. For a long time Nietzsche's illness was thought to be neurosyphilis. However, recently there has been a lot of controversy about this diagnosis, but a clear and definite diagnosis has not been established yet (2-5). In this paper, we describe and integrate Nietzsche's different health problems, we review formerly proposed diagnoses, we focus on the history of a diagnostic mistake, and propose a new diagnosis, explaining Nietzsche's illness. Both medical and historical elements of Nietzsche's illness, and the focus on the historical and current diagnostic approach might be interesting for neurologists, historians and others who are interested in Nietzsche's life and work.

Methods and materials

Autobiographical data from letters, first-hand descriptions from relatives, friends and doctors, and biographical material were used. Nietzsche wrote a huge amount of letters and exhaustively described his medical complaints and symptoms. These descriptions of his illness are central to our undertaking. A meticulous overview of Nietzsche's life, including detailed medical notes by his treating doctors and some pictures reflecting his physical state at the end of his life, is available. We studied several Nietzsche-biographies to look for occasional references to his health. Finally, we studied medical papers on Nietzsche's illness in order to have an overview over past and current diagnostic difficul-

ties and hypotheses. The careful study of autobiographical and biographical data, using original German sources, allowed us to reconstruct Nietzsche's medical biography quite accurately.

We are aware of the fact that a historical medical analysis may be an anachronistic historical exercise, but the method of analyzing historical accurate data using modern theoretical concepts is a commonly used and necessary perspective and method. Hence a well described and documented historical clinical picture can be used to propose a retrospective diagnosis, using a current concept of disease with proposed diagnostic criteria.

Results

NIETZSCHE'S MEDICAL HISTORY

Nietzsche's medical history consisted of several major problems including severe headache, visual difficulties, psychiatric disturbances, cognitive decline and stroke. We will summarize each problem in chronological order.

1. *Headache.* Nietzsche's headaches began when he was 9 years old (6). These headaches were usually very severe and had a major impact on his daily life and later on his professional activities. They were almost always located on the right side, mostly frontal and above the right eye, but also at the right hemicranium, and were typically associated with gastrointestinal symptoms like nausea and vomiting (7-9). Because of these headaches, he sometimes also kept his eyes closed to lessen the discomfort experienced from external light, suggesting photophobia, and he avoided physical activities and went to bed (8-10). The headaches usually persisted for several hours or even days. We found numerous descriptions of a duration of these headaches ranging from 4 to 44 hours (9). Rarely, the headache was not lateralized and lasted for four to six days (11). We found no clear descriptions of possible premonitory symptoms, preceding aura or frequency and nature of the headaches. Nietzsche described his headaches several times as migraine and this diagnosis was also mentioned in several original medical notes on his complaints (12, 13). Summarizing, we can state that Nietzsche's headaches fulfil the criteria of migraine without aura as proposed by the International Headache Society (IHS) (14).

2. *Visual problems.* Nietzsche's visual problems also started at young age. He mentioned them for the first time in 1856, when he was 12 years old (15). As a child Nietzsche often complained about "bad light", "tiredness of the eyes" and "episodes of eye weakness with altered vision" (16, 17). He never mentioned complaints that could be suggestive for visual symptoms typical for migrainous aura. Nietzsche underwent repeated examinations by different ophthalmologists. They found an

extreme myopia with concomitant insufficiency of the internal rectal muscles (18). Signs of central chorioretinitis (not further detailed) in both eyes, most pronounced on the right side, are mentioned once (18). Eye pressure measurements and ophthalmoscopic evaluations were always normal (2).

Already at young age (before age 13) anisocoria was noted by Nietzsche's mother and by professor Schellbach, ophthalmologist in Jena (19). On September 28, 1876 the same anisocoria (right > left) was noted by Dr. Heinrich Schiess-Gemuseus (20). Forty years after the first description, the same anisocoria was observed at the asylum in Basel and was assumed to be a new symptom and a key sign for the diagnosis of neurosyphilis (4).

At older age (4th decade), Nietzsche clearly suffered from fluctuating visual disturbances of the right eye. Eventually, visual problems occurred in both eyes. In 1873, Nietzsche described for the first time a sudden "weakness of his eyes" with strongly diminished vision and accommodation cramps of the eye muscles (21). Ophthalmological evaluation at that time confirmed blindness of the right eye. In 1878, Nietzsche's vision suddenly worsened and he became almost completely blind. Apparently, besides his well known myopia and eye muscle insufficiency, Nietzsche suffered also from fluctuating visual disturbances with probable transient near blindness. Signs of chorioretinitis centralis or chorioiditis were found by 2 ophthalmologists, Dr. Kruger and Dr. W. Vulpius, but were never mentioned by other ophthalmologists (22).

3. *Mental illness : mood disorder and delusions.* In 1882, Nietzsche began to show depressive symptoms with suicidal ideas (23-25). These symptoms recurred intermittently and in 1887 Nietzsche described his mood as a persistent depression (26). This depressive mood had a clear impact on his social and professional life. On several occasions Nietzsche expressed bizarre ideas that reflected delusions (27). In 1883, he labelled his own mental state for the first time as madness and in several letters he expressed his worries about suffering from madness (28-30). In 1884 he even described a visual hallucination, consisting of a profusion of fantastic flowers, twining round each other and constantly growing, changing in shape and colour with exotic opulence (28). His mental state evolved within the following years and at the end of 1888, the final mental breakdown appeared in Turin with manifest delusions and inability to take care of himself (31). At that time he was admitted to a psychiatric asylum in Basel, Switzerland (4).

4. *Dementia.* Shortly after his mental breakdown in 1888, a progressive cognitive decline developed and Nietzsche succumbed to dementia in 1889. In January 1889, Nietzsche arrived at the psychiatric asylum in Basel, where dementia paralytica was diagnosed, also known as general paresis of the

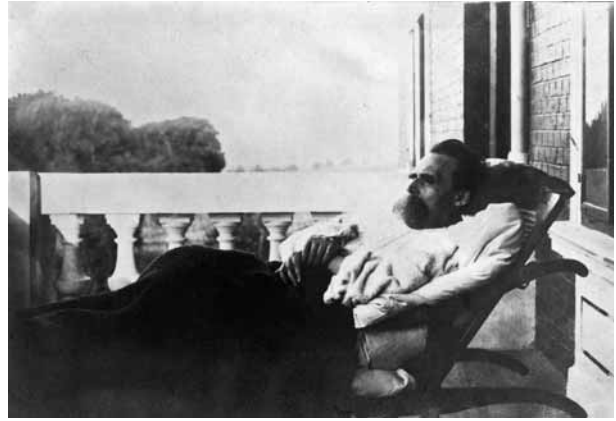
insane, progressive paralysis or paretic syphilis. Later on, he was transferred to the asylum in Jena, where professor Otto Ludwig Binswanger (1852-1929) confirmed the diagnosis of progressive paralysis. In March 1890, Nietzsche's mother decided to take care of her son and he left the asylum in Jena. In 1891, severe memory problems evolved, together with apathy, irritability, behavioural disorders, lack of insight, aggression, change of character and personality, loss of self-control, regression (with childish interest and thoughts), increasing delusions and prosopagnosia (4, 32). His mental disorder at that time fulfilled the diagnostic criteria for dementia (DSM-IV), with severe memory problems, involvement of other higher cortical functions and a major impact on his activities in daily life and on his professional activities (33).

5. *Stroke*. In the last years of his life Nietzsche developed several acute neurological symptoms with speech disturbances, probably evolving to anarthria, and facial paresis (2, 34). These symptoms are very likely to have been caused by stroke episodes. Several descriptions mentioned the occurrence of such acute episodes with focal neurological deficits (e.g. facial nerve paresis) (34). At the end of his life, Nietzsche was bedridden and clearly suffered from a left hemiparesis or hemiplegia. Several photographs from 1899 clearly show Nietzsche in a bedridden state, with a paresis of the left hemisoma with flexion of the left arm, suggesting pyramidal involvement (see figures 1 and 2). This left hemiplegia is most likely to have been caused by a vascular lesion or stroke. Diagnosis of stroke at the end of his life was already reported by Podach in 1931 (8).

6. *Pneumonia & death*. In the last years of his life, Nietzsche was bedridden and totally dependent from his relatives for his activities of daily living. On August 25 1900, at the age of 56, he finally died from pneumonia, probably secondary to a final stroke (4, 8). There are no post mortem data available and an autopsy has never been performed (4).

MEDICAL FAMILY HISTORY

On several occasions Nietzsche compared his illness to his father's (35). During his life, Carl Ludwig Nietzsche (1813-1849), a Lutheran priest, suffered from several episodes of depression. Starting in 1846, epileptic seizures occurred (with staring, inability to communicate, and postictal amnesia). At that time he also had severe attacks of headache, mostly at the left frontal side of his head, together with nausea and vomiting, and lasting more or less one day. When an attack of headache appeared, most of the time he went to bed and when he woke up, the headache had almost disappeared. These characteristics point at migraine as probable cause of the headache (15). When Friedrich Nietzsche was 4½ years old, his father died at the



FIGS. 1 and 2. — Two rare pictures showing Friedrich Nietzsche in 1899 with the clinical signs of a left hemiparesis, with adduction of the left arm and a bedridden state.

Klassik Stiftung Weimar ; Hans Olde, may 1899.

age of 36 years after a two years of mental illness ("Nervenabspannung" (tiredness of the nerves) and "Gehirnaffektion" (brain disorder)), followed by increasing "Abzehrung" (wasting), speech problems ending in aphasia, which prevented him from doing his job as a priest, and visual loss (1, 36). At that time he was already completely bedridden. Eventually, Nietzsche's father died on July 30, 1849. An autopsy was performed and revealed that a quarter of the brain was affected by "softening" ("Gehirnerweichung"), probably of vasculo-ischemic origin (37).

Nietzsche's mother, Franziska Oehler, did not suffer from major health problems, except some abdominal troubles, and she died from abdominal cancer in 1897 at the age of 70. Franziska's relatives did not suffer from major health problems. She had one brother, Theobald, who committed suicide (1). Nietzsche's little brother Joseph died at the age of almost 2 years (1848-1850) after an acute illness with general malaise and seizures. Friedrich Nietzsche's sister, Elisabeth, died at the age of 89 years and didn't suffer from serious health problems during her life. Carl Ludwig Nietzsche had 2 sisters, Rosalia and Auguste. Rosalia was

described as a nervous person, but none of them suffered from psychiatric illness (38). Friedrich Nietzsche did not have children.

Discussion

1) THE CASE OF SYPHILIS (PRO & CONTRA)

For a long time Nietzsche's illness has been considered to be a case of syphilis, and general paresis (or parietic neurosyphilis) in particular. Neurosyphilis is often referred to as a tertiary or late effect of syphilis. However, the central nervous system involvement spans the entire course of the syphilitic infection. Different stages of syphilis can be complicated by several neurological syndromes like acute syphilitic meningitis, cerebrovascular or meningovascular syphilis, parietic neurosyphilis and tabes dorsalis (39). Meningovascular syphilis is often preceded by a clinical course of weeks to months before the onset of a clear stroke syndrome (39). Dr. Houston Merritt, a leading twentieth-century expert on syphilis, showed that the onset of neurological symptoms had an average latency of seven years. Prodromal symptoms consisted of headache, vertigo, insomnia and various psychiatric disturbances (emotional lability or personality changes) (40). The interval between syphilitic infection and symptoms of parietic neurosyphilis (general paresis, dementia paralytica) is 10 to 20 years (range 3 to 30 years) (41).

Early symptoms consist of memory problems, cognitive disturbances, irritability and decline in personal appearance. This stage is followed by intellectual decline ending in progressive dementia. A great diversity of psychiatric symptoms may occur, including psychotic signs with delusional symptoms (39). Merritt identified five typical clinical signs of parietic syphilis: an expressionless face, hyperactive tendon reflexes, tremor of facial muscles and tongue, problems with handwriting due to intention tremor and dysarthria with slurred speech (42). The full clinical picture includes dementia, dysarthria, myoclonic jerks, action tremor, seizures, hyperreflexia, Babinski signs and Argyll-Robertson pupils. Eventually, a bedridden state and diverse, focal neurological symptoms may develop. Without treatment there is a progressive mental breakdown and death occurs within 3 to 4 years (39).

In his paper on Nietzsche's dementia, Leonard Sax gave a good overview of the arguments pro and contra syphilis as the cause of Nietzsche's illness (4). The diagnosis of parietic syphilis in Nietzsche's case was based on his asymmetrical pupils with a slow reaction of the right pupil to light, the appearance of bizarre ideas and grandiosity, and the development of dementia (4). When Nietzsche was admitted to the asylum in Basel, the asymmetrical pupils were assumed to be a new

development. However, Nietzsche's mother had already noticed that his right pupil was larger than his left when he was a child (4). This finding was confirmed by a professional eye examination. Several explanations can be given for the slow reaction of the right pupil to light. A pre-existing eye condition (e.g. Adie's pupil), a secondary phenomenon caused by migraine, or a tumour pressing to the third nerve, are alternative possibilities. The appearance of grandiosity and bizarre ideas were supposed to be a sudden phenomenon when Nietzsche was brought to the asylum in Basel, but this assumption was incorrect. In fact, these mental disturbances were the culmination of a trend of many years (4). The occasional description of chorioretinitis could have been an additional element in favour of the diagnosis of syphilis, as chorioretinitis can be caused by syphilis. However, there are many other possible causes of chorioretinitis, like herpesviruses, Lyme disease, and systemic diseases (e.g. lupus). The description of signs of chorioretinitis remains unclear and has only been confirmed once afterwards. At the end of the 19th century, the commonest aetiology for a subacute onset of dementia in a middle-aged man was syphilis, but Nietzsche's clinical presentation was not typical for parietic syphilis. Moreover, Nietzsche showed none of the five cardinal signs of neurosyphilis identified by Merritt. From medical descriptions made upon his arrival at the asylum in Basel, we can read that his facial expression remained vivid, his reflexes were normal, he showed no tremor, his handwriting remained stable and his speech was not slurred, but remained fluent (4). Upon his arrival in Basel, Nietzsche was supposed to be another case of neurosyphilis. Since his mother was not financially able to afford a first-class treatment with specific medical attention during his stay in the asylum in Jena, and since Nietzsche was not a famous person at that time (which e.g. was also confirmed by S. Simchowitz, one of his contemporaries who was among Binswanger's pupils in Jena when Nietzsche was admitted) (43), no specific attention was given to his clinical picture and it appears that the diagnosis of neurosyphilis in Nietzsche's case was paid in spite of, and not because of, the clinical evidence (4). Moreover, during Nietzsche's life, some doctors already doubted the diagnosis of neurosyphilis. Dr. Muthmann, a psychiatrist at the Basel asylum, concluded that the content of Nietzsche's notebooks were sufficient evidence to reject the diagnosis of progressive paralysis due to syphilis (2). Sax describes four important features of Nietzsche's clinical presentation that are not accounted for, or even contradict, the diagnosis of neurosyphilis. Nietzsche's migraine was not typical for the headaches caused by neurosyphilis, which normally precede the general collapse by a few days to a few months. In Nietzsche's case there is a period of 35 years between the onset of migraine at the

age of nine and the general collapse at the age of 44. Nietzsche's length of life after his collapse was also unusually long (12 years) for patients with neurosyphilis. The laterality of Nietzsche's symptoms with right-sided headaches, speech problems and hemiparesis of his left side are also atypical for neurosyphilis, which generally affects both cerebral hemispheres with generalized and bilateral signs and symptoms. It has been suggested that perhaps the most important elements that make the neurosyphilis-hypothesis questionable are the lack of evidence that Nietzsche has been in a situation where he could have been infected with *Treponema pallidum*, and the lack of diagnostic evidence that Nietzsche actually suffered from syphilis (4).

2) ALTERNATIVE DIAGNOSES

Alternative diagnoses explaining Nietzsche's medical health problems have been proposed in the past. Sax proposed a retrobulbar meningioma of the right optic nerve, underlying the right frontal lobe of the brain as most likely diagnosis (4). This hypothesis was based upon the slow progression of the symptoms, the association of visual and psychiatric symptoms (including visual phosphenes), and the co-occurrence of migrainous headaches and the retinal disease. However, the occurrence of focal neurological symptoms like dysarthria and complete hemiplegia are very unlikely to be caused by a right frontal meningioma.

Cybulska and Schain, two other opponents of the hypothesis of neurosyphilis, proposed the diagnosis of manic depression or manic psychosis as most likely explanation for Nietzsche's mental illness (3, 5). Nietzsche's other medical problems (headaches, visual problems, stroke) were not incorporated in this diagnosis and were considered as being separate, unconnected health problems. Recently, it was suggested that Nietzsche's mental illness was caused by frontotemporal dementia (44). These alternative hypotheses do not consider Nietzsche's medical personal and family history.

3) A NEW HYPOTHESIS

Reviewing Nietzsche's different health problems, we think that they all could have been part of one neurological syndrome. We hypothesize that Nietzsche suffered from cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy or CADASIL, an inherited, generalized small-artery disease caused by mutations in the Notch 3 gene on chromosome 19q12 (45). CADASIL is characterized by a nonatherosclerotic, nonamyloid systemic angiopathy with a purely neurological clinical expression due to involvement of the small arteries penetrating the cerebral white matter (46-48). Clinically, CADASIL is mainly characterized by the associa-

tion of migraine, mood disorders, ischaemic strokes and dementia. It starts in early adulthood and on average leads to death in 10 to 20 years (47). Rarely, the first stroke appears before the age of 30. The reported peak of stroke incidence is in the fourth and fifth decade (47). Diagnostic criteria for CADASIL were proposed by Davous (49). To accept the diagnosis of probable CADASIL five criteria are necessary: a young age at onset of symptoms (< 50 years), presence of at least two of the four major neurological features (migraine, stroke-like episodes, major mood disturbances and subcortical dementia), the absence of any vascular risk factors aetiologically related to the deficit, the evidence of an inherited autosomal dominant transmission, and the presence of abnormal MRI imaging findings of the white matter without cortical infarcts (49). Exclusion criteria are: a late age at onset (> 70 years), severe hypertension or complicated heart or systemic vascular disease, absence of any other case in a documented pedigree and normal MRI imaging after age 35 in symptomatic subjects (49). Nietzsche's medical history fulfils 4 out of 5 criteria, since there are no imaging data on his cerebral white matter available. In several reviews of major symptoms and signs of CADASIL observed at onset with related age, stroke and stroke-like episodes were the most frequent symptoms, affecting 36.5% to 67.6% of the patients. Migraine was the second mode of onset in the CADASIL population (34.6%) (49, 50). When migraine was present, it was usually the earliest symptom, frequently beginning in the second decade (51). Migraine may begin even in the first decade, but more commonly during the third decade, with a peak around the fifth decade and the oldest age in the eighth decade (47, 51). Migraine is present in 22-38% of the mutation carriers (47). Migraine corresponding to the IHS criteria can be either with or without aura and may predominate in some families. The aura is often atypical, long lasting or exceptionally severe (46). However, some reports describe the occurrence of migraine without aura in CADASIL (50, 52, 53). Davous even mentioned a prevalence of common migraine (or migraine without aura) of 20% in CADASIL patients (49). Mood disorders are the most frequent psychiatric disturbances and include major depression, manic depressive disorder, panic disorder, but, although not typical for the most common psychiatric disturbances in CADASIL, also hallucinatory syndromes, delusions and even psychosis may appear (51, 54).

The natural course of CADASIL is variable. It was shown that in CADASIL an insidious cognitive decline may appear and may start in the pre-stroke phase, before the first onset of symptomatic ischemic episodes, due to cumulative brain lesions (48). Cognitive decline predominantly involves frontal lobe functions with mental slowing,

concentration problems, slowing of motor functions, disinhibition and perseveration (47, 48). Variant forms of CADASIL have been reported. CADASIL can appear as an isolated slowly progressive neurobehavioral disorder with personality disorder, psychosis, mood disorder and eventually dementia over an extended period of time (55). In 10-15% of the patients, dementia even develops without acute stroke episodes (56). CADASIL eventually leads to death most often 10 to 20 years after symptom onset (range, < 1 to 65 years) (47, 50). Davous reported stroke as the most frequent primary cause of death, followed by bronchopneumonia and other decubitus complications (49). In another study on the long-term prognosis and causes of death in CADASIL pneumonia was the most frequent (primary and secondary) cause of death (38%) (57).

Although we are aware of the fact that most of Nietzsche's visual problems cannot be explained by CADASIL (e.g. signs of chorioretinitis), it is not impossible that the episodic loss of vision, which occurred at various times during Nietzsche's life, could have been part of CADASIL. Visual loss due to transient or stable ischemic events involving the optic nerve and occurring at a young age, without evidence for other cardiovascular risk factors, is considered to be part of the CADASIL phenotype in some patients (58).

Some of Nietzsche's acute episodes with neurological impairment could be considered as epileptic seizures (e.g. complex partial seizures). We cannot exclude that Nietzsche suffered from epileptic fits. However, this is no argument against our CADASIL hypothesis, since epileptic seizures already have been reported as an atypical clinical presentation in CADASIL (59). Moreover, Nietzsche's father also suffered from epilepsy, which could have been part of the inherited disease and supports our hypothesis.

Besides the clinical aspects of Nietzsche's disease, an important argument to our hypothesis is the family history. The similar disease history in Nietzsche's father may point at a dominant inheritance of the disease. Unfortunately, no further medical history of other family members on the father's side is available. This lack of a complete and detailed family history makes it difficult to make definitive conclusions.

The integration of these major medical problems (migraine, psychiatric disturbances, dementia, stroke, and possibly the visual problems), together with a history of mental and cognitive problems in several family members, and migraine with epileptic seizures and cognitive decline and stroke in Nietzsche's father, corresponds to the proposed diagnostic criteria of CADASIL and supports our hypothesis that Friedrich Nietzsche may have suffered from CADASIL. This disease entity most closely fits all of Nietzsche's medical data available.

Conclusion

Friedrich Nietzsche suffered from severe migraine, psychiatric disease, dementia, visual loss (possibly from a vascular origin), and stroke or stroke-like episodes. Based upon these clinical symptoms, together with the family history, we think that Friedrich Nietzsche might have suffered from CADASIL. Considering the proposed diagnostic criteria, Nietzsche's symptoms meet the criteria of 'probable CADASIL'. This retrospective, tentative and speculative diagnosis integrates his major medical problems and provides a better explanation than former diagnoses proposed by other authors (3, 4). We are convinced that currently CADASIL is the best working hypothesis. Hence, the case of Friedrich Nietzsche might be the first well-documented historical case of CADASIL. The final diagnosis remains unclear due to the absence of any diagnostic instrument (e.g. imaging) at the end of the 19th century. Theoretically, the proposed diagnosis of CADASIL could be confirmed with DNA analysis, even post mortem, although a typical Notch 3 mutation may be absent in the presence of granular osmiophilic material in several tissues. Unfortunately, since Nietzsche did not have children, it is not possible to trace descendants for further investigation of our hypothesis.

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