

Neuro-cognitive disorders

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Mild and major Frontotemporal neurocognitive disorder

- Frontotemporal neurocognitive disorder is a mental health condition characterized by abnormal shrinkage in two parts of the brain, called the frontal and temporal anterior lobes.
- This condition replaces an essentially equivalent illness, known as Frontotemporal dementia, in DSM 5.
- Some people affected by Frontotemporal neurocognitive disorder develop relatively mild impairments in their ability to exercise conscious brain functions e.g. speaking calculating etc.
- However, other people with the disorder develop major impairments that reduce or eliminate their ability to lead independent lives
- The brain's frontal and temporal lobes play a primary role in maintaining brain function such as the ability to use language, the ability to regulate behavior.
- People with Frontotemporal neurocognitive disorder have any one of several problems that lead to shrinking in these vital brain areas.

- The specific manifestation of the disorder depends upon the particular portions of the frontal and temporal lobes that undergo shrinkage, as well as the degree of shrinkage that occurs at any given point in time.
- People with mild Frontotemporal problems experience relatively slight changes in their ability to exercise their conscious mental functions, and retain the ability to function well enough to live on their own without serious difficulty.
- Still, when compared to individuals with normal frontal and temporal lobes, they clearly have signs and symptoms of brain dysfunction.
- People with major Frontotemporal problems experience much more severe changes in their ability use their conscious mental functions
- subsequently partially or completely lose their ability to function independently in everyday life.

Diagnostic Criteria

A. The criteria are met for major or mild neurocognitive disorder.

B. The disturbance has insidious onset and gradual progression.

C. Either (1) or (2);

1. **Behavioral variant;**

a. Three or more of the following behavioral symptoms:

i. Behavioral disinhibition.

ii. Apathy or inertia.

iii. Loss of sympathy or empathy.

iv. Perseverative, stereotyped or compulsive/ritualistic behavior.

v. Hyperorality and dietary changes.

b. Prominent decline in social cognition and/or executive abilities.

2. **Language variant:**

Prominent decline in language ability, in the form of speech production, word finding, object naming, grammar, or word comprehension.

D. Relative sparing of learning and memory and perceptual-motor function.

E. The disturbance is not better explained by cerebrovascular disease, another neurodegenerative disease, the effects of a substance, or another mental, neurological, or systemic disorder

Risk and Prognostic Factors

- Genetic and physiological. Approximately 40% of individuals with major or mild frontotemporal NCD have a family history of early-onset NCD, and approximately 10% show an autosomal dominant inheritance pattern. A number of genetic factors have been identified, such as mutations in the gene encoding the microtubule associated protein tau (MAPT), the granulin gene (CRN), and the C90RF72 gene. A number of families with causative mutations have been identified (see the section "Diagnostic Markers" for this disorder), but many individuals with known familial transmission do not have a known mutation. The presence of motor neuron disease is associated with a more rapid deterioration.

Treatment

- Frontotemporal neurocognitive disorder is both incurable and progressive.
- Gets worse over time.
- Doctors can potentially manage the effects of Frontotemporal dysfunction through the use of medications i.e. types of antidepressants.

Neurocognitive Disorder Due to Lewy Bodies

- Lewy bodies = microscopic protein deposits that damage brain over time
- NCDLB is the newest dementia diagnosis with an incidence of 7 per 1,000 individuals among those aged 65 and older.
- Individuals with NCDLB are often misdiagnosed with NCD due to Parkinson's Disease.
- Both show similar motor and cognitive clinical symptoms.
- There are intense neurotransmitter deficits along the dopaminergic and cholinergic pathways.
- In The cholinergic deficit, acetylcholine is responsible for cognitive dysfunction whereas the dopamine deficit is responsible for motor dysfunction.
- NCDLB can be differentiated from NCD due to Parkinson's Disease based on the chronological onset of symptoms.
- Individuals with NCDLB will exhibit cognitive symptoms before the onset of motor symptoms

Diagnostic Criteria

- A. The criteria are met for major or mild neurocognitive disorder.
- B. The disorder has an insidious onset and gradual progression.
- C. The disorder meets a combination of core diagnostic features and suggestive diagnostic features for either probable or possible neurocognitive disorder with Lewy bodies. For probable major or mild neurocognitive disorder with Lewy bodies, the individual has two core features, or one suggestive feature with one or more core features. For possible major or mild neurocognitive disorder with Lewy bodies, the individual has only one core feature, or one or more suggestive features.

1. Core diagnostic features:

- a. Fluctuating cognition with pronounced variations in attention and alertness.
- b. Recurrent visual hallucinations that are well formed and detailed.
- c. Spontaneous features of parkinsonism, with onset subsequent to the development of cognitive decline.

2. Suggestive diagnostic features;

- a. Meets criteria for rapid eye movement sleep behavior disorder.
- b. Severe neuroleptic sensitivity.
- D. The disturbance is not better explained by cerebrovascular disease, another neurodegenerative disease, the effects of a substance, or another mental, neurological, or systemic disorder.

Risk and Prognostic Factors

- Genetic and physiological. Familial aggregation may occur, and several risk genes have been identified, but in most cases of NCDLB, there is no family history.
- NCDLB results in a collection of proteins, called Lewy bodies, that progress through the neuronal synapses.
- The functional deficits seen with NCDLB are greater than NCD with Alzheimer Disease as a result of the effects on motor and involuntary nervous systems

Treatment

- When developing a plan for individuals with NCDLB, it is important to modify care by having the patient or caregiver rank the cognitive, emotional, and motor difficulties by level of subjective distress.
- The medications are effective with many symptoms including fluctuating cognition, hallucinations, and mood disorders.

Vascular Neurocognitive disorder

- vascular neurocognitive disorder is a condition characterized by disruptions in the brain's blood supply that lead to impairment of one or more aspects of a person's conscious brain functions.
- The DSM includes this as a replacement for a condition previously identified as vascular dementia
- The degree of impairment associated with vascular neurocognitive disorder can vary considerably.
- Some affected individuals retain enough mental function to maintain their everyday lives
- while others lose much of their mental function and become dependent on some form of assistance for their daily well-being.

- The term “vascular” in vascular neurocognitive disorder refers to the body’s system of blood vessels, known medically as the vascular system or circulatory system.
- The disorder is named so because the impairments it produces originate from some sort of reduction or blockage in the supply of blood that normally passes through the blood vessels called arteries and into the brain’s tissues
- People with mild vascular neurocognitive disorder have impairments in their conscious brain functions
- Prominent enough to produce testing results lower than those found in people unaffected by a vascular disorder
- But not prominent enough to produce serious life disruption.
- individuals with major vascular neurocognitive disorder produce test results that are considerably lower than those produced by individuals with the mild form of the disorder
- Have impairments that at least partially eliminate their ability to live successfully without some form of outside care.

Diagnostic Criteria

- A. The criteria are met for major or mild neurocognitive disorder.
- B. The clinical features are consistent with a vascular etiology, as suggested by either of the following:
 - 1. Onset of the cognitive deficits is temporally related to one or more cerebrovascular events.
 - 2. Evidence for decline is prominent in complex attention (including processing speed) and frontal-executive function.
- C. There is evidence of the presence of cerebrovascular disease from history, physical examination, and/or neuroimaging considered sufficient to account for the neurocognitive deficits.
- D. The symptoms are not better explained by another brain disease or systemic disorder.

Probable vascular neurocognitive disorder is diagnosed if one of the following is present; otherwise **possible vascular neurocognitive disorder** should be diagnosed:

- 1. Clinical criteria are supported by neuroimaging evidence of significant parenchymal injury attributed to cerebrovascular disease (neuroimaging-supported).
- 2. The neurocognitive syndrome is temporally related to one or more documented cerebrovascular events. 3
- 3. .Both clinical and genetic (e.g., cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) evidence of cerebrovascular disease is present

Risk and Prognostic Factors

- **Environmental.** The neurocognitive outcomes of vascular brain injury are influenced by neuroplasticity factors such as education, physical exercise, and mental activity.
- **Genetic and physiological.** The major risk factors for major or mild vascular NCD are the same as those for cerebrovascular disease, including hypertension, diabetes, smoking, obesity, high cholesterol levels, high homocysteine levels, other risk factors for atherosclerosis and arteriolosclerosis, atrial fibrillation, and other conditions increasing the risk of cerebral emboli. Cerebral amyloid angiopathy is an important risk factor in which amyloid deposits occur within arterial vessels. Another key risk factor is the hereditary condition cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy, or CADASIL.

Causes

- Stroke – a condition that occurs when a brain artery either gets blocked or springs a leak of blood
- Ongoing health problems that either decrease a blood vessel's general health or produce abnormal narrowing in a blood vessel's interior diameter.
- Conditions that can trigger these damaging blood vessel changes include
 - atherosclerosis (hardened arteries),
 - hypertension (high blood pressure)
 - diabetes
 - effects of the normal aging process.

Treatment

- Vascular dementia is incurable and inevitably shortens the lives of affected individuals.
- However, doctors can potentially slow the disorder's progression or even stop its effects from growing substantially worse over time
- treated with the help of certain medications originally developed to treat Alzheimer's disease. Examples of these medications include a group of drugs known collectively as cholinesterase inhibitors and a single drug called memantine

Neurocognitive disorder due to traumatic brain injury

- Neurocognitive disorder due to traumatic brain injury is a mental health condition that sometimes arises in the long-term outcome of a physical injury that results in brain damage.
- Some people affected by neurocognitive disorder due to traumatic brain injury experience symptoms that are severe enough to degrade their ability to lead independent lives
- Others experience milder symptoms and retain most of their day-to-day mental function
- Neurocognitive disorder due to a traumatic brain injury comes in both major and mild forms.
- People with the major form of the disorder have symptoms that the general public commonly refers to as dementia (including such things as memory problems, a declining ability to think logically, and a declining ability to make decisions or control one's behavior).
- People with mild neurocognitive disorder due to a traumatic brain injury don't have dementia-like symptoms; instead, they have less dramatic changes in their mental function that can worsen over time

- People with mild neurocognitive disorder have impairments in their conscious brain functions
- Prominent enough to produce testing results lower than those found in people unaffected by a disorder
- But not prominent enough to produce serious life disruption.
- individuals with major vascular neurocognitive disorder produce test results that are considerably lower than those produced by individuals with the mild form of the disorder
- Have impairments that at least partially eliminate their ability to live successfully without some form of outside care.

Diagnostic Criteria

- A. The criteria are met for major or mild neurocognitive disorder.
- B. There is evidence of a traumatic brain injury—that is, an impact to the head or other mechanisms of rapid movement or displacement of the brain within the skull, with one or more of the following:
 - 1. Loss of consciousness.
 - 2. Posttraumatic amnesia.
 - 3. Disorientation and confusion.
 - 4. Neurological signs (e.g., neuroimaging demonstrating injury; a new onset of seizures; a marked worsening of a preexisting seizure disorder; visual field cuts; anosmia; hemiparesis).
- C. The neurocognitive disorder presents immediately after the occurrence of the traumatic brain injury or immediately after recovery of consciousness and persists past the acute post-injury period.

Risk and Prognostic Factors

Risk factors for traumatic brain injury. Traumatic brain injury rates vary by age, with the highest prevalence among individuals younger than 4 years, older adolescents, and individuals older than 65 years. Falls are the most common cause of TBI, with motor vehicle accidents being second. Sports concussions are frequent causes of TBI in older children, teenagers, and young adults.

Risk factors for neurocognitive disorder after traumatic brain injury. Repeated concussions can lead to persistent NCD and neuropathological evidence of traumatic encephalopathy. Co-occurring intoxication with a substance may increase the severity of a TBI from a motor vehicle accident, but whether intoxication at the time of injury worsens neurocognitive outcome is unknown.

Course modifiers. Mild TBI generally resolves within a few weeks to months, although resolution may be delayed or incomplete in the context of repeated TBI. Worse outcome from moderate to severe TBI is associated with older age (older than 40 years) and initial clinical parameters, such as a low Glasgow Coma Scale score; worse motor function; pupillary nonreactivity; and computed tomography (CT) evidence of brain injury (e.g., petechial hemorrhages, subarachnoid hemorrhage, midline shift, obliteration of third ventricle).

Treatment

- **Patient centered rehabilitation** : Involving patients in their own treatment showed that it motivated them to work harder in rehab
- **Motivational therapy** : Patients earned rewards for performing an action correctly using PM (perspective memory)
- **Using hypothermia after initial injury** : Patients who had scored low on the Glasgow coma scale, GCS (meaning they had more severe injuries, or unconsciousness for a longer period of time), did not benefit from hypothermia but those who scored mid level did seem to benefit
- **Combination hypothermia & stem cells** :
 1. Hypothermia keeps stem cells alive
 2. Stem cells have ability to become neuronal cells, improving the affected or dead cells

Substance/Medication-Induced Major or Mild Neurocognitive Disorder

- Results from prolonged drug use, especially in combination with poor diet
- May be caused by alcohol, sedative, hypnotic, anxiolytic or inhalant drugs
- Brain damage may be permanent
- Symptoms similar to Alzheimer's
- Deficits may include
 1. Memory impairment
 2. Aphasia, apraxia, agnosia
 3. Disturbed executive functioning

Diagnostic Criteria

- A. The criteria are met for major or mild neurocognitive disorder.
- B. The neurocognitive impairments do not occur exclusively during the course of a delirium and persist beyond the usual duration of intoxication and acute withdrawal.
- C. The involved substance or medication and duration and extent of use are capable of producing the neurocognitive impairment.
- D. The temporal course of the neurocognitive deficits is consistent with the timing of substance or medication use and abstinence (e.g., the deficits remain stable or improve after a period of abstinence).
- E. The neurocognitive disorder is not attributable to another medical condition or is not better explained by another mental disorder.

Risk and Prognostic Factors

- Risk factors for substance/medication-induced NCDs include older age, longer use, and persistent use past age 50 years. In addition, for alcohol-induced NCD, long-term nutritional deficiencies, liver disease, vascular risk factors, and cardiovascular and cerebrovascular disease may contribute to risk.

Treatment

- **Psychiatry Follow-up:** For treatment of comorbid psychiatric disorders. Also, specific medications for addiction like suboxone, naltrexone, methadone, etc. can be started. The patient might be referred to these specific medication management clinics if needed.
- **Intensive Outpatient Program:** IOPs serve as an intermediate level of care for patients who have needs that are too complex for outpatient treatment but do not require inpatient services. These programs allow people to continue with their daily routine and practice newly acquired recovery skills both at home and at work. IOPs generally comprise a combination of supportive group therapy, educational groups, family therapy, individual therapy, relapse prevention and life skills
- **Detoxification:** Detoxification refers to the medical management of symptoms of withdrawal. Medically supervised detoxification is indicated for any adolescent who is at risk of withdrawing from alcohol or benzodiazepines and might also be helpful for adolescents withdrawing from opioids, cocaine, or other substances. Detoxification may be an important first step but is not considered definitive treatment.

Treatment

- **Group Therapy:** Group therapy is a mainstay of substance abuse treatment for adolescents with substance use disorders. It is a particularly attractive option, because it is cost-effective and takes advantage of the developmental preference for congregating with peers.
- **Family Therapy:** Family-directed therapies are the best validated approach for treating adolescent substance abuse. A number of modalities have been demonstrated to be effective. Family counseling typically targets domains that figure prominently in the etiology of substance use disorders in adolescents: family conflict, communication, parental monitoring, discipline, child abuse/neglect, and parental substance use disorders
- **Individual Therapy:** Performed by a counselor or specialist in the field of substance use disorder. Therapists teach problem solving and coping strategies, social skills training are integral part of therapy. Other therapy strategies include behavioral strategies, CBT, motivational interviewing techniques.