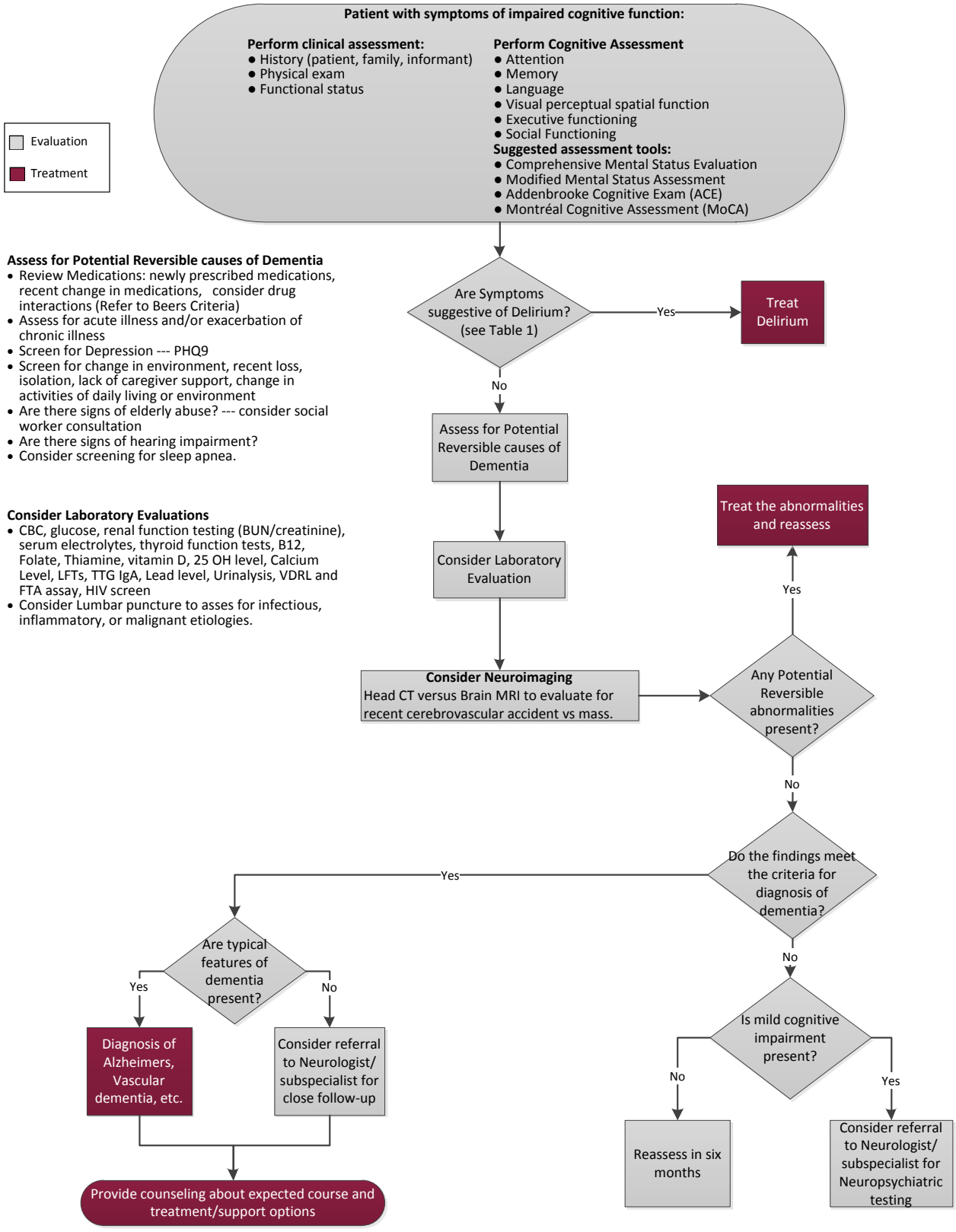
MOUNT CARMEL Health Partners

# Dementia Clinical Guideline

**Definition:** Dementia is a highly variable clinical syndrome characterized by progressive deterioration of cognitive function involving impairment in one or more cognitive domains including learning and memory, language, executive function, complex attention, perceptual-motor or social cognition. The deficits are severe enough to interfere with daily function and independence. Potential causes of dementia are numerous and the prognosis depends on the underlying cause.



Worldwide, approximately 24.3 million people suffer from dementia, and 4.6 million new cases are diagnosed yearly. The prevalence is approximately 1% at the age of 60 years but doubles every 5 years until it reaches 30 to 50% by the age of 85.

## Dementias must be distinguished from delirium and depression.

*Delirium* is usually abrupt in onset or subacute in nature and is often associated with fluctuations in the level of consciousness. There is typically clouding of the sensorium with impaired cognition or perceptual disturbances. The patients are usually accompanied by a family member, friend or caregiver who recognizes a new change in the patient. Generally, a major difference between delirium and dementia is the rapidity of onset. Patients typically have difficulty maintaining concentration and attention and vital signs are often times abnormal. Dementia on the other hand should not be associated with abnormal vital signs and is associated with gradual and progressive cognitive deficits that affects multiple areas including short and long-term memory.

Patients with *depression* often present on their own complaining of memory loss. They may show signs of psychomotor slowing and exhibit poor effort during testing. *Depression* is a common treatable comorbidity that can masquerade as dementia. Patients with dementia on the other hand, often try hard but respond with incorrect answers. Depression and dementia may coexist. Depression, anxiety and apathy are common in the prodrome and course of Alzheimer's disease. Depression is the most common treatable form of dementia.

**Table 1: Comparison of Delirium and Dementia**

| | Delirium | Dementia |
|---|---|---|
| Time course | Acute (hours to days) | Chronic (months to years) |
| Course | Fluctuating | Progressive |
| Autonomic Disturbance | Present | Absent |
| Consciousness | Altered | Clear |
| Level of Disturbance | Orientation& perception impaired | Confused but Intact perception |
| Reversible | Yes | Usually not |
| Sleep-wake cycle | Disrupted | Usually normal |
| Cause | Acute insult (systemic or confined to the CNS) | CNS origin |

**Table 2: Precipitating Causes of Delirium**

| |
|---|
| Infections |
| Medications and toxins |
| Intracranial diseases |
| Cardiovascular disease |
| Metabolic disorders |
| Endocrine disorders |
| Dehydration and malnutrition |
| Iatrogenic |

**Table 3: Signs and Symptoms That May Indicate the Need for Evaluation for Dementia**

| | |
|---|---|
| Cognitive changes | New forgetfulness, more trouble understanding spoken and written communication, difficulty finding words, not knowing common facts such as the name of the current U.S. president, disorientation |
| Psychiatric symptoms | Withdrawal or apathy, depression, suspiciousness, anxiety, insomnia, fearfulness, paranoia, abnormal beliefs, hallucinations |
| Personality changes | Inappropriate friendliness, blunting and disinterest, social withdrawal, excessive flirtatiousness, easily frustrated, explosive spells |
| Problem behaviors | Wandering, agitation, noisiness, restlessness, being out of bed at night |
| Changes in day-to-day functioning | Difficulty driving, getting lost, forgetting recipes when cooking, neglecting self-care, neglecting household chores, difficulty handling money, making mistakes at work, trouble with shopping. |

## Reversible vs Irreversible Dementia

Dementia can be classified as either potentially reversible or irreversible. Most patients with dementia have an irreversible disease process. During the past several years, the prevalence of reversible dementia has fallen between 3 and 10% with depression, hydrocephalus, subdural hematomas, drugs and alcohol dependence syndrome making up the majority of the cases.

The goal for patient with suspected dementia is to:
1) recognize signs symptoms of potentially reversible forms of dementia
2) identify the manifestations of acute illness in the demented patient
3) assess the findings for congruencies with a normal progression of the irreversible dementias.

| **Primary Cortical Dementias (nonreversible)** |
|---|
| Alzheimer's disease |
| Pick's disease |
| **Primary Subcortical Dementias (nonreversible)** |
| Huntington's chorea |
| Parkinson's disease |
| Progressive supranuclear palsy |
| **Secondary Dementias (potentially reversible)** |
| Cerebrovascular disease (multi-infarct dementias) |
| Drug or Toxin Induced |
| Metabolic or electrolytic disturbance |
| Endocrinopathies |
| Infectious (intracranial, chronic meningitis, encephalitis, abscess, HIV infection, slow virus infection, neurosyphilis |
| Nutritional |
| Intracerebral disorders |
| Head trauma |
| Mass effect (tumor, hematoma, abscess) |
| Hydrocephalus |
| Psychiatric (pseudodementia) |
| Other (e.g., collagen vascular disease, paraneoplastic syndrome, parathyroid tumor) |

Alzheimer's dementia accounts for 60% of all dementias. Vascular dementia (with or without Alzheimer's disease) accounts for 20%, and the remaining 20% of cases are attributable to more than 50 known causes. Worldwide, approximate 24.3 million persons suffer from dementia, and 4.6 million new cases are diagnosed yearly. The prevalence is approximately 1% at the age of 60 years but doubles every 5 years until it reaches 30-50% by the age of 85 years. The National Institutes of Health calculates that by 2030 there will be approximately 10 million people with Alzheimer's disease in the United States.

## Diagnostic Criteria for Dementia:

A. The development of multiple cognitive deficits manifested by (*must meet 1 & 2 criteria*):
    1) Memory Impairment (impaired ability to learn new information or recall previously learn information)
    2) One (or more) of the following cognitive disturbances:
        a. Aphasia (language disturbance)
        b. Apraxia (impaired ability to carry out motor activities despite intact motor function)
        c. Agnosia (failure to recognize common objects)
        d. Disturbance in executive functioning (e.g., Planning, organization, sequencing, abstracting)
B. The cognitive deficits cause significant impairment and social or occupational functioning and represent a significant decline from a previous level of functioning.
C. The deficits do not occur exclusively during the course of a delirium.

## Dementia Syndromes:

Dementia typically has more than one cause. This is especially true as it progresses and is exacerbated by medical illnesses and comorbidities. The major dementias syndromes include:

### Primary Cortical Dementias:

Critical dementia is associated with prominent movement disorder including posturing, ataxia, tremor and chorea that tends to occur early in the illness. Other features include slowness of speech, hypotonia and dysarthria which can progress to mutism.

**Alzheimer's disease** is a primary degenerative dementia which comprises approximately 60 - 80% of all types of dementia. It is characterized by cortical atrophy which is most prominent in the temporal and the hippocampal regions and caused by slow progressive loss of cerebral gray matter followed by subcortical atrophy and loss of white matter. There is not a significant ischemic component to Alzheimer's disease.

The gradual development of forgetfulness is the major symptom and memory deficits are prominent. Short-term episodic memory problems are the first most obvious manifestations of the disorder. Appointments are forgotten and possessions misplaced. Questions are repeated and the patient often forgets what has just been discussed. Remote memories are preserved and recent ones lost (the Ribot law of memory). Once the memory disorder has become pronounced other failures of cerebral function become increasingly apparent such as halting speech secondary to one's inability to access a needed word. Writing subsequently becomes interrupted. As vocabulary becomes restricted, expressive language becomes stereotyped and inflexible. Complicated requests are often not carried out either because of inattention or because it was forgotten. There is a tendency to repeat a question before answering it with a sometimes-dramatic repetition of every spoken phrase (echolalia). Arithmetic ability deteriorates to the point where patient can no longer carry out the simple as calculations (acalculia or dyscalculia).

Alzheimer's disease is a clinical diagnosis. There are no routine laboratory tests that confirm the presence of the disorder although MRI scan, functional scans looking at regional blood flow or glucose metabolism, assays for specific biomarkers, and CSF analysis can significantly increase the probability of the presence of the disease. Specifically, decreased levels of the neurotransmitter acetylcholine is characteristic. Levels of the enzyme choline acetyltransferase which synthesizes acetylcholine in the brain can be reduced 20% compared with age matched control subjects. Careful clinical and neuropsychological evaluation results in a reliable diagnosis of the disease in most instances. EEG may show diffuse swelling.

Several risk factors for Alzheimer's disease are recognized including advancing age, family history, low education level, hypercholesterolemia and head trauma.

**Lewy-Body Dementia**

Next to dementia, diffuse Lewy-body disease is the most frequent pathologic diagnosis established in many series of globally demented patients. The disease is defined by diffuse involvement of cortical neurons with Lewy-body inclusions and by an absence of neurofibrillary tangles and amyloid plaques. Lewy-body dementia is characterized by Parkinsonian features, dementia, rapid eye movement (REM) sleep behavioral disorder and a tendency to episodic delirium which frequently occurs nocturnally. Two of the three following criteria are necessary as diagnostic criteria for diagnosis including: A Parkinsonian syndrome (usually symmetric), fluctuations in behavior and cognition, or recurrent hallucinations.

**Pick disease**

The disease is a subacute or chronic neurovascular storage disease with early signs of hepatosplenomegaly and later signs of neurological involvement. It is typically a pathologic diagnosis and occurs in approximately 20% of clinical cases presenting with signs and symptoms of frontotemporal dementia. The pathologic hallmark of Pick disease are argyrophilic cellular inclusions known as Pick bodies and swollen achromatic tau-positive neurons named Pick cells. This entity is associated with loss of large pyramidal neurons with selective atrophy of the frontal and anterior temporal lobes. The largest concentration of Pick bodies is in the hippocampus and amygdala. The disorder involves progressive dementia, dysarthria, ataxia, rarely extrapyramidal signs (choreoathetosis), and paralysis of horizontal and vertical gaze with the latter being a distinguishing feature of the later onset type. Patient's typically have frontal lobe release signs including dramatic behavioral changes of disinhibition and social inappropriateness. The diagnosis is made by bone marrow biopsy.

**Primary subcortical dementias**

**Huntington's Disease**

Distinguished by the triad of autosomal dominant inheritance of having both parents with the disease, choreoathetosis and dementia. The disease is characterized by a motor, behavioral, oculomotor and cognitive dysfunction. Onset is typically between the ages of 25 and 45 years. The mental aspect starts suddenly before more obvious deterioration of cognitive function becomes evident. Patient begins by finding fault with everything and complaints constantly. They may be suspicious, irritable, impulsive, eccentric, untidy or excessively religious or they may exhibit a false sense of superiority. Mood disturbances such as depression is common and occurs in almost half of the patients. Later the patient becomes less communicative and socially withdrawn. Abnormalities of movement often begins with itchiness, restlessness or "nervousness "and evolves to affect the entire musculature with chorea or rapid, nonpatterned, semi-purposeful, involuntary choreiform movements. Huntington disease patients may develop non-insulin-dependent diabetes mellitus and neuro-endocrine abnormalities such as hypothalamic dysfunction. Genetic testing can be used to confirm the diagnosis and to detect at risk individuals in the family.

## Dementia Syndromes *(continued)*

### Primary subcortical dementias *(continued)*

**Parkinson's disease**

Parkinson's disease is the second most common neurodegenerative disease exceeded only by Alzheimer's disease. The mean age of onset is about 60 years but cases can be detected in patients in their 20s. The frequency of occurrence increases with aging. Parkinson's disease is characterized by a resting involuntary tremor, rigidity, bradykinesia, and gait impairment which make up the "cardinal features" of the disease. Advanced Parkinson's disease, results in dementia where patients display mental sluggishness and a general lack of spontaneity. The Hallmark feature pathologically involves degeneration of the dopaminergic neurons in the substantia nigra pars compacta, reduced striatal dopamine, and interest cytoplasmic proteinaceous inclusions known as Lewy bodies. Amyloid plaques and tangled neurofibrillary depositions in the cerebral cortex and substantia nigra are common in the brains in patients with Parkinson's disease (20-30 percent).
Language functions are relatively preserved as compared with those with Alzheimer's dementia.

**Progressive supranuclear palsy**

Is a form of dementia with underlying degenerative disorder involving the brainstem, basal ganglia, limbic structures and selected areas of the frontotemporal areas of the cortex with typical onset in the sixth decade. Patient's experience difficulty in balance, abrupt falls, visual and ocular disturbances, slurred speech, dysphasia and sometimes vague changes in personality including apprehensiveness and forgetfulness suggestive of an agitated depression. Most common complaint is unsteadiness of gait and unexplained repeated falling without loss of consciousness. It may take a year or longer for the characteristic syndrome comprising supranuclear ophthalmoplegia, pseudobulbar palsy and axial dystonia to fully develop. Involuntary vertical movement of the eyes which is oftentimes only upward as they are unable to look down with later impairments involuntary saccades in all directions are characteristic. They retain oculocephalic reflexes demonstrated using a vertical doll's head maneuver. The dementia exhibits frontotemporal features including apathy, frontal-executive dysfunction, poor judgment, slowed thought process, impaired verbal fluency and difficulty with sequential actions with shifting from one tests to another. The dementia component often precedes the motor syndrome.

### Secondary dementias

**Cerebrovascular "vascular" dementia** previously known as multi-infarct dementia which accounts for 20% causes of dementia is characterized by the development of cognitive impairment in association with single or multiple areas of infarction involving the cerebral hemispheres, basal ganglia and/or subcortical ischemia. The occurrence of dementia depends partly on the total volume of damaged cortex. Early symptoms include mild confusion, apathy, anxiety, psychosis, and memory, spatial or executive deficits. Difficulty in judgment and orientation with dependence on others for activities of daily living develop later. Euphoria, elation, depression or aggressive behaviors are common as the disease progresses. Gait disorders are seen in at least half of patients with cerebrovascular dementia. As the disease advances, urinary incontinence and dysarthria with or without other pseudobulbar features (dysphasia, emotional liability) are frequent. These multiple vascular infarcts often occur at an earlier age of onset as compared with Alzheimer's disease and occur more often in those who have risk factors for atherosclerosis including smoking, hypertension, diabetes mellitus, coronary artery disease (CAD) and previous history of CVA.
Focal neurological deficits are more common in vascular dementia compared with Alzheimer's dementia. Diagnostic criteria for vascular dementia have been proposed but none are sensitive or specific enough to rule the diagnosis in or out with certainty.

**Drug and toxin induced**

Chronic, heavy ethanol consumption is associated with dementia and may result from associated malnutrition involving the B vitamins and thiamine in particular. Thiamine deficiency (vitamin B1) causes Wernicke's encephalopathy which is characterized by confusion, ataxia and diplopia. Administration of parenteral thiamine (100 mg intravenously for 3 days followed by daily oral treatment) may reverse the disease if given early. Prolonged untreated thiamine deficiency can result in an irreversible amnestic syndrome called Korsakoff syndrome and even death. In Korsakoff syndrome, the patient is unable to recall recent information despite intact attention and normal level of consciousness. Memory for new events is significantly impaired. These patients are easily confused and disoriented and cannot store information for more than a few minutes. Confabulations is common but is not always present. There is no specific treatment for Korsakoff syndrome as the preceding thiamine deficiency has produced irreversible damage.

Overall, the neurotoxicity of ethanol appears to be independent of thiamine deficiency. Heavy chronic alcohol consumption causes cerebral cortical atrophy, but no single alcohol-related dementia syndrome exists. It is estimated however, that approximately 20% of chronically demented patients have history of alcoholism.

Vitamin B12 deficiency can result in pernicious anemia causing a megaloblastic anemia with subsequent damage to the nervous system. It most commonly produces a spinal cord syndrome affecting the posterior columns with loss of vibration and position sense and dysfunction in the cortical spinal tracks resulting and hyperactive tendon reflexes with Babinski sign. Peripheral nerves damage can result in sensory loss and depressed tendon reflexes. Dementia results from damage to myelinated axons.

Medications with atropinic activity can produce an apparent dementia or worsen a structurally related dementia.

## Dementia Syndromes *(continued)*

### Secondary dementias *(continued)*

**Metabolic or electrolyte disturbance**

Hypercalcemia, hypothyroidism and uremia are associated with dementia

**Infectious (intracranial)**

Chronic CNS infections and in particular, chronic meningitis may produce dementia. This may be apparent in the patient presenting with dementia or a behavioral syndrome who also has headaches, cranial neuropathy and/or radiculopathy and meningismus.

Those with advanced HIV of a 20-30% chance of becoming demented with features of psychomotor retardation, apathy and impaired memory which may result from secondary opportunistic infections or by direct infection of the CNS neurons with HIV. One of the most prevalent slow virus infections causing progressive dementia is HIV-1 infection which may produce a primary neurotrophic disorder in addition to causing the immunologic compromise that permits other viruses to replicate.
HIV dementia or AIDS dementia complex occurs in approximately one fourth of patients with late stage AIDS and is generally seen in individuals whose T-cell count has fallen below 200. Pathologic changes occur mostly in the hippocampus and basal ganglia and include atrophy, ventricular dilation and fibrosis. Symptoms include impaired attention and difficulty learning new information, slow, soft and impoverished speech, ataxia, decreased manual dexterity and motor slowness, poor judgment and flat and done spontaneous facial expression with fixed gaze. Personality changes may include apathy or increased impulsivity.

Neurosyphilis was previously more common prior to developing antibiotics however is much less likely except in patients with multiple sex partners, particularly among patients with HIV.

Creutzfeldt-Jacob disease (CJD), and variant CJD (which appears to be linked to bovine spongiform encephalopathy, the pathologic process in "Mad Cow Disease". Slow virus infections of the CNS can cause a progressive dementia that is irreversible. With these infections, months to years passed between infection with a virus and appearance of the clinical illness. Creutzfeldt-Jacob disease is a rare infectious cause it should be suspected one a non-elderly person develops a rapid dementing illness associated with other neurological deficits such as myoclonus.

**Intracerebral disorders**

Primary and metastatic neoplasms involving the cerebral nervous system usually produce focal neurological findings and seizures rather than dementia however, if tumor growth begins in the frontal or temporal lobes memory loss or behavioral changes may be seen initially.

A paraneoplastic syndrome called “limbic encephalitis” can present with dementia from an occult neoplasm, most commonly small cell lung carcinoma and involve confusion, agitation, seizures, poor memory and emotional changes.

**Head trauma**

Recurrent head trauma and severe head trauma with loss of consciousness of 30 minutes or more has been associated with dementia and an increased risk of permanent cognitive impairment which might be viewed as static dementia. This is previously been referred to as “punch-drunk” syndrome and is now known as chronic traumatic encephalopathy. The symptoms can be progressive beginning late in the athlete’s career or after retirement. Early signs include personality change associated with social instability. Paranoia and delusions can sometimes be present. Parkinsonian signs and ataxia with an intention tremor can be associated with progressive memory loss resulting in full-blown dementia.

**Hydrocephalus**

Normal pressure hydrocephalus generally affects younger people; 50% of patients are younger than 60 years. Most of the conditions that cause hydrocephalus and fall to defect in uptake of CSF by rectally villi which resulted in gradual ventricular dilatation and is associated with the classic triad of progressive dementia, ataxia, and urinary incontinence.

**Psychiatric (pseudodementia)**

Pseudodementia or depression is the most common form of treatable dementia. The distinction between depression and dementia can often be difficult and the coexistence of depression, anxiety and dementia is common in people with mild dementia. Distinguishing features suggesting depression rather than dementia include intact memory and language when tested and rather abrupt onset of cognitive signs and symptoms of a relatively short duration. The patient may feel confused and unable to accomplish routine tasks. Vegetative symptoms such as insomnia, lack of energy, poor appetite and preoccupation with bowel function are common. The progression of symptoms is typically rapid and a history of psychiatric illnesses is common. Patients with pseudodementia typically complain of their cognitive status dysfunction and emphasized the associated failures and disabilities. Loss of social skills occurs early in the illness usually and patient communicates a strong sense of distress and inability to function. Attention and concentration are often intact and patients commonly give answers such as "I don't know" on tests of orientation, concentration and memory. Memory loss for recent and remote events usually are equally severe and variability is seen in performance of tasks with similar degrees of difficulty may be marked. Tasks of high capacity such as testing of delayed memory with distraction may be helpful in identifying the depressed patient.

## Dementia Syndromes:

### Secondary dementias *(continued)*

**Other causes**

Other causes include dementia from collagen vascular disease, hypothyroidism, vasculitis, hepatic, renal or pulmonary disease. Vasculitis of the cerebral nervous system can cause a chronic encephalopathy associated with confusion, disorientation and clouding of consciousness with headache being a common feature. Cranial neuropathies may be present on exam and cerebrovascular accidents may also be associated. CSF analysis and a revealed a mild pleocytosis or elevated CNS protein.
Alcohol-related dementia, chronic traumatic encephalopathy, medication side effects, depression and other central nervous system illnesses make up the majority of the remaining causes of chronic dementia.
A chronic medical exposure especially from lead poisoning can result in dementia. Additional features may include fatigue, depression, confusion with episodic bouts of abdominal pain and a peripheral neuropathy. Gray lead lines can sometimes be seen in gingival tissue accompanied by an anemia with basophilic stippling of the red blood cells. The clinical presentation can resemble acute intermittent porphyria with elevated levels of urine porphyrins. Chelation therapy is the primary treatment.
Chronic mercury poisoning produces dementia, peripheral neuropathy, ataxia and tremulousness that potentially could progress to a cerebellar intention tremor or choreoathetosis.
Chronic arsenic intoxication is associated with confusion and memory loss as well as nausea, weight loss, peripheral neuropathy, pigmentation and scaling of the skin and transverse white lines of the fingernails (Mees' lines). Treatment is also with chelation therapy utilizing dimercaprol (BAL).

## Diagnostic Strategies

Comprehensive Mental Status Evaluation

Modified Mental Status Assessment

Addenbrooke Cognitive Exam (ACE)

Montréal Cognitive Assessment (MoCA): Brief 30-point screening test designed to detect cognitive impairment in older adults that takes approximately 10 minutes to administer accessible at: www.mocatest.org.

**Physical examination:**

Focus with neurological examination looking for focal neurological deficits that may be consistent with prior strokes, signs of Parkinson disease (Caldwell rigidity and/or tremors), gait abnormalities or slowing, and abnormal eye movements. Patients with Alzheimer's disease generally have no motor deficits.

**Laboratory testing**: The American Academy of neurology (AAN) recommends screening for B12 deficiency and hypothyroidism in patients with dementia.
There is no clear data to support or refute ordering "routine" laboratory testing:

- Assessment CBC, glucose, renal function (BUN/creatinine) serum electrolytes, folate, thiamine, urinalysis, lead level, red cell folate in patient with alcohol dependence if clinically indicated.
- Screen for HIV and neurosyphilis with VDRL/FTA assay if high clinical suspicion to support testing
- Check ionized serum calcium (25(OH)D level) and patient with multiple myeloma, prostate or breast carcinoma or neoplastic process.
- TTGA IgA test for patients with symptoms suggesting celiac disease
- Consider lumbar puncture to assess for infectious, inflammatory or malignant episodes.

Patients with cognitive dysfunction who are younger (<60 years) over those with rapidly progressive dementia may benefit from more extensive evaluation including lumbar puncture, EEG and/or more extensive serological testing.

**Neuroimaging**: The AAN recommends evaluation with either noncontrast head CT or MRI in the routine initial evaluation of all patients with dementia.

Clinical prediction rules can assist with identifying patients who might have a reversible cause of dementia diagnosed with imaging studies for such conditions including subdural hematoma, normal pressure hydrocephalus and treatable cancer.

While the sensitivity and specificity of the prediction rules is low, important factors supporting neuroimaging include:

- patients deemed of young age (<60 years)
- focal neurologic signs
- short duration of symptoms (less than 2 years)
- unusual or present with atypical features
- acute onset of cognitive impairment and rapid neurological deterioration
- physical exam findings suggestive of subdural hematoma, thrombotic cerebrovascular accident, cerebral hemorrhage
- rapidly progressive dementia

## Treatment:

Pharmacotherapy approved by the Federal Drug Administration for the treatment of mild to moderate Alzheimer's disease include the cholinesterase inhibitors donepezil (Aricept), rivastigmine (Exelon), and galantamine (Razadyne). The drugs are not considered disease modifying, and there ~~are~~ is limited data at present on the benefit of these drugs beyond 2 or 3 years. A significant number of patients discontinue these medications because of side effects. The most common side effect of these agents is due to the cholinergic effects including nausea, vomiting and diarrhea. Memantine (Namenda) is a disease modifying agent that helps regulate the excitatory effects of glutamate by antagonizing the N-methyl-D-aspirate receptor. Whether the drug alters the underlying disease processes is unclear, but short-term studies show improved cognition in patients with moderate to severe ~~his~~ Alzheimer's disease.

Increasing evidence suggested certain nonpharmacological measures, including behavioral methods and avoidance of environmental triggers, may be effective in reducing agitation and anxiety in patients with dementia. On occasion, medications are needed for behavioral symptoms of dementia.

**Pharmacologic treatment**

Hyperactive delirium commonly requires intervention to protect the patient and staff from harm. Pharmacologic treatment with atypical and typical antipsychotics can reduce delirium if nonpharmacological measures have failed. Although medications for delirium should be used cautiously, they play an important role in the safe care of the acutely delirious older patient. Most commonly, the initial treatment may require intramuscular medication because the patient may not cooperate with oral medications. The elderly patient with dementia often requires smaller doses than younger adult counterparts. Repeated low doses are preferred to a single large initial dose. Side effects with antipsychotics are lower in the acute care setting (0.9%) as opposed to chronic use. [1] In the large study by Hatta and colleagues, non-serious extrapyramidal symptoms were the most common side effects at 5.6%. The most common serious adverse events include aspiration pneumonia and followed by cardiovascular events, none of which were fatal, and none occurred with intravenous haloperidol.

Medication dosing considerations:

| | | |
|---|---|---|
| Haloperidol | 0.5–1 mg IM/IV every 30–60 min as needed;<br>0.5–1 mg orally twice daily and every 4 h as needed | Preferred agent |
| Olanzapine | 2.5–5 mg orally once per day | — |
| Risperidone | 0.5 mg orally twice daily | — |
| Quetiapine | 12.5–25 mg orally twice daily | Parkinson disease and hypoactive delirium |
| Ziprasidone | 2 mg–5 mg IM | — |

Haloperidol is one of the oldest treatments and continues to be a preferred agent for hyperactive delirium. Haloperidol is likely as safe, effective and reasonably well tolerated with minimal cardiovascular toxicity as newer atypical medications. The oral and parenteral options of haloperidol make it a versatile treatment option. Quetiapine (Seroquel) is recommended in patients with underlying Parkinson disease and has been found effective in hypoactive delirium. Agitation may occasionally be due to unrecognized depression and dementia, and a trial of selective serotonin reuptake inhibitors may be warranted. Temazepam (Restoril) is a drug of choice for sleep disturbance. The half-life of Temazepam is 8-10 hours for patients of all ages and the drug bypasses the oxidative hepatic enzymes system. In some circumstances Benzodiazepines may exacerbate delirium and agitation and should be avoided unless treating acute alcohol withdrawal or seizure. Furthermore, in critically ill older patients requiring sedation, Dexmedetomidine (Precedex) has less risk of delirium than benzodiazepines and is preferred.

| ICD-10 codes for Dementia | |
|---|---|
| **Late Syphilis** | |
| A52.17 | Symptomatic neurosyphilis, General paresis |
| **Vascular Dementia** | |
| F01.50 | Vascular dementia without behavioral disturbance |
| F01.51 | Vascular dementia with behavioral disturbance |
| **Dementia in Other Diseases Classified Elsewhere** | |
| F02.80 | Dementia in other diseases classified elsewhere, without behavioral disturbance |
| F02.81 | Dementia in other diseases classified elsewhere, with behavioral disturbance |
| **Unspecified Dementia** | |
| F03.90 | Unspecified dementia without behavioral disturbance |
| F03.91 | Unspecified dementia with behavioral disturbance |
| **Delirium due to Known Physiological Condition** | |
| F05 | Delirium due to known physiological condition |
| **Other Mental Disorders Due to Known Physiological Condition** | |
| F06.0 | Psychotic disorder with hallucinations due to known physiological condition |
| F06.8 | Other specified mental disorders due to known physiological condition |
| **Alzheimer's Disease** | |
| G30.0 | Alzheimer's disease with early onset |
| G30.1 | Alzheimer's disease with late onset |
| G30.8 | Other Alzheimer's disease |
| G30.9 | Alzheimer's disease, unspecified |
| **Other Degenerative Diseases of Nervous System, Not Elsewhere Classified** | |
| G31.01 | Pick's disease |
| G31.09 | Other frontotemporal dementia |
| G31.83 | Dementia with Lewy bodies |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