Psychoses in the Elderly: A Spectrum of Disorders

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The incidence of psychoses increases with age with a number of factors leading to the increase in vulnerability and expression. They include comorbid physical illnesses, social isolation, sensory deficits, cognitive changes, polypharmacy, and substance abuse. Agitation and aggressiveness are also associated with psychosis in the elderly and frequently are the precipitating reasons for psychiatric consultation. A review of psychoses in the elderly must, therefore, consider psychotic symptoms within the context of the underlying etiologies of the psychotic symptoms. Elderly patients who present with psychotic symptoms require social, behavioral, and environmental interventions that are necessary for their safety and orientation. Given the likelihood of comorbid medical disorders and concomitant medications, the mere presence of delusions or hallucinations is not always an indication for additional medications. However, some patients may need pharmacologic intervention in order to manage the behavioral disturbance that often results from the psychotic symptoms. The atypical antipsychotics with their low propensity to produce extrapyramidal and cognitive side effects have greatly advanced the pharmacotherapy for elderly patients with psychoses.

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As the population gets older, there will be a greater need for clinicians to recognize emerging symptoms of psychosis in their older patients. There is an increased incidence of psychotic symptoms in elderly patients in contrast to younger adults.[1,2] Age-related deterioration of cortical areas such as the temporal or frontal lobes, as well as neurochemical changes common in aging, may be involved in the increased incidence of psychosis. Further, a combination of comorbid physical illnesses, social isolation, sensory deficits (i.e., hearing and visual loss), cognitive changes, polypharmacy, and substance abuse frequently seen in elderly patients adds to the vulnerability for psychosis as well as complicates the treatment of these symptoms. Age-related pharmacokinetic and pharmacodynamic changes in the elderly also affect drug response and increase the risk for delirium. In addition, genetic predisposition, certain premorbid personalities (i.e., schizotypal, paranoid), and female gender have also been implicated as risk factors for the development of psychoses in the elderly.[2,3]

The identification of psychotic symptoms in the elderly may be obscured by the presence of multiple medical illnesses and medications. Agitation and aggressiveness are also associated with psychosis in the elderly and are frequently the precipitating reason for psychiatric consultation. Therefore, in elderly patients, it is best to apply a broader definition of psychosis such as "an impairment of reality testing causing cognitive and/or behavioral disturbances and often manifested as delusions and/or hallucinations."

The Epidemiologic Catchment Area (ECA) survey found that 16% to 23% of the older population had a range of "organic" psychoses.[4] Christenson and Blazer identified paranoia in 40 (4%) of 997 older adults in their community survey.[5] Molinari and Chacko found paranoia in 16 (17%) of 93 elderly patients in an outpatient clinic.[6] In one survey of a long-term care facility, 72 (90%) of 80 subjects had at least 1 psychiatric diagnosis and 40 (50%) of 80 subjects had 4 or more behavioral problems.[7] Dementia increases the vulnerability for psychosis, and more than 50% of elderly patients with dementia have been noted to have paranoia and hallucinations.[8,9]

Somatic and visual hallucinations may be more common in elderly than younger patients, particularly when the psychosis is secondary to a medical condition (e.g., Parkinson's disease). There may be a genuine organic basis for these symptoms that must be ruled out. In the elderly, visual hallucinations must be differentiated from illusions due to poor vision, and auditory hallucinations must be distinguished from carotid bruits or tinnitus. Similarly, delusions are frequently seen in the elderly and must be differentiated from misperceptions due to sensory deficits or cognitive impairment. For example, the misperception of theft due to a misplaced object may be incorrectly described as a delusion. Alternatively, the assertion of theft by an older patient may at first seem plausible and actually

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Table 1. Diagnostic Categories Commonly Associated With Psychosis in the Elderly: A Spectrum of Disorders

Delirium
Schizophrenia
Delusional disorder
Mood disorder
Dementia
Substance abuse
Medical conditions
Neurologic conditions
Drug-induced psychosis

delay recognition of an underlying delusional disorder.[2] Hence, the identification of the underlying cause of the symptoms must precede treatment interventions.

A review of psychoses in the elderly must consider psychotic symptoms within the context of the underlying etiology of these symptoms. Psychotic symptoms can be manifested among a spectrum of disorders as described in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* of the American Psychiatric Association (DSM-IV).[10] Diverse diagnostic categories, including psychiatric conditions (e.g., delirium, schizophrenia, delusional disorder, mood disorders, dementia, substance abuse) and neurologic conditions (e.g., brain tumors, Parkinson's disease, metabolic encephalopathies), are associated with psychotic symptoms and are listed in the DSM-IV.[10] Table 1 lists several diagnostic categories commonly associated with psychosis in the elderly. In addition, several commonly prescribed medications can produce psychotic symptoms in elderly patients (Table 2).

DELIRIUM

Delirium is an acute, reversible state of confusion, characterized by changes in cognition and consciousness, that is frequently unrecognized or misdiagnosed in an elderly population.[11] In the DSM-IV, delirium is coded as either 293.00 or 780.09.[10] Jacobson describes delirium as a threshold phenomenon in which systemic and cerebral impulses combine to yield a disturbed state of consciousness.[12] These patients present with disorientation, an inability to focus or sustain attention, memory impairment, perceptual disturbances (i.e., delusions and hallucinations), psychomotor changes of hypo- or hyperactivity, labile mood, anxiety, or disruptive behavior. The prevalence of delirium is reported to be 11% to 24% of elderly patients on hospital admission, although it has been reported in a much higher percentage of postsurgical patients.[13] Delirium may be superimposed on other neuropsychiatric conditions such as schizophrenia, depression, or dementia, diagnoses that can obscure its identification. However, the key distinguishing feature is a clouded consciousness, which makes it difficult for patients to sustain attention. In elderly patients, the symptoms may be most pronounced in the evening, yielding a "sundowning" syndrome characterized by incoherence, confusion, and illogical behaviors, which in turn can lead to injury.

Table 2. Medications Associated With Psychotic Symptoms in the Elderly[a]

Antiparkinsonian drugs and related compounds
Levodopa or carbidopa
Amantadine
Bromocriptine
Anticholinergics and antihistamines
Diphenhydramine
Hydroxyzine
Cimetidine
Antidepressants
Tricyclic antidepressants
Amitriptyline
Imipramine
Doxepin
Selective serotonin reuptake inhibitors
Fluoxetine
Sertraline
Paroxetine
Novel antidepressants
Bupropion
Venlafaxine
Conventional antipsychotics
Chlorpromazine
Thioridazine
Haloperidol
Benzodiazepines[b]
Alcohol (ethanol)[b]
Stimulants
Methylphenidate
Amphetamine
Ephedrine
Analgesics and anti-inflammatory drugs
Indomethacin
Aspirin (acetylsalicylic acid)
Antineoplastic drugs
Anticonvulsants
Phenytoin
Primidone
Carbamazepine
Prednisone
Antidysrhythmics
Digoxin
Quinidine
Procainamide
Propranolol

[a]Adapted from Wood et al.[49] and reprinted with permission.
[b]Including withdrawal from these agents.

Early recognition of incipient delirium is important because its persistence can contribute to an increase in morbidity and mortality. Evidence of personality change, irritability, distractibility, and loosening of associations may precede the changes in consciousness that tend to be characteristic features of delirious patients. Unfortunately, delirium is often not recognized in the early stages. Farrell and Ganzini reported that 28 (42%) of 67 elderly patients evaluated for depressive disorder in a Veterans Administration hospital setting actually had delirium.[14] Further, Cameron and colleagues reported that only 1 (5%) of 20 cases of delirium were actually recorded as such by the attending physician.[15]

Delirium is generally the manifestation of an underlying medical illness or drug toxicity that disrupts cerebral

Table 3. Medical Conditions Associated With Psychosis and Delirium[a]

Cardiopulmonary
Congestive heart failure
Dysrhythmias
Hypertensive encephalopathy
Hypoxia (including secondary to chronic obstructive pulmonary disease)
Myocardial infarction
Pneumonia
Pulmonary embolus
Gastrointestinal
Severe fecal impaction
Genitourinary
Uremia
Urinary tract infections
Severe urinary retention
Metabolic
Azotemia
Hepatic encephalopathy
Hypo- or hyperglycemia
Hypercalcemia
Hyponatremia
Hypo- or hyperthyroidism
Hypo- or hyperadrenalism
Malnutrition (including severe vitamin deficiency)
Neurologic
Dementia
Intracranial mass lesions
Meningitis
Seizure
Stroke
Trauma
Pharmacologic
Alcohol (ethanol) or drug intoxication or withdrawal
Anticholinergics
Antipsychotics
Antidepressants
Antiparkinsonian agents
Analgesics
Corticosteroids
Histamine H_2 receptor antagonists
Cardiac glycosides
Diuretics
Hypnosedatives
Antineoplastics
Lithium
Rheumatologic
Vasculitis
Systemic illness
AIDS
Burns
Infections (potentially all)
Septicemia
Systemic lupus erythematosus

[a]Adapted from Rummans et al.[11] and Lake et al.[46] and reprinted with permission.

metabolism and neurotransmission, particularly of the dopamine and GABA pathways.[16] As shown in Table 3, many medical conditions can cause delirium. In the elderly, infections such as pneumonia, hypoxic conditions such as chronic obstructive pulmonary disease (COPD), intoxication, and medication withdrawal are the most common causes of delirium. Some drugs (e.g., conventional antipsychotics, anticholinergic drugs, and long-acting benzodiazepines) or toxins can also act to cause delirium. Independent risk factors contributing to the development of delirium include age over 80 years, fractures on hospital admission, symptomatic infection, and male gender.[17] The underlying disease or causative agent affects both the course and resolution of delirium. Although the onset is usually abrupt, the symptoms may fluctuate and persist for days or as long as months.[11] Elderly hospitalized patients with delirium are at high risk for death, and its presence may serve as an indicator of a poor prognosis.[18,19] Cole and Primeau conducted a meta-analysis of outcomes of hospitalized patients with delirium and reported that 43% were institutionalized and 14% had died within 1 month of admission.[19] Although treatment can often reverse the initial presentation of the delirium, some studies have shown a persistence of symptoms in the majority of these patients.[19] Levkoff and coworkers reported that fewer than 20% (58/328) of delirious patients had achieved full resolution of symptoms 6 months after hospital discharge.[20] In some instances, persistent cognitive deficits may also reflect a concurrent dementing illness that was unmasked by the state of delirium.

SCHIZOPHRENIA

Most, but not all, new cases of schizophrenia occur in young adults, and symptoms generally continue to be manifested throughout life. Although schizophrenia continues into old age, the symptoms often become less severe and may not require ongoing antipsychotic medications.[21] Ciompi suggested that advancing age might mitigate the intensity of schizophrenic illness, allowing more patients to live as outpatients with residual states.[22] On the other hand, Davidson and colleagues noted that 175 (57%) of 308 chronically institutionalized schizophrenic patients in their institution had cognitive impairment consistent with dementia.[23]

It has been shown that 10% of cases of first-episode schizophrenia occur in patients who are older than 45 years of age.[1] Although often similar in clinical presentation, this group of late-onset schizophrenics reveals some differences from the early-onset group. For instance, patients with late-onset schizophrenia are more often women, have more persecutory delusions and fewer negative symptoms (less affective flattening or social withdrawal), and tend to respond to considerably lower doses of antipsychotic medication than patients with early-onset schizophrenia.[1,24] Further, in a MRI study of the comparative size of thalami, Corey-Bloom and colleagues found the thalami were larger in the late-onset schizophrenic group than in the early-onset schizophrenic group.[25]

As noted above, elderly patients with schizophrenia may also be at greater risk for dementia, a symptom that might exacerbate the existing schizophrenic illness as well as precipitate new psychotic symptoms. Comorbid

dementia may benefit from cholinesterase-inhibitor drugs, whereas anticholinergic drugs may exacerbate the confusion. Further, schizophrenic patients may not receive the best health care and, consequently, may be at risk for developing medical conditions that could also generate psychotic symptoms. Access to psychiatrists is often limited in long-term care settings where an evolving dementia in a schizophrenic patient may go unrecognized. Finally, older patients are more susceptible to extrapyramidal symptoms (EPS) when treated with conventional antipsychotic drugs, and women, in particular, are more at risk for the development of tardive dyskinesia. The advent of atypical antipsychotics, with their lower incidence of EPS, has heralded a new era in the treatment of older schizophrenic patients whose risk for EPS and tardive dyskinesia is greater than among younger patients.

DELUSIONAL DISORDER

Delusional disorder (coded 297.10 in the DSM-IV) refers to patients who reveal persistent delusions without prominent hallucinations in the absence of dementia, schizophrenia, or mood disorders.[10] Generally, delusional disorders appear in men between the ages of 40 and 49 years and in women between the ages of 60 and 69 years.[1] The symptom of paranoia extends beyond the single diagnostic category of delusional disorder and has been noted in many elderly patients with other underlying disorders. Therefore, a differential diagnosis, which includes other categories of psychosis, must be entertained before the diagnosis of delusional disorder is established.

The delusions of these patients are usually nonbizarre in nature, well circumscribed, and may include beliefs about somatic illnesses, jealousy, persecutions, theft, marital infidelity, or mistaken identity.

An association has been reported between delusional disorder and certain premorbid personality disorders (e.g., schizotypal, paranoid), early life trauma (e.g., sexual or physical abuse), hearing loss, immigration status, and socioeconomic status.[1,26]

Patients with delusional disorder are characteristically resistant to treatment when they finally come for medical attention. Frequently, the paranoid symptoms and resultant behaviors are more distressing to family members or neighbors than they are to the patient who may deny the problem exists at all. Antipsychotic medications are sometimes helpful in reducing the delusional beliefs when combined with behavioral and supportive therapy and environmental adjustments.

MOOD DISORDERS WITH PSYCHOSIS

Depression is the most common of the psychiatric disorders in older patients. The ECA community survey identified symptoms of depression in 27% of the elderly individuals they surveyed.[4] Retirement, relocation, loss of social support, bereavement, financial problems, and chronic medical illnesses contribute to the increased risk for depression in the elderly.[27] Unipolar depression in elderly patients is often associated with delusional symptoms. Nelson and coworkers observed delusions in 39 (36%) of 109 patients being treated for depression.[28] Similarly, Meyers and Greenberg reported 72 (45%) of 161 elderly depressed patients had delusions.[29] The delusions are usually mood-congruent with a hopeless content expressed and may include perceptions of persecution, guilt, suspiciousness, and immorality. Hallucinations may also occur and can sometimes include commands pertaining to suicide.[2] In contrast to nonpsychotic depression, elderly patients with psychotic depression are at increased risk for relapse and have more persistent symptoms (e.g., lasting over 1 year), suicide attempts, hospitalizations, comorbidity, and financial dependency.[1] In one study, 9 (47%) of 19 elderly depressed patients with psychosis who had recovered suffered a relapse or recurrence of the illness within 2 years in contrast to 10 (15%) of 68 nonpsychotic depressed elderly.[30] The cognitive status of the elderly depressed patient may also be compromised and, as such, influence the course of the illness.

Elderly patients with psychotic depression may respond poorly to antidepressants alone and frequently require antipsychotic medications. These patients appear to be highly susceptible to the neuromuscular side effects of antipsychotic medications, particularly tardive dyskinesia.[31] Electroconvulsive therapy (ECT) is often effective in elderly depressed patients with psychosis.[32]

Mania can also present in elderly patients.[21,33] Elderly manic patients are rarely euphoric and more commonly present with irritability, paranoia, or mild confusion. The safe use of thymoleptic drugs like lithium or sodium valproate requires a consideration of comorbid medical illnesses and concomitant medications that might affect the metabolism of these agents.

DEMENTIA WITH PSYCHOSIS

The incidence of dementia (both senile dementia of the Alzheimer's type and vascular dementia) increases with age and has been reported in 44 (30%) of 147 individuals over 80 years of age.[34] Recent studies have found a greater incidence of dementia among Hispanic and African American men in contrast to Caucasian men.[35] Elderly patients with dementia are at high risk for developing psychotic symptoms and behavioral disturbance during the course of this illness. The distinction between psychosis and Alzheimer's disease was obscured during the past decade due to the labeling of Alzheimer's disease as "senile psychosis" instead of senile dementia.[8] Consequently, psychotic symptoms were not considered separately from the cognitive impairment that defines the disease. It is now

known that psychotic symptoms and behavioral disturbances may arise from the cognitive impairment and that these symptoms require treatment interventions that are independent of the Alzheimer's disease.

More than 50% of Alzheimer's patients manifest psychotic symptoms during the course of this progressive illness, and some authors have reported rates of behavioral disturbance up to 70%.[1,9,36,37] Tariot surveyed the Alzheimer's disease literature and reported median percentages of 28% for the occurrence of hallucinations, 44% for agitation, 24% for verbal aggression, 34% for disturbed ideation (delusions), and 18% for wandering.[38] Cummings and coworkers found persecutory delusions in 30% of patients with Alzheimer's disease and in 40% of patients with multi-infarct (vascular) dementia.[39]

Typically, patients with dementia will report simple paranoid beliefs and frequently describe visual and auditory hallucinations. Tariot has emphasized the importance of differentiating these true psychotic symptoms from misperceptions, which result from a patient's compromised capacity to organize perceptual information.[38] Initially, efforts to adjust the environment, optimize sensory input, and provide supportive reality orientation may ameliorate the symptoms. Mild delusions or hallucinations may be tolerated in a safe environment. However, global agitation or aggressiveness may be harder to manage safely and may necessitate pharmacologic intervention. The decision to introduce psychotropic medication must be considered within the context of the total medical presentation of the patient, including comorbid medical illnesses and the use of concomitant medications. It has also been suggested that cholinesterase-inhibitor drugs may have antipsychotic effects in addition to their cognitive effects.[40]

Another dementia syndrome that has been given increased attention is dementia with Lewy bodies. Lewy bodies are inclusion bodies that are immunoreactive to ubiquitin and are often found at autopsy in patients with Parkinson's and Alzheimer's diseases.[41] Demented patients with Lewy bodies represent a large percentage of patients with dementia. Lewy bodies were found in 19% of demented elderly patients in a British community survey.[41] Dementia with Lewy bodies is a form of dementia in which fluctuations in cognition and alertness (attention) are prominent findings of the disease along with the visual hallucinations and motor features of parkinsonism.[41,42] Often, these patients have a history of falls and/or syncope related to a transient loss of consciousness. It has been suggested that demented patients with Lewy bodies may be particularly responsive to cholinesterase inhibitor drugs.[43] However, patients with Lewy body disease are extremely sensitive to conventional antipsychotic medication and have frequent adverse reactions, including persistence of motor symptoms after drug withdrawal.[42]

SUBSTANCE ABUSE AND PSYCHOSIS

Substance abuse is a common problem in elderly patients. Elderly patients often abuse alcohol because of loneliness or boredom or from the overuse of prescription drugs such as barbiturates. Consequently, acute and chronic substance abuse can be a factor in the development of psychosis in this population. Acute alcohol withdrawal can also elicit delirium complete with vivid hallucinations and delusions.

Elderly patients may not report alcohol or substance abuse to their clinicians. A drug screen is often useful when the etiology of psychotic symptoms is unknown, particularly if the patient takes his or her medication without supervision. The risk of seizures due to abrupt withdrawal must be considered when the recent medication history is not certain. It is also important to eliminate conditions such as thiamin deficiency in patients who may have poor nutrition and potentially suffer from Korsakoff's psychosis or Wernicke's encephalopathy.

PSYCHOTIC DISORDERS DUE TO MEDICAL OR NEUROLOGIC CONDITIONS

Medical disorders may predispose elderly patients to develop psychotic symptoms (see Table 3). Common disorders including thyroid disease, diabetes, B_{12} and folate deficiency, sodium-potassium imbalance, sleep deprivation, and dehydration, as well as chronic illnesses have been associated with psychosis in the elderly.[24] Presenting symptoms can include delusions (DSM-IV code 293.81) and/or hallucinations (DSM-IV code 293.82) and often meet the criteria for delirium.[10] Vivid visual hallucinations and confusion are particularly common when the etiology of the psychosis is related to an underlying metabolic disturbance. Structural brain lesions or subtle seizure disorders must be ruled out as well.

A full discussion of neurologic conditions causing psychotic symptoms extends beyond the scope of this review. However, Parkinson's disease requires special consideration because of its high prevalence in the elderly and the complex relationship of dementia and depression to this disorder as well as to the medications used to treat the motor components of the illness. Up to 40% of Parkinson's disease patients experience a related psychosis, and the incidence increases with age.[1] The psychotic symptoms may result from the disease process, emerging dementia, or the drugs used to treat the disease. Amantadine, anticholinergic drugs, and dopaminergic drugs can elicit psychotic symptoms in patients with Parkinson's disease. Visual hallucinations occur in 20% of patients receiving dopaminergic agents, like levodopa or carbidopa, and appear to be dose-related.[44] The hallucinations are usually well formed, occur in the evening, and frequently consist of images of people or animals. Patients are often very frightened by

these hallucinations and may become agitated, particularly if they have an associated parkinsonian dementia. Further, the depression associated with Parkinson's disease may also yield psychotic symptoms. Conventional antipsychotic drugs like haloperidol tend to exacerbate the neuromuscular dysfunction of these patients and worsen their overall psychomotor retardation. Alternatively, atypical antipsychotics like clozapine, quetiapine, and olanzapine offer promise for the treatment of parkinsonian psychosis because of their low liability for the development of extrapyramidal symptoms.

A distinct entity that occurs primarily in older patients is the Charles Bonnet syndrome, which is characterized by visual hallucinations occurring when the patient is in a clearly conscious state.[2] Many patients with Charles Bonnet syndrome have bilateral visual impairment, and some may reveal cognitive impairment as well.[2] The hallucinations may be self-limiting and benefit from improved lighting, although some patients with Charles Bonnet syndrome may also require antipsychotic medication.

DRUG-INDUCED PSYCHOSIS

Elderly patients are often receiving multiple medications when they present with psychotic symptoms. Table 2 lists a group of commonly used drugs that can produce psychotic symptoms in elderly patients.[45] Drug interactions and dosage must be considered when evaluating drugs as causative agents of psychotic symptoms.

EVALUATION AND TREATMENT STRATEGIES FOR PSYCHOSES IN THE ELDERLY

Elderly patients presenting with psychotic symptoms require social, behavioral, and environmental interventions that are necessary for their safety and orientation. Given the likelihood of comorbid medical disorders and concomitant medications, the mere presence of delusions or hallucinations is not always an indication for additional medications. However, some patients may need pharmacologic intervention in order to manage the behavioral disturbance that often results from the psychotic symptoms. A scrupulous assessment of underlying medical conditions and concomitant medications is essential before the initiation of pharmacotherapy. A psychiatric history may uncover an earlier episode or episodes of psychosis or depression that may have predisposed an elderly patient to psychotic symptoms. However, psychiatric disorders like schizophrenia or depression may coexist with organic or toxic causes of psychosis; all of these possibilities must be considered in the differential diagnosis.

Generally, psychotropic drugs have been used to manage the behavioral manifestations as well as the hallucinations and delusions that present in elderly psychotic patients. In demented patients who present with a complex array of problems, Tariot has compiled a list of specific symptoms and disturbed behaviors into a "psychobehavioral metaphor" that may approximate drug responsive syndromes and serve to guide the appropriate selection of pharmacotherapy (see Tariot, this supplement). In this fashion, a trial of antidepressants may precede the introduction of antipsychotic medications.

Benzodiazepine use is limited by virtue of side effects like cognitive impairment and drowsiness that can lead to physical injury from falls. Benzodiazepines have also been associated with disinhibition in some cases. Barbiturates are addictive and can produce more confusion in elderly patients.

Although drugs like buspirone, propranolol, divalproex, carbamazepine, and antidepressants have been used with some success, the primary treatment of psychosis in the elderly has been with antipsychotic medications.[38]

The usefulness of conventional antipsychotic agents like haloperidol is limited by virtue of undesirable side effects and the risk of tardive dyskinesia. When conventional antipsychotics are used, the practice has been to use them for brief periods and attempt to taper off their use when possible. Atypical antipsychotic drugs like quetiapine and olanzapine (which have lower liability for extrapyramidal side effects and tardive dyskinesia and better overall safety profiles) (see Maixner and colleagues, this supplement) provide a new therapeutic approach for the treatment of psychotic symptoms of elderly patients and may eventually replace these other treatments.

Psychosis in the elderly is often accompanied by behavioral disturbances, including agitation and uncooperative behavior. The early recognition of emerging psychotic symptoms and the interpretation of underlying etiologies coupled with the initiation of appropriate treatment interventions, including the new atypical antipsychotics, will reduce morbidity and improve the quality of life for these patients.

Drug names: amantadine (Symmetrel), amitriptyline (Elavil and others), amphetamine (Adderall), bromocriptine (Parlodel), bupropion (Wellbutrin), buspirone (BuSpar), carbamazepine (Tegretol), carbidopa (Sinemet), chlorpromazine (Thorazine and others), cimetidine (Tagamet), clozapine (Clozaril), digoxin (Lanoxin), diphenhydramine (Benadryl and others), divalproex sodium (Depakote), doxepin (Sinequan and others), fluoxetine (Prozac), haloperidol (Haldol and others), hydroxyzine (Atarax and others), imipramine (Tofranil and others), indomethacin (Indocin and others), levodopa (Larodopa), methylphenidate (Ritalin), olanzapine (Zyprexa), paroxetine (Paxil), phenytoin (Dilantin and others), prednisone (Delta-Dome and others), primidone (Mysoline), procainamide (Procanbid), propranolol (Inderal and others), quetiapine (Seroquel), sertraline (Zoloft), thioridazine (Mellaril and others), venlafaxine (Effexor).

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