Recognition and Management of Behavioral Disturbances in Dementia

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Behavioral disturbances are seen in most patients with dementia at some point in their course. They cause immense patient suffering and are responsible for caregiver stress, institutionalization, and hospitalization. Identification of predisposing and precipitating factors is very important. The approach to the management of behavioral disturbances in dementia patients should be structured and thorough. Ensuring the safety of the patient and others should be paramount. Addressing the causes of behavioral disturbances such as comorbid medical illnesses, polypharmacy, pain, personal need, environmental factors, etc. is critical to a successful outcome. Many behavioral disturbances such as wandering and hoarding are not amenable to pharmacotherapy. Nonpharmacologic interventions are the mainstay of managing behavioral disturbances. Success of pharmacologic interventions will depend on accurate identification of specific syndromes, e.g., depression-anxiety and psychosis and severity of symptoms. Response to pharmacologic interventions is usually modest and may be associated with significant symptom resolution. Many behavioral disturbances can be prevented by avoiding inappropriate medications and educating patient, family, caregivers, and health care providers. Hospitalization can be avoided and institutionalization delayed by early recognition and treatment of behavioral disturbances. Leadership from physicians to implement preventive measures is recommended. Research to clarify the biological underpinnings of behavioral disturbances and to address cost-effectiveness of currently identified interventions is needed.

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Dementias are one of the most feared disorders of later life and one of the most devastating in their toll on patient suffering and dysfunction. Late-life dementias are associated not only with deficits in cognition and self-care, but also with noncognitive psychiatric and behavioral symptoms.[1] Alzheimer's disease and related disorders account for more than 90% of dementia cases in the elderly. This includes Alzheimer's disease, vascular dementia, Lewy body disease, and other degenerative dementias. More than 4 million Americans currently have Alzheimer's disease or related disorders. Their prevalence will soon reach epidemic proportions, mainly because of the aging of the population.

Although cognitive disturbances have received the most attention in terms of targeted pharmacotherapy in patients with dementia, behavioral disturbances are a source of considerably more morbidity and are also more amenable to pharmacotherapy. Patients with dementia and behavioral disturbances behave in a manner that may place themselves and others in danger,[2] contribute to a great deal of distress and burden for caregivers,[3–5] and severely disrupt family, social, and institutional networks. Behavioral disturbances are frequently reasons for acute hospitalization and long-term institutional placement.[6] Behavioral disturbances associated with dementia may lead to caregiver "burnout" and a decrease in empathy. Behavioral disturbances are one of the primary reasons why health care professionals are asked to intervene. Early recognition and prompt treatment of behavioral disturbances will go a long way toward improving quality of life of patients and their families and caregivers and reducing health care costs.

INCIDENCE AND PREVALENCE OF BEHAVIORAL DISTURBANCES IN DEMENTIA

At some point in the course of their illness, 90% of those with dementia are expected to develop significant behavioral problems.[7–9] Behavioral disturbances occur throughout the course of dementia, irrespective of level of cognitive impairment.[10] (Refer to Table 1 for the common behavioral disturbances associated with dementia.) Behavioral disturbances (synonymous with agitation in most studies) occur in up to 75% of nursing home residents; most of them have dementia.[11] More than half will exhibit

Table 1. Common Behavioral Disturbances in Dementia

Aggression	Affect-Mood
Verbal	Anxiety
Screaming	Depressive symptoms
Cursing	Apathy
Physical	Irritability
Hitting	Anger outbursts
Biting	Thought and perception
Kicking	Delusions
Scratching	Hallucinations
Grabbing	Illusions
Nonaggressive behavioral	Misperceptions
Verbal	Vegetative symptoms
Repetitive questioning	Sleep disturbances
Complaining	Insomnia
Physical	Increased daytime napping
Wandering	Sundowning
Pacing	Sexual
Hoarding	Hyposexuality
Rummaging	Hypersexuality
Hiding	Sexual disinhibition
Taking other people's belongings	Appetite
Voiding at inappropriate places	Poor food intake
Shadowing	Hyperphagia
Resistance to care	
Intrusiveness	
Fatigability	
Mannerisms	

2 or more problem behaviors.[12–14] Verbal aggression/threats (54%) and physical aggression/agitation (42%) constitute the 2 most frequent behavioral disturbances reported in patients with Alzheimer's disease and related disorders.[160] The high mean prevalence rates for both behaviors clearly reinforce the clinical magnitude of these problems for caregivers and health care providers. Other behaviors, such as sleep disturbances (38%), restlessness (38%), and wandering (30%) are also quite prevalent. Delusions (30%), hallucinations (24%), and depression (30%) constitute major psychiatric syndromes that may underlie many behavioral disturbances.[160] Baker and colleagues[15] reported that 57% of the Alzheimer's disease patient population demonstrated mixed psychiatric symptoms. Verbally nonaggressive behaviors are most prevalent in the middle stages of dementia, when verbal abilities are still maintained but the ability to use them effectively is diminished. In contrast, aggressive behaviors tend to occur in late stages of dementia, when verbal communication is severely compromised.

PREDISPOSING AND PRECIPITATING FACTORS

The more cognitively impaired the patient, the more likely it is that the patient will evidence agitated behavior.[16,17] Premorbid personality problems are also correlated with higher incidence of behavioral disturbances in dementia patients.[18] Specific behaviors such as screaming and vocal outbursts are strongly correlated with increased functional impairment, depressed affect, and social networks of poor quality.[19–21] Deutsch and Rovner[22] found that Alzheimer's disease patients who were more physically violent were more dependent on others regarding oral hygiene, dressing, and toilet needs. Correspondingly, staff-patient interaction was the most frequently identified precipitant for physical aggression in state hospital dementia patients.[23] Preliminary data suggest that racial differences exist in the prevalence of neuropsychiatric symptoms of dementia. Some studies have found higher rates of hallucinations among black than among white dementia patients[24,25] and a higher prevalence of agitation and depression among white than among black dementia patients.[26,27] Restraint use may also increase agitation.[28] Staff touch and verbal interaction may elicit agitation in many residents.[29] Identification of specific predisposing and precipitating factors in each and every patient is the first step in successful management of behavioral disturbances in dementia.

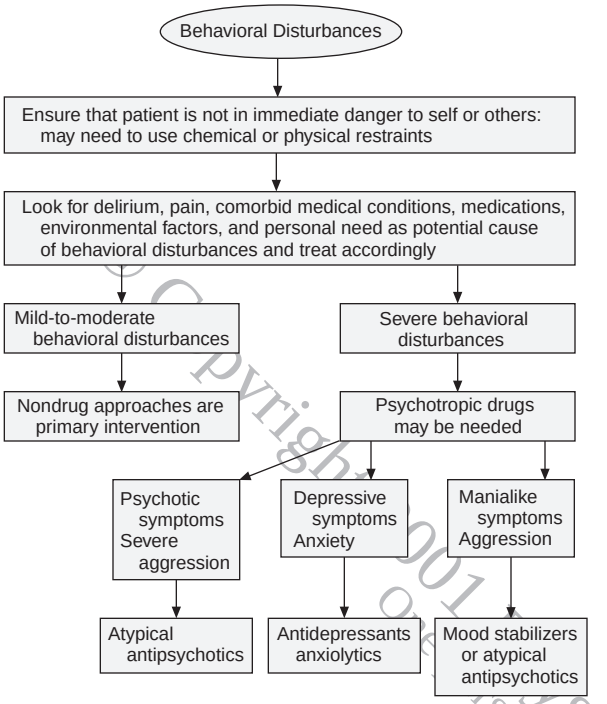
CLASSIFICATION OF BEHAVIORAL DISTURBANCES IN DEMENTIA

It is important to approach the management of behavioral disturbances associated with dementia in a structured manner. Behavioral disturbances in dementia can be classified as follows:

1. Primary behavioral disturbances. These disturbances are seen at some time in the course of dementia and are mainly caused by the underlying neurochemical changes associated with dementing diseases. These can be further classified as follows: (a). Behavioral disturbances for which pharmacotherapy has not been found to be beneficial. These include, but are not limited to, wandering, pacing, hoarding-rummaging, apathy, and sexual disinhibition. Hopefully, as we learn more about the underlying neurochemical basis of such behaviors, we will have specific drugs to target these problems. (b). Behavioral disturbances for which pharmacotherapy has been found to be beneficial. These include, but are not limited to, syndromes of psychoses, depression, and anxiety.
2. Secondary behavioral disturbances. These behavioral disturbances are caused by comorbid medical illness, delirium, medications, pain, personal need, or environmental factors.
3. Mixed behavioral disturbances. In many patients, primary behavioral disturbances may be exacerbated by secondary factors and vice versa. Physical aggression invariably has primary and secondary causes.

It is important to differentiate between these disorders because of their different prognoses and treatment approaches.

Figure 1. An Algorithm for the Management of Behavioral Disturbances in Dementia Patients



Several compelling reasons exist for treating behavioral disturbances in Alzheimer's disease patients. Behavioral disturbances cause significant emotional distress to the patient and/or caregivers. They may escalate to the point of hospitalization, are a frequent cause of early institutionalization (placement in long-term care facilities), and may cause caregiver breakdown or burnout. They also may become life-threatening and are responsible for staggering health care costs. Finally, numerous interventions (pharmacologic and nonpharmacologic) are now available that have increasing evidence of being effective and relatively safe in the management of behavioral disturbances.

APPROACH TO TREATING A DEMENTIA PATIENT WITH BEHAVIORAL DISTURBANCES

Figure 1 provides an algorithm for the management of behavioral disturbances in patients with dementia. It is important to approach this problem in a structured and systematic manner. The reason for agitation is usually not apparent. The onset (acute or chronic), type of symptoms (e.g., depression, delusions), input from significant others or staff in long-term care facilities, observation over time, pertinent physical and mental status examinations, appropriate tests (bedside tests such as the Geriatric Depression Scale,[161] as well as blood tests or brain imaging) when clinically relevant, and review of patients' current medications, past psychiatric history, and premorbid personality will shed light on the potential etiology. It is important to diagnose delirium early due to its potential for fatal consequences if untreated or hospitalization if treatment is delayed. Finding the patient's particular symptom cluster is important for determining the best treatment approach. Depression may be due to boredom or loneliness, and hallucinations may be a result of severe vision loss.[30] Prevention of behavioral disturbances, accommodation, and flexibility should be essential elements of intervention. The environment should be structured to prevent conditions leading to disruptive behaviors. Controlling temperature, facilitating activities, monitoring pain, and providing stimulation and social contact are ways to improve the environment. Behaviors such as wandering that fulfill the needs of dementia patients should be allowed (e.g., encouraging them to walk in sheltered gardens), as long as they occur in a manner and setting that do not pose a risk to the patients and do not increase caregiver burden. Caregivers must also be flexible in adjusting the older person's daily routine and environment based on the person's habits, identity, physical disabilities, and remaining abilities. Flexibility in mealtimes and type of food, sleep times, and type of bathing can all reduce conflict and ensuing disruptive behavior.

Activities should be matched with the patient's primary needs for social contact and meaningful and challenging activity. Information regarding preferred activities can be obtained from close relatives. It is also important for patients to maintain the sense of identity they may have found through work and family roles. Current sensory and cognitive abilities, as well as the person's ability to comprehend, respond to, and process information, should also be considered. Augmentation of sensory abilities should be simple, such as securing better-fitting eyeglasses, an auditory amplifier, or better-fitting hearing aids. Fitting patients with hearing devices can result in significant decreases in inappropriate behaviors.[31,32]

Assessing the underlying need is critical. Carefully listening to a demented patient even when the information is not clear frequently yields positive results. The patient may say that it is cold outside or that the place is wet, when they mean that they are cold or wet. The caregiver should be sure that the dementia patient can see them during a conversation. Observing the patient for few minutes over several days and listening to any verbalizations can be very informative. Information about changes in behavior and affect and probable causes of discomfort can be provided by the caregivers.

Various interventions should be attempted until one is found that fits the needs of the manifested behavior. Patients have shown improvement in eating or drinking with the use of enhanced light during meals.[33] Because physical restraints increase agitation,[28] their removal may eliminate inappropriate behaviors. Caregiver and patient

education regarding goals of therapy and expected side effects are paramount. The physician should routinely review and discontinue ineffective, unnecessary, or harmful medications. Nonpharmacologic interventions should involve an understanding of the person's needs and treatment options based on his or her abilities and preferences. This demands consideration, persistence, and creativity from caregivers. Nonpharmacologic interventions decrease problem behaviors and promote independence. If the patient with dementia requires institutionalization, planned admissions to a long-term care facility may be better than unplanned admissions.[34] Behavioral disturbances should first be treated with nonpharmacologic approaches before any medication is administered. Consistent routine and regular stimulation can help manage many behavioral disturbances. In long-term care facilities, inadequate staffing (in quality and quantity) and high staff turnover may make effective behavioral management difficult to implement.

When drug therapy is considered, a "start low and go slow" approach is recommended. The dosage of any psychotropic medication should be increased very slowly until the targeted symptoms are eliminated or until the patient experiences toxicity. A nontoxic efficacious dose should be maintained and continued for weeks or months and then tapered and reevaluated. Drug therapy may not effectively ameliorate many behavioral problems. Many patients in the nursing home are often inappropriately prescribed psychotropic medications, which are then inadequately monitored and reviewed, with the potential for serious detrimental consequences.[35] Use of practice guidelines for the treatment of dementia, delirium, and agitation in demented patients is strongly recommended.[36–38]

SPECIFIC BEHAVIORAL DISTURBANCES

Loneliness

Loneliness is best treated with involvement of the person with the most positive relationship with the agitated patient, for that person to interact with the patient in a warm and loving manner. Other interventions found useful are one-to-one interaction with a new caregiver,[39] videotapes of family members,[39] contact with animals,[40] massage therapy,[41] and simulated presence therapy,[42] in which the family caregiver tapes his or her side of a telephone conversation that is played for the patient as a repeated phone conversation.

Boredom

Boredom is managed by providing stimulation with structured and unstructured activities and accommodating agitated behaviors. Sensory stimulation includes music tailored for the patient,[43] aromatherapy, and touch therapy. Books and pamphlets can be provided for patients to handle, and aprons with buttons, threads, and other articles sewn on can be provided so that patients can fiddle with these rather than with their own clothing or with harmful materials. For some individuals, it is important to provide a meaningful activity, such as folding towels or kneading dough.[44]

Psychosis

Late-life dementias are associated with delusions and hallucinations.[45–47] In a recent study,[46] the cumulative incidence of hallucinations and delusions in patients with probable Alzheimer's disease was 20.1% at 1 year, 36.15% at 2 years, 49.55% at 3 years, and 51.3% at 4 years. Paranoia may be most prominent in the middle stages of the illness.[45,47] The most common delusions associated with dementing disorders were of people stealing, breaking in, or having intentions to persecute the patient or of food being poisoned.[48] Visual hallucinations are the most common, followed by auditory hallucinations or combined auditory and visual hallucinations.[49] The content of typical visual hallucinations includes persons from the past (such as deceased parents), intruders, animals, complex scenes, or inanimate objects.[50] Delusions or hallucinations in Alzheimer's disease may be a marker of a more severe or rapidly progressive dementing process.[47,51,52] Impaired visual acuity may be associated with visual hallucinations in patients with Alzheimer's disease.[30]

Depression

Major or minor depression is seen in up to one half of patients with the disease[53] and can be differentiated from apathy by the presence of psychic distress and a low mood state. Unlike that of most behavioral symptoms, the frequency of depression does not necessarily increase with overall disease severity.[54] Depression frequently goes unrecognized in patients with dementia because of the presence of behavioral disturbances and aggression as part of dementia.

Anxiety

Anxiety is more prominent in the earlier phases of the illness and often results from anticipation of potentially stressful circumstances or an adjustment reaction to the increasing dependency associated with progressive functional decline.

Sundowning

The increased prevalence of psychiatric and behavioral symptoms in the early evening has been linked to changes in sleep patterns (partial arousal from rapid eye movement sleep, sleep apnea, and phase shifting) as well as to sensory deprivation, loneliness, and diminished social and physical time cues (e.g., zeitgebers).[55] It is best managed by nondrug interventions. No drug has been specifically found to be useful for this problem.

Apathy

Apathy occurs as frequently as aggression or psychosis in dementia patients and is as important a source of caregiver distress. Apathy may best be characterized as a disturbance of motivation; associated features include loss of interest, fatigue, motor retardation, and affective blunting. Increased severity of apathy symptoms is associated with severity of cognitive impairment, the presence of psychotic symptoms, and with increased severity of symptoms of depression. It responds poorly to currently available psychotropic medications. One recent retrospective study found risperidone efficacious not only in positive (psychotic) symptoms of Alzheimer's disease but also negative symptoms (diminished initiative, drive, motivation, and emotional reactivity).[56]

Screaming

Disruptive vocalization tends to occur along with various other agitated behaviors. It has been associated with depression,[57] physical discomfort, and response to some environmental factors. In some cases it tends to occur during patient care activities, particularly toileting and bathing, whereas in other cases it may result from social isolation. Interventions may include (1) the use of music (when social isolation and self-stimulation are the problems), (2) a differential reinforcement system rewarding patients for silence or appropriate requests (when screaming is being reinforced by contingent staff attention), and (3) the use of touch in selected patients.

Sleep Problems

Sleep disturbances are common with dementia. The normal changes in sleep that occur with aging (reduced REM and slow-wave sleep, with increased nighttime wakefulness and daytime napping) are exaggerated in dementia.[162] The disruptions in nighttime sleep increase in magnitude with increasing severity of dementia.[163] Decreased daytime activity may result from deficient physical stimulation or frailty and in turn cause sleep problems. Depression, sleep apnea, restless legs syndrome, or other sleep disorders can explain increased nighttime activity in some. Sleep disturbance in persons with cognitive impairment may be an indicator of depression, because depressed elderly persons actually have more objective evidence of sleep disturbances than do demented individuals.[58]

Elderly persons having difficulty with sleep may use over-the-counter sleeping pills. In most instances, these preparations are more hazardous than some prescribed medications. Sedating antihistamines (such as diphenhydramine) are common ingredients in over-the-counter sleeping medications (e.g., Tylenol PM). Most of these drugs have potent anticholinergic effects, and tolerance develops after several weeks. Although these drugs are popular with older patients, their use should be discouraged.

Lorazepam used for nighttime sedation obviates the need for multiple benzodiazepine preparations. It is particularly useful in hospitalized patients because an intramuscular form is available. One of the major advantages of lorazepam for use by outpatients is that it is available in a less expensive generic preparation. In elderly demented patients, benzodiazepines can cause side effects even at low therapeutic dosages that are not seen in nondemented elderly and younger patients. Two hypnotics, zolpidem, a short-acting hypnotic, and zaleplon, a new, even shorter-acting hypnotic, have demonstrated efficacy in the treatment of elderly individuals with insomnia and may provide advantages over benzodiazepines in dementia patients. The preferred dose of zolpidem is 5 mg and that of zaleplon is 5 or 10 mg. Use of hypnotics should be only for a short term (a few days to 3 weeks), after careful assessment of risks and benefits, and should always be accompanied by measures to improve sleep hygiene. A number of approaches have been taken to improve sleep and thereby decrease agitation: use of bright light therapy,[59,60] use of melatonin,[61] increased exercise, and a decrease in nighttime interruptions.[62]

Wandering/Pacing

Wandering/pacing is more often a nuisance to other residents and caregivers than to the patient. Psychotropic medications do not help and often worsen the problem. Conventional neuroleptics such as haloperidol often cause akathisia, which mimics wandering/pacing and requires discontinuation of the medication rather than increase in the dose. Patients try to leave their environment and, when prevented by caregivers, may become aggressive. Use of programs such as "safe return" by the Alzheimer's Association may prevent complications by early detection of dementia patients who wander out of their homes and cannot find their way back. In long-term care facilities, using identification bracelets and position alarms on the person, putting alarms and complex locks on doors, and avoiding restraints are some general measures that may be helpful. Outdoor walks and the use of outdoor wandering areas[63,64] are also found to be beneficial. It is important to exclude pain, discomfort, and any other physical source as potential causes of wandering/pacing. High-calorie finger foods to replace lost calories, fanny packs filled with food for snacks, and distracting places for the pacer to sit, relax, and rest are also important interventions.

Physical Aggression

Physical aggression is found to be associated with depression, psychoses, male sex, younger age, and use of psychotropic drugs, as well with dementia itself. In mild-to-moderate cases, behavioral interventions are the first line of treatment. In severe persistent cases, atypical antipsychotics or mood stabilizers may be considered for a limited period.

Self-Injurious Behavior

Although the specific prevalence rate of self-injurious behavior in elderly patients with dementia is unknown, geriatric psychiatrists are frequently consulted for this problem. For example, it may manifest as severe self-induced excoriations of the skin secondary to delusions of parasitosis or as excessive skin picking because patients feel "sand" and feel the sand moving through the body. There are case reports of benefit from psychopharmacologic treatment of such problems.[65]

Hoarding

Hoarding—collecting a large number of unneeded objects—is commonly found in dementia.[66] It can interfere with the hygienic management and health of patients, and patients may become extremely agitated and even violent when family members threaten to discard their possessions.[67] Patients with hoarding have been found to have a higher prevalence of repetitive behaviors, hyperphagia, and pilfering.[68] Also, many nurses and physicians view hoarding as negative and assume that the patient is a bit "strange" or psychotic. This behavior is best managed with nonpharmacologic interventions. Patients with "gathering/shopping behaviors"—those who take belongings from others—should be provided with safe areas from which they can "shop" and with canvas bags where their treasures can be stored and from which they can then be restored to their rightful owners.

Resistiveness

Resistiveness to physical care among patients with dementia is an extremely tiring and burdensome problem frequently leading to caregiver burnout, increased staff turnover in long-term care facilities, and even caregiver injuries.[4,69] Executive impairment may be a predictor of resistiveness to nursing care among dementia patients. Resistiveness is best managed by caregiver education and training in nonpharmacologic interventions.

Sexual Disinhibition

Sexual symptoms such as exhibitionism and inappropriate touching (to self or others) need to be evaluated carefully to determine the nature of the gesture, to whom it was made, what preceded it, and its effect on staff and other residents. Such behaviors have not been treated successfully with medications. A multidisciplinary team should develop a consistent plan to manage such behavior.

Delirium

Patients with dementia or other brain damage have a lower threshold for developing delirium and do so with greater frequency.[70–72] Physicians should suspect delirium in any elderly patient with an acute change in mental status, personality, or behavior.[73] Delirium should be promptly identified and treated.

MEASUREMENT OF BEHAVIORAL CHANGES

The Brief Agitation Rating Scale[74] is a 10-item scale to quantify agitation. It has good interrater reliability and validity and is easy to use on a regular basis. Measurement is especially important in long-term care settings where patients with advanced dementia who are receiving psychotropics need documentation regarding the benefit of drugs. The Neuropsychiatric Inventory[75] provides comprehensive assessment of psychopathology in dementia and is usually used in research settings. The Geriatric Depression Scale-15[76] was designed to be easier for cognitively impaired people to complete and may be considered in dementia patients to identify comorbid depression.

BEHAVIORAL DISTURBANCES AS PSYCHIATRIC EMERGENCIES

Most elderly persons with dementia die from physical complications of disease, but some experience life-threatening behavioral disturbances that can be fatal to self and others if not recognized and adequately treated. Such behavioral disturbances include suicide, physical or sexual aggression toward others, delirium, profound weight loss due to depression, and refusal to take life-sustaining medications such as warfarin or digoxin. Behavioral disturbances that are a response to physical or sexual abuse and neglect should also be considered psychiatric emergencies. Although suicide is rare in nursing homes, indirect self-destructive behaviors such as the refusal to eat or take life-sustaining medications are commonly encountered. For some, this represents a cry for help, whereas in others it is a reasoned behavioral expression of legitimate preference for an earlier death. Although an identifiable subset of persons who commit or seriously contemplate committing suicide do not have a diagnosable mental disease,[77] most do. It is paramount for the physician to quickly recognize the serious nature of these behaviors, provide accurate assessment, and recommend effective treatment in the least restrictive settings.

SECONDARY BEHAVIORAL DISTURBANCES

Pain

Pain is a significant trigger of behavioral disturbance in dementia patients, but is often overlooked or ignored. Most common complaints concern musculoskeletal pain such as joint, back, and leg pain. Neuropathic and other causes of pain (e.g., peripheral vascular disease, cancer) should also be looked for because a very different class of drugs are indicated to treat non-musculoskeletal pain. In dementia patients, cognitive impairment and communication issues lead to underreporting of pain incidence. Pain is prevalent, undertreated, and relatively unstudied in dementia patients.[78–80] It should be considered as the fifth

vital sign and routinely monitored and aggressively treated in all patients with dementia with or without behavioral disturbances.

Comorbid Medical Conditions

Elderly individuals are at increased risk for psychiatric disturbances due to a medical illness because of their higher rates of physical illnesses and resultant polypharmacy as well as aging-related susceptibility to disruption of brain function.[81] Underlying medical conditions need to be included in the differential diagnosis of behavioral disturbances in dementia patients. Common comorbidities include, but are not limited to, dehydration, urinary tract infection, polypharmacy, adverse drug reactions, fecal impaction, abscessed tooth, fracture, and congestive heart failure. Nursing home residents experience acute illness and its complications at a high rate.[82,83] These residents often do not report physical complaints due to cognitive and communicative impairment. Behavioral disturbances may be the only overt manifestation of an acute medical problem. In fact, nursing assistants often notice early signs of acute illness and behavioral changes that precede acute illness but do not systematically document them or report them to medical staff.[84] High degree of suspicion, being familiar with the patient, early recognition, and prompt treatment of comorbid medical conditions causing behavioral disturbances will prevent unnecessary hospitalization and psychotropic administration, thereby greatly reducing suffering and cost of health care for dementia patients.

Drug-Induced Behavioral Disturbances in Dementia Patients

Benzodiazepines. Benzodiazepines are routinely used to treat sleep problems and behavioral disturbances in dementia patients.[1,85,86] Benzodiazepines can cause significant behavioral disturbances in dementia patients in addition to increasing the risk of falls, fractures, and worsening cognition.[87,88] Benzodiazepines are inappropriate especially if used for behavioral disturbances that are secondary to medical problems. Nonetheless, there is a high prevalence of inappropriate use of benzodiazepines in frail, older adults in nursing homes and in the community. Best practice recommendations for benzodiazepine use in patients with dementia include (1) emergency or short-term (few days) use; (2) use of short half-life agents, preferably metabolized through phase 2 (e.g., lorazepam, oxazepam); and (3) avoidance of other central nervous system depressants. In long-term care facilities, it is recommended to follow the criteria set forth by Beers[89]: benzodiazepine use is inappropriate (1) if it includes any use of flurazepam, diazepam, or chlordiazepoxide and (2) if the following recommended dosing limits per 24 hours are exceeded: lorazepam (3 mg), oxazepam (60 mg), alprazolam (2 mg), temazepam (15 mg), triazolam (0.25 mg), and 5 mg for the nonbenzodiazepine hypnotic zolpidem.

Drugs with anticholinergic activity. Individually and/or in combination, these drugs not only can cause behavioral disturbances, but in some instances can cause life-threatening delirium. Such drugs include amitriptyline, doxepin, imipramine, digoxin, trihexyphenidyl, benztropine, diphenhydramine, furosemide, and many other commonly used (over-the-counter as well as prescription) drugs. Anticholinergic side effects may be significant in the elderly and include memory deficits, confusion and disorientation, agitation, and hallucinations. In extreme cases, anticholinergic toxicity can depress brain function, leading to coma and circulatory collapse. Even mild side effects can have significant ramifications for the elderly and for demented patients. Dry mouth, the most common side effect of anticholinergic medications, can lead to problems such as significant decreases in talking and refusal to eat, painful sores on the inside of the patient's mouth, and agitation and depression. The anticholinergic effects from most psychotropic medications added to the anticholinergic effects of the most common drugs prescribed to the elderly result in an overwhelming, and often intolerable, challenge for the patient.

Polypharmacy. Polypharmacy in patients with dementia is usually due to the significant comorbidity of medical and psychiatric conditions, especially in those living in long-term care facilities. Polypharmacy, especially use of more than 6 drugs, is associated with a high incidence of drug-drug reactions and in dementia patients may manifest as behavioral disturbances. Polypharmacy is also associated with a "prescribing cascade" in which drug number 1 causes an adverse effect that is interpreted as a new medical condition. Drug number 2 is prescribed to treat the "new" condition. Drug number 2 causes its own adverse effect triggering drug number 3, and so on. Polypharmacy and its problems can be minimized by periodic (e.g., twice a year) evaluation of a patient's medications, preferably with a pharmacist, and in the case of psychotropics, with a psychiatrist specializing in geriatric care.

Environmental Causes

Patients with dementia are exquisitely sensitive to changes in the environment. Excessive noise; change of routine; large rooms with many people; lack of activity; inadequate (in number or quality) staffing in long-term care facilities resulting in basic needs such as hunger, thirst, and toileting being unmet; change in routine; and change of caregivers (rapid turnover of nursing assistants in a long-term care facility) are some of the commonly recognized environmental causes of behavioral disturbances. Many dementia patients eat better and show less agitation in small groups (4–8 people) rather than large groups during meal times.

FOUR-STEP APPROACH TO MANAGEMENT OF BEHAVIORAL DISTURBANCES

A 4-step approach to managing behavioral disturbances in dementia patients can be followed:

1. Ensure that the patient is not in imminent danger to self or others. Chemical and/or physical restraints may be needed in severe cases.
2. Assess for delirium, comorbid medical illness(es), environmental factors, or drugs causing the behavioral disturbances and treat them.
3. Look for and treat specific psychiatric syndromes such as depression, delusions, and hallucinations, all of which respond better to pharmacologic interventions compared with other behavioral disturbances.
4. Formulate and implement a behavioral plan to identify the antecedents and modify the consequences to improve the behavioral disturbances.

CASE EXAMPLES

The following case examples illustrate ways that clinicians can take specific steps in identifying and managing behavior disturbances in patients with dementia.

Case 1. Ms. A has probable Alzheimer's disease and for the last 3 days had been "agitated," according to the nurse caring for her in a long-term care facility. The nurse asked the physician for some medication over the phone. The physician inquired as to whether the patient had been started on any new medications and whether there were any recent changes in the primary caregivers (e.g., change of nurse aides) and considered other possibilities such as urinary tract infection or pain.

Case 2. Mr. B has dementia, and his spouse reported that he had been physically aggressive over the last several weeks. The physician inquired as to whether he had been experiencing hallucinations or delusions, asked for examples of situations in which the patient became aggressive, and asked whether Mr. B was short tempered or was exhibiting a catastrophic reaction to his inability to dress himself without assistance.

Case 3. Ms. C has dementia, and her daughter reported verbal aggression and refusal of activities of daily living such as bathing and changing clothes. The physician inquired as to whether there was any possibility of abuse by the new home health worker the daughter had hired for assistance, inquired about depression, and considered the possibility of posttraumatic stress disorder since the patient was a war veteran.

Case 4. Mr. D has dementia, and the home health worker reported that the patient lately had become "moody" and "difficult." The physician inquired regarding Mr. D's diabetes control, the possibility of hypoglycemia, whether he was taking any over-the-counter medications such as diphenhydramine (Tylenol PM or Benadryl), whether his family was putting demands on him that he could not meet because of dementia but which his family believed he was deliberately shirking.

Table 2. Nonpharmacologic Interventions for the Management of Behavioral Disturbances in Dementia Patients

Reassurance
Distraction
Maintaining routine
Structured activities: bingo, group singing
Unstructured activities: sorting, walking
Music
Exercise
Bright light therapy
Simulated presence therapy
Touch therapy: hand massages, back rubs
Pet therapy
Gardening
Behavioral interventions
One-to-one therapy

NONPHARMACOLOGIC INTERVENTIONS

Table 2 lists the nonpharmacologic interventions that allow for management of behavioral disturbances in patients with dementia. The majority of dementia patients are calmer and better adjusted when treated with low-tech, nondrug approaches that help to decrease problem behaviors and promote independence. Nonpharmacologic interventions are the key to management of behavioral disturbances in dementia.[164,165] The foundation of nonpharmacologic management is recognizing that the person with dementia is no longer able to adapt, and that instead the environment must be adapted to the patient's specific needs.[166] The literature is replete with environmental intervention strategies that have proved effective in improving behavioral disturbances associated with dementia.[167–169] Effective environmental interventions may avoid unnecessary medication use in this vulnerable population. Behavior therapy is well suited for managing behavioral disturbances in an institutionalized setting, because behavioral interventions are ideal for implementation before maladaptive behaviors develop, and they can continue to have beneficial effects even when staff are not present.[170] Efforts to reinforce independent positive behavior and channel the dementia patient's energy and mobility into more positive activity rather than trying to eliminate unwanted behavior have been suggested.[171] Both aggressive and verbally agitated behaviors have been successfully treated by manipulating reinforcing consequences of these behaviors.[90] Reassurance and distraction may be sufficient for many patients.

Patients may be disturbed by changes in their social milieu (e.g., when a patient moves to a nursing home or another family member's home); this can be ameliorated by ensuring the presence of familiar objects, the maintenance of consistent routines, and constant contact with family members. Environmental changes, seeking to minimize visual and spatial clutter, may also be helpful. If patients tend to wander, a possible solution might be to modify their living space in order to permit safer wandering. The point of view of the person with dementia is frequently unknown, yet it is important to try to identify it in order to offer proper intervention. Aggressive behaviors are usually a response to actions by others, which the older person does not comprehend and does not want. Staff approach also significantly influences dementia patients' behavior. Many dementia patients show behavioral disturbances as an expression of distress caused by boredom and loneliness, especially in a long-term care facility. Structured and unstructured activities go a long way in enhancing dementia patients' quality of life.

The Progressively Lowered Stress Threshold Model

The Progressively Lowered Stress Threshold (PLST) model aims at decreasing environmental stress and thereby decreasing some behavioral disturbances in dementia patients.[172] Caregivers who receive PLST training report fewer secondary behavioral symptoms in patients than do caregivers who do not receive such training.[172,173] The PLST model identifies 6 "triggers" of behavioral symptoms and resulting disability[172]:

1. Fatigue. To counter problem behaviors resulting from fatigue, institutionalized patients should be given at least 2 rest or quiet periods at the same times every day. Calm times should be alternated with brief periods of activity. Caffeine should be avoided.
2. Responses to overwhelming or misleading stimuli. Many people with dementia tend to select the level of noise and social interaction they can tolerate, but in the nursing home they lose that control. Large dining rooms—with their noise and high activity level—are especially troublesome. Patients may do better eating in small groups, which tends to decrease agitation and enhance food consumption. As dementia progresses, patients may misinterpret stimuli from television, radio, photographs, and mirrors (for example, they may believe they are seeing someone else when looking at themselves in the mirror). Caregivers should look for these cues and remove the "environmental offenders."
3. Change of environment, routine, or caregiver. Because people with dementia cannot cope with change, it is important for staff to follow a predictable routine each day. Holidays such as Christmas can be particularly stressful because of the overabundance of novel stimuli: decorations, parties, singing groups, visiting children. The solution is to "avoid overdoing it," but not to the point of limiting family visits.
4. Excessive demand. There is a tendency to want to "exercise the brain" of people with dementia by asking numerous questions and trying to assess the person's cognitive skill level. Caregivers and families need to accept that the patient is doing his or her best at all times, provide unconditional encouragement, and offer assistance when the patient cannot perform a task.
5. Perception of loss. No one wants to talk to the patient about the disease, but many patients do want to know what is wrong with them and need to talk about their functional losses, even if they become angry and deny that anything is the matter. Cherished lost activities should be replaced with safer activities that engage attention and interest. If the patient has clinical depression, it should be treated.
6. Delirium. Patients with dementia should be monitored constantly for signs of pain, discomfort, urinary infection, trauma, and adverse drug reactions.

Other Nonpharmacologic Strategies

The following nonpharmacologic interventions may also prove helpful in reducing behavioral disturbances in patients with dementia:

1. Music. Music helps decrease aggressive behaviors in people with dementia,[91] relieves anxiety and agitation,[92] promotes relaxation,[93] provides opportunity for reality orientation and access to memory, provides cognitive stimulation, increases attention span, increases socialization (even in withdrawn patients) and social skills, and improves quality of life in dementia patients. Consider use of soothing music at meal times and patients' preferred music at bath time. Individualized music (music that has been integrated into the individual's life and is based on personal preference) may decrease agitation in dementia patients.[94]
2. Simulated presence therapy. Audiotapes of family conversation or telephone messages and/or videotapes of family events and functions are played while residents listen on headphones or watch on the video.
3. Regular exercise. Regular exercise such as walking may reduce aggression.
4. Touch therapies. Hand massage intervention helps decrease aggressive behaviors,[95] and expressive

physical touch intervention helps lower anxiety and decrease episodes of dysfunctional behaviors.[96]

5. Simple cognitive activities. Bingo can be of great value to the daily management of dementia patients.[97] Reading a newspaper or a story is another useful activity. Sorting is also a good activity. For example, colored macaroni or pasta shells can be sorted into different piles, as can nuts of different shapes and napkins of different colors. Avoid using small items such as marbles that may be inadvertently ingested.
6. Rocking chair intervention. The use of rocking chairs has been found to decrease depression and anxiety.[98]
7. Pet therapy. Pet therapy has been found to reduce the number of agitated behaviors in persons with dementia.[41]

Humanizing Long-Term Care Facilities

Interventions designed to humanize long-term care facilities have been suggested. These include but are not limited to, attention to spiritual and religious needs of residents; decentralization of care into separate self-contained, more homelike units, sometimes referred to as "households"[174] or "neighborhoods"[175]; the reduction or elimination of physical and chemical restraints; professionally developed therapeutic activities using music, art, pets, plants, and intergenerational exchanges; architectural and design modifications to enhance safety and autonomy for persons with dementia; and interpersonal interventions focused on reducing learned helplessness and restoring the sense of control. One trend that is catching attention is an approach that refashions traditional facilities into lush natural habitats filled to overflowing with plants, animals, and people of all ages in a warm, bustling, homelike environment. The approach, labeled the "Eden Alternative," was started by Dr. William Thomas.[176] These and similar interventions may decrease the prevalence of behavioral disturbances, especially loneliness, helplessness, and boredom in long-term care facilities. Peer-reviewed scientific articles to clarify the strengths and limitations of such approaches are needed.

PHARMACOLOGIC INTERVENTIONS FOR MANAGEMENT OF BEHAVIORAL DISTURBANCES IN DEMENTIA

Table 3 lists the principles of using pharmacotherapy to manage behavioral disturbances in patients with dementia. Although several drugs have been found to be beneficial for a variety of behavioral disturbances associated with dementia, no single drug is approved by the U.S. Food and Drug Administration (FDA) for management of these disturbances. Also, many trials evaluating efficacy of drugs for behavioral and psychological symptoms of dementia are not controlled, have insufficient power, include a heterogeneous population, and fail to use standardized scales to identify and track target behaviors. Hence, the evidence for pharmacologic interventions for the management of behavioral and psychological symptoms in dementia is far from conclusive. Serotonergic therapies may be used to manipulate other neurotransmitter systems to alleviate behavioral and psychological symptoms of dementia or in combination with agents specific for the other neurotransmitter receptor sites.[99] Past history of major mental illness (e.g., major depression, schizophrenia, bipolar disorder) and past response to psychotropic medications should be taken into consideration in deciding the type of pharmacologic agent.

Table 3. Principles of Pharmacotherapeutic Management of Behavioral Disturbances in Dementia Patients

1. Use drugs only when secondary causes of behavioral disturbances have been ruled out and nonpharmacologic interventions have failed.
2. Review current medications and consider tapering or discontinuing unnecessary, ineffective, or harmful medications.
3. Consider adverse drug reactions or drug-drug interactions as potential cause of behavioral disturbances.
4. Target symptoms and their impact on functioning should be documented prior to initiation of drug therapy.
5. If pharmacotherapy is used, start low and go slow and use it in conjunction with nonpharmacologic interventions.
6. Select agents based on target symptoms, side effect profile, and individual patient characteristics.
7. Give the medication for an adequate time at an adequate dose.
8. Closely monitor for and document side effects and beneficial effects.
9. If found beneficial, continue the medication for a few months. If the patient has been stable for that period, consider decreasing or discontinuing the medication.
10. Educate patient and family regarding the benefits and side effects of medications.

Management of Behavioral Emergencies

If the patient is physically aggressive and poses imminent danger to others, consider using intramuscular haloperidol and/or lorazepam. Haloperidol may cause less drowsiness and cognitive impairment than lorazepam and hence is preferred in patients with dementia and delirium.[100] If necessary, consider physical restraints until the medication takes effect. In most elderly patients with dementia, haloperidol in the dose of 0.5 to 1.0 mg should be used and may be repeated every 20 to 30 minutes until the patient ceases to be an imminent danger to others. Lorazepam is preferred over haloperidol when benzodiazepine or alcohol withdrawal is suspected.

Cholinesterase Inhibitors

The cholinergic deficiency contributes to the neuropsychiatric symptoms of Alzheimer's disease, and cholinomimetic therapies such as cholinesterase inhibitors ameliorate these neuropsychiatric symptoms.[101] Neuropsychiatric

inventory data from trials of several cholinesterase inhibitors (including rivastigmine, donepezil, galantamine, and tacrine) have suggested improvements in psychiatric and behavioral disturbances in Alzheimer's disease patients. Rivastigmine improves behavioral symptoms in patients with Alzheimer's disease and Lewy body disease.[102–104] An open-label study of tacrine showed marked reduction in behavioral symptoms, and persons with moderate disease benefited more than those with mild cases.[105] Cholinesterase inhibitors are increasingly being considered by many experts as first line for the treatment of mild-to-moderate behavioral disturbances in patients with Alzheimer's disease and related disorders. Although the data are for patients with Alzheimer's disease, the initial data in patients with Lewy body disease and the postmortem finding of Alzheimer's disease in many patients clinically diagnosed as vascular dementia justify the use of these agents in all patients with Alzheimer's disease and related disorders.

Antidepressants

Citalopram, a selective serotonin reuptake inhibitor (SSRI), was found to be useful in a range of symptoms (including depression and agitation) in dementia patients in 2 multicenter studies.[106,107] In the first study,[106] 98 patients with dementia, with a mean age of 78 years, were randomly administered 20 mg/day of citalopram or placebo. The results showed a wide range of symptomatology that improved over a 4-week period with citalopram. A similar multicenter[107] trial was conducted using citalopram for 6 weeks in elderly patients who had depression both with and without dementia and cognitive impairment. This trial also demonstrated that a wide range of symptomatology improved with citalopram over a relatively short period of time. Fluoxetine has been found to be useful for major depression complicating Alzheimer's disease.[108] Placebo-controlled trials with mixed dementia populations have shown nonsignificant improvement in symptoms common in behavioral and psychological symptoms of dementia such as irritability, anxiety, fear/panic, mood, and restlessness with fluvoxamine[109] and significant improvements in depression with paroxetine.[110] Fluoxetine was reported to slightly improve disinhibition, depressive symptoms, carbohydrate craving, and compulsions in about one half of 11 patients with frontotemporal dementia.[111] A recent study of the use of sertraline in depressed patients with late-stage Alzheimer's disease[112] reported no significant benefit over placebo. In an open-label trial of SSRIs,[113] "very old" demented nursing home patients with depression did not benefit from pharmacotherapy.

Atypical Antipsychotics

The currently available atypical antipsychotics include clozapine, risperidone, olanzapine, ziprasidone, and quetiapine. There are no published data regarding ziprasidone in patients with psychosis associated with dementia. Clozapine should not be used as a first-line drug because of the risk of agranulocytosis and requirement for white blood cell count monitoring. Double-blind, placebo-controlled studies in dementia patients have found risperidone and olanzapine to be useful for psychotic symptoms such as delusions and hallucinations in dementia patients.

The largest body of currently available evidence concerns risperidone. Two 12-week, double-blind, controlled trials of risperidone[114,115] included nearly 1000 test subjects suffering from Alzheimer's disease and related disorders. The first study[114] was a fixed-dose trial comparing risperidone at daily doses of 0.5, 1, and 2 mg with placebo. Six hundred seventeen test subjects in hospitals or nursing homes with Alzheimer's dementia (73%), vascular dementia (16%), and mixed dementia (11%) were evaluated using a variety of assessment tools. Patients taking risperidone engendered a highly statistically significant improvement in psychotic symptomatology and aggressive behavior compared with those taking placebo. This difference was observed at all 3 dose levels, but was statistically significant only at 1 and 2 mg daily. The 2-mg dose was associated with more adverse effects. A second study[115] largely confirmed these findings and also compared risperidone with haloperidol. Risperidone was found to be superior to haloperidol in terms of efficacy, while presenting a significantly more benign side effect profile. Risperidone at doses higher than 1.5 mg is associated with increased extrapyramidal symptoms (EPS). Doses of 0.5 to 1.5 mg daily do not have significantly increased incidence of side effects, but nonetheless are very effective in controlling psychosis-driven undesirable behaviors. Risperidone has also been found to be effective and well tolerated over 13 to 46 months in a group of geriatric nursing home patients with dementia-related behavioral problems.[116] Risperidone carries a dose-dependent risk for extrapyramidal symptoms and peripheral edema. It can also cause orthostatic hypotension. Starting at 0.25 mg and slowly titrating upward may decrease the risk of orthostatic hypotension. Risperidone should be avoided in patients with spontaneous parkinsonism (such as patients with Parkinson's disease and patients with Lewy body disease).

Olanzapine was found to be effective and safe for the treatment of psychosis and agitation in elderly demented nursing home patients.[117] In this 6-week, double-blind study, 3 doses of olanzapine (5, 10, and 15 mg/day) were compared with placebo in 206 elderly patients with dementia-associated agitation, aggression, and psychosis. Significantly greater improvements in agitation/aggression and delusions/hallucinations were observed in patients treated with 5 or 10 mg/day of olanzapine than in those treated with placebo or olanzapine, 15 mg/day. Olanzapine should be started at 2.5 mg/day and slowly increased to the therapeutic dose (usually 5 mg/day). An older study[118] using a mean

daily olanzapine dose of 2.4 mg/day in 238 elderly outpatients who had Alzheimer's disease and psychosis found no statistically significant difference compared with placebo. Olanzapine carries the risk of sedation, unsteady gait, and weight gain. It should be avoided in obese patients and patients with poorly controlled diabetes.

Quetiapine was found to be efficacious in psychosis in older patients in a large multicenter, open-label study, many of whom had dementia.[119] Quetiapine was also found to be efficacious in patients with psychoses associated with Parkinson's disease.[120,121] Quetiapine carries the least risk for EPS, compared with risperidone and olanzapine, but it carries the risk of sedation and orthostatic hypotension. Orthostatic hypotension risk may be less if the starting dose is low (25 mg/day) and slowly increased. The optimal quetiapine dose for patients with dementia-related psychoses may be around 100 mg.

Atypical antipsychotics are preferred to conventional antipsychotics because of better side effect profile. Atypical antipsychotics have a lower incidence of EPS compared with conventional agents. They may also carry a lower risk of tardive dyskinesia. More EPS have been reported with risperidone than with olanzapine or quetiapine.[122] These agents may be considered in the management of severe persistent aggression after ruling out secondary causes (such as medical illness or depression) as potential etiologies. For patients with dementia at high risk of EPS, e.g., those with Lewy body disease or Parkinson's disease, olanzapine and quetiapine are preferred over risperidone for the management of psychoses. For patients with sleep disturbances and weight loss, somnolence and weight gain may be beneficial rather than adverse. Patients taking quetiapine require an eye examination every 6 months for cataracts (so far reported only in animals). In most patients, this is beneficial because it would also identify and correct any disability due to age-associated eye problems. A dose decrease or discontinuation is recommended periodically for all patients with behavioral disturbances associated with dementia who receive antipsychotic medications.[36,123] Hepatic impairment requires dose adjustment for all psychotropics. Risperidone requires dose adjustment for renal impairment (up to 50% reduction for severe renal impairment).[124] There is high prevalence of tardive dyskinesias in elderly individuals who take conventional antipsychotics.[125] The risk of tardive dyskinesia is increased in elderly patients without schizophrenia who are administered conventional antipsychotics.[126] Atypical antipsychotics such as olanzapine may also have comparatively less risk for tardive dyskinesia.[127] In frail elderly demented and "old-old" elderly patients (90 years or more), very small doses of psychotropics may suffice.

Conventional Antipsychotics

Several clinical trials have been conducted with conventional neuroleptics in dementia patients, and they elicit a consistent clinical response, although with a high side effect profile.[128] Specific target symptoms that are reduced are hallucinations and delusions. The efficacy of conventional neuroleptics is the same, regardless of the neuroleptic used. Haloperidol is frequently used in doses varying from 0.25 mg to 3 mg. Withdrawal of haloperidol, thioridazine, and lorazepam in one study in nursing home patients with controlled crossover to placebo found no behavioral or functional differences between drugs.[129] A recent study[130] found no difference between patients who received haloperidol, trazodone, behavioral intervention, or placebo for agitation in patients with probable Alzheimer's disease. Conventional neuroleptics in the elderly are associated with a very high incidence of serious adverse events such as EPS, tardive dyskinesia, falls and fractures, orthostasis, and anticholinergic effects. Risk of tardive dyskinesia is increased in elderly patients without schizophrenia who are administered conventional antipsychotics.[126] Hence, all conventional neuroleptics (preferably haloperidol) are recommended only for emergency use in dementia patients. Unfortunately, these agents are commonly used to treat patients with dementia,[131,132] resulting in significant iatrogenic morbidity and even mortality.

Benzodiazepines

Benzodiazepines are frequently used to treat behavioral disturbances in dementia. Daytime sedation is a side effect limiting their use. Chronic sedation with benzodiazepines may cause increased confusion and behavioral disturbances, including agitation, belligerence, and social disinhibition—symptoms that closely mimic behaviors complicating Alzheimer's disease and related disorders. Short-acting agents are more likely than long-acting agents to cause withdrawal symptoms such as rebound insomnia and anxiety.[133] Use of benzodiazepines for patients with Alzheimer's disease and related disorders should be limited to emergency settings, especially when the patients' behavioral disturbances are associated with severe anxiety.

Mood Stabilizers

Anticonvulsants may provide an alternative to antipsychotics for aggression and agitation in dementia patients. An early pilot study[134] displayed the potential for 300 mg of carbamazepine to decrease impulsive or aggressive behaviors; when the medication was withdrawn, the behavioral disturbances relapsed. A recent study[135] did not find divalproex sodium to improve signs and symptoms of mania associated with dementia in a sample of nursing home residents, but divalproex did improve symptoms of agitation.[135] Another recent study[136] found divalproex to reduce agitation in 68% of treated subjects compared with 52% who were taking placebo ($p = .06$), but side effects occurred in 68% of the divalproex group versus 33%

of the placebo group (p = .03).[136] Divalproex at doses of 150 to 250 mg decreased agitation and aggression in one pilot study.[137] The elderly may have a higher risk of developing thrombocytopenia with valproate.[138] Gabapentin has also been found to be useful in reducing agitation and aggression in patients with dementia.[139] Due to lack of a large amount of controlled data, use of anticonvulsants should be limited to patients with severe aggression not responding to nonpharmacologic intervention and in whom medical causes and depression are ruled out and atypical antipsychotics have failed. Lithium is not recommended for management of behavioral disturbances in patients with dementia because of high incidence of cognitive and other adverse effects.

Other Agents

Trazodone, in a number of open-label studies,[140–143] was found to improve behavioral symptoms in demented elderly patients. In a small double-blind trial,[144] trazodone showed a small but significant reduction in behavioral symptoms compared with buspirone and placebo. In another double-blind study controlled with haloperidol,[145] trends suggested that specific symptoms, including aggression, may respond preferentially to trazodone. Trazodone may be tried for anxiety and insomnia not responding to nondrug interventions. Twenty-five milligrams at bedtime for insomnia or twice a day for anxiety is a good starting dose. Orthostasis may be seen, especially at higher doses.

Buspirone may be tried if the patient shows symptoms of persistent or generalized anxiety. A recent study[146] found that switching dementia patients with agitation from their current psychotropic (antipsychotic, antidepressant, benzodiazepine, alone or in combination) to buspirone appeared to significantly reduce episodes of agitation. Previous studies with buspirone have had mixed results. There was no significant overall reduction in behavioral symptoms with buspirone compared with placebo in the small number of patients tested (N = 10).[144] However, in another study,[147] buspirone was as effective as haloperidol in treating 26 patients with probable Alzheimer's disease and superior to haloperidol in decreasing anxiety and tension. Short-term estrogen therapy has been found to be beneficial in a small randomized, double-blind study[148] for management of aggressive behaviors in elderly patients with moderate-to-severe dementia. Case reports have indicated potential benefits of estrogen,[149] medroxyprogesterone,[150] and cimetidine[151] for treatment of sexual aggression associated with dementia in the elderly.

Electroconvulsive Therapy

Electroconvulsive therapy has been reported to improve depression,[152,153] screaming,[154] and agitation[155] in dementia patients. Such treatment interventions may be considered in an academic setting, by geriatric psychiatrists experienced in severe cases of behavioral disturbances refractory to other interventions.

American Hospital Association Criteria for Psychotropic Use in Long-Term Care Facilities

The criteria specified by the American Hospital Association[156] for the use of psychotropic medications in long-term care facilities are as follows:

- Do not order a drug without setting a definite stop date.
- Do not use a hypnotic medication for longer than 30 consecutive days without review.
- Do not use more than one hypnotic agent at one time.
- Do not exceed the maximum recommended dosage of a hypnotic medication.
- Do not use antidepressants or antipsychotics for fewer than 3 days.
- Do not use more than one antipsychotic agent at a time.
- Do not exceed the maximum recommended dosage of antipsychotic medications.
- Do not use anticholinergic drugs in conjunction with antipsychotic drugs unless an extrapyramidal syndrome has been documented.

OTHER CONSIDERATIONS

Dementia Special Care Units

Residents with dementia can be disruptive to other residents, difficult to manage, and challenging to health care professionals charged with their care. Special care units may help ensure superior quality of care for dementia patients, especially those at risk of wandering out of the facility and who are difficult to redirect back.

Caregiver Stress

Clinicians should look for and assess caregiver stress and caregiver burden for every dementia patient. Caregiver education and training in communication and management of dementia patients may decrease behavioral disturbances, delay institutionalization, and reduce caregiver stress. Caregivers should be encouraged to consider joining a support group, the Alzheimer's Association, and other community support programs. Caregivers may experience guilt and should be provided with emotional support. Caregivers should be encouraged to avoid correcting dementia patients and to be more accommodating of dementia patients' behavioral disturbances and flexible in their approach to management.

Lewy Body Disease

Lewy body disease is probably the second most common form of degenerative dementia[157] and is associated

with visual hallucinations early in the course of dementia. Patients with Lewy body disease are very sensitive to even small doses of antipsychotics such as haloperidol and may become rigid and immobile even after 1 or 2 doses. There is a high incidence (60%) of adverse and life-threatening reactions to antipsychotics in patients with Lewy body disease.[158] Cholinergic therapies such as rivastigmine have recently been found to be useful for symptomatic treatment of psychiatric disturbances associated with Lewy body disease.[104]

PREVENTION OF BEHAVIORAL DISTURBANCES IN DEMENTIA

Primary Prevention

The aim of primary prevention is to decrease the incidence and prevalence of behavioral disturbances in dementia. This can be achieved by instituting cholinesterase therapy early in the course of Alzheimer's disease and Lewy body disease, educating family members, encouraging caregivers to undergo special training (e.g., PLST), incorporating the philosophy of humanizing nursing homes and other similar approaches in long-term care, and educating the physicians and other health care providers involved in caring for dementia patients. Since perceived need for psychiatric services in long-term care facilities is far greater than the level actually provided,[159] availability of geriatric psychiatrists as consultants in long-term care facilities will also decrease the prevalence of behavioral disturbances in such facilities.

Secondary Prevention

The aim of secondary prevention is to decrease the need for hospitalization, institutionalization, and life-threatening complications associated with severe behavioral disturbances. Prompt use of safer pharmacologic interventions in psychiatric syndromes in which they have been found to be useful (e.g., psychoses), limiting the use of drugs with high risk of adverse events (such as conventional antipsychotics and benzodiazepines) for emergency situations, aggressive use of nonpharmacologic interventions, and early recognition and treatment of secondary causes of behavioral disturbances will go a long way in achieving the goals of secondary prevention.

CONCLUSION

Behavioral disturbances in dementia are extremely frequent and cause immense suffering to the patients and their family and caregivers. A large body of research in the last decade indicates that most behavioral disturbances can be recognized early and managed effectively using nonpharmacologic interventions. Some behavioral disturbances may need pharmacologic interventions. Many behavioral disturbances can be prevented. A host of conditions can cause behavioral disturbances in dementia patients. Success in management of behavioral disturbances depends on accurate identification of the cause. Correct identification of psychiatric syndromes such as depression, delusions, and hallucinations associated with Alzheimer's disease and related disorders will greatly enhance the success of pharmacologic interventions. It is very important to look for comorbid medical illnesses and/or medication(s) that may present with atypical symptoms, including behavioral disturbances. An appreciation of the interaction of environment, physical illness, disease severity, and psychiatric symptomatology in the expression of behavioral disturbances in an individual patient is key to developing a therapeutic framework for the management of these behaviors.

Drug names: alprazolam (Xanax and others), amitriptyline (Elavil and others), benztropine (Cogentin and others), carbamazepine (Tegretol and others), chlordiazepoxide (Librium and others), cimetidine (Tagamet and others), citalopram (Celexa), clozapine (Clozaril and others), diazepam (Valium and others), digoxin (Lanoxin and others), diphenhydramine (Benadryl and others), divalproex sodium (Depakote), donepezil (Aricept), doxepin (Sinequan and others), fluoxetine (Prozac), fluvoxamine (Luvox), furosemide (Lasix and others), gabapentin (Neurontin), galantamine (Reminyl), haloperidol (Haldol and others), lorazepam (Ativan and others), olanzapine (Zyprexa), oxazepam (Serax and others), paroxetine (Paxil), quetiapine (Seroquel), risperidone (Risperdal), rivastigmine (Exelon), sertraline (Zoloft), tacrine (Cognex), temazepam (Restoril and others), trazodone (Desyrel and others), triazolam (Halcion), trihexyphenidyl (Artane and others), warfarin (Coumadin), zaleplon (Sonata), ziprasidone (Geodon), zolpidem (Ambien).

REFERENCES

1. Small GW, Rabins PV, Barry PB, et al. Diagnosis and treatment of Alzheimer disease and related disorders: consensus statement of the American Association for Geriatric Psychiatry, the Alzheimer's Association, and the American Geriatrics Society. JAMA 1997;278:1363–1371
2. Maletta GJ. Pharmacologic treatment and management of the aggressive dementia patient. Psychiatr Ann 1990;20:446–455
3. Chenoweth B, Spencer B. Dementia: the experience of family caregivers. Gerontologist 1986;26:267–272
4. Everitt DE, Fields DR, Soumerai SB, et al. Resident behavior and staff distress in the nursing home. J Am Geriatr Soc 1991;39:792–798
5. Stanford JRA. Tolerance of debility in elderly dependents by supporters at home: its significance for hospital practice. Br Med J 1975;3:471–473
6. Moak GS. Characteristics of demented and nondemented geriatric admissions to a state hospital. Hosp Community Psychiatry 1990;41:799–801
7. Deutsch LH, Bylsma FW, Rovner BW, et al. Psychosis and physical aggression in probable Alzheimer's disease. Am J Psychiatry 1991;148: 1159–1163
8. Mega MS, Cummings JL, Fiorello T, et al. The spectrum of behavioral changes in Alzheimer's disease. Neurology 1996;46:130–135
9. Reisberg B, Borenstein J, Salob SP, et al. Behavioral symptoms in Alzheimer's disease: phenomenology and treatment. J Clin Psychiatry 1987;48(5, suppl):9–15
10. Hope T, Keene J, Fairburn CJ, et al. Natural history of behavioral changes and psychiatric symptoms in Alzheimer's disease: a longitudinal study. Br J Psychiatry 1999;174:39–44
11. Rovner BW, German PS, Broadhead J, et al. The prevalence and management of dementia and other psychiatric disorders in nursing home. Int Psychogeriatr 1990;2:13–24
12. Tariot P, Podgorske C, Blazina L, et al. Mental disorders in the nursing home: another perspective. Am J Psychiatry 1993;150:1063–1069
13. Rovner B, Kafonek S, Fillipp M, et al. Prevalence of mental illness in a community nursing home: another perspective. Am J Psychiatry 1986; 143:1446–1449
14. Cohen-Mansfield J, Billig N. Agitated behaviors in the elderly: a conceptual review. J Am Geriatr Soc 1986;34:711–721

15. Baker FM, Kokmen E, Chandra V, et al. Psychiatric symptoms in cases of clinically diagnosed Alzheimer's disease. J Geriatr Psychiatry Neurol 1991;4:71–78
16. Cooper JK, Mungas D, Weiler PG. Relation of cognitive status and abnormal behaviors in Alzheimer's disease. J Am Geriatr Soc 1990;38:867–870
17. Teri L, Larson EB, Reifler BV. Behavioral disturbance in dementia of the Alzheimer's type. J Am Geriatr Soc 1988;36:1–6
18. Meins W, Frey A, Thiesemann R. Premorbid personality traits in Alzheimer's disease: do they predispose to noncognitive behavioral symptoms? Int Psychogeriatr 1998;10:369–378
19. Cariaga J, Burgio L, Glynn W, et al. A controlled study of disruptive vocalizations among geriatric residents in nursing homes. J Am Geriatr Soc 1991;39:501–507
20. Cohen-Mansfield J, Marx MS. Relationship between depression and agitation in nursing home residents. Compr Gerontol 1988;2:141–146
21. Cohen-Mansfield J, Werner P, Marx MS. Screaming in nursing home residents. J Am Geriatr Soc 1990;38:785–792
22. Deutsch LH, Rovner BW. Agitation and the other noncognitive abnormalities in Alzheimer's disease. Psychiatr Clin North Am 1991;14: 341–351
23. Colenda CC, Hamer RM. Antecedents and interventions for aggressive behavior of patients at a geropsychiatric state hospital. Hosp Community Psychiatry 1991;42:287–293
24. Cohen CI, Carlin L. Racial differences in clinical and social variables among patients evaluated in a dementia assessment center. J Natl Med Assoc 1993;85:379–394
25. Fabrega H, Mezzich J, Ulrich RF. Black-white differences in psychopathology in an urban psychiatric population. Compr Psychiatry 1988;29: 285–297
26. Cohen CI, Weston R, Hyland K. Mood, Psychoses, and Agitation Among Afro-American, Afro-Caribbean, and Caucasian Dementia Patients [Final Report]. New York, NY: New York State Dept Health; 1996
27. Cohen CI, Magai C. Racial differences in neuropsychiatric symptoms among dementia outpatients. Am J Geriatr Psychiatry 1999;7:57–62
28. Werner P, Cohen-Mansfield J, Braun J, et al. Physical restraints and agitation in nursing home residents. J Am Geriatr Society 1989;37:1122–1126
29. Burgio LD, Butler FR, Roth DL, et al. Agitation in nursing home residents: the role of gender and social context. Int Psychogeriatr 2000;12: 495–511
30. Chapman FM, Dickinson J, McKeith I, et al. Association among visual hallucinations, visual acuity, and specific eye pathologies in Alzheimer's disease: treatment implications. Am J Psychiatry 1999;156:1983–1985
31. Leverett M. Approaches to problem behaviors in dementia. In: Taira ED, ed. The Mentally Impaired Elderly: Strategies and Interventions to Maintain Function. New York, NY: Haworth Press; 1991:93–105
32. Palmer CV, Adams SW, Bourgeois M, et al. Reduction in caregiver-identified problem behaviors in patients with Alzheimer disease post-hearing-aid fitting. J Speech Lang Hear Res 1999;42:312–328
33. Koss E, Gilmore GC. Environmental interventions and functional ability of AD patients. In: Vellas B, Fitten LJ, eds. Research and Practice in Alzheimer's Disease. Paris, France: Serdi Publishers; 1998:185–192
34. Wilson SA. Transition to nursing home life: a comparison of planned and unplanned admissions. J Adv Nurs 1997;26:864–871
35. Furniss L, Craig SK, Burns A. Medication use in nursing homes for elderly. Int J Geriatr Psychiatry 1998;13:433–439
36. Alexopoulous GS, Silver JM, Kahn DA, et al. Expert Consensus Guideline Series: Agitation in Older Persons With Dementia [Special Report]. Postgrad Med 1998:1–88
37. American Psychiatric Association. Practice Guideline for the Treatment of Patients With Alzheimer's Disease and Other Dementias of Later Life. Am J Psychiatry 1997;154(suppl 5):1–39
38. American Psychiatric Association. Practice Guideline for the Treatment of Patients With Delirium. Am J Psychiatry 1999;156(5, suppl):1–20
39. Cohen-Mansfield J, Werner P. Management of verbally disruptive behaviors in nursing home residents. J Gerontol A Biol Sci Med Sci 1997;52: M369–M377
40. Churchill M, Safaoui J, McCabe BW, et al. Using a therapy dog to alleviate the agitation and desocialization of people with Alzheimer's disease. J Psychosoc Nurs Ment Health Serv 1999;37:16–22
41. Rowe M, Alfred D. The effectiveness of slow-stroke massage in diffusing agitated behaviors in individuals with Alzheimer's disease. J Gerontol Nurs 1999;25:22–34
42. Camberg L, Woods P, Ooi WL, et al. Evaluation of simulated presence: a personalized approach to enhance well-being in persons with Alzheimer's disease. J Am Geriatr Soc 1999;47:446–452
43. Gerdner LA. Effects of individualized versus classical "relaxation" music on the frequency of agitation in elderly persons with Alzheimer's disease and related disorders. Int Psychogeriatr 2000;12:49–65
44. Russen-Rondinone T, DesRoberts AM. Success through individual recreation: working with the low-functioning resident with dementia of Alzheimer's disease. Am J Alzheimer's Dis Other Dementias 1996;11:32–35
45. Ballard CG, Chithiramohan RN, Bannister C, et al. Paranoid features in the elderly with dementia. Int J Geriatr Psychiatry 1991;6:155–157
46. Paulsen JS, Salmon DP, Thal LJ, et al. Incidence of and risk factors for hallucinations and delusions in patients with probable AD. Neurology 2000;54:1965–1971
47. Drevets WC, Rubin EH. Psychotic symptoms and the longitudinal course of senile dementia of the Alzheimer type. Biol Psychiatry 1989;25:39–48
48. Lachs MS, Becker M, Siegal AP. Delusions and behavioral disturbances in cognitively impaired elderly persons. J Am Geriatr Soc 1992;40: 768–773
49. Cummings JL. Neuropsychiatric aspects of Alzheimer's disease and other dementing illnesses. In: Yudofsky SC, Hales RE, eds. The American Psychiatric Press Textbook of Neuropsychiatry. 2nd ed. Washington, DC: American Psychiatric Press; 1992:605–620
50. Mendez MF, Martin RJ, Smyth KA, et al. Psychiatric symptoms associated with Alzheimer's disease. J Neuropsychiatry Clin Neurosci 1990;2: 28–33
51. Lopez OL, Becker JT, Brenner RP, et al. Alzheimer's disease with delusions and hallucinations: neuropsychological and electroencephalographic correlates. Neurology 1991;41:906–912
52. Levy ML, Cummings JL, Fairbanks LA, et al. Longitudinal assessment of symptoms of depression, agitation, and psychosis in 181 patients with Alzheimer's disease. Am J Psychiatry 1996;153:1438–1443
53. Lyketsos CG, Steele C, Baker L, et al. Major and minor depression in Alzheimer's disease: prevalence and impact. J Neuropsychiatry Clin Neurosci 1997;9:556–561
54. Cooper JK, Mungas D, Weiler PG. Relation of cognitive status and abnormal behaviors in Alzheimer's disease. J Am Geriatr Soc 1990;38:867–870
55. Reynolds CF. Sleep disorders. In: Sadavoy J, Lazarus LW, Jarvik LF, eds. Comprehensive Review of Geriatric Psychiatry. Washington, DC: American Psychiatric Press; 1991:403–418
56. Negron AE, Reichman W. Risperidone in the treatment of patients with Alzheimer's disease with negative symptoms. Int Psychogeriatr 2000;12: 527–536
57. Dwyer M, Byrne GJA. Disruptive vocalization and depression in older nursing home residents. Int Psychogeriatr 2000;12:463–471
58. Kwentus JA. Sleep problems. Clin Geriatr 2000;8:64–72
59. Mishima K, Okawa M, Hishikawa Y, et al. Morning bright light therapy for sleep and behavior disorders in elderly patients with dementia. Acta Psychiatr Scand 1994;89:1–7
60. Okawa M, Mishima K, Hishikawa Y, et al. Circadian rhythm disorders in sleep-waking and body temperature in elderly patients with dementia and their treatment. Sleep 1991;14:478–485
61. Cohen-Mansfield J, Garfinkel D, Lipson S. Melatonin for treatment of sundowning in elderly persons with dementia: a preliminary study. Arch Gerontol Geriatr 2000;3:65–76
62. Alessi CA, Yoon EJ, Schnelle JF, et al. A randomized trial of a combined physical activity and environmental intervention in nursing home residents; do sleep and agitation improve? J Am Geriatr Soc 1999;47: 784–791
63. Cohen-Mansfield J, Werner P. Outdoor wandering parks for persons with dementia: a survey of characteristics and use. Alzheimer Dis Assoc Disord 1999;13:109–117
64. Cohen-Mansfield J, Werner P. Visits to an outdoor garden: impact on behavior and mood of nursing home residents who pace. In: Vellas B, Fitten LJ, eds. Research and Practice in Alzheimer's Disease. Paris, France: Serdi Publisher; 1998:419–436
65. Warnock JK, Burke WJ, Huerter C. Self-injurious behavior in elderly patients with dementia: four case reports. Am J Geriatr Psychiatry 1999;7: 166–169
66. Greenberg D, Witztum E, Levy A. Hoarding as a psychiatric symptom. J Clin Psychiatry 1990;51:417–421
67. Greenberg D. Compulsive hoarding. Am J Psychother 1987;41:409–416
68. Hwang J, Tsai S, Yang C, et al. Hoarding behavior in dementia: a preliminary report. Am J Geriatr Psychiatry 1998;6:285–289
69. Fulop G, Strain JJ, Vita J, et al. Impact of psychiatric comorbidity on length of hospital stay for medical/surgical patients: a preliminary report. Am J Psychiatry 1987;144:878–882
70. Stewart JT, Gonzalez-Perez E, Shu Y, et al. Cognitive predictors of resis-

tiveness in dementia patients. Am J Geriatr Psychiatry 1999;7:259–263
71. Epstein LJ, Siman A. Organic brain syndrome in the elderly. Geriatrics 1967;22:145–150
72. Lipowski ZJ. Delirium: Acute Confusional States. New York, NY: Oxford University Press; 1990
73. Sumner AD, Simons RJ. Delirium in the hospitalized elderly. Cleve Clin J Med 1994;61:258–262
74. Finkel SI, Lyons JS, Anderson RL. A Brief Agitation Rating Scale (BARS) for nursing home elderly. J Am Geriatr Soc 1993;41:50–52
75. Cummings JL, Mega M, Gray K, et al. The Neuropsychiatric Inventory: comprehensive assessment of psychopathology in dementia. Neurology 1994;44:2308–2313
76. Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter form. Clin Gerontol 1986;5: 165–173
77. Byer G, DeRenzo EG, Matricardi E. Rational suicide or involuntary commitment of a patient who is terminally ill? J Clin Ethics 1993;4: 327–335
78. Ferrell BA. Pain evaluation and management in the nursing home. Ann Intern Med 1995;123:681–687
79. Sengstaken EA, King SA. The problem of pain and its detection among geriatric nursing home residents. J Am Geriatr Soc 1993;41:541–544
80. Bernabei R, Gambassi G, Lapane K, et al. Management of pain in elderly patients with cancer. SAGE Study Group. JAMA 1998;279:1877–1882
81. Marsh CM. Psychiatric presentations of medical illness. Psychiatr Clin North Am 1997;20:181–204
82. Garibaldi RA, Brodine S, Matsumiya S. Infections among patients in nursing homes: policies, prevalence, problems. N Engl J Med 1981;305: 731–735
83. Smith MA, Duke WM. A retrospective review of nosocomial infections in an acute rehabilitative and chronic population at a large skilled nursing facility. J Am Geriatr Soc 1994;42:45–49
84. Boockvar K, Brodie HD, Lachs M. Nursing assistants detect behavior changes in nursing home residents that precede acute illness: development and validation of an illness warning instrument. J Am Geriatr Soc 2000;48:1086–1091
85. Christensen D, Benfield W. Alprazolam as an alternative to low-dose haloperidol in older, cognitively impaired nursing facility patients. J Am Geriatr Soc 1998;46:620–625
86. Yudofsky SC, Silver JM, Hales RE. Pharmacologic management of aggression in the elderly. J Clin Psychiatry 1990;51(10, suppl):22–28
87. Sorock GS, Shimken EE. Benzodiazepine sedative and the risk of falling in a community-dwelling elderly cohort. Arch Intern Med 1988;148: 2441–2444
88. Ray WA, Griffin MR, Downey W. Benzodiazepines of long and short elimination half-life and the risk of hip fracture. JAMA 1989;262: 3303–3307
89. Beers M. Explicit criteria determining potentially inappropriate medication use by the elderly. Arch Intern Med 1997;157:1531–1536
90. Landreville P, Bordes M, Dicaire L, et al. Behavioral approaches for reducing agitation in residents of long-term care facilities: critical review and suggestions for future research. Int Psychogeriatr 1998;10:397–419
91. Clark ME, Lipe AW, Bilbrey M. Use of music to decrease aggressive behaviors in people with dementia. J Gerontol Nurs 1998;24:10–17
92. Sambandham M, Schirm V. Music as a nursing intervention for residents with Alzheimer's disease in long-term care. Geriatr Nurs 1995;16:79–83
93. Tabloski P, McKinnin-Howe L, Remington R. Effects of calming music on the level of agitation in cognitively impaired nursing home residents. Am J Alzheimer's Care Related Disord Res 1995;10:10–15
94. Gerdner L. An individualized music intervention for agitation. J Am Psychiatr Nurs Assoc 1997;3:177–184
95. Snyder M, Egan EC, Bruns KR. Efficacy of hand massage in decreasing agitation behaviors associated with care activities in persons with dementia. Geriatr Nurs 1995;16:60–63
96. Kim EJ, Buschmann MT. The effect of expressive physical touch on patients with dementia. Int J Nurs Studies 1999;36:235–243
97. Sobel BP. Bingo vs physical intervention in stimulating short-term cognition in Alzheimer's disease patients. Am J Alzheimer's Dis Other Dementias 2001;16:115–120
98. Watson NM, Wells TJ, Cox C. Rocking chair therapy for dementia patients: its effects on psychosocial well-being and balance. Am J Alzheimer's Dis 1998;13:296–308
99. Lanctot LK, Herrmann N, Mazzotta P. Role of serotonin in the behavioral and psychological symptoms of dementia. J Neuropsychiatry Clin Neurosci 2001;13:5–21
100. Trzepacz P, Breitbart W, Franklin J, et al. Practice Guidelines for the Treatment of Patients With Delirium. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders. Washington, DC: American Psychiatric Association 2000:31–68
101. Cummings JL, Black C. The cholinergic hypothesis of neuropsychiatric symptoms in Alzheimer's disease. Am J Geriatr Psychiatry 1998;6: S64–S78
102. Cummings JL, Anand R, Koumaras B, et al. Behavioral benefits in Alzheimer's Disease patients residing in a nursing home following 52 weeks of rivastigmine treatment. In: New Research Abstracts of the 153rd Annual Meeting of the American Psychiatric Association; May 17, 2000; Chicago, Ill. Abstract NR574:212–213
103. Cummings JL, Anand R, Koumaras B, et al. Rivastigmine provides benefits to Alzheimer's Disease patients residing in a nursing home: findings from a 26 week trial. Neurology 2000;54(suppl 3):A468
104. McKeith I, Del Ser T, Anand R, et al. Rivastigmine provides symptomatic benefit in dementia with Lewy bodies: findings from a placebo-controlled international multicenter study. Lancet 2000;356:2031–2036
105. Kaufer D, Cummings JL, Christine D. Differential neuropsychiatric symptom responses to tacrine in Alzheimer's disease: relationship to dementia severity. J Neuropsychiatry Clin Neurosci 1998;10:55–63
106. Nyth AL, Gottfries CG. The clinical efficacy of citalopram in treatment of emotional disturbances in dementia disorders: a Nordic multicenter study. Br J Psychiatry 1990;157:894–901
107. Nyth AL, Gottfries CG, Lyby K, et al. A controlled multicenter clinical study of citalopram and placebo in elderly depressed patients with and without concomitant dementia. Acta Psychiatr Scand 1992;86:138–145
108. Taragano FE, Lyketsos CG, Mangone CA, et al. A double-blind, randomized, fixed-dose trial of fluoxetine vs amitriptyline in the treatment of major depression complicating Alzheimer's disease. Psychosomatics 1997;38:246–252
109. Olafsson K, Jorgensen S, Jensen HV, et al. Fluvoxamine in the treatment of demented elderly patients: a double-blind, placebo-controlled study. Acta Psychiatr Scand 1992;85:453–456
110. Katona CLE, Hunter BN, Bray J. A double-blind comparison of the efficacy and safety of paroxetine and imipramine in the treatment of depression with dementia. Int J Geriatr Psychiatry 1994;2:352–354
111. Swartz JR, Miller BL, Lesser IM, et al. Frontotemporal dementia: treatment response to serotonin selective reuptake inhibitors. J Clin Psychiatry 1997;58:212–216. Correction 1997;58:275
112. Magai C, Kennedy G, Cohen CI, et al. A controlled clinical trial of sertraline in the treatment of depression in nursing home patients with late-stage Alzheimer's disease. Am J Geriatr Psychiatry 2000;8:66–74
113. Trappler B, Cohen CI. Use of SSRIs in "very old" depressed nursing home residents. Am J Geriatr Psychiatry 1998;6:83–89
114. Katz IR, Jeste DV, Mintzer JE, et al. Comparison of risperidone and placebo for psychosis and behavioral disturbances associated with dementia: a randomized double-blind trial. J Clin Psychiatry 1999;60:107–115
115. DeDeyn PP, Rabheru K, Rasmussen A, et al. A randomized trial of risperidone, placebo, and haloperidol for behavioral symptoms of dementia. Neurology 1999;53:946–955
116. Goldberg RJ. Long-term use of risperidone for the treatment of dementia-related behavioral disturbances in a nursing home population. Int J Geriatr Psychopharmacol 1999;2:1–4
117. Street J, Clark WS, Gannon KS, et al. Olanzapine treatment of psychosis and behavioral disturbances in patients with Alzheimer's disease in nursing care facilities. Arch Gen Psychiatry 2000;57:968–976
118. Satterlee WG, Reams SG, Burns RP, et al. A clinical update on olanzapine treatment in schizophrenia and in elderly Alzheimer's disease patients [abstract]. Psychopharmacol Bull 1995;31:534
119. McManus DQ, Arvanitis LA, Kowalcyk BB, for the Seroquel Trial 48 Study Group. Quetiapine, a novel antipsychotic: experience in elderly patients with psychotic disorders. J Clin Psychiatry 1999;60:292–298
120. Parsa MA, Bastani B. Quetiapine (Seroquel) in the treatment of psychosis in patients with Parkinson's disease. J Neuropsychiatry Clin Neurosci 1998;10:216–219
121. Targum SD, Abott JL. Efficacy of quetiapine in parkinson's patients with psychosis. J Clin Psychopharmacol 2000;20:54–60
122. Leucht S, Pitschel-Walz G, Abraham D, et al. Efficacy and extrapyramidal side effects of the new antipsychotics olanzapine, quetiapine, risperidone, and sertindole compared to conventional antipsychotics and placebo: a meta-analysis of randomized controlled trials. Schizophr Res 1999;35:51–68
123. Rabins P, Blacker D, Bland W, et al. Practice Guideline for the Treatment of Patients With Alzheimer's Disease and Other Dementias of Late Life.

American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders. Washington, DC: American Psychiatric Association 2000:69–137
124. Ereshefsky L. Pharmacokinetics and drug interactions: update for new antipsychotics. J Clin Psychiatry 1996;57(suppl 11):12–25
125. Jeste DV, Caligiuri MP, Paulsen JS, et al. Risk of tardive dyskinesia in older patients: a prospective longitudinal study of 266 outpatients. Arch Gen Psychiatry 1995;52:756–765
126. Saltz BZ, Woerner MG, Kane JM, et al. Prospective study of tardive dyskinesia incidence in the elderly. JAMA 1991;266:2402–2406
127. Beasley CM, Dellva MA, Tamura RN, et al. Randomised double-blind comparison of the incidence of tardive dyskinesia in patients with schizophrenia during long-term treatment with olanzapine or haloperidol. Br J Psychiatry 1999;174:23–30
128. Schneider LS, Pollock VE, Lyness SA. A meta-analysis of controlled trials of neuroleptic treatment in dementia. J Am Geriatr Soc 1990;38: 553–563
129. Cohen-Mansfield J, Lipson S, Werner P, et al. Withdrawal of haloperidol, thioridazine, and lorazepam in a nursing home: a controlled, double-blind study. Arch Intern Med 1999;159:1733–1740
130. Teri L, Logsdon G, Peskind E, et al. Treatment of agitation in AD: a randomized, placebo-controlled clinical trial. Neurology 2000;55: 1271–1278
131. Tariot PN. Treatment strategies for agitation and psychosis in dementia. J Clin Psychiatry 1996;57(suppl 14):21–29
132. Verma SD, Davidoff DA, Kambhampati KK. Management of the agitated elderly patient in the nursing home: the role of the atypical antipsychotics. J Clin Psychiatry 1998;59(suppl 19):50–55
133. Kales A, Bixler EO, Vela-Bueno A, et al. Comparison of short and long half-life benzodiazepine hypnotics: triazolam and quazepam. Clin Pharmacol Ther 1986;40:378–386
134. Tariot PN, Jakimovich LJ, Erb R, et al. Withdrawal from controlled carbamazepine therapy followed by further carbamazepine treatment in patients with dementia. J Clin Psychiatry 1999;60:684–689
135. Tariot PN, Schneider LS, Mintzer JE, et al. Safety and tolerability of divalproex sodium in the treatment of signs and symptoms of mania in elderly patients with dementia: results of a double-blind, placebo-controlled trial. Curr Ther Res Clin Exp 2001;62:51–67
136. Porsteinsson AP, Tariot PN, Erb R, et al. Placebo-controlled study of divalproex sodium for agitation in dementia. Am J Geriatr Psychiatry 2001;9:58–66
137. Porteinsson AP, Tariot PN, Erb R, et al. An open trial of valproate for agitation in geriatric neuropsychiatric disorders. Am J Geriatr Psychiatry 1997;5:344-351
138. Trannel TJ, Ahmed I, Goebert D. Occurrence of thrombocytopenia in psychiatric patients taking valproate. Am J Psychiatry 2001;158: 128–130
139. Hawkins JW, Tinklenberg JR, Sheikh JI, et al. A retrospective chart review of gabapentin for the treatment of aggressive and agitated behavior in patients with dementias. Am J Geriatr Psychiatry 2000;8:221–225
140. Simpson DM, Foster D. Improvement in organically disturbed behavior with trazodone treatment. J Clin Psychiatry 1986;47:191–193
141. Tingle D. Trazodone in dementia [letter]. J Clin Psychiatry 1986;47:482
142. Houlihan DJ, Mulsant BH, Sweet RA, et al. A naturalistic study of trazodone in the treatment of behavioral complications of dementia. Am J Geriatr Psychiatry 1994;2:78–85
143. Lebert F, Pasquier F, Petit H. Behavioral effects of trazodone in Alzheimer's disease. J Clin Psychiatry 1994;55:536–538
144. Lawlor BA, Radcliffe J, Molchan SE, et al. A pilot placebo-controlled study of trazodone and buspirone in Alzheimer's disease. Int J Geriatr Psychiatry 1994;9:55–59
145. Sultzer DL, Gray I, Gunay I, et al. A double-blind comparison of trazodone and haloperidol for treatment of agitation in patients with dementia. Am J Geriatr Psychiatry 1997;5:60–69
146. Cooper JW, Cobb HH III, Burfield AH. Effects of psychotropic load reduction and buspirone conversion on behavioral disturbances in a nursing home population. Consult Pharm 2001;16:358–363
147. Cantillon M, Brunswick R, Molina D, et al. Buspirone vs haloperidol: a double-blind trial for agitation in a nursing home population with Alzheimer's disease. Am J Geriatr Psychiatry 1996;4:263–267
148. Kyomen HH, Satlin A, Hennen J, et al. Estrogen therapy and aggressive behavior in elderly patients with moderate-to-severe dementia. Am J Geriatr Psychiatry 1999;7:339–348
149. Shelton PS, Brooks VG. Estrogen for dementia-related aggression in elderly men. Ann Pharmacother 1999;33:808–812
150. Cooper AJ. Medroxyprogesterone acetate (MPA) treatment of sexual acting out in men suffering from dementia. J Clin Psychiatry 1987;48: 368–370
151. Wisemen SV, McAuley JW, Freidenberg GR, et al. Hypersexuality in patients with dementia: possible response to cimetidine. Neurology 2000;54:2024
152. Price TRP, McAllister TW. Safety and efficacy of ECT in depressed patients with dementia: a review of clinical experience. Convuls Ther 1989;5:61–74
153. Nelson JP, Rosenberg DR. ECT treatment of demented elderly patients with major depression: a retrospective study of efficacy and safety. Convuls Ther 1991;7:157–165
154. Carlyl W, Killick L, Ancill R. ECT: an effective treatment in the screaming demented patient. J Am Geriatr Soc 1991;39:181–190
155. Holmberg SK, Tariot P, Challapalli R. Efficacy of ECT for agitation in dementia: a case report. Am J Geriatr Psychiatry 1996;4:330–336
156. Office of Finance and Data Analysis, American Hospital Association. Omnibus Budget Reconciliation Act of 1987 (OBRA-1987). Summary of Key Medicare Provisions Relating to Hospitals and of Other Health-Related Program Provisions. Washington, DC: American Hospital Association; 1988
157. McKeith I, O'Brien J. Dementia with Lewy bodies. Aust N Z J Psychiatry 1999;33:800–808
158. McKeith I, Fairbairn A, Perry R, et al. Neuroleptic sensitivity in patients with senile dementia of Lewy body type. BMJ 1992;305: 673–678
159. Reichman WE, Coyne AC, Borson S, et al. Psychiatric consultation in the nursing home: a survey of six states. Am J Geriatr Psychiatry 1998; 6:320–327
160. Colenda CC III. Agitation: a conceptual overview. In: Lawlor B, ed. Behavioral Complications in Alzheimer's Disease. Washington, DC: American Psychiatric Press; 1995:3–17
161. Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. J Psychiatr Res 1983;17:37–49
162. Prinz PN, Vitiello MV, Raskind MA, et al. Geriatrics: sleep disorders and aging. N Engl J Med 1990;323:520–526
163. Vitiello MV, Prinz PN. Alzheimer's disease: sleep and sleep/wake patterns. Clin Geriatr Med 1989;5:289–299
164. Eimer M. Management of the behavioral symptoms associated with dementia. Prim Care 1989;16:431–450
165. Swanwick GR. Nonpharmacological treatment of behavioral symptoms. In: Lawlor BA, ed. Behavioral Complications in Alzheimer's Disease. Washington, DC: American Psychiatric Press; 1995:183–207
166. Knopman DS, Sawyer-DeMaris S. Practical approach to managing behavioral problems in dementia patients. Geriatrics 1990;45:27–35
167. Lawton PM. Environmental approaches to research and treatment of Alzheimer's disease. In: Light E, Lebowitz BD, eds. Alzheimer's Disease Treatment and Family Stress: Direction for Research. Baltimore, Md: Johns Hopkins University Press; 1989
168. Coons DH. The therapeutic milieu: concepts and criteria. In: Coons D, ed. Specialized Dementia Care Units. Baltimore, Md: Johns Hopkins University Press; 1991
169. Cohen U, Weisman G. Holding on to Home: Designing Environments for People with Dementia. Baltimore, Md: Johns Hopkins University Press; 1991
170. Franks CM. Behavior therapy and the aging process. In: Wilson GT, Franks CM, Kendall PC, et al, eds. Review of Behavior Therapy: Theory and Practice, vol 2. New York, NY: Guilford; 1987
171. Bradbury N. Problems of elderly people, In: Dryden W, Rentoul R, eds. Adult Clinical Problems: A Cognitive Behavioral Approach. London, England: Routledge; 1991:203–231
172. Hall G, Buckwalter K. A conceptual model for planning and evaluating care of the client with Alzheimer's disease. Arch Psychiatr Nurs 1987; 1:399–406
173. Hall G, Gerdner L, Sweigart-Stauffacher M. Principles of nonpharmacological management: caring for people with Alzheimer's disease using conceptual model. Psychiatr Ann 1995;25:432–440
174. Ott L. New design and management approach improves quality of life. J Long-Term Care Adm 1996;24:52–54
175. Bond GE, Fiedler FE, Keeran CV, et al. The neighborhood concept as a model for long-term care. J Long-Term Care Adm 1996;24:27–32
176. Thomas WH. Life worth living: how someone you love can still enjoy life in a nursing home: the Eden Alternative in action. Acton, Mass: Vander Wyk & Burnham; 1996