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## Features:

### Sleep Disturbances Among Patients with Dementia

- Sonia Ancoli-Israel, PhD

As of the year 2000, approximately 4 million Americans had Alzheimer's disease (AD), and it is projected that more than 14 million will have AD by the year 2050.<sup>1</sup> As this population grows, increasing efforts must be made to improve quality of life, including improving sleep in these patients. Objective measurements of sleep in patients with dementia have shown increased sleep fragmentation, longer sleep onset latency, decreased sleep efficiency, decreased total sleep time, and decreased slow wave sleep.<sup>2</sup> In addition, those with more severe dementia appear to have more severe sleep disruption.<sup>3</sup> These changes in sleep architecture result in excessive daytime sleepiness, nighttime wandering, confusion, and agitation (sundowning). Disturbed sleep is one of the most common reasons why caregivers are no longer able to care for a patient, resulting in institutionalization.<sup>4</sup> Therefore, addressing the issues related to sleep disturbances in patients with dementia is especially important.

Some evidence suggests that dementia may affect sleep beyond the effects of normal aging.<sup>5</sup> In part, this may be secondary to the irreversible damage to the brain in areas responsible for regulating sleep, caused by illnesses such as AD, Parkinson's disease, multi-infarct dementia, and Lewy body dementia.

Since it may be difficult for the patient with dementia to describe their sleep disturbance, caregivers can be a valuable source of information. The sleep disorders commonly found in elderly patients also need to be considered in patients with dementia (ie, discomfort secondary to medical illness, the medications used to treat illness, and changes in circadian rhythms). Psychiatric illness, particularly depression, must also be considered. Primary sleep disorders, such as sleep-disordered breathing (SDB), restless legs syndrome (RLS), or periodic limb movements in sleep (PLMS) need to be ruled out or, if present, treated.<sup>6,7</sup>

#### Dementia and Sleep Apnea

As mentioned above, patients with dementia often also have sleep apnea. One study confirmed that in patients with dementia, those with more severe sleep apnea had more severe dementia than those with mild-to-moderate sleep apnea, and those with severe dementia had more severe sleep apnea than those with mild-to-moderate dementia.<sup>8</sup> The correlation between dementia and SDB was significant at  $r = 0.37$ . Although it is unlikely that sleep apnea causes dementia, the hypoxia and daytime sleepiness associated with sleep apnea may exacerbate the symptoms of dementia. Approximately 90% of persons with moderate-to-severe AD

have at least five respiratory events per hour of sleep, 63% have at least 15 respiratory events per hour of sleep, and one-half have at least 20 events per hour of sleep.<sup>9</sup>

Many physicians may be hesitant to treat SDB in this population for fear of noncompliance with treatment. However, preliminary results from one study suggest that patients with mild-to-moderate dementia who have caregivers living with them are able to tolerate continuous positive airway pressure (CPAP) for approximately 5 hours per night, similar to the amount of compliance seen for most people with sleep apnea.<sup>10</sup> In these patients, CPAP decreased the amount of nighttime respiratory disturbance from approximately 24 events per hour of sleep to fewer than ten per hour. Daytime sleepiness also improved with CPAP treatment, and some preliminary research has suggested that cognitive impairment does not progress as quickly with CPAP, and may even decline. Caregivers also reported decreases in snoring with CPAP treatment, as well as improvements in mood and quality of life for both the patients and themselves.<sup>10</sup>

#### Treatment of Sleep Disturbance in Patients with Dementia

Treatment of sleep disturbances in patients with dementia is the same as that for patients without dementia. Sleep-disordered breathing can be treated with CPAP. RLS and PLMS should be treated with a dopamine agonist, and shifts in the circadian rhythm can be treated with evening bright light therapy. Keeping a regular pattern of physical activity and social interaction also promotes a more robust sleep/wake cycle.<sup>11</sup> Although longer-acting sedating medications—including benzodiazepines, tricyclic antidepressants, antihistamines, anticonvulsants, and antipsychotics—are frequently prescribed for sleep problems in patients with dementia, the administration of these medications can cause adverse daytime effects, such as excessive daytime sleepiness and poor motor coordination, which may lead to injuries.<sup>12</sup>

In the elderly, the risk of falls, cognitive impairment, and respiratory depression are of particular concern, although recent data suggest that insomnia, *per se*, and not hypnotics, might increase the risk of falls.<sup>13</sup> Nonpharmacologic interventions are preferred. In addition, the FDA recently put a “black-box” warning on the use of the atypical antipsychotic agents for patients with dementia. Although not yet studied in this population, the newer benzodiazepine receptor agonists might be safer.

#### Sleep in Institutionalized Patients with Dementia

Sleep in institutionalized patients with dementia is more disturbed than that seen in community-dwelling patients with dementia.<sup>14</sup> Middelkoop et al<sup>15</sup> reported that individuals living in nursing homes, when compared to those living in the community or in assisted-living environments, had worse sleep quality, longer sleep onset, more phase-advanced sleep periods, and higher use of sedative-hypnotics.

The typical pattern of nursing home residents with dementia involves sleep that is extremely fragmented throughout the day and night. In fact, on average, these patients are rarely asleep for a full hour and rarely awake for a full hour (ie, not a single hour in a 24-hour day is spent fully awake or fully

asleep).<sup>3,14,16</sup> The times of greatest alertness are during meals, but some residents fall asleep even at those times. Although patients with severe dementia are sleepier throughout the day and night than those with mild-to-moderate dementia, all have very disrupted sleep. In one study, patients with severe dementia slept about 58% of the night, compared to those with mild-to-moderate dementia who slept about 45% of the night.<sup>17</sup> In addition, those with severe dementia napped during 29% of the day compared to 15% for those with mild-to-moderate dementia. Thus, both groups spent much of the day and night in fragmented sleep (and fragmented wake).<sup>17</sup>

#### Environment and Sleep in the Nursing Home

There are a variety of environmental factors that contribute to the poor sleep seen in nursing home residents, with studies showing that improving the environment also improves sleep. Schnelle et al<sup>18</sup> demonstrated that both ambient light and nighttime noise contributed significantly to sleep disruption in nursing home patients. The main contributor of noise at night, as measured in this study, was noise from nursing staff.<sup>18</sup> When noise was kept to a minimum, and the environment kept as dark as possible, sleep significantly improved.<sup>19</sup>

As much as a dark environment is needed at night, a bright environment is needed during the day. Ancoli-Israel and Kripke<sup>14</sup> reported that nursing home residents were exposed to less than 10 minutes of bright light per day. However, those exposed to more bright light had fewer sleep disruptions, independent of the severity of the dementia.<sup>20</sup>

These findings were confirmed in two studies that provided increased bright light exposure either during the morning or during the evening. These placebo-controlled studies concluded that increasing light exposure throughout the morning and evening is likely to have a beneficial effect on sleep and on circadian rhythm in persons with dementia.<sup>21,22</sup> Residents exposed to more bright light in the morning had nighttime sleep bouts that increased from 65 minutes to 88 minutes, and those exposed to bright light in the evening increased their nighttime sleep bouts from 71 minutes to 95 minutes.<sup>21,22</sup>

#### Treatment of Sleep Disturbance in Nursing Home Residents with Dementia

As with patients with dementia living at home, once the cause of the sleep problems has been identified, specific treatment should be initiated. However, in addition, general measures to be taken include limiting naps to one hour in the early afternoon and avoiding all caffeine (including chocolate). Many medications are known to affect sleep patterns; therefore, residents' medications should be evaluated and dosing schedules adjusted. The most important action is improving the environment—keeping it bright during the day, and dark and quiet at night.<sup>23</sup> If residents do not have an opportunity to go outside during the day, bright light should be brought into rooms where the residents spend the most time. Last but not least, roommates should be matched. Residents who are disruptive at night should be placed with others who are disruptive at night, and not with those who are better sleepers. With these interventions, all residents can have better sleep.

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