

Dysphagia and Aspiration Pneumonia in Patients With Alzheimer's Disease

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Dysphagia and aspiration pneumonia are the 2 most serious medical conditions seen in late-stage Alzheimer's disease (AD) patients. Pseudobulbar dysphagia is associated with weight loss, which is not always prevented by optimizing the management of the dysphagia. Failure of basic homeostatic mechanisms appears to play an important role in the nutritional status of these patients. Aspiration pneumonia is the most common cause of death in end-stage AD. The primary problems that predispose to aspiration pneumonia include a reduced level of consciousness, dysphagia, loss of the gag reflex, periodontal disease, and the mechanical effects of inserting various tubes into the respiratory and gastrointestinal tracts. The bacterial flora involved include the indigenous oral flora (among which aerobes predominate) and, in the hospital or nursing home setting, nosocomially acquired pathogens such as *Staphylococcus aureus* and various aerobic and facultative gram-negative bacilli that may colonize in patients. In addition to treatment with antibiotics, adequate symptomatic treatment of AD patients with pneumonia is a priority in order to relieve suffering.

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ALZHEIMER'S disease (AD) is a devastating, multidimensional disease characterized by rapidly deteriorating mental illness ending in death. Since the first description of AD at the beginning of the last century¹ it has been defined as a disease occurring in the presenilium. The first published account by Alois Alzheimer in 1907 was of a 51-year-old woman who died 4.5 years later in a completely demented state. At present, it has been estimated that AD afflicts more than 4 million people in the United States, but the number of persons affected by the disease may actually be far higher. In the population over 85 years of age, the prevalence of AD may approach 47%.² In 1999, AD was the fifth leading cause of death (after heart disease, cancer, stroke, and chronic obstructive pulmonary disease) among US women 85 years of age and older. The recent dramatic rise in the incidence of AD and other dementias is often considered a byproduct of the increase in the aging population. The National Institute on Aging projects that, unless a way can be found to prevent or cure AD, there could be 14 million people with the disorder by the middle of the century, adding billions of dollars per year to the healthcare budget. While AD is a major problem, its prevalence among older people should not be exaggerated. Most people over age 65 do not suffer from memory defects or dementia, and the large majority of older people have an impressive capacity for learning and growth.³

Progressive loss of memory and executive function, coupled with progressive aphasia and apraxia, are considered hallmarks of AD. The disturbances in cognition, behavior, and affect that characterize AD are well understood.^{4,5} Postmortem histological analysis reveals dense bundles of unusual fibrils within nerve cells (neurofibrillary tangles [NFTs]) and numerous focal lesions within the cerebral cortex called "senile plaques."^{6,7} The correlation between these neuropathological changes with the cognitive symptoms of AD is also well established. Re-

cently, clinical neuroscience research has also documented the neuropathological basis for the noncognitive symptoms of AD such as depression, psychosis, and circadian disruption.⁵ When considering the management strategies for AD in the future it will be necessary to focus on the cognitive, noncognitive, behavioral, and affective symptoms of AD.

As the dementia advances, patients of AD start to have difficulty swallowing and lose interest in eating. Eating and swallowing impairments are well documented in late-stage AD, but the time of onset of these stages in the disease process is not well known. Eating consists of 2 components: self-feeding and swallowing. AD patients rely on partner-initiated cues or direct assistance in self-feeding. In addition, the act of swallowing (deglutition) is significantly prolonged in AD patients. Delays occur in the oral transit duration (solid food), pharyngeal response duration (liquid), and the total swallow duration (liquid).⁸ It is quite possible that changes in self-feeding and swallowing begin to occur early in the course of AD. The etiology and consequences of disruption of swallowing reflexes that lead to dysphagia and pneumonia in AD patients are the focus of this review.

ETIOLOGY AND CONSEQUENCES OF SWALLOWING DISORDERS IN THE ELDERLY

It has been estimated that over 50% of the population of long-term care units suffer from deglutition disorders.⁹ While the physiological processes associated with aging alter several parameters of swallowing, there is no evidence to suggest that these age-related modifications have any adverse effect on swallowing in normal aging individuals. However, the elderly are vulnerable to concomitant disorders such as xerostomia, cerebrovascular diseases, central nervous system degenerative disorders (eg, AD), and neuromotor diseases. Alterations in the oropharyngeal anatomy from cancer in this region or from external compression from the thyroid or Zenker's diverticulitis are other specific causes of dysphagia in the elderly. Dysphagia of iatrogenic origin is frequent in the elderly, following cervical radiotherapy, oropharyngeal surgery, during and after tracheal intubation, during tube feeding, or in the course of treatment with such medications as neuroleptics¹⁰ and other drugs with central nervous system side effects. Obviously, drug-induced dysphagia will improve significantly when the drugs are discontinued.

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These oropharyngeal swallowing abnormalities, including aspiration are more prevalent in patients with AD than in normal elderly individuals.¹¹ The adverse consequences of dysphagia are generally underrated. They range from deterioration in the quality of life, dehydration, undernutrition, asphyxia, congestion, and recurrent respiratory tract infections to aspiration to aspiration pneumonia and death.¹⁰ The risk of pneumonia is related not only to dysphagia and aspiration but to mobility, nutritional status, and host immune response. There is little evidence to suggest that pneumonia can be prevented by appropriate management of the dysphagia. Although the potential beneficial role of enteral feeding in patients with advanced AD is small, the debate on the benefits and risks of long-term enteral feeding in patients with advanced dementia in AD continues. Most studies have been performed in nursing homes or skilled nursing facilities.¹⁰ Patients on enteral nutrition are at risk of pneumonia from aspiration and at risk of bowel ischemia because enteral nutrition increases intestinal oxygen consumption.¹⁰ Enteral nutrition is sometimes considered to be a way of reducing steroid dependency.¹⁰

ASPIRATION PNEUMONIA IN ALZHEIMER'S DISEASE PATIENTS

Pneumonia is a major cause of death in frail AD patients,^{12,13} although the overall incidence of aspiration pneumonia is difficult to ascertain. Using a diagnosis based on history, aspiration is the most commonly identifiable cause of pneumonia in community-based patients admitted to hospitals. The incidence is somewhat higher in elderly in nursing homes,¹⁴ where pneumonia is the reported cause of death in a high proportion of AD patients. Pneumonia in nursing homes is a quite different disease than that seen in the community. *Klebsiella pneumoniae* and *S aureus* are frequently isolated in nursing home patients; in contrast, *Streptococcus pneumoniae* and *Haemophilus influenzae* are more common in community-dwelling patients.¹⁴

Aspiration pneumonia in ambulatory AD patients is significantly and independently associated with: severe dementia, silent brain infarction (SBI) in the basal ganglia, intake of neuroleptics, and male gender.¹⁵ Compared to patients with mild/moderate AD, the mean latency of the swallowing reflex is significantly longer in severe AD patients. The difference in length of latency is exacerbated by use of neuroleptics.¹⁶ To prevent life-threatening aspiration pneumonia, neuroleptics in severely demented AD patients should be administered in the

smallest dose possible and be discontinued as soon as the psychiatric and behavioral problems are resolved.

A recent study¹⁷ assessed the relationship between severity of dementia and unfavorable outcomes of nursing home-acquired pneumonia. It was found that mortality was highest in the most severely demented patients and in less severely demented patients who had aspirated or lost weight. This observation suggests that in the early stages of AD (mild to moderate dementia) prevention of aspiration and attempts to stabilize weight loss could improve mid-term outcome. However, if the weight loss is a component of the dementia processes (reflecting the existence of a catabolic state) then interventions might not be helpful. In addition, improving the outcome of aspiration pneumonia is difficult to achieve, regardless of the severity of the dementia. The most severely demented patients are indeed frail and at a high risk of dying from pneumonia despite antibiotic treatment,¹⁸ but aspiration and weight loss are important factors to consider when caregivers are making decisions about the management of moderately demented patients.

Sir William Osler in the first edition of his *Principles and Practice of Medicine*, published in 1892,¹⁹ viewed pneumonia in older people as "the special enemy of old age." Six years later he called pneumonia "the friend of the aged, that allowed the elderly to escape from 'those 'cold gradations of decay' that make the last state of all so distressing."²⁰ However, recent advances in medical care have led to a longer productive life of the elderly, and the availability of vaccines has proved to be effective in preventing common forms of bacterial pneumonia. The conflict about how to prolong life without prolonging suffering was present in Osler's day and still exists today. With regard to treating pneumonia, it is not always clear whether treatment will prolong life or prolong suffering. There is no evidence available regarding the degree of discomfort experienced by older nursing home patients treated with or without antibiotics for pneumonia. A recent study,¹⁸ however, has shown that pneumonia in the AD patient is far from "friendly" as Osler described it in his time. Today, pneumonia, whether treated or untreated with antibiotics, produces obvious and severe suffering in the demented nursing home patient. Pneumonia may even mean a "painful escape," because the suffering it causes can be severe. At the present time, efforts are being made to identify patients at high risk of discomfort and to treat that discomfort adequately.

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