

Advances in Geriatrics

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Evaluating the Effectiveness of Dysphagia Management Strategies

Dysphagia—or swallowing dysfunction—can have devastating effects on a person's health and well-being. In addition to diminishing quality of life, dysphagia can lead to dehydration, malnutrition, and pneumonia related to aspiration of food or liquid into the airway. Frequently, dysphagia develops as a consequence of an age-related condition, such as Alzheimer disease (AD) or Parkinson disease (PD). Overall, 70% to 80% of people with AD and as many as 50% of people with PD have dysphagia, and bronchopneumonia is a common cause of death in both groups.¹

Recent data suggest that 37% of all U.S. veterans are aged 65 or older,² and the VHA expects the number of veterans aged 85 or older to peak in 2012 at 1.4 million.³ Given these trends, it's no surprise that the VA has named the early identification, comprehensive evaluation, and long-term treatment and management of swallowing problems as "urgent priorities."⁴ In 2000, more than 270,000 veterans with swallowing problems accounted for approximately 350,000 VHA visits and admissions (VA National Database, unpublished data, December 2005).

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When the Geriatric Research, Education and Clinical Center (GRECC) at the William S. Middleton Memorial Veterans Hospital in Madison, WI opened in 1991, one of its primary foci was the study of swallowing and dysphagia. Five years later, the Madison GRECC undertook a key role in the largest multisite, randomized, clinical trial concerning dysphagia ever supported by the National Institutes of Health (NIH). This complex, decade-long investigation was recently completed, and its results have provided critical guidance for the clinical care of dysphagic patients with dementia or PD. In addition, the study illustrates one way in which the VA can partner with other public and private institutions to benefit veteran and non-veteran patients alike.

PREVENTING ASPIRATION IN DYSPHAGIA

A particular challenge of managing dysphagia in patients with AD or PD is the high incidence of silent aspiration (no outward sign, such as coughing or

throat clearing), which renders patients incapable of protecting themselves by automatically clearing the airway or alerting health care providers. In such patients, effective strategies for preventing aspiration are particularly important.

One strategy in current use is mechanical alteration of the patient's diet, which often involves adding thickening agents to thin liquids.¹ This practice is growing—data compiled by VA vendors suggests that the VA will spend nearly \$1 million on thickened liquids in 2007 (VA National Database, unpublished data, March 2007). Few studies supporting the efficacy of this approach have been published, however, and these studies have limited generalizability.^{5,6}

A common alternative to thickened liquids is the use of a chin-down posture during drinking.⁷ While previous reports have provided a basis for widespread clinical use of the chin-down posture, these studies did not include long-term health outcome data.

To address this paucity of data, the Communication Sciences and

The VHA's 21 Geriatric Research, Education and Clinical Centers (GRECCs) are designed for the advancement and integration of research, education, and clinical achievements in geriatrics and gerontology throughout the VA health care system. Each GRECC focuses on particular aspects of the care of aging veterans and is

at the forefront of geriatric research and clinical care. For more information on the GRECC program, visit the web site (<http://www1.va.gov/grecc/>). This column, which is contributed monthly by GRECC staff members, is coordinated and edited by Kenneth Shay, DDS, MS, director of geriatric programs for the VA Office of Geriatrics and Extended Care, VA Central Office, Washington, DC.



Disorders Clinical Trials Research Group (part of the American Speech-Language-Hearing Association) embarked in 1996 on the largest NIH-funded, multisite, randomized, clinical trial on dysphagia. The study was designed to investigate the effectiveness of the chin-down posture versus the thickened liquid strategy for preventing aspiration in dysphagic patients with dementia or PD.

A full description of the study design was published in 2006,⁸ and detailed results are forthcoming (see the Acknowledgement section at the end of this column). Briefly, the study comprised two sequential clinical trials, the first of which determined the incidence of immediate aspiration with the chin-down posture versus thickened liquids, and the second of which investigated the incidence of pneumonia in a subset of participants assigned to one of the management strategies over a three-month period. The diagnostic method used in part 1 of the study to identify aspiration was videofluoroscopy, a dynamic radiographic procedure that is the most common method—both within and outside the VHA—used for dysphagia diagnosis and intervention planning (Figure).⁹

THE VA'S ROLE

Jeri Logemann, PhD, professor at Northwestern University in Evanston, IL, was the principal investigator, and JoAnne Robbins, PhD, associate director for research at the Madison GRECC and professor at the University of Wisconsin, Madison, served as the study chair. Between May 20, 1998 and September 16, 2005, 711 men and women with dementia or PD (with or without dementia) were enrolled at 126 acute and subacute health care facilities in Florida, Illinois, Indiana, Massachusetts, Minnesota, New York, Ohio, and Wisconsin. A total of 17 (13%) of the study sites were VA facili-

ties and 275 (39%) of the participants were VA patients. Numerous VA practitioners—including speech pathologists, nurses, dietitians, radiologists, and physicians—played vital roles both in identifying subjects and in facilitating their participation. In short, without the unwavering support and dedication of VA facilities, this study could not have been undertaken.

In particular, the participation of the Madison GRECC was key. Clinician-researchers from the GRECC developed and validated tools for objectively quantifying hypothesized secondary outcomes (a penetration-aspiration scale and temporospatial measures).¹⁰ Over the course of the study, more than 200 visiting clinician-researchers attended an intensive, two-day training program held at the Madison GRECC as a prerequisite to study participation. The GRECC's Swallowing and Speech Clinical Research Program analyzed the videofluoroscopic data from all study sites. Additionally, the GRECC provided resources for clinician-researchers to present these important findings at national conferences and cosponsored several conferences in Madison at which study methods and results were presented to local and national audiences.

KEY FINDINGS

Immediate aspiration

In part 1 of the study, all participants underwent a series of three videofluoroscopic evaluations, during which they drank (in random order): thin liquid using the chin-down posture, liquid thickened to a viscosity of 300 centipoise (cps) (nectar-thick liquid) in their normal posture, and liquid thickened to a viscosity of 3,000 cps (honey-thick liquid) in their normal posture. (For reference, the viscosity of water is 1 cps and that of Karo syrup is 3,500 cps.) Overall, significantly more participants aspirated while drinking thin



Figure. Dr. JoAnne Robbins performing a videofluoroscopic swallowing evaluation on a veteran patient. This diagnostic procedure provides dynamic images of radio-opaque food and liquid moving from the mouth, past the airway, and into the esophagus. Photograph provided courtesy of VA Medical Media.

liquid in the chin-down posture than they did while drinking either of the thickened liquids. The nectar-thick liquids were aspirated significantly more often than the honey-thick liquids.

These results reinforce the importance of videofluoroscopy as a diagnostic approach in patients at risk for dysphagia, and they demonstrate the benefit of evaluating treatment strategies during the procedure. Notably, more than half of the participants with dementia benefited from at least one of the strategies for preventing thin liquid aspiration. Clearly, a particular medical diagnosis alone does not justify neglecting to try a given treatment strategy. Data analysis is ongoing to learn more about the biomechanical mechanisms underlying swallowing in these patient groups.

Development of pneumonia

In part 2 of the study, a subset of participants were assigned randomly to employ one of the three treatment strat-

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egies for three months, during which the onset of pneumonia was tracked. For ethical reasons, this subset of participants consisted of the 515 who had done equally well or equally poorly with both the chin-down posture and the thickened liquids in part 1.

There was no statistically significant difference in the incidence of pneumonia between participants using the chin-down posture and those drinking any thickened liquids. The incidence was twice as high, however, for participants assigned to honey-thick liquids compared with those assigned to nectar-thick liquids. Furthermore, among the participants who were hospitalized for pneumonia, those assigned to honey-thick liquids were hospitalized for a significantly longer period than those assigned to nectar-thick liquids and those assigned to the chin-down posture. These findings may reflect the fact that thicker liquids, once aspirated, are more challenging to clear from the airway.

Regardless of intervention, participants with dementia (with or without PD) had a significantly higher incidence of pneumonia than did those with PD alone. In addition, participants who aspirated in part 1 of the study during all three interventions were more likely to develop pneumonia compared with those who did not aspirate at all during part 1.

FULFILLING A PROMISE

Dysphagia diagnosis and treatment have been identified as priorities of the VA in order to reduce associated adverse health outcomes experienced by elderly veterans. The study described here has provided a strong first step toward developing an evidence-based practice addressing this growing concern. Findings that will affect veterans and nonveterans alike include recommendations for the use of videofluoroscopy in dysphagia diag-

nosis and treatment, identification of risk factors for aspiration pneumonia in vulnerable patients, and recommendations for safe treatment strategies and products for those with dysphagia.

The VA's 1976 plan to establish a system of GRECCs came about with just this sort of endeavor in mind. Through this study, among others, the Madison GRECC is achieving the goals the VA has set out for all GRECCs: to identify health challenges of increasing importance to the growing elderly veteran population; to investigate the relevant causes and consequences of these health challenges; to develop and assess management strategies; and to share the knowledge gained with VA and non-VA health providers everywhere. ●

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Author disclosures

The authors report no actual or potential conflicts of interest with regard to this column.

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