



## The incidence and prognostic implications of dysphagia in elderly patients institutionalized: A multicenter study in Spain



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### ABSTRACT

**Aim:** Determine the incidence of dysphagia, identify its consequences and objectify related complications and mortality associated with pneumonia, in the institutionalized elderly.

**Methods:** A prospective observational and multicenter study with a 3-year follow-up period was designed in a cohort of 12 nursing homes within 6 cities in Spain. A total of 2384 patient records were studied. Demographic and clinical data (dementia, cerebrovascular disease), as well as an evaluation of the Barthel Index, dysphagia and aspiration, and mortality at 30 days and 1 year after pneumonia in patients with dysphagia were collected.

**Results:** Of the 2384 patients, 69.6% presented clinical signs of oropharyngeal dysphagia. Patients with dysphagia were older and showed lower functional status and higher prevalence of comorbidities. They had higher mortality as well.

**Conclusions:** Oropharyngeal dysphagia is a highly prevalent clinical finding in elderly institutionalized patients. Among this population, there is also a higher prevalence of pneumonia, dementia, and cerebrovascular disease and pneumonia is an indicator of mortality.

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### 1. Introduction

The proportion of people over the age of 65 is increasing, and this population has a higher risk of all types of disease and disability (Makai, Brouwer, Koopmanschap, Stolk, & Nieboer, 2014).

This population is at higher risk for oropharyngeal dysphagia, which is a symptom of many diseases that somehow relate to the aging process (Aslam & Vaezi, 2013). Oropharyngeal dysphagia, or difficulty swallowing, is a term that indicates the existence of a subjective feeling of difficulty when passing food or liquid from the mouth and esophagus to the stomach. It may occur as a result of various causes, central nervous system diseases, neuromuscular disorders, and structural damage. In the elderly, some of these conditions are more common than in young people (Chen, Golub, Hapner, & Johns, 2009). Aging itself causes dysphagia, but the different phases of swallowing are affected by age-

related changes. It is also important to note that the consequences of swallowing disorders are significant and the results often include dehydration, malnutrition, aspiration, and pneumonia, which compromise the health and life expectancy of the elderly (Cabre et al., 2010; Humbert & Robbins, 2008). Dysphagia is a prevalent symptom in the elderly population, and its consequences are important to the patient. At the individual level, it causes health problems and a decline in the quality of life; for the health system, it results in increased costs that are the consequences of dysphagia.

The phenomenon of dysphagia and its prevalence have been extensively studied in relation to certain diseases to which it has been closely linked, such as neurodegenerative diseases. However, few studies have focused on the elderly population in general (Chouinard, 1999; Easterling & Robbins, 2008; Kalf, De Swart, Bloem, & Munneke, 2012).

The most frequent causes of oropharyngeal dysphagia in the elderly are diseases of the central nervous system (stroke, dementia, Parkinson's disease, multiple sclerosis, tumors), various neuromuscular disorders (amyotrophic lateral sclerosis, polymyositis and dermatomyositis, hypothyroidism and hyperthyroidism, neuropathy peripheral secondary to diabetes), local structural lesions (oropharyngeal tumors, goiter, abscesses) and Zenker's diverticulum (Rofes et al., 2011; Sura, Madhavan, Carnaby, & Cray, 2012). Dysphagia is a frequent consequence of progressive neurological disease, as well as dementia, and

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also a common disability of patients with stroke (CVA) in rehabilitation programs and nursing homes (Chouinard, 1999; Easterling & Robbins, 2008; Kalf et al., 2012).

Dysphagia after a stroke has been estimated at 25%–45% (Cabre et al., 2010). Among studies in patients with dysphagia after a stroke, we have seen that this is often temporary, which may explain the wide variation relating to prevalence between 28% and 73% (Bomfim, Chiari, & Roque, 2013; Somasundaram et al., 2014). Suction prevalence ranges from 29% to 50%; however, the suction detected by videofluoroscopy can be silent in up to 50% of the cases (Clavé et al., 2008).

Another study conducted by the “European Group for the diagnosis and therapy of dysphagia and esophageal balloon” (Ekberg, Hamdy, Woisard, Wuttge-Hannig, & Ortega, 2002) in four EU countries (Germany, France, Spain and the UK) distributed questionnaires among 360 elderly institutionalized patients. Prior to participation in the study, they had referred subjective complaints of dysphagia; 61% of the patients felt that their swallowing difficulties could not be treated.

A later study also delved into the psychological impact and the quality of life that dysphagia has on the person who suffers from it. Among the study participants, 36% reported that they experienced anxiety or panic during meals; 84% thought that eating should be an enjoyable experience, but only 48% felt that way. In addition, 36% said that they had avoided eating in the company of others because of dysphagia.

Elderly who are institutionalized usually have greater functional dependency and, in many cases, also have neurodegenerative disorders. The incidence of dysphagia in nursing home studies is estimated at between 20% and 40% (Bomfim et al., 2013; van der Maarel-Wierink et al., 2014). Several studies noted that the risk of bronchial aspiration and pneumonia by aspiration is one of the major complications, among others, that are derived from dysphagia (Serra-Prat et al., 2012; van der Maarel-Wierink, Vanobbergen, Bronkhorst, Schols, & de Baat, 2011). Presumably, one may also assume that, if neurodegenerative or cerebrovascular disease exists, the incidence of dysphagia increases (Palmu et al., 2014).

The aim of this study was to determine the incidence of dysphagia, identify its consequences and objectify related complications and mortality associated with pneumonia in elderly institutionalized individuals in 12 nursing homes in different cities in Spain.

## 2. Methods

A prospective observational and multicenter study with a 3-year period was designed in a cohort of 12 nursing homes within 6 cities in Spain that all belong to the same foundation.

A review of all medical records for three years (2011, 2012, 2013) was performed to quantify the prevalence of diagnosed cases of dysphagia and the diagnosis that was considered to be the most frequent complications of dysphagia (bronchial aspiration and aspiration pneumonia).

The protocol for diagnosing dysphagia is the same in the 12 schools that were studied since they belong to the same entity. The diagnosis made by the doctor from each center was based on clinical history, physical examination and an assessment of two specific tests: the EAT<sub>10</sub> (Eating Assessment Tool-10) (Belafsky et al., 2008) and the 3 oz Water Swallow Test or “Water’s test” (DePippo, Holas, & Reding, 1992). The EAT<sub>10</sub> is a rapid screening instrument that consists of 10 easily understood questions that can be answered by the patient or caregiver/family. Answering takes little time (between 2 and 4 min). Scores range from 0, no trouble with swallowing, to a maximum score of 4, which signifies major problems with swallowing. Normative data from previous studies explored the upper limit of reference interval and suggested that a final EAT-10 score  $\geq 3$  was abnormal. Further, the 3 oz Water Swallow Test has been the instrument most commonly used to screen for dysphagia in clinical settings. It is a validated method for the diagnosis of dysphagia. It involves the administration of preset water volumes and watching for symptoms of dysphagia. The patient

has to drink 3 oz or 9 ml of water from a cup without interruption and abnormality was defined by coughing during swallowing or 1 min after completion. The presence of a wet/hoarse voice quality after swallowing also was scored as abnormal. It is a simple method, with a sensitivity of 76%, and identifies patients at risk for pneumonia.

Sociodemographic variables, such as age, sex, the presence of cerebrovascular disease and/or neurodegenerative diseases (dementia, stroke, etc.), were collected. Functional capacity was assessed by using the Barthel test or Barthel Index (Mahoney & Barthel, 1965). The Barthel is a 10-item ordinal scale used to measure performance in activities of daily living (ADL). Each performance item is rated on this scale with a given number of points assigned to each level or ranking. The response categories of disability in an activity were defined and rated in scale steps (0, 5), (0, 5, 10), (0, 5, 10, 15) dependent on the item. An overall score is formed by adding scores on each rating. Scores range from 0 to 100, in steps of 5, with higher scores indicating greater independence. Barthel has demonstrated high inter-rater reliability (0.95) and test-retest reliability (0.89) as well as high correlations (0.74–0.8) with other measures of physical disability. Dysphagia diagnoses, type of diet, supplements, and the use of thickening or other measures of related complications (aspiration pneumonia and aspiration) were also collected from the medical records. The presence of nasogastric tubes and that of percutaneous endoscopic gastrostomy (PEG) were also collected.

Consent, which was obtained in order to conduct the study, was granted by the general management of the foundation, residential centers, and the ethics committee attached to the main residential center (in Madrid).

The statistical treatment of the data was performed with SPSS 19.0 software. A descriptive and frequency analysis was conducted. Significance assessments were performed by using the Chi square test ( $\chi^2$ ) to evaluate possible differences between nominal variables and the Student t test (when parametric criteria were met). To analyze possible differences among the twelve centers for each of the remaining variables, ANOVA analysis of variance was performed. The possible relationship between the presence of neurological or cognitive disease (as dementia) and the presence of dysphagia was studied (Spearman correlation). The possible relationship between the presence of dysphagia and the degree of functional capacity was also studied (Pearson correlation) ( $\alpha = 0.05$ ).

To assess the effect of the various prognostic factors at 30 days and 1 year after pneumonia in patients with oropharyngeal dysphagia, logistic regression was used to calculate the odds ratio with 95% confidence intervals. To adjust for possible confounding variables on the effect of oropharyngeal aspiration, two multivariate logistic regression models were created (one for 30-day mortality and another for 1-year mortality). Both models included the clinical variables associated with aspiration and mortality in the univariate analysis with a  $p < 0.10$ . Given that immobility, the Barthel score is closely associated. In order to avoid over-adjustment, only the Barthel score was considered in the multivariate model. A level of statistical significance of  $p < 0.05$  was considered in all cases.

## 3. Results

A total of 2384 patient records between years 2011 and 2013, were studied. The mean age was 88.7 (95% confidence interval (CI): 82.1 to 89.60, range: 69–101) and 73.4% were female. The main sample characteristics are presented in Table 1. There were no significant differences in age ( $p = 0.06$ ) or sex ( $p = 0.91$ ).

Patients with clinical signs of oropharyngeal aspiration were older and also revealed poor functional capacity and a higher prevalence of neurological comorbidities.

In regard to the type of diet, 81.4% ( $n = 1659$ ) of the participants were on a specific dysphagia diet, of which 34.5% were consuming a thickener in liquids and/or meals. All of the residences (100%) offered purees in the residents’ diets.

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