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Original article

Nutritional status of older patients with oropharyngeal dysphagia in a chronic versus an acute clinical situation☆

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SUMMARY

Background: Oropharyngeal dysphagia (OD) is a prevalent risk factor for malnutrition (MN) in older patients and both conditions are related to poor outcome.
Objective: To explore the nutritional status in older patients with OD in a chronic and an acute clinical situation.
Design: We examined 95 older (≥70 years) patients with OD associated to chronic neurological diseases or aging, and 23 older patients with OD and acute community-acquired pneumonia (CAP) with videofluoroscopy; and 15 older people without OD. We collected nutritional status, measured with the Mini Nutritional Assessment (MNA®), anthropometric measurements, and biochemistry and bioimpedance for body composition. Functional status was assessed with the Barthel index.
Results: 1) Taking into consideration patients with OD with chronic conditions, 51.1% presented a MNA® ≤23.5; 16.7%, sarcopenia and a) reduced visceral and muscular protein compartments and fat compartment; b) muscular weakness c) intracellular water depletion, and d) reduced body weight. Patients with OD and MNA® ≤23 needed higher levels of nectar viscosity for a safe swallow and had increased oropharyngeal residue at spoon-thick viscosity. 2) Patients with OD and CAP, 69.5%, presented an MNA® ≤23.5 and 29.4% sarcopenia, the inflammatory response of the pneumonia adding to the more severe depletion in visceral protein and muscular mass.
Conclusions: Prevalence of impaired nutritional status (malnutrition risk, and sarcopenia) among older patients with OD associated with either chronic or acute conditions is very high. In patients with OD and chronic diseases, poor nutritional status further impairs OD with an increase in oropharyngeal residue at spoon-thick viscosity. In the acute setting there is inflammation and an additional protein deficiency. These findings will help develop specific products both for OD and nutritional status in each specific clinical situation.

1. Introduction

Malnutrition (MN) and oropharyngeal dysphagia (OD) are highly prevalent, clinically relevant and potentially treatable conditions among older persons. The World Health Organization has specifically classified both conditions using the International Statistical Classification of Diseases and Related Health Problems ICD-9 and ICD-10 (OD: 787.2, R13 and MN: 260-69, E40-E46). Accurate tests have been developed for clinical screening and assessment of both conditions, the EAT-10 and the volume-viscosity swallow test (V-VST) for the screening of OD [1] and the Mini Nutritional

Abbreviations: OD, oropharyngeal dysphagia; MN, malnutrition; V-VST, volume-viscosity swallow test; VFS, videofluoroscopy; MNA®, Mini Nutritional Assessment®; BMI, body mass index.

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Assessment (MNA®) recommended by the European Society of Parental and Enteral Nutrition (ESPEN) for the screening of MN in older patients [2]. The European Society for Swallowing Disorders (ESSD) position statements declare that OD is a risk factor for MN and a nutritional examination should be performed regularly, using validated nutritional screening tools [3]. In addition, the ESPEN guidelines on nutrition in older people recognized OD as a major cause of impaired nutritional intake among this population [4]. Despite all these recommendations, both conditions continue to be underestimated and underdiagnosed and can be considered neglected conditions among older people [5].

Prevalence of OD among the older population is very high: 23% of older people living in the community, 55% of older people admitted to hospital with an acute condition, and 40%–51% of older people living in a nursing home [6]. The natural processes of aging and neurogenic diseases have been related to an impairment of neural swallow response that results in delayed laryngeal vestibule closure (LVC) with the presence of penetrations and aspirations. Oropharyngeal residue mainly occurs as a result of weak tongue propulsion [7]. In a prior study by our group, OD was associated withMN, lower respiratory tract infection and community acquired pneumonia (CAP) in older people [8,9]. In frail older patients, 50% of cases of pneumonia come from tracheobronchial aspiration caused by reduced safety of swallowing, presenting a one-year mortality rate of up to 55.4% [10,11]. OD in older persons has been found to be an important risk factor for hospital readmission for low tract respiratory infections [12].

Prevalence of MN among older people is also very high and is present among 38.7–80% of older persons admitted to general hospitals for acute diseases [13]. OD has been found to be an important risk factor for MN both in independent older people from the community [14] and older patients hospitalised for an acute disease in a general hospital [13]. In both studies, OD was associated with poor functional status [13,14] and among the frail phenotype both OD and MN were related to poor outcome presenting a 1-year mortality of 65.8% [13]. The pathophysiology of MN in older people is multifactorial: starvation-related MN, chronic disease-related MN and acute disease or injury-related MN [15]. Disease-associated MN is very common among older people and prevalence ranges between 20 and 50% of patients, depending on the diagnostic criteria used [16]. Studies also found that sarcopenia was significantly associated with OD in older people with swallowing muscle impairment [17,18]. Sarcopenic dysphagia is a new concept that includes this situation and requires a combination of both rehabilitation therapies and nutritional intervention for its improvement [18].

The prevalence, pathophysiology, and the specific characteristics of MN among patients with OD are not fully determined and the systematic evaluation and combined management of both conditions is infrequent in clinical practice. The main objective of our study was to describe the nutritional characteristics of older patients with OD, exploring the anthropometrical characteristics, laboratory findings and body composition in a chronic vs an acute clinical setting.

2. Methods, patients and experimental design

2.1. Study design and patient sample

This was an observational cross-sectional study on 3 groups of people:

- **Group A**, Older patients with OD associated with chronic neurological diseases or aging (**n = 95**), referred to our dysphagia unit for assessment of swallowing function. Both swallowing and nutritional assessments were performed the same day.
- **Group B**, Older patients with OD consecutively admitted to the hospital with an acute community-acquired pneumonia **(CAP), (n = 23)**. Diagnostic criteria for CAP at our institution have been previously described [9,11] The study of MN and OD by VFS were performed during the first 2 days of admission.
- **Group C**, a control group of older volunteers (**n = 15**) without medical history of OD, and with a negative test for OD (V-VST) [1].

Exclusion criteria were the same for all 3 groups and included allergy to any medication especially iodinated contrast, major respiratory diseases needing oxygen, any type of surgery in the three months prior to the study, alcohol or drug dependence and currently participation or 4 weeks prior in another clinical trial. A total of 133 persons over 70 years of age were recruited from June, 2010 to January, 2012. Written informed consent was obtained from the patient or the legally-authorized representative if the patient wasn't able to give it, after study was explained and written information given. The study protocol was approved by the Institutional Review Board of the Hospital of Mataró (Mataró, Spain), protocol codes (03/11 and 15/10).

2.2. Clinical methods

2.2.1. Clinical geriatric assessment

A multidisciplinary team performed a geriatric evaluation and included: (a) demographic information, (b) comorbidities according to the Charlson Comorbidity Index [19], (c) functional capacity according to the Barthel Index [20], (d) muscle strength according to dominant hand grip strength using a hand dynamometer (TKK 5001-Grip A hand dynamometer. Takei Scientific Instruments, Japan) [21] e) physical performance evaluated with the Time "Up-and-Go" test and the measure of time was expressed in seconds [22] (f) number of drugs usually taken and concomitant treatments that could affect swallow response such as antidepressants, neuroleptics and sedatives [13].

2.2.2. Swallowing function

Assessment of swallowing function was performed by the dysphagia team of our institution and included:

a) *Clinical assessment of OD*. The V-VST is a safe, agile and precise clinical method with 0.9 sensitivity and 0.88 specificity for OD [1] and was performed on all groups of patients with to identify alterations in swallowing efficacy and safety [23]. Briefly, a xanthan gum-based thickener (Resource Thicken Up Clear, Nestlé Healthcare Nutrition, Vevey, Switzerland) [1] was used for the three viscosity series (nectar-like, thin liquid and spoon-thick), at three volumes (5, 10 and 20 mL). Signs of altered swallow efficacy include impaired labial seal, oral residue and piecemeal deglutition and symptoms of pharyngeal residue and signs of altered swallow safety include voice quality changes (including wet voice), coughing and decrease in oxygen saturation ≥3% (using a finger pulse-oximeter; Nellcor OxiMax, Philips Medical Systems, Eindhoven, Netherlands) and were evaluated for each swallow.
b) *Videofluoroscopic studies* Diagnosis of OD was established by VFS in Group A and B [7]. Using the same algorithm as with the V-VST but with a dynamic study, safety and efficacy of deglutition was evaluated with VFS [23].

Nectar-like, thin liquid and spoon-thick were prepared using the same thickener as with the V-VST and according to the descriptors

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