Oropharyngeal dysphagia: when swallowing disorders meet respiratory diseases

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Patients with chronic respiratory diseases should be screened for oropharyngeal dysphagia to prevent complications http://ow.ly/JaXl309wdNG

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The recent European Respiratory Society (ERS) Annual Meeting in London (September, 2016) has seen the beginning of a collaboration between the ERS and the European Society for Swallowing Disorders (ESSD) based on the importance (incidence and prevalence) of often unrecognised swallowing disorders in respiratory diseases.

Oropharyngeal dysphagia includes penetration of food, drink or saliva into the larynx, aspiration into the trachea, and oropharyngeal residue. It is a major complaint among many patients with neurological diseases and among the elderly [1]. The prevalence of functional oropharyngeal dysphagia is very high: it affects more than 30% of patients who have had a cerebrovascular accident, 52%–82% patients with neurodegenerative diseases, more than 35% of patients with head and neck diseases and more than 60% of elderly institutionalised patients [2].

Swallowing is defined as "the function of clearing food and drink through the oropharynx, and oesophagus into the stomach at an appropriate rate and speed". Oropharyngeal dysphagia is a clinical symptom, defined by the difficulty to move the alimentary bolus from the mouth to the oesophagus. However, the term is often used, not fully appropriately, to mean a disorder or disease of swallow function. Many patients affected are unaware of their swallow dysfunction. Swallowing is one of the most complex stereotyped patterns of motor behaviour involving over 25 pairs of muscles in the mouth, pharynx, larynx and oesophagus. The process of swallowing can be divided into three consecutive phases:

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oral phase (voluntary phase), pharyngeal phase (involuntary phase) and oesophageal phase. Swallowing requires precise coordination with the process of ventilation since both these processes share the pharynx as a conduit [3]. The coordinating site is located in the brainstem [4] and receives sensory influences from, and is under the influence of, pharyngeal swallowing afferences [5, 6]; it is also influenced by afferences linked to the respiratory centre [7].

In healthy adults, swallowing occurs during the expiratory phase of respiration [3]. Swallowing apnoea, an involuntary pause in ventilation during swallowing, usually lasts between 0.5 and 1.0 s and occurs during expiration. Changes in the ventilation pattern can compromise swallowing and also swallowing–ventilation coordination [5, 8] because of interactions between the two central pattern generators [9]. In fact, modifying the ventilatory drive by inducing hypercapnia or by changing the respiratory mechanical or flow-resistive load, increases swallowing frequency and laryngeal irritation [10, 11]. Concomitant oropharyngeal dysphagia in patients with chronic respiratory diseases [12] can increase exacerbations. Almost all of the studies on this subject showed a relationship between patients having oropharyngeal dysphagia and concomitant chronic obstructive pulmonary disease (COPD) [13, 14]. As a result, patients are more likely to suffer a rapid deterioration of their ventilatory function, aspiration and respiratory infection, and to be admitted more frequently to hospital. Given the direct consequences of oropharyngeal dysphagia, it is critical to determine whether patients with chronic respiratory diseases are at risk of dysphagia.

In respiratory diseases, 15%–20% of patients with COPD reported experiencing difficulties in swallowing [14]. Of particular note, dysphagia has been found to be a major complication of the surgical and radiotherapeutic treatment of oropharyngeal cancers [15]. Through the consequent lower respiratory tract infections, dysphagia can compromise the prognosis of patients otherwise cured of cancer, and alter their quality of life [16]

Oropharyngeal dysphagia may give rise to clinically relevant complications such as aspiration pneumonia, malnutrition and/or dehydration [17]. When a decrease in deglutition safety occurs, tracheobronchial aspiration results in pneumonia in 50% of cases [18], with an associated mortality of up to 50% [19]. Impaired safety also limits the ability of patients to ingest all the calories and water that they need to be adequately nourished and hydrated [18]. Defining aspiration pneumonia as pneumonia occurring in patients with swallowing disorders, the Japanese Study Group on Aspiration Pulmonary Disease reported that the proportion of admissions due to aspiration pneumonia among all admissions due to pneumonia increases gradually with age, from 0% in those aged 50 years or younger to as high as 90% in those aged 90 years or older [20]. In a study by Jokinen *et al.* [21], the proportion of elderly patients with aspiration pneumonia increased to 93.8%, while the proportion of elderly patients with other types of pneumonia decreased. A recent resolution of the Council of Europe claimed that undernutrition among hospital patients is highly prevalent and leads to extended hospital stays, prolonged rehabilitation, and diminished quality of life, and identified oropharyngeal dysphagia as a major contributor to malnutrition [22]. A recent study in a cohort of older patients admitted with an acute disease to a general hospital clearly revealed that patients with dysphagia and patients with malnutrition presented increased intra-hospital 6-month and 1-year mortality rates. The poorest outcome was for patients with both conditions (1-year mortality was 65.8%) [18]. Oropharyngeal dysphagia has been identified as a serious risk factor for developing aspiration pneumonia in frail older people [23]. The pathogenesis of aspiration pneumonia in immunocompetent elderly people has been attributed to oropharyngeal colonisation of respiratory pathogens and subsequent aspiration–inhalation of infectious particles [24]. Oropharyngeal dysphagia has also been proposed as an independent risk factor associated with community-acquired pneumonia in the elderly. Moreover, the pathogenic mechanism that leads to oropharyngeal dysphagia in the frail elderly and in neurological patients constitutes a form of delayed airway protection [25]. Preserved swallowing and cough functions are thus essential in preventing deep aspirations and consequent chest infections. If both responses fail, silent aspiration (an aspiration without cough) will occur, a dangerous event because of the difficulties in detecting it clinically and its severe consequences [26].

The current state-of-the-art of oropharyngeal management is aimed at early identification of patients at risk for aspiration, assessment of alterations in the biomechanical events of the oropharyngeal swallow response, and prevention and treatment of the potential complications of dysphagia – such as aspiration pneumonia and malnutrition – by promoting posture and cough exercises [27, 28]. Treatment is also changing from compensatory strategies to the promotion of brain plasticity, both to recover swallow function and to improve brain-related swallowing dysfunction [6].

Videofluoroscopy (VFS) is the gold standard method for studying the oral and pharyngeal mechanisms of dysphagia and for evaluating the efficacy and safety of the swallow function [29]. VFS can identify the main signs of oropharyngeal dysfunction, which comprise delay in pharyngeal swallow, penetration of bolus into the laryngeal vestibule, tracheobronchial aspiration and oropharyngeal residue, and can assess the short-term effect of therapeutic strategies on dysphagic patients [30]. Using this technique, a study by

Clavé *et al.* [31] revealed that patients with neurogenic dysphagia presented high prevalence of impaired safety during liquid boluses, and that increasing bolus viscosity to nectar and pudding viscosity exerted a strong therapeutic effect on safety of deglutition. In contrast, increasing bolus volume was found to impair safety of deglutition in these patients.

Flexible endoscopic evaluation of swallowing (FEES) is also routinely used to assess aspiration. Furthermore, the sensitivity of FEES is comparable to that of videofluoroscopic swallowing examination in detecting aspiration [32]. FEES is an objective technique that permits pre-swallow assessment of both pharyngeal anatomy and physiology and the presence of pooled secretions in the pharynx, larynx or trachea [32]. It can be performed for as long as necessary to note fatigue with eating because there is no irradiation exposure, it provides pre- and post-swallowing visual biofeedback to the patient and family, and it allows for immediate assessment of dietary modifications [33].

The high prevalence of dysphagia among vulnerable patients and the dynamic condition of this symptom according to the natural history of each disease make it unfeasible to perform a videofluoroscopy or FEES on every patient or to repeat studies during disease evolution. Clinical screening assessment methods with high diagnostic accuracy are, therefore, needed to recognise patients with oropharyngeal dysphagia, to identify patients at risk of aspiration and who should be referred for a videofluoroscopy, and to help select the most appropriate bolus volume and viscosity for those patients who cannot easily undergo videofluoroscopy. To assess the diagnostic accuracy of a clinical bedside test, the ESSD developed the volume viscosity swallow test (V-VST), which is able to predict signs of dysphagia and impaired safety of deglutition (penetration, aspiration) observed during VFS studies, and to identify patients whose deglutition could be improved by increasing bolus viscosity [34].

To conclude, oropharyngeal dysphagia is highly prevalent among patients with chronic respiratory diseases, and also causes respiratory complications, mainly respiratory infections and pneumonia, showing the strong relationship between these conditions and its major complication – aspiration pneumonia. We recommend a policy of systematic and universal screening and assessment of oropharyngeal dysphagia among patients with these respiratory diseases to prevent the severe complications of their swallowing dysfunction. It concerns the elderly population, and patients with neurological disorders or head and neck cancer, but also patients with respiratory diseases. A collaboration between the two societies (ERS and ESSD) should help to develop such a programme for our patients.

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