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Dysphagia in older adults: its nature, assessment and management

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ABSTRACT

Dysphagia impacts on the health and quality of life of individuals and contributes to the cost of healthcare. This paper summarises current literature regarding the nature, assessment and management of acquired oro-pharyngeal dysphagia in older adults. It examines the aetiology, prevalence and consequences of dysphagia as well as issues regarding medication administration. Assessment of dysphagia is explored in terms of multidisciplinary screening, speech and language therapist clinical swallowing evaluation and instrumental assessment.

KEY WORDS

Dysphagia, adult, assessment, screening, management

This paper will summarise the characteristics, assessment and management of acquired oro-pharyngeal dysphagia in older adults. Dysphagia can be defined as a swallowing impairment (Alagiakrishnan et al 2013) and may result in penetration or aspiration of the airway. Penetration is “the passage of material into the larynx but not below the true vocal folds” (Aviv et al 2001:553), while aspiration is “the passage of material below the level of the true vocal folds and into the

trachea” (Aviv et al 2001:553). Silent aspiration can be defined as “subglottic penetration of a bolus without elicitation of a cough reflex” (Daniels et al 1998:14).

Acquired dysphagia may occur due to a variety of aetiologies including neurological disorders such as dementia (Alagiakrishnan et al 2013), Parkinson’s disease (Walker et al 2011) and stroke (Martino et al 2005). It can occur as a result of surgery such as cervical spine surgery (Radcliff et al 2013) and following traumatic brain injury (Mandaville et al 2014), head and neck cancer (García-Peris et al 2007) and chronic obstructive pulmonary disease (McKinstry et al 2010). Side-effects of medication can also be a factor in dysphagia. Medication can adversely impact swallowing by resulting in a dry mouth, reduced alertness and/or extrapyramidal symptoms (Liantonio et al 2014). Dysphagia can impact on both an individual’s health and quality of life and requires specialist management.

Changes in swallowing may occur with normal ageing (Hiss et al 2001). In the elderly nursing home resident population with chronic medical conditions, dysphagia may accompany a gradual deterioration in health (Langmore et al 2002). For these individuals, with an already declining swallowing function, a sudden acute event such as reduced alertness or a urinary tract infection, may lead to a rapid increase in aspiration (Langmore et al 2002).

Normal swallowing consists of four stages: oral preparatory, oral propulsion, pharyngeal and oesophageal. In the oral preparatory stage the food or fluid is prepared to be swallowed safely. This involves mastication (chewing) to break the bolus up and mixing it with saliva (Atkinson & McHanwell, 2002). In the oral propulsion stage the food or fluid bolus is moved by the tongue to the back of the oral cavity and into the pharynx (Atkinson & McHanwell, 2002). During the pharyngeal stage several processes happen within a very short duration of time (Atkinson & McHanwell, 2002). The swallow is triggered which involves the larynx rising and moving forwards (Atkinson & McHanwell, 2002). The nasal cavity and oral cavity are closed off from the pharynx by the posterior movement of the tongue and the rising of the soft palate (Cichero, 2006a). The airway is protected by the epiglottis tipping over and covering the entrance to the airway as well as the vocal folds

closing (Martini et al 2012), with respiration ceasing briefly (Atkinson & McHanwell, 2002). The base of the tongue moves backwards to meet the constricting pharyngeal walls (Logemann, 1993). This generates pressure to move the bolus down the pharynx (Logemann, 1993). The cricopharyngeus muscle relaxing and the movement of the larynx opens the upper-oesophageal sphincter so the bolus can pass into the oesophagus (Logemann, 1993). In the oesophageal phase the bolus moves down the oesophagus via peristalsis and enters the stomach (Martini et al 2012). Impairment of functioning of any of these stages may result in dysphagia. Impairment of the oral stage and/or the pharyngeal stages of swallowing is known as oro-pharyngeal dysphagia.

Prevalence

Dysphagia is a symptom of a disorder rather than being a disorder itself. It tends to affect the elderly population as many of the causes of dysphagia are associated with increasing age (Morris, 2006). One in nine older healthy people self-report signs of dysphagia (Holland et al 2011). The prevalence of dysphagia is higher in the nursing home elderly population. Prevalence of dysphagia was reported at 52.7% for nursing home elderly (65-103 years of age) residents (Park et al 2013).

Prevalence of dysphagia depends on the age of the individual, the aetiology of the dysphagia (Royal College of Speech and Language Therapists (RCSLT), 2009) and the method used to assess for dysphagia (Martino et al 2005). Incidence of dysphagia has been reported at 78% following stroke (Martino et al 2005), 32% in individuals with Parkinson's disease (Walker et al 2011), 31.3% in individuals with multiple sclerosis (Solaro et al 2013) and 13-57% in individuals with dementia depending on the dementia type (Alagiakrishnan et al 2013). COPD may make the coordination of respiration and swallowing more difficult and prevalence of dysphagia in this population has been reported at 27% (McKinstry et al 2010).

Consequences of dysphagia

Dysphagia may result in pneumonia (Martino et al 2005), dehydration, weight loss (Morris, 2006), increased mortality (Wilson, 2012), later discharge from acute wards and worse rehabilitation outcomes (Miller & Patterson, 2014). Dysphagia influences the cost of healthcare by increasing the use of healthcare services by individuals. Cabre et al (2010) investigated 134 people admitted to hospital with pneumonia and compared those with and without dysphagia. It was found that significantly more individuals with dysphagia were malnourished, had a longer length of hospital stay and increased mortality within one month and one year of being admitted to hospital.

Individuals with both Alzheimer's disease and dysphagia have been found to require more hospitalisations and hospital visits and their healthcare to cost more than matched people with Alzheimer's disease but without dysphagia (Tian et al 2013). Tian et al (2013) found the difference in healthcare costs between people with both Alzheimer's disease and dysphagia and people with Alzheimer's disease but without dysphagia was \$3,620 (approx. £2,461). The average cost of pneumonia after stroke for inpatients has been calculated at \$27,633 (approx. £18,793) (Wilson, 2012).

Additionally to adversely affecting physical health, dysphagia may affect a person's quality of life. Individuals with dysphagia have expressed that having dysphagia negatively affects socialising (Leow et al 2010). Not being able to eat with family and friends can lead to social isolation and depression (Cichero & Altman, 2012). Ekberg et al (2002) interviewed people with dysphagia in four different European countries, including the UK. Only 45% reported eating was an enjoyable experience, 36% did not eat with other people due to their dysphagia, 37% (68% in UK) were embarrassed when eating because of their dysphagia, 41% had experienced either anxiety or panic because of their dysphagia and 55% (73% in UK) said their dysphagia made life less enjoyable.

Screening and assessment

In some situations dysphagia screening is carried out by health care professionals such as nurses who have undergone appropriate training (RCSLT, 2009). The primary purpose of a dysphagia screen is to allow early identification of dysphagia and to speed referral to speech and language therapy for assessment and management (Daniels et al 2012).

Currently there is no standardised protocol for a dysphagia screen and therefore this may vary between different healthcare locations (Daniels et al 2012). The components of swallow screens may overlap to differing degrees with a speech and language therapy clinical swallowing evaluation (CSE).

Bours et al (2009) conducted a systematic review of bedside dysphagia screening protocols compared to a videofluoroscopic study of swallowing (VFSS) or a fiberoptic endoscopic evaluation of swallowing (FEES) for individuals with neurological disorders. Tests involving swallowing water ranged from 27%-85% sensitivity (i.e. ability to identify dysphagia when dysphagia was present) and specificity (i.e. the ability to not identify dysphagia when dysphagia was not present) varied from 50% to 88%. Tests involving different liquid and diet consistencies had sensitivity ranging from 41% to 100% and specificity ranging from 57%-82%. Two swallow tests used endpoints of coughing, choking, voice change or +/-2% desaturation on pulse oximetry as endpoints. The sensitivity was 94% and 98% and the specificity for each test was 63% and 70%. Bours et al (2009) concluded that, taking into account feasibility such as time taken for the testing and materials required, a swallow screen incorporating a water swallow test using coughing, altered voice and choking as end points and combining it with the instrumental pulse oximetry measure was best at detecting dysphagia. It was also concluded that single clinical features considered in isolation, such as medical history elements or voluntary cough, are not helpful at identifying aspiration (Bours et al 2009).

A literature review of swallow screening following stroke (Daniels et al 2012) also supported the use of a water swallow test as part of a screen and the inclusion of cough and 'wet' vocal quality as

indicators of aspiration in a water swallow test. However more research is needed to identify the most valid method of screening (Daniels et al 2012).

Assessment usually involves taking a case history (DeFabrizio and Rajappa, 2010), conducting a CSE and possibly instrumental assessment of swallowing such as a VFSS or a FEES. A CSE is carried out by an appropriately trained healthcare professional, usually a speech and language therapist. A CSE provides information regarding the nature and severity of the dysphagia and facilitates clinical decision making regarding referral for instrumental assessment (Cichero, 2006b). It should consider time taken to eat a meal, the pleasure of eating and drinking and the amount of fluid and diet consumed (McCullough, 2005).

The case history investigates the individual's medical history, medications, and details of the dysphagia such as duration and signs (DeFabrizio & Rajappa, 2010). It should also enquire about nutritional status and social history (Cichero, 2006b).

The case history may highlight signs of possible dysphagia such as recurrent chest infections, weight loss (Miller & Patterson, 2014) and dehydration. The presence of recurrent chest infections is significant as it may be indicative of silent aspiration.

Clinical analysis of the case history may provide information regarding the nature of the dysphagia. For example the case history may indicate that the dysphagia is more likely due to a deficit of the oral stages of swallowing as opposed to the pharyngeal stage. The clinician is then able to use this information to decide how to conduct the CSE and later to develop a management plan.

The clinical evaluation of swallowing commonly involves an assessment of functioning of the cranial nerves involved in swallowing, assessment of cognition, phonation, the oral cavity, dentition and palpation of the larynx (DeFabrizio & Rajappa, 2010). Speech intelligibility, management of secretions and the strength of coughing are examined (Cichero, 2006b). The second part of the

clinical evaluation commonly involves assessing swallowing with food and fluids of differing consistencies, if it is judged clinically prudent to do so.

Signs of possible dysphagia that may be reported or observed include avoiding particular consistencies of food, difficulty chewing food, fear of choking, oral residue, drooling of saliva (Miller & Patterson, 2014). These may indicate impairment of the oral preparatory or oral propulsion stages of swallowing. If coughing, fear of choking, 'wet' vocal quality, changes in the respiration pattern (Miller & Patterson, 2014) or throat clearing (Cichero, 2006b) are seen or reported during the CSE, impairment of the pharyngeal stage of swallowing and consequent aspiration may be possible.

Cervical auscultation, in which swallow sounds are listened to with a stethoscope, is sometimes used in assessment. It may aid clinical decision making if used as an adjunct to the CSE and it is accompanied with appropriate training and interpretation (Bergström et al 2014). Swallowing assessment may also involve mealtime observation. This can be helpful in identifying issues resulting from aspects such as environmental factors, positioning and carer feeding techniques and may be more suitable for people who cannot participate in more formal assessment methods (Miller & Patterson, 2014).

VFSS and FEES are two commonly used instrumental assessments of swallowing (Aviv et al 2001). During a videofluoroscopy a range of liquid and diet consistencies containing barium can be swallowed while the individual sits in an X-ray machine. The movement of the bolus can be seen and all the stages of the swallow can be investigated (Rugiu, 2007). FEES involves the use of an endoscope to view laryngopharyngeal physiology and to evaluate management of secretions and swallowing (RCSLT, 2015). Table 1 shows advantages and disadvantages for the use of VFSS and FEES in dysphagia assessment.

Table 1: Contrasting VFSS and FEES in the assessment of swallowing (Based on RCSLT, 2015 and Rugiu, 2007)

VFSS	FEES
<p>All stages of swallowing may be viewed.</p> <p>Not able to directly observe the vocal folds or saliva management.</p> <p>Requires specialist equipment that may not be accessible to all individuals with dysphagia, for example, if in poor medical health and unable to be transported to the X-ray clinic.</p> <p>Requires exposure to radiation limiting re-testing.</p> <p>Silent aspiration can be directly observed.</p> <p>Measurement of temporal characteristics such as oral transit time is possible.</p>	<p>View limited to part of the pharyngeal stage.</p> <p>Can observe laryngopharyngeal physiology including appearance of the vocal folds and saliva management.</p> <p>Requires specialist equipment but can be done at the bedside.</p> <p>Does not involve radiation and can be repeated more frequently.</p> <p>Silent aspiration not directly observable.</p> <p>Measurement of temporal characteristics such as oral transit time is not possible.</p>

<p>The artificial environment and demands of the assessment may make it unsuitable for individuals with cognitive or behavioural problems.</p>	<p>It is an invasive procedure. Although safe it may be unsuitable for individuals with cognitive or behavioural problems.</p>
<p>The use of X-ray equipment means a speech and language therapist cannot perform a VFSS without requiring the assistance of another professional such as a radiologist.</p>	<p>Can be performed independently by competent speech and language therapists.</p>
<p>Radiation exposure makes VFSS unsuitable for women who are pregnant.</p>	<p>It may not be suitable for all individuals, for example, if a base of skull fracture or craniofacial anomalies exist.</p>

Both VFSS and FEES are considered to be effective assessments in the diagnosis of dysphagia (Logemann, 2012; Martino et al 2000; Rugiu, 2007; Deutschmann et al 2013; Umay et al 2013). The more appropriate assessment for any given situation will depend on factors such as clinical information sought, local availability, accessibility and transport options for the person with dysphagia (Rugiu, 2007).

Medication administration

Dysphagia may create issues in medication administration such as requiring modification of the formulation to facilitate swallowing resulting in the medication being administered outside licence (for example, by crushing pills) (Kelly et al 2009). The option of soluble and syrup formulations may be more costly (Kelly et al 2009). It has been shown that there were more errors made in administering medicine to people with dysphagia (21.1%) than to individuals without (5.9%) (Kelly et al 2011). In order to reduce errors the multi-disciplinary team should jointly develop a plan for medication administration that is individualised, clinically appropriate and practical (Kelly et al 2011).

Management

Management of dysphagia is multi-disciplinary and may involve not only speech and language therapists, but also doctors, nurses, carers, dieticians. The person with dysphagia should be involved in decision-making throughout the assessment and treatment process (Department of Health, 2012). Aims of management will vary depending on the situation but may include achieving safe swallowing, maximising nutrition and hydration and education of carers (RCSLT, 2009). Management should take into consideration the cultural background of the individual with dysphagia (RCSLT, 2009), for example providing culturally sensitive swallowing guidelines.

A compensatory approach to management aims to assist the act of consuming food and drink without improving the impaired swallowing physiology (Smith et al 2012). Compensatory methods include postures and swallowing techniques (Ashford et al 2009), modifying diets/thickening fluids (Logemann et al 2008), adapting the environment (Easterling & Robbins, 2008), and intra-oral prosthetics (Zaki 2006). It is advisable to investigate on VFSS the impact of postures/swallowing techniques on the swallow to ensure they are indeed beneficial and not detrimental before they are

recommended (Fraser and Steele, 2012). Liantonio et al (2014) also advocate oral care to reduce pneumonia.

Modification of diet and thickening of fluids is a commonly used compensatory method. However the ability of healthcare staff to mix drinks to the correct consistency varies and may impact on the safety and hydration levels of individuals (Garcia et al 2010). Garcia et al (2010) recommended that staff, who administer thickened fluids, should understand the need for the thickened fluids and be trained to mix them appropriately. NHS England (2015) reported incidents of two individuals directly ingesting dry thickening powder, which resulted in the death of one of the individuals. Training should also include how to store and administer thickener in a safe manner (NHS England, 2015).

A rehabilitation approach to management aims to improve the impaired swallow physiology (Smith et al 2012). It generally involves a programme of exercises, usually developed by a speech and language therapist, to improve the functioning of the oral and/or pharyngeal stages of the swallow. Examples are the Mendelsohn manoeuvre to improve laryngeal elevation and upper oesophageal opening (Fukuoka et al 2013) and exercises to improve lip and tongue functioning during the oral stages of swallowing (Murry, 2006; Robbins et al 2007).

There is evidence in the literature supporting the use of rehabilitation and compensatory approaches for dysphagia (for example, Robbins et al 2007, Logemann et al 2008, Logemann et al 2009; Carnaby-Mann & Crary, 2010; Troche et al 2010, Fraser and Steele, 2012; Huang et al 2014).

There are relatively few randomised controlled trials in the literature supporting the effectiveness of treatments for oro-pharyngeal dysphagia (Deane et al 2001; Xie et al 2008; Geeganage et al 2012; Regan, 2014). Further research into the required frequency and duration of dysphagia interventions as well as their timeliness and safety (Logemann et al 2012) and more large scale randomised controlled trials would supplement the current evidence base (Deane et al 2001; Xie et al 2008; Regan, 2014).

In cases of severe dysphagia or poor nutrition/fluid in-take non-oral feeding is an option. Common methods of non-oral feeding are via naso-gastric tube (NGT) and percutaneous endoscopic gastrostomy (PEG). If the non-oral-feeding is likely to be for a longer time period then a PEG is a more appropriate option (Geeganage et al 2012). Non-oral feeding (especially PEG feeding) raises major ethical and quality of life issues and management decisions should include the person with dysphagia in the decision-making process (Department of Health, 2012).

Conclusion

This article has summarised the nature of oro-pharyngeal dysphagia in older adults and current methods of assessment and management. There is a high prevalence of dysphagia across a range of different aetiologies. The consequences of dysphagia can severely impact an individual's health and quality of life. A multi-disciplinary approach to assessment and management is necessary to minimise this impact.

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