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Dysphagia: A Geriatric Giant?

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Abstract

With increasing age there are changes to the physiology of all aspects of swallowing. Despite these changes, the majority of older people will swallow safely. With increasing frailty the number of people presenting with dysphagia increases either in the presence of acute illness or with co morbidity; with significant number living in institutions.

The aetiology of dysphagia is multiple and is associated with increased dependency and mortality and as such dysphagia meets the criteria to be classified as a geriatric syndrome or giant.

This paper presents the case for dysphagia to be recognised as a geriatric giant.

Keywords: Physiology; Dysphagia; Respiration

Introduction

The worldwide population is increasing, such that it is predicted that there will be 2 billion over the age of 65 years by 2050; the greatest proportional increase will be in those over the age of 85 years. Accompanying this will be an increase In people living longer with long term conditions and a consequent increase in frail older people.

Old age is frequently accompanied by many long-term conditions that affect health. Many old people will have multiple long-term conditions (e.g. ischaemic heart disease, diabetes, dementia).

Dysphagia, difficulty in swallowing, will accompany many long term conditions and may be latent in many frail older people, and is associated with increasing dependency and death. The time has come to fully recognise dysphagia as a Geriatric Giant /Syndrome.

To be recognised as a Geriatric Syndrome/Giant [1] dysphagia has to meet accepted recognised criteria (Table 1). This short paper will outline the reasons why it should be considered thus.

Table 1 Factors required to be considered as a Geriatric Giant.

Factor for Geriatric Giant	Dysphagia
Age	✓
Symptom	✓
Cognitive Function	(✓)
Functional Impairment	(✓)
Common	✓
Multifactorial	✓
Morbidity	✓
Outcome	✓

The Normal Swallow

The essential function of the swallowing process is to transfer food from the mouth to the stomach via the oesophagus, a simple, but complex process. The process of swallowing is separated into three phases, oral, pharyngeal and oesophageal [2,3]. The oral phase, to be efficient, requires adequate lip closure, a functioning tongue and the presence of saliva; the pharyngeal phase is a transfer phase between the mouth and the oesophagus, but it is a shared space with respiration. Therefore the airway needs to be protected during this phase. Then to enter the oesophagus the upper oesophageal sphincter or cricopharyngeus needs to relax.

The pharyngeal phase of the swallow is a complex reflex, co-ordinated by the swallowing centres within the medullary pontine area of the brainstem [4] This reflex is modified via the feedback loop between the pharynx, hyoid muscles and tongue to the cortex regarding bolus characteristics (volume and consistency), which then regulates the timing of events during the pharyngeal swallow, but not the sequence of events [5,6].

Protection of the airway is a complex process that involves the closure of the larynx by the false and true vocal folds, elevation and rotation forward of the larynx and backward pressure from the base of the tongue. The Naso-pharynx is protected by elevation of the soft palate and the forward movement of the posterior pharyngeal wall. As the larynx

closes off, respiration ceases to be followed by expiration when the swallow has been completed.

The neurological innervation of swallowing (Figure 1) comprises 6 cranial nerves as well as the pharyngeal plexus. Cortical representation is diffuse, but work by Hamdy and colleagues have shown that although cortical representation is bilateral, one hemisphere is dominant. This dominance has importance when the brain is injured (stroke, TBI), and if the injury has affected the dominant side, the response of the non-dominant hemisphere is important to recovery [4,7-9].

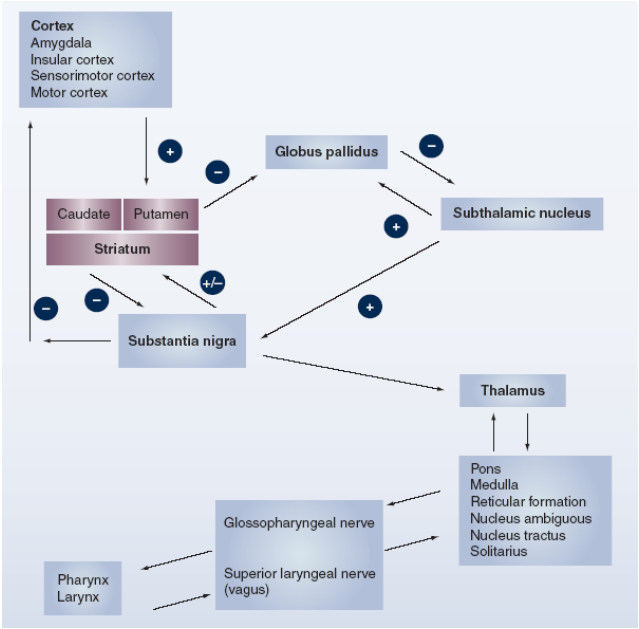

Figure 1 Neurological control of swallowing.

Food recognition requires more than taste alone. The recognition of a particular food relies on vision, smell, proprioception and memory. Unfortunately age brings changes to these systems. Age may result in failing eyesight due to macular degeneration, cataracts or reduced visual field/ neglect with stroke [10]. Memory may be reduced due to dementia resulting in the inability to recall previous experiences with food. Dyspraxia of eating/swallowing may occur [11-13]. Not least to cope with the joys of having dentures and eating.

Saliva is crucial for a swallow and although volumes are reduced, adequate volumes are still present, until there is a perturbation on the system due to illness or medication (Table 2) [14,15].

With age there are changes in the ability to swallow, though, not infrequently the older person may not recognise that any changes to their swallow has occurred. Within the peripheral neurological system, there is a reduction in nerve conduction and increased conduction times due to myelin degeneration [11,16], which reduces the effectiveness of the feedback loop. There is a reduction in proprioception both in the tongue and lips reducing the ability to identify texture and viscosity [17].

Table 2 Medication and affect of swallowing.

Medication	Affect of Swallowing
Anticholinergic Effects Antidepresants Incontinence Opiates Antipsychotics	 Dry Mouth Confusion Sedation
Central Effects Anxiolytics Sleeping Tablets Medication for Epilepsy Opiate Medication	 Sedation Incoordination Dry Mouth
Antibiotics	Altered Taste Oral Infection
Anti-inflammatory Agents	Altered Taste
Medication for diabetes (Metformin)	Altered Taste
Anti-Hypertensive Agents ACE-I Calcium Channel Blockers Diuretics	 Altered Taste Dry Mouth Dry Mouth
Cox-2 Inhibitors	Reduced Cough

The sequence of events during swallowing does not change, but the timing of events and the degree of change is different. The oro-pharyngeal phase is prolonged [18] with a prolonged transit time [19] and there are more cortical areas activating during swallow suggesting a more concentrated effort [20].

The changes in the oral phase will include prolonged oral bolus transit [21]; there is an increase in the dippers as opposed to tippers of tongue position [22] prior to the propulsion of the bolus towards the pharynx.

Changes in the swallowing process may be affected due to frailty and sarcopenia rather than an overt disease process [23]. As a consequence of both of these processes, skeletal muscle is weak (poor quality muscle fibres and reduction in number) which may result in reduced tongue function and pharyngeal contraction. . Isometric tongue pressures although reduced, have no clinical effect as the tongue is working at submaximal pressures [24], Calve et al. have suggested that weakness in the tongue due to sarcopenia reduces tongue propulsion and increases risk of aspiration [24]. However Logemann did note that women exhibit reduction in tongue base movement [25]. Smaller volumes are swallowed but a larger bolus is required to trigger a reflex swallow [26,27].

Laryngeal elevation, rotation and forward movement are reduced. Laryngeal vestibule closure is delayed and maximal hyolaryngeal excursion is delayed [24]. The final defence of the airway during swallowing is the cough reflex. A weak cough reflex increases the risk of aspiration and pneumonia [28], with normal ageing there is no change in the cough reflex,

however the threshold concentration for citric acid does increase in the presence of dementia (2.6 ± 4.0 mg/mL in control subjects; 37.1 ± 16.7 mg/mL in patients with dementia; >360 mg/mL in survivors of aspiration pneumonia).

The ability to clear the pharynx is also reduced in those over 65 years of age (18% vs 38%) requiring the person to undertake repeated swallows. This is evident with the need to undertake recurrent hyoid gestures [25] table. Pharyngeal transit times increase. The larynx has a tendency to have a lower resting height and does not elevate as much in younger people.

Prevalence of Dysphagia

The prevalence of dysphagia in the general population is 16-23% [29-32] increasing to 27% in those over 76 years of age. Many older people will have swallowing problems. The prevalence of dysphagia increases with the degree of frailty present and the degree of dependence irrespective of ethnicity [13,16,33-37]. In the presence of neurological disease (dementia/Parkinson's Disease/Stroke) the prevalence is higher than the general population (Table 3, Adapted from Clavé et al. [38]). Frail older people readmitted with pneumonia may have a prevalence as high as 55% [39] even greater in those admitted from nursing homes [40].

Problems may present with fatigability whilst eating, coughing on certain consistencies and at times with behavioural issues such as food refusal, spitting and the hiding of food.

24% of older people consider developing swallowing problems a natural consequence of getting old [35], many old people slowly adapt by eating slower, changing food consistencies and taking smaller portion sizes.

Table 3 Population and evaluation method.

Target Population	Evaluation Method	Prevalence	References
Independently-living older people	Screening (Questionnaires)	11.4%-33.7%	[34,41-46]
	Clinical exploration (V-VST)	23%	[47]
Hospitalized AGU	Not specified/ Water swallow test/ V-VST	29.4%-47%	[48,49]
Hospitalized with CAP	Water swallow test/V-VST	55%-91.7%	[39,50]
Hospitalized with CAP	Instrumental exploration	75%	[50]
Institutionalized	Screening (Questionnaires)	40%	[13]
	Water swallow test	38%	
	Screening + clinical exploration	51%	[51]
Parkinson's disease	Reported by patients	35%	[52]
	Objective exploration	82%	
Alzheimer's disease	Instrumental exploration	57-84%	[53,54]
Dementia	Reported by caregivers	19-30%	[53,55]
	Instrumental exploration	57-84%	[19,53,56]
Multiple Sclerosis	Screening (Questionnaires)	24%	[57]
	Instrumental exploration	34.30%	[58]
ALS	Clinical and Instrumental explorations	47%-86%	[59,60]
Acute Stroke	Screening (Questionnaires)	37 - 45%	[61,62]
	Clinical exploration	51 - 55%	
	Instrumental exploration	64 - 78%	
Chronic Stroke	Clinical exploration	25 - 45%	
	Instrumental exploration	40 - 81%	

CAP: Community-Acquired Pneumonia; AGU: Acute Geriatric Unit; V-VST: Volume-Viscosity Swallowing Test; NDD: Neurodegenerative Diseases; ALS: Amyotrophic Lateral Sclerosis.

The consequences of swallowing problems (Table 4) may be very little for some, but in others it will result in poor nutrition, reduced muscle strength, immobility, poor wound healing, aspiration and pneumonia [63,64]. The consequence for society is a greater use of health resources at time when there are already pressures on health systems. Mortality at 30 days from pneumonia has been found to be 22.9% compared to 8.3% in those with dysphagia and at one year the mortality rate is doubled [65,66].

Table 4 Complications of dysphagia.

Cough
Aspiration
Recurrent Chest Infection
Pneumonia
Malnutrition
Dehydration
Hypoxia
Increased dependency
Frailty
Death

The relative risk of pneumonia is 6 fold for those greater than 75 years compared to those under 65. Those living in care homes are 33 times as likely to be admitted to hospital with a pneumonia compared to those living in the community [37]. Oral health is an important factor in the occurrence of pneumonia. With poor dental care and the presence of dentures, not only is mastication less effective, the risk of oral infection with anaerobes and yeast is quite high. Keeping the mouth clean, particularly in the most dependent people will reduce the risk of infection [67,68].

What should not be under estimated is the psychological consequences of dysphagia such as anxiety, and depression [69,70] and quality of life in general [71].

Co-existent Long Term Conditions

It is an unfortunate fact that as people age, they suffer from multiple chronic diseases all of which can exacerbate or result in dysphagia. The commonest neurological medical complaints associated with dysphagia are stroke (50%), dementia (up to 93%), Parkinson's Disease (39%) and Motor Neurone Disease. However cardiac failure, chronic obstructive lung disease and rheumatoid arthritis are other medical conditions that are associated with dysphagia [72,73].

What can be done?

As has been mentioned earlier, the poor outcome associated with dysphagia has a multifactorial component, either that due to the dysphagia itself (aspiration, infection, weight loss) or secondary to underlying risk or aetiological factors (dementia, diabetes, smoking).

The management of dysphagia is similar to other long term conditions including the management of environmental factors (such as smoking, alcohol, medication)

The first point about management is to recognise that there is a problem. Asking whether the ability to eat has changed (slower, different textures, painful) and where the admission has been due to pneumonia in older, frail populations consider aspiration as a cause.

The management of dysphagia, and particularly its consequences, in older people may be simple. The crucial point is to remember to look for it; suspect that dysphagia may be a problem. Many frail older people may not complain of dysphagia until they become unwell, and then due to their lack of physiological reserve, dysphagia ensues [74]. It is important to work with the older person and be prepared to take risks. To many the mere factor of eating and drinking is more important than the risk of aspirating.

When older people have swallowing difficulties, appropriate investigation needs to be undertaken. This includes a swallow screen [75,76], swallow assessment by speech and language pathologists and then investigation typically with videofluoroscopy or Fibreoptic endoscopic evaluation of swallowing . In some cases manometry is required to detect oesophageal problems or pH monitoring for reflux [77].

When dysphagia is suspected a referral should be made to a speech and language therapist for a full assessment of swallowing, clinically initially and later via videofluoroscopy or FEES depending on clinical need or availability. This should be followed by advice as to food texture, speed of swallowing and swallowing manoeuvres. Where there evidence of significant cognitive impairment a more pragmatic approach may have to be taken, such as watching them eat a meal or take a drink.

Other simple measures include: review medication, stop anything that may worsen the ability to swallow (drugs causing a dry mouth; drowsiness etc), check dental plates for infection; check positioning and if appropriate, how people are fed.

Within the hospital setting, both the Matero Hospital in Barcelona (P Clavé personal communication) and the Royal Berkshire in Reading UK (M Gosney personal communication) have developed projects aimed at reducing aspiration including the use of elevation of the head end of the bed, or sitting upright at meal times, mouth wash and routine screening. In Japan [78], dental hygienists and dentists are employed to improve mouth care. Recent work in stroke patients has suggested that the use of Metoclopramide may reduce the risk of aspiration [79], whereas routine prescribing of antibiotics did not help [80,81].

A Geriatric Syndrome/Giant

The term geriatric Syndrome was first used in 1909 [1]. Originally there were four recognised syndromes or giants, this has been added to in recent years with Sarcopenia and frailty

[81]. Is dysphagia, therefore, a geriatric syndrome? Geriatric syndromes are defined as “conditions” experienced by the older persons that occur intermittently, may be triggered by acute insults and often are linked to subsequent functional decline [74].

As we have noted above, dysphagia and swallowing in old age are complex and associated with many different aetiologies (Figure 2). It is recognised that dysphagia, frailty and poor outcome (including death) are intertwined.

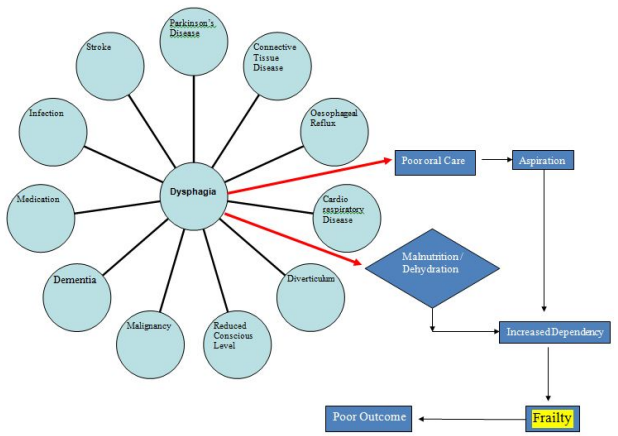

Figure 2 Dysphagia: A geriatric giant. Aetiology and long term effects.

Therefore, dysphagia is a geriatric giant in that it is common in old age and is a result of many processes, has an adverse effect on outcome in its own right but is also a non-specific indicator of functional decompensation [82], carries a significant morbidity and decline. Geriatric giants are symptoms and not diagnoses in their own right; require a multidisciplinary approach to management and treatment

Summary

Dysphagia is a common problem that accompanies ageing. It has many aetiologies, many of which overlap with other Giants. Dysphagia is associated with a poor outcome, including increasing frailty, institutionalisation and mortality. It is for these reasons that it should be recognized as a true Geriatric Giant.

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