Assessment and management of dysphagia

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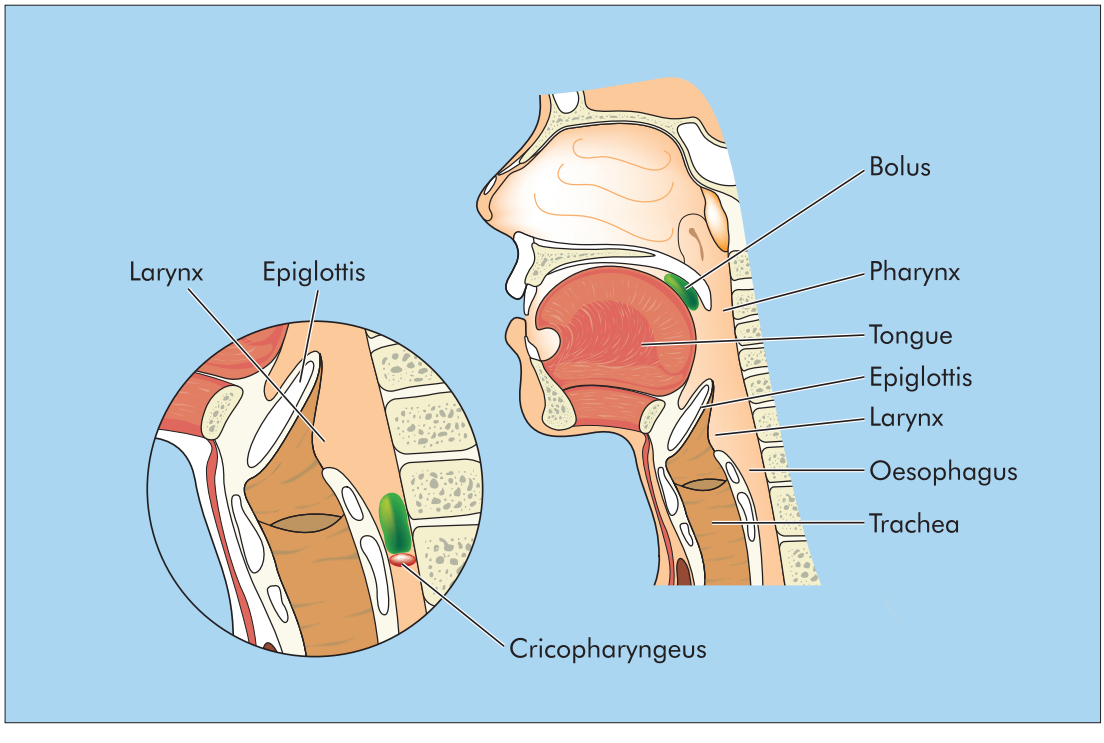
Swallowing problems are common in hospital inpatients and may affect morbidity and mortality. Accurate assessment of dysphagia is important, allowing optimal management and minimizing potential complications. This article considers the methods of swallow assessment available and ways in which problems can be addressed.

Swallowing (*Figure 1*) is a complex procedure involving the use of six cranial nerves and 55 muscles (Smithard, 2002a). It consists of three phases: oral, pharyngeal and oesophageal. Apart from the first part of the oral phase, which is under voluntary control, swallowing is predominantly an involuntary process, the stages of which are modified by the characteristics of the bolus and by input from higher cortical and subcortical centres (*Figure 2*). A safe swallow requires coordination such that the sequential phases are in synchrony not only with each other but also with respiration, since respiration must cease as swallowing commences to allow concomitant airway protection; exhalation then occurs when the swallow is complete.

Difficulty in swallowing (dysphagia) is common in many acute and chronic neurological conditions (e.g. stroke), head and neck disease, and oesophageal disorders (Logemann, 1995). As well as causing psychological distress, dysphagia may increase morbidity and mortality (Smithard et al, 1996). Many patients with abnormal swallowing are at risk of aspiration (the passage of food or fluid below the true vocal cords) and its associated morbidity

Figure 1. Principal structures involved in swallowing.



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(Schmidt et al, 1994). This article reviews the various methods of oropharyngeal swallow assessment which are available (*Table 1*) and then considers practical points in the management of a dysphagic patient.

ASSESSMENT OF SWALLOWING

The presence of swallowing difficulties may be obvious if a patient coughs during oral intake or complains of food sticking, or may be suggested by recurrent chest infections or a wet voice quality, especially after meals. It is important to obtain a good history, either from the patient or his/her carers, and this will be supported by knowledge of possible aetiologies for the dysphagia, such as an acute stroke or progressive Parkinson's disease. However, a more formal assessment of the swallow itself will almost always be required.

Bedside swallow assessment

This term covers a number of heterogeneous techniques which can be performed at the patient's bedside without significant additional equipment (Linden et al, 1993; Smithard et al, 1998). General appraisal of the patient's physical and cognitive state is required, and most methods involve an assessment of oromotor function including tongue function, facial weakness, ability to produce a voluntary cough and voice quality.

The gag reflex has traditionally been tested as an indicator of swallow function but many studies have failed to find a convincing link between an absent gag and dysphagia (Smithard et al, 1998; McCullough et al, 2001). A gag reflex may be absent in a significant proportion of healthy adults (Davies et al, 1995), and the differing neurological basis of the gag reflex and the swallow mechanism makes it unsurprising that the two are not clearly linked (Logemann, 1995).

Following an initial assessment, patients are challenged with food or fluid, usually starting with small volumes of water in case of difficulty and then trying other volumes of food and liquid. The degree of laryngeal elevation is noted, as is the amount of effort required to swallow, and patients are observed for coughing, signs of respiratory distress and any change in voice quality. Some swallow assessments include additional features such as the time required to swallow a set volume of liquid (Hinds and Wiles, 1998), the latent time to swallowing (Teramoto and Fukuchi, 2000) or the presence or absence of an adequate laryngeal cough reflex (Addington et al, 1999). Other workers have assessed laryngopharyngeal sensation by directing air pulses at the mucosa supplied by the superior laryngeal nerve (Aviv et al, 1998).

Although bedside swallow assessments are practical in a clinical setting, being possible in most patients who are alert enough to feed even if they are too ill to leave the ward, they have limitations. Validity studies using videofluoroscopy (VF) for comparison have found wide-ranging sensitivity, specificity and predictive values for these tests (Splaingard et al, 1988; Smithard et al, 1998; Smith et al, 2000). For example, the phenomenon of silent aspiration, in which aspiration occurs without coughing or other outward sign of difficulty (Horner and Massey, 1988), is by definition difficult to detect at the bedside. In addition, inter- and intra-rater reliability for these assessments may be very poor (Smithard et al, 1998; McCullough et al, 2000).

Figure 2. A diagrammatic representation of the complex neurological control of swallowing.

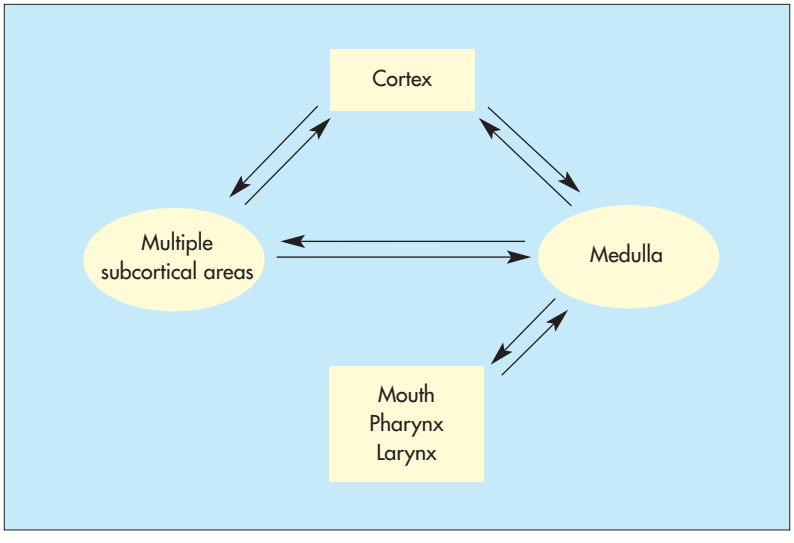

TABLE 1.
Methods of swallow assessment

Bedside swallow assessment	
Videofluoroscopy	
Fibreoptic endoscopic evaluation of swallowing	
Pulse oximetry	
Other methods	Cervical auscultation
	Lateral cervical soft tissue radiography post contrast
	Ultrasonography
	Pharyngeal or oesophageal manometry
	Scintigraphy
	Electromyography

Videofluoroscopy

VF or modified barium swallow is regarded by many as the method of choice in assessing swallowing (O'Donoghue and Bagnall, 1999). It involves imaging a patient sitting at 45–90° while he/she swallows food or fluids of different consistencies which have been impregnated with contrast agent (usually barium). The technique allows real-time visualization of the structural and functional elements of swallowing as well as testing of potential compensatory techniques (Logemann, 1995).

VF provides a dynamic assessment of swallowing but has logistical disadvantages (Ramsey et al, 2003). Not all hospitals offer the procedure, which requires a patient to be able to sit relatively upright and be well enough to leave the ward. The test provides a brief snapshot of the patient's swallowing in a well-supervised environment which may not be representative of their time on the ward, and does not take into account swallow fatigue during a meal prolonged by dysphagia. The radiation exposure involved makes the study inappropriate for frequent repetition, but repeat trials of each consistency are required within a session since test–test variability within patients has been described (Lof and Robbins, 1990). Inter-rater reliability for interpretation of a study is variable but probably better with training and experience (Ekberg et al, 1988).

Fibreoptic endoscopic evaluation of swallowing

Fibreoptic endoscopic evaluation of swallowing (FEES) is used in some centres to visualize local anatomy and the swallow process itself (Aviv et al, 1998). Aspiration cannot be seen directly because of the 'white-out' during swallowing but may be inferred from residue left afterwards or from the sight of food being ejected from the trachea. The procedure is safe and generally well-tolerated (Aviv et al, 2000) and may be performed at the bedside and recorded for later review. However, it requires a trained operator and specialist equipment and is not available in all centres. Comparison with VF and with outcomes suggests that it is a valid procedure (Langmore et al, 1991).

Pulse oximetry

A number of studies have suggested that desaturation on pulse oximetry during swallowing may serve as a marker of aspiration (Zaidi et al, 1995; Collins and Bakheit, 1997; Smith et al, 2000), either by reflex bronchoconstriction or via a poor breathing pattern while swallowing (Zaidi et al, 1995; Teramoto et al, 1996). Although not all studies confirm the association (Colodny, 2000), comparisons of saturations with VF or FEES have given reasonable sensitivities and specificities (Collins and Bakheit, 1997; Smith et al, 2000; Lim et al, 2001); using aspiration or penetration as the end point rather than aspiration alone was more predictive (Smith et al, 2000). Use of saturation data in combination with a bedside clinical assessment may be more useful than in isolation (Smith et al, 2000; Lim et al, 2001), but further work is required before pulse oximetry can be part of routine assessment.

Other methods

Various other methods of swallow testing have been used but primarily only as research tools. These include cervical auscultation (Zenner et al, 1995), lateral cervical soft tissue radiography after contrast swallowing (Bradford et al, 2000), ultrasonography (Smithard, 2002b), pharyngeal or oesophageal manometry (Hila et al, 2001), scintigraphy (Muz et al, 1991) and electromyography (Palmer et al, 1992).

MANAGEMENT OF DYSPHAGIA

Once a diagnosis of dysphagia has been made, effective management (*Table 2*) comprises two main components: prevention of aspiration and maintenance of adequate nutritional intake. Any assessment must first determine whether a person is alert and well enough to try swallowing. Patients with a significantly depressed conscious level cannot protect their airway against aspiration of their own saliva, making oral feeding wholly inappropriate. Other individuals may be alert for short periods but then become fatigued,

TABLE 2.
Management considerations in dysphagic patients

Level of alertness
Cognition
Posture and compensatory techniques (e.g. head turning)
Consistency of fluids
Volume of fluids
Supervision of meals
Swallow exercises
Increased sensory input
Nasogastric feeding
Percutaneous endoscopic gastrostomy feeding

putting them at risk of aspiration with a prolonged meal. An individual's level of attention is also important: a tendency to distraction may lead to an attempt to speak while swallowing, leaving the airway unprotected. Swallowing must always be performed with an individual in the most upright position possible to optimize swallow safety.

If oral intake is felt to be appropriate, a number of strategies (*Table 3*) are available to assist in safe swallowing. Postural techniques and compensatory manoeuvres may be used in dysphagic patients who can follow instructions (Logemann, 1995); for example, in patients with unilateral pharyngeal paresis, turning the head towards the damaged side while swallowing may help to prevent passage of food down the damaged side of the oropharynx, minimizing aspiration from residue which might otherwise collect on this side. Tucking the chin down may help patients in whom posterior movement of the tongue base is impaired by pushing food back towards the pharyngeal wall. The manoeuvre also narrows the laryngeal entrance somewhat, reducing the risk of aspiration if triggering of the swallow is delayed.

Other manoeuvres can be used in patients able to understand more complex instructions, such as the supraglottic swallow, in which the true vocal folds are closed before and during the swallow via use of a voluntary breath hold; this may be of help in patients with reduced or late vocal fold closure and a delayed pharyngeal swallow.

Whether or not postural measures are successful, changing the consistency and type of food or fluid for different individuals may be of help (*Table 3*). Simple measures such as cutting up food may alleviate difficulties for patients with a paretic hand. Supervised meals may allow safe feeding in individuals who tend to distraction or fatigue. Small volumes such as sips or teaspoonfuls may be easier to manage than larger ones. In terms of consistency, thin liquids such as water may be less likely to cause physical obstruction of the airway but can be difficult to maintain as a cohesive bolus in the oropharynx if there are problems such as facial or tongue weakness; thicker consistencies may be easier. However, thin liquids would be inappropriate in individuals in whom swallow triggering is delayed or absent, since they may easily fall backwards into the open airway.

Some patients may benefit from swallow exercises, for example to improve the activity of the base of the tongue and the pharyngeal wall after head and neck surgery (Logemann, 1995). In other individuals, techniques may be tried to increase local sensory input before swallowing (Logemann, 1995; Smithard, 1995), in the hope that this may alert the CNS to the presence of a bolus to be swallowed. For example, a bolus may be used with a strong (perhaps sour) flavour, or increased tactile pressure may be applied in the oral cavity or the anterior faucial arches with a spoon or cold laryngeal mirror before an attempt to swallow.

A number of patients are assessed as completely unsafe to swallow. A transient period of support via intravenous fluids may be appropriate (for example, in patients who are drowsy following a general anaesthetic). However, after 24–48 hours of no swallowing, enteral feeding should be considered to minimize malnutrition and discomfort for the patient. Initial support in dysphagic patients generally involves feeding through a nasogastric tube, which may also be used in patients who can swallow small amounts safely but are unable to manage sufficient orally to support their nutritional requirements. Patients with prolonged severe dysphagia or those who are finding it difficult to tolerate a nasogastric tube should be considered for insertion of a percutaneous endoscopic gastrostomy (PEG) tube. This is a more invasive procedure with associated mor-

TABLE 3.
Strategies to aid in the management of oropharyngeal dysphagia

Disorder		Postural technique	Appropriate food consistencies
Oral stage	Reduced cheek tension	Tilt head to stronger side	Thin liquid to pureed
	Reduced tongue elevation	Tilt head back	Thin to thick liquids
Triggering of pharyngeal swallow	Delayed/absent	Chin down	Avoid thin liquids
Pharyngeal stage	Unilateral pharyngeal weakness	Rotate head to weaker side	Liquids to thin pureed
	Bilateral pharyngeal weakness	Lie down	Liquids to thin pureed
	Reduced laryngeal elevation	Chin down	Thick liquid to solid food

bidity and mortality (Pennington, 2002) and does not prevent aspiration of a patient's own secretions although it does allow maintenance of nutrition.

ETHICAL ISSUES

It is important for care-providers to recognize that persistent failure to eat will result in death, as well as prolonging recovery from illness and predisposing to malnutrition-associated problems such as pressure ulcers and infections. Access to food and fluid is a basic human right for all individuals expressing a desire to eat or drink, and these should be provided in the absence of medical contraindications. However, a competent adult has the legal right to refuse a treatment should they wish to do so (Lennard-Jones, 1999) and indeed perceptions of quality of life may vary between individuals, with some patients finding severe debility relatively acceptable and others considering less severe illness as intolerable, undignified suffering. In the USA laws now exist to ensure that previously stated patient preferences regarding medical treatments and life-sustaining treatments are honoured, and similar recognition of such documents is advised in the UK as well.

Ethical issues may arise in the care of persons without the mental competence to make clear their wishes, particularly if food or fluids would need to be provided via artificial means. In England and Wales another person cannot give consent on behalf of a mentally incapable adult (Lennard-Jones, 1999) and decisions for such individuals are the responsibility of the medical and mutidisciplinary team involved, acting in the best interests of the patient, seeking any previously expressed wishes on such treatments from family and carers if possible.

In recent years in the UK there has been much debate regarding the provision of nutrition to patients with severe brain injury, terminal disease (e.g. metastatic malignancy) or end-stage dementia. A balance needs to be achieved between the prevention of untimely death and the postponement of the inevitable. In some situations the decisions are simple, but ethical and moral dilemmas may arise for patients who are neither dying nor clearly improving. In some circumstances, it may be appropriate to use enteral nutrition as a palliative tool rather than as a curative treatment.

Currently in UK law, tube feeding is regarded as a medical treatment rather than as basic mandatory care (Lennard-Jones, 1999), and it can therefore be withheld or withdrawn if this is felt appropriate by the medical team responsible. However, in this situation it is important for a patient's loved ones to be aware that withholding or withdrawing tube feeding does not mean withdrawal of all treatment. All patients must be offered whatever care is necessary to relieve any pain and suffering, and it should be made clear that death from dehydration is generally a peaceful, pain-free death (increased potassium levels, ketones and endorphins). If providing nutrition is felt to be appropriate, the cost/benefit (burden) ratio for the patient needs to be considered. It may be felt appropriate to start treatment as a time-limited trial, to be reviewed at the end of a specified time, but withdrawal of therapy is emotionally more difficult than withholding it and it is difficult to know how to assess the success of a short period of nutritional support.

Consent for the provision of enteral nutrition is often assumed to have been given in the passing of a nasogastric tube, unless insertion is actively resisted. Repeated subsequent removals of nasogastric tubes may mean refusal of nutrition or may simply reflect discomfort from a local irritant. The insertion of a PEG tube, a more invasive procedure, requires formal informed consent and this may be difficult to obtain, especially in a dysphasic, cognitively impaired or acutely confused patient, making it the responsibility of the treating doctor. Questions remain as to what is in the best interest of the patient, what is quality of life, whose quality of life and also as to whether in reality we are treating a patient, his/her family or ourselves (Smithard, 1999). Whatever decision is made, it must be made after consultation with the relatives and the multidisciplinary team so that all are aware of any decision to feed or not to feed, as failure to supply fluids and food will ultimately result in death.

CONCLUSIONS

Swallowing problems are common in an inpatient setting and may present significant challenges to the staff involved. A number of methods of assessment are available depending upon a unit's resources although the most commonly used test in most places is still the bedside assessment. VF is often the next method used but this and other more complex techniques all have their limitations. Once diagnosed, dysphagia may be managed via a number of strategies depending upon the patient and the underlying cause of the dysphagia. The importance of effective and appropriate management of these problems is

highlighted by the potential for increased morbidity and mortality in dysphagic patients. Ethical issues in the nutritional support of dysphagic patients unable to express their own wishes directly can be challenging. HM

Figure 1 *is adapted from Smithard (1995).*
Conflict of interest: none.

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KEY POINTS

- Swallowing problems may occur in a number of common disorders of hospital inpatients.
- Several methods of swallow assessment are available, the most commonly used of which is the bedside clinical assessment.
- Management strategies may include using different head and neck positions while swallowing or altering the consistency of food or liquids.
- Prolonged inability to swallow may require enteral feeding support via a nasogastric or gastrostomy tube.