

Milk nasendoscopy in the assessment of dysphagia

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Abstract

The bedside assessment of dysphagia may be difficult, due to the inability to witness the act of swallowing directly. The milk test described in this paper gives a good assessment of swallowing, is cheap and easily portable and allows an instant decision to be made without recourse to special investigations.

Introduction

Assessment of dysphagia relies on history, examination and further investigation. The history may sometimes be difficult to elicit unless a relative is present. Examination of the mouth, pharynx and cranial nerves may reveal little or no abnormality, though drooling and pooling of saliva imply the presence of a problem. By using a laryngeal mirror more information may be gained, but this method does not assess function during swallowing.

The principle of the milk test is not new. The 'Fibreoptic Endoscopic Examination of Swallowing Safety' (FEES) was described in 1988 (Langmore *et al.*, 1988). Its use was to identify aspiration and therefore to determine if oral feeding was safe. The present authors believe that much more information may be gained about swallowing than simply an assessment of aspiration.

This paper presents the method of assessment used, and the results of comparing patients complaining of dysphagia with normal subjects undergoing nasendoscopy for other reasons.

Patients and method

Fifteen patients complaining of dysphagia and 15 normal patients have been compared. The diagnosis for the 15 dysphagic patients is shown in Table I.

The patients were initially assessed by simple examination of the lips, mouth and tongue. Oropharyngeal sensation was tested as was the gag reflex. Indirect laryngoscopy was performed to look for evidence of anatomical abnormality in the larynx and pharynx. Any pooling in the pyriform fossa was noted. The nasendoscope passed was an Olympus ENF-10, with an external diameter of 5 mm. Where possible (those patients seen in clinic) the examination was videotaped; in some cases still photography was also undertaken.

The anterior nares on one side was anaesthetized with a single activation of 'Xylocaine' spray. No further anaes-

thetic was used, to avoid reduction of pharyngeal sensation. The endoscope was passed along the floor of the nose into the postnasal space and on into the oro-pharynx. The larynx and pharynx were then examined, during tongue movement, phonation, coughing and swallowing. Supraglottic sensation may be tested by advancement of the endoscope toward the larynx, touching the epiglottis on both sides.

For the purposes of the milk test the best position for the distal end of the nasendoscope is just inside the oropharynx at the level of the soft palate. This allows a view of the base of the tongue, the epiglottis, valleculae, pyriform fossae and laryngeal inlet.

A small graduated medicine glass with a straw is then given to the patient, and the patient asked to suck milk into the mouth. The volume is noted. On command the patient is instructed to swallow and direct observation is made of the act of swallowing. The particular features noted are the function of the tongue, any premature loss of bolus into the pharynx, filling of the vallecula and/or pyriform fossa with milk, the presence or absence of aspiration and when it occurs. When aspiration has occurred reduced tracheal sensitivity is noted by a reduced cough reflex. Swallowing reflex delay may be inferred by the presence of milk beyond the faucial pillars without triggering of the reflex. Videotaping of these events allows subsequent slow motion analysis to be made.

TABLE I
DIAGNOSIS FOR DYSPHAGIC PATIENTS HAVING MILK TEST

Cerebro-vascular accident	5
Parkinson's disease	3
Motor neuron disease	2*
Globus pharyngeus	2
C.P. Angle tumour	1
Post-cricoid web	1
Recurrent laryngeal nerve palsy	1
Non-specific dysphagia	1

*One patient with Parkinson's disease also had motor neuron disease and therefore has been included in both figures.

TABLE II
SWALLOW ABNORMALITIES SEEN IN DYSPHAGIC PATIENTS

Abnormality	Number
Loss of bolus (=poor oral control)	8
Delayed triggering of swallowing reflex	7
Decreased supraglottic sensation	4
Pooling in vallecula	7
Pooling in pyriform fossa	10
Aspiration	11
Absent cough reflex following aspiration	9

Results

Oral phase

It is impossible to directly assess the oral phase using the nasendoscope, though information about this part of swallowing may be gained. Six of 15 'normals' showed a minimal trickle of milk over the back of the tongue prior to initiation of swallowing. Eight of 15 patients with dysphagia showed marked loss of bolus. When this occurred a large amount of milk was observed falling over the back of the tongue. This represents poor tongue function.

Pharyngeal phase

Triggering of swallowing occurred promptly in normals, in fact so promptly that it was difficult to witness the act directly unless the investigation had been videotaped. In these patients the only thing observed was the white of the milk on the end of the scope. Delayed triggering could be inferred from the observation of filling of the valleculae and pyriform fossae without initiation of swallowing. This occurred in seven patients with dysphagia. The function of the cricopharyngeus cannot be directly assessed, though pooling of milk above this muscle may be seen (10 patients with dysphagia). This is not found in normal subjects, though some minimal coating of the pharyngeal wall may be observed.

As expected no normal patient was seen to aspirate during the investigation. Eleven patients were found to be aspirating, although only nine had an intact cough reflex. Ten patients complained of choking attacks, only eight of these were found to be aspirating. The test has therefore identified two patients who were silent aspirators and two thought to be aspirating who were not. The abnormalities seen in the dysphagia group are shown in Table II.

Discussion

Accurate assessment of dysphagia is difficult. History and examination are important, particular attention focussing on food consistency, head position, choking attacks, weight loss and chest infections.

Barium swallow and videofluoroscopy may be undertaken, the latter giving more detailed information about oropharyngeal swallowing problems especially if used with a video timer. However, these may be difficult to undertake in some patients due to movement disorders, either paralysis or overactivity. Whilst chairs have been developed to overcome some of these problems, they are expensive and not universally helpful. The investigations require arrangements to be made, are expensive and time consuming.

Most otolaryngology departments have a flexible

fiberoptic nasendoscope, which is easily transported to the patient's bedside if necessary, and thus have the ability to provide a 'mobile' service for the assessment of dysphagia. In most cases the investigation may be carried out by anyone able to use a nasendoscope, with assistance from one other person if necessary.

The investigation is able to give an assessment of tongue function, by direct observation of the way bolus is handled over the back of the tongue. A minimal trickle of milk over the posterior third of the tongue is observed in many normal people and should be ignored.

Triggering of the swallowing reflex should occur as the bolus reaches the faucial pillars. Delay of swallowing reflex may then be inferred by the observation of a marked amount of milk in the vallecula, which will subsequently spill over into the pyriform fossa. Pooling observed in the pyriform fossae may result from a number of reasons. Loss of bolus in the oral phase, delay in triggering of the swallowing reflex, lack of laryngeal elevation during swallowing and dysfunction of cricopharyngeus itself. As the first three causes of pooling may be directly assessed by this method, dysfunction of cricopharyngeus may be inferred. By direct observation of aspiration, the procedure allows identification of those patients at risk of chest infection. History and simple examination alone are not sufficient. This study found two patients thought to be aspirating because of a history of choking attacks who were not, but also identified two patients with an absent cough reflex.

The only food consistency used has been liquid (milk), though semi-solid and solid are now used in this unit. Consistencies other than milk may become lodged on the end of the scope and therefore obscure the view. The procedure is not only an adjunct to other methods of investigation, but may in some circumstances be the only investigation required. It is cheap, portable and relies only on special equipment which is already available in most hospitals. It is minimally invasive and can be repeated to assess progress.

However, the capital cost is approximately £5000 for the basic equipment if not already available, and some skill and training is required in the positioning of the scope if it has not previously been used. For clinicians familiar

TABLE III
COMPARISON OF VIDEOFLUOROSCOPY AND MILK NASENOSCOPY

	Videofluoroscopy	Milk nasendoscopy
Personnel	Radiologist	Endoscopist. ? Assistant
Equipment	X-ray machine. Monitor. Video recorder. Special chairs/restraints	Nasendoscope. Xylocaine spray.
Contrast	Barium	Milk
Time	20-30 mins.	5 mins.
Advantages	Tongue/pharyngeal and crico-pharyngeal function directly seen. Timing of swallow reflex slow motion analysis	Quick and transportable. Repeatable. Instant recommendation on management. Slow motion (need video).
Disadvantages	Time consuming. Not instantly available. Impossible in some patients. Small radiation dose for patient and staff.	Oral phase not completely visible. Crico-pharyngeus cannot be directly assessed. Solids and semi-solid more difficult.

with the flexible fiberoptic nasendoscope no further training is required. Comparison of the two techniques is shown in Table III. This technique has the advantage that the cause of dysphagia may be seen and appropriate advice offered without delay. Management options include advice on head position, food consistency, thermal stimulation of swallowing reflex and nasogastric tube feeding.

In our unit, all dysphagic patients referred to the swallowing team undergo milk nasendoscopy. As a direct result of this we have been able to spare many patients the inconvenience of nasogastric feeding and allowed them to continue with a normal or slightly modified diet. In addition, our referral rate for videofluoroscopy for dysphagia

has decreased, whereas previously this was the normal method of screening for swallowing problems.

References

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