EDITORIAL

Pulse oximetry as a screening tool in detecting aspiration

Dysphagia continues to be an important topic of debate for two main reasons.

First, it can cause aspiration (i.e. entry of food or fluid into the airway below the level of the vocal folds [1]). Although it may occur in many conditions—iatrogenic, infectious, metabolic, myopathic, neurological or structural [2]—one of the main disorders to attract attention is acute stroke, where the incidence of aspiration is high, perhaps as much as 50% [3], with a greatly increased risk of developing aspiration pneumonia [4]. A quick and accurate initial screening assessment is crucial to decide whether a patient can eat and drink safely.

Secondly, dysphagia, malnutrition and dehdydration are closely inter-related. Each one can lead to another [5] and may present in acute or chronic conditions. Keller [6] included progressive neurological disorder as a risk factor for malnutrition and those with swallowing difficulties will be at particular risk. It is essential that food and drink are not withheld unnecessarily from those who do not have dysphagia but who have not been assessed by an expert.

Listening to the swallow

One technique being examined is cervical auscultation [8, 9]. By listening to the swallow using a stethoscope, it is possible to distinguish between normal and abnormal patterns of sound. However, research into the meaning of the sounds is still ongoing. Cervical auscultation is intended to be an adjunct to bedside swallowing assessment and has the advantage of being readily repeatable with no risk to the patient. In the future there is likely to be computer-aided cervical auscultation. This will provide objective results to complement the subjective ones. This tool is already being used by some speech and language therapists to enhance the bedside information. Because it requires much practice, it is difficult to see how it may be incorporated into a screening assessment in the foreseeable future. If its success is proven, then it is more likely to reduce the number of videofluoroscopies required.

Watching the swallow

At present, only videofluoroscopy provides a clear and objective picture of what is happening at each stage of the swallow. It is the standard most used to compare other assessment methods and test their accuracy [3]. However, this radiological procedure requires co-operation from the patient and cannot be performed at the bedside.

The challenge, then, is to develop a screening tool which can be easily taught, is quickly administered and non-invasive, causes no distress to the patient and gives reliable results.

Monitoring the swallow

Is pulse oximetry the answer? A few studies have considered its use in detecting aspiration by observing for oxygen desaturation during and immediately after swallowing [10–16]. It fulfils the criteria of ease of use and non-invasiveness. Pulse oximeters are widely available in hospitals, and nurses are already familiar with their use.

Four of the studies compared oxygen saturation levels with videofluoroscopy [10, 12–14], three being simultaneous [10, 12, 14]. Of these, two have suggested that pulse oximetry may be useful in diagnosing aspiration [10, 12]. The others have been more cautious,

Initial screening problems

Speech and language therapists have become the key professionals in assessing and managing oropharyngeal dysphagia, but they do not work round the clock. In the Health Advisory Service document Not Because They are Old [7], it is made clear that trained staff must be available at all times to carry out swallowing assessments. This has implications for training other staff, particularly doctors and nurses. Effective feeding and swallowing management does in any case rely on co-operation within an inter-disciplinary team.

Some centres have already developed training schemes, which include an initial bedside screening assessment. This allows a decision to be made about whether a patient should be given anything by mouth. A full assessment by a speech and language therapist can then be made at a later time, if required.

The main difficulty with such procedures is that they lack sufficient sensitivity and specificity [3]. Research has considered which features are the most indicative of dysphagia [4] but, even using combinations of signs, it has not yet proved possible to devise a reliable screening tool.
but there is sufficient support to warrant further research. In a recent study, Colodny [16] compared pulse oximetry with fibro-optic endoscopic evaluation in 104 subjects and found no relationship between Oxygen saturation (SpO2) levels and aspiration. She did, however, conclude that pulse oximetry may be used as an adjunct to discriminate dysphagia from non-dysphagia.

In this issue of *Age and Ageing*, Smith and co-workers describe how 53 patients with confirmed acute stroke had bedside assessment, followed on the same day by simultaneous pulse oximetry and videofluoroscopy [17]. By combining the bedside assessment and pulse oximetry data, they obtained a positive predictive value of 95%. They are sufficiently confident in their results to recommend a screening test which combines swallowing minimum 10 ml of water whilst monitoring SpO2 levels using a pulse oximeter.

**The way forward?**

This is the first time that such a recommendation has been made. The research has specifically concentrated on patients with acute stroke, therefore generalization to other conditions cannot be made. Further work must be done: can these results be replicated, both in similar patient groups and in dysphagic patients with other conditions? Is there a difference between those with acute and those with chronic conditions? What other factors could influence oxygen saturation levels?

Nevertheless, this is an exciting step. It takes account of patient need. It promotes inter-disciplinary and poly-disciplinary working. There is a progression from subjective to objective analyses, with minimum time and cost and discomfort to the patient. Dysphagia has come a long way over the last 20 years, and we now know a lot about normal and abnormal swallowing. The research into pulse oximetry extends the boundary of knowledge about dysphagia and may be valuable as a diagnostic tool.

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**References**


