

ROUND TABLE S.I.O. NATIONAL CONGRESS

Endoscopic evaluation of neurological dysphagic patients

Valutazione endoscopica in pazienti neurologici portatori di disfagia

S. COSCARELLI, L. VERRECCHIA, A. COSCARELLI¹Phoniatics Unit, University Hospital "Careggi", Florence; ¹ Department of Economics and Statistics, University of Calabria, Italy

SUMMARY

Dysphagia is a frequent finding in neurological patients and is a symptom related to the severity of the clinical picture. The swallowing impairments, in these patients, increase the risk of aspiration pneumonia, that leads to death, in at least 6% of patients, within the first year. Therefore, evaluation of the swallowing status is essential in patients with dysphagia and videofluoroscopic study of swallowing (VFSS) is the method of choice. It cannot be performed in all patients on account of the complexity of the procedure and since they must be brought to the Radiology Unit. In the 1980, a new bedside method was introduced, namely: fiber-optic endoscopic study of swallow (FESS) which is easy, low-cost, well-tolerated and repeatable. We use this bedside technique to assess swallowing function in patients with dysphagia admitted to acute care units, neurological and internal medicine units. The evaluation aims to indicate the safer nutritional method (oral intake, feeding tube or percutaneous gastrostomy) and, consequently, reducing the risk of aspiration pneumonia during hospitalization. We found that more than 50% of the dysphagic patients present cerebrovascular injuries and in 2% of the population, the first diagnostic hypothesis of *Myasthenia Gravis* can be made with the FESS technique. In 60%, we indicate a change in nutritional method: in 20% we indicate percutaneous endoscopic gastrostomy (PEG). With these indications, none of those patients had aspiration pneumonia. Our protocol for the bedside fiberoptic study of neurological patients with dysphagia has demonstrated its effectiveness by eliminating the incidence of aspiration pneumonia.

KEY WORDS: Dysphagia • Neurological diseases • Aspiration pneumonia • Diagnosis

RIASSUNTO

La disfagia è una frequente evenienza in pazienti neurologici ed è un sintomo legato alla gravità del quadro clinico neurologico. I disturbi della deglutizione incrementano in questi pazienti il rischio di polmonite "ab ingestis" che porta a morte perlomeno il 6% di questi pazienti nel primo anno dall'inizio del disturbo. Quindi la valutazione della condizione deglutitoria è essenziale e lo studio videofluoroscopico della deglutizione (VFSS) è il metodo di riferimento per questo scopo. Ma questa metodica non può essere condotta su tutti i pazienti, sia perché alcuni pazienti di questo tipo non possono essere mobilizzati, sia per la complessità della tecnica. Negli anni '80 è stata introdotta una nuova metodica utilizzabile al letto del paziente: la FESS (studio fibroendoscopico della deglutizione), è facile, di basso costo, ben tollerata dal paziente e ripetibile. Abbiamo utilizzato questa tecnica per valutare al letto del paziente la funzione deglutitoria di soggetti ricoverati con problemi di disfagia presso le unità di osservazione breve del pronto soccorso, i reparti di medicina e di neurologia. La FESS permette di indicare la più sicura via di somministrazione del cibo per la disfagia in corso (alimentazione per bocca, sondino naso-gastrico e gastrostomia percutanea), al fine di ridurre al minimo il rischio di polmonite ab ingestis durante il ricovero. Abbiamo riscontrato che più della metà di questi pazienti presentano esiti di eventi cerebrovascolari e nel 2% la FESS ha permesso di fare la prima ipotesi diagnostica di Miastenia Gravis. Abbiamo indicato una modificazione della nutrizione nel 60% dei casi e nel 20% abbiamo consigliato una PEG. Grazie a queste indicazioni nessuno dei pazienti ha sviluppato polmonite ab ingestis. Il protocollo da noi utilizzato con la FESS al letto del paziente negli affetti da disfagia, ricoverati per patologia neurologica, ha dimostrato la sua efficacia, eliminando l'incidenza di polmonite ab ingestis dei pazienti disfagici.

PAROLE CHIAVE: *Disfagia • Malattie neurologiche • Polmonite "ab ingestis" • Diagnosi*

Introduction

Dysphagia occurs in approximately 13-14% of patients in the acute care setting and 40-50% of patients in nursing homes¹. Dysphagia is, in fact, present in patients who have sudden-onset neurological disorders, in patients with chronic neuro-degenerative disease and patients with general medical problems. Evaluating a population with severe brain injury, Mackay et al.² found, in a videofluoroscopic study, 9 abnormalities of swallowing, such as delayed trigger of swallow reflex, decreased laryngeal closure, decreased laryngeal elevation, unilateral pharyngeal paralysis, reduced lingual control, decreased tongue retraction and, in most, loss of oral bolus control. These Authors concluded that the greater the neurological injury, the greater the risk of swallowing impairments and aspiration. Patients who suffer from acute disorders causing dysphagia, particularly those involving the nervous system, such as stroke and head trauma, tend to demonstrate less dysphagia with time. Conversely, patients with chronic disorders, especially neuro-degenerative disease, manifest progressive deterioration in swallowing function. Therefore, it is important to follow the evolution of these clinical pictures.

Aspiration is defined as the misdirection of oro-pharyngeal or gastric contents into the larynx and lower respiratory tract and aspiration pneumonia is the frequent consequence, intended as the development of pneumonia in patients with risk factors for increased oropharyngeal aspiration³, for the colonization of the lower respiratory tract by pathogens normally resident in the oro-pharyngeal environment. During sleep, 50% of healthy patients aspirate small amounts of oro-pharyngeal secretions, without any consequence. However if the mechanical, humoral, or cellular mechanisms are impaired or if the aspirated inoculum is large enough, pneumonia may follow. Loeb et al.⁴ demonstrated that dysphagia is one of the most important risk factors leading to pneumonia in resident patients. In these patients, an intact cough reflex is a defensive respiratory mechanism and often this mechanism is impaired in elderly dysphagic patients, leading to a major risk for pneumonia almost 6 times greater in those > 75 years old, compared to those < 60 years old; furthermore, mortality from pneumonia increases strikingly with aging. The meaning of this age trend is due to the increased incidence of cerebrovascular and degenerative neurological diseases with aging and these disorders are strongly associated with impaired swallow and cough reflexes, leading to an increased risk of aspiration.

Hanning et al.⁵ reported that 6% of all patients suffering from a cerebro-vascular injury die from aspiration within the first year. Ding & Logemann⁶ dividing the population of a Stroke Unit into patients with pneumonia and patients without pneumonia, found that the pneumonia group had a higher incidence of aspiration related to insufficient laryngeal elevation during video-fluoroscopic study. Therefore, swallowing problems are strictly associated with aspiration pneumonia and its consequences. The gold standard method for evaluating swallowing, used in these studies and accepted worldwide, is VFSS (video-fluoroscopic swallowing study⁷) the results of which are predictive of aspiration pneumonia and can modify the indication to oral intake rather than a feeding tube or percutaneous gastrostomy.

Unfortunately, it is often difficult to move neurological patients and video-fluoroscopic studies, in these patients,

would not be feasible or have to be delayed. Thus in the '80s an alternative instrumental procedure was introduced, in clinical practice, for bedside assessment of swallowing safety, namely, FESS: fiberoptic endoscopic examination of swallowing⁸. It requires transnasal passage of a flexible laryngoscope into the hypopharynx and provides detailed information concerning the anatomy and physiology of the pharynx and larynx, with assessment of the pharyngeal phase of swallowing. Food and liquid are administered during the fiberoptic evaluation and, because of the obstruction of the lumen due to the pharyngeal contraction, the motion of essential food-way structures or the food bolus during the swallow cannot be shown, but, however, aspiration and pharyngeal retention after the swallow can be identified by direct observation and cough or gag reflexes can be tested by direct stimulation of the laryngeal mucosa or the tongue base. Besides, it can be easily used in follow-up, on account of bedside feasibility and reproducibility⁹.

The technique has acquired more and more space and more and more importance in the clinical assessment of resident patients at high risk of pneumonia. With this study, we confirm the value of FESS, in the clinical management of neurological/acute-care unit patients, describing our technique and results.

Methods

Between September 2006 and February 2007, 250 patients were evaluated by the medical doctor of the Phoniatrics Unit using the bedside FESS technique, at the Intensive Care, Neurological and Internal Medicine Units of the University Hospital of Careggi in Florence, Italy. The population submitted to this examination comprised various pathological conditions (Fig. 1).

The examination was always conducted on the same day as the request, which was normally the day of hospitalization or soon after, for a first indication of which kind of feeding would be more appropriate. The requests for a phoniatric evaluation of swallowing varied:

1. anamnesis positive for dysphagia;
2. evaluation of swallowing in patients with feeding tube or gastrostomy;
3. history of aspiration pneumonia;
4. dysphonia or gurgling voice;
5. invalid or persistent cough;
6. poor discrimination of taste or food temperature.

The technique consists of trans-nasal fibre endoscopy, for a direct view of the anatomy of the pharynx and study of the swallowing with the "bolus" test¹⁰. First of all, the inspection is conducted at the level of the rhinopharynx, evaluating its valid exclusion during swallowing without regurgitation of the bolus. Thereafter, endoscopy proceeds to the oropharynx where the anatomy of the tongue and pharyngeal walls as well as the mobility of the tongue are assessed during normal talking. We also assess pharyngeal mucosa sensitivity and the eliciting of gag reflex with direct contact of the tip of the endoscope on the pharyngeal walls or the base of the tongue. The hypopharynx is evaluated as far as concerns the anatomy and also for retention of saliva or secretions with their possible silent passage into the larynx. The larynx is inspected for anatomical or functional abnormalities or asymmetries and for superficial sensitivity

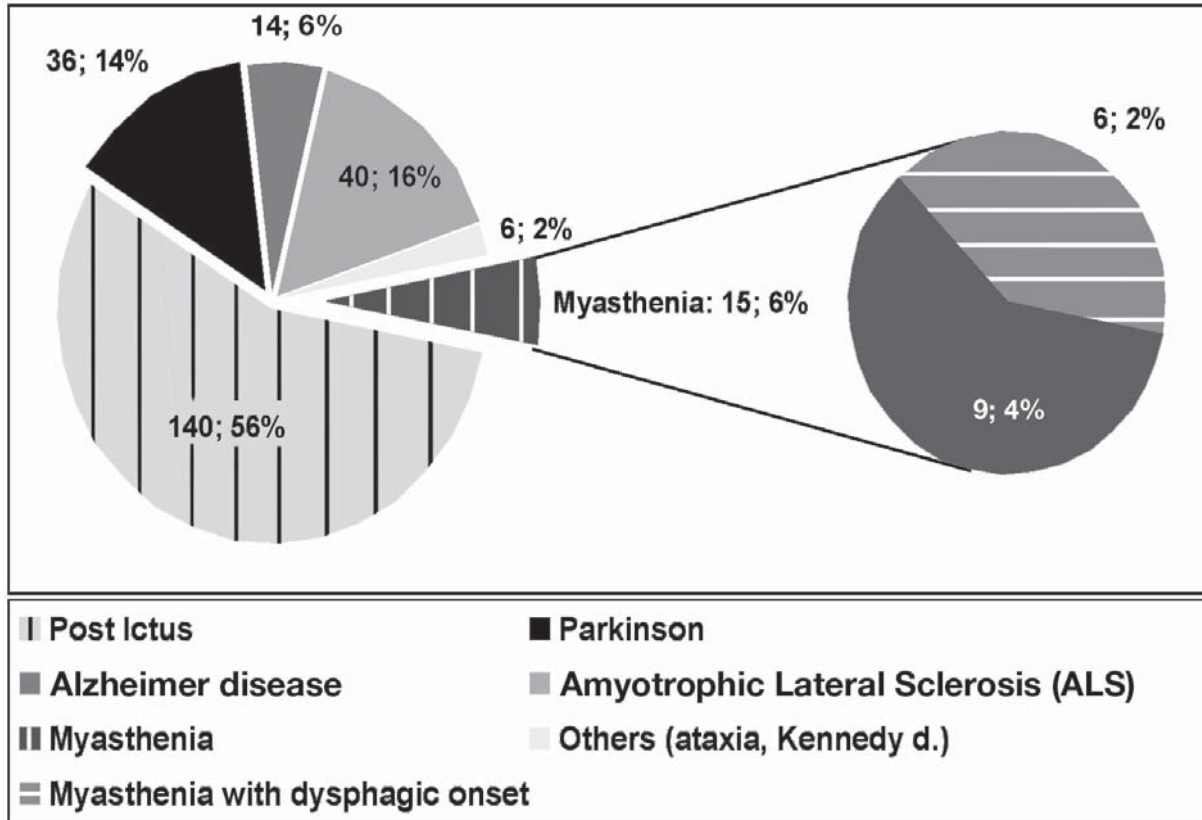


Fig. 1. Population submitted to bedside FESS study.

or sphincter activity with voluntary coughing or induced by touching with the tip of the endoscope. If the cough is valid, or there are no retentions in the pharynx, we can proceed with the bolus test. The patient is then instructed to take a small quantity of semisolid food in the mouth, then swallow it. Swallowing is a “black-out” moment, at endoscopy, due to closure of the walls of the pharynx on the tip of the endoscope, but we can detect a disorder in swallowing indirectly. In fact, the bolus may fall down prematurely before swallowing, introducing in the larynx – pre-deglutitory bolus –, or it can be diverted into the trachea during the swallow, due to a deficient sphincter activity of the larynx (this becomes evident due to a strong reaction of cough immediately after swallowing or to the presence of food debris on the larynx or expulsion of debris with coughing – intrade-glutitory bolus), or furthermore the retention of the bolus in the hypopharynx, vallecula or inter-arytenoid region, that can slowly enter the larynx eliciting delayed cough – post deglutitory bolus. We have a decisional flow-chart for use in this endoscopic technique (Fig. 2).

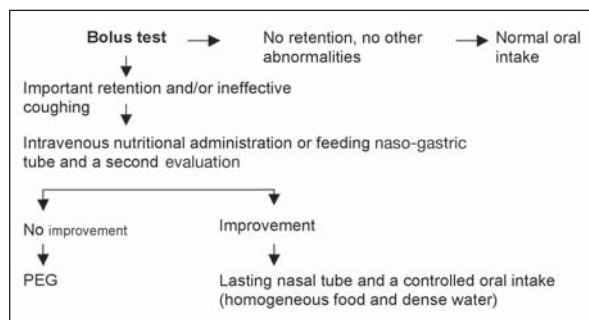


Fig. 2. Decisional flow-chart.

If no retention, cough or inhalation occur during the deglutition test, the patient can proceed with normal eating. If there is significant retention or an invalid cough reflex, the patient must be fed by parenteral route or nasogastric tube, until a second evaluation that can indicate the need of a percutaneous endoscopic gastrostomy (PEG), if a new exam gives the same result; otherwise, if there is an improvement in swallowing, the patient can be monitored with mixed feeding: lasting tube together with controlled feeding with semi-solid foods or drinks, until further improvement in the condition is observed that could lead to extraction of the nasogastric tube.

Results

All these patients had an indication to maintenance of oral intake, modification of the feeding, with the use of a nasal tube, or mixed alimentation, or, finally insertion of a PEG, as illustrated in Figure 3.

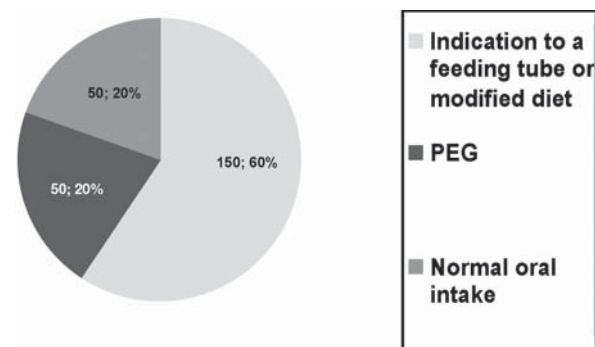


Fig. 3. Modification of feeding after FESS.

With these indications, no patient has shown aspiration pneumonia either during hospitalization or during evaluation at the Phoniatics outpatient unit at 1 month control after discharge. Only 10% of the patients presented an invalid cough reflex and were, therefore, considered at high risk of silent aspiration and were indicated directly to PEG.

Interestingly, of the 15 patients with *Myasthenia Gravis*, six (2% of the population) were first diagnosed with phoniatic FESS, on account of the lack of other clinical or instrumental disease-specific manifestations.

Discussion

The bedside FESS protocol, used by our Unit, demonstrates the efficacy of this quick, easy and reproducible instrumental evaluation of swallowing in all those patients with feeding problems during a hospitalization.

The gold standard for the swallowing study is the videofluoroscopic technique which has the advantage of a direct cinematic study of the swallow function and a more precise demonstration of aspiration during swallowing. It does, however, have some technical complications (radiations to the patient, need of specific personal support, transportation of an immobilized patient to a radiological unit and a little reproducibility) that limits its conventional use during the hospitalization of patients with swallowing problems. Furthermore, the most important problem of the FESS technique is that it does not allow direct study of the swallowing and presence of aspiration. On the other hand, the acquisition of direct visual three-dimensional information of the pre-deglutitory moments and the post-deglutitory moments allows the specialist to consider, with high confidence, the effectiveness of swallow function.

In a direct comparison between VFSS vs. FESS, conducted by Kaye et al.¹¹, FESS was found to be suitable as a screening tool for the evaluation of dysphagia, although not substituting VFSS, in cases in which the oesophagus requires evaluation, or when aspiration is strongly suspected. In fact, it can rule out aspiration with 97% certainty if accompanied by a complete physical examination.

Our experience has modified the indications for feeding in 80% of the patients examined, allowing them to undergo safe management of their swallowing problems, running no risk of pneumonitis.

More than 75% of the cases of oropharyngeal dysphagia are caused by neuromuscular disorders involving the central nervous system¹². Our experience with FESS is specific for neuromuscular patients for an obvious reason: all the requests that we receive for a bedside FESS concern patients that cannot be moved or other kinds of patients (for example, ENT patients, medical or surgical patients) who cannot reach our outpatient units or the radiology units for a VFSS.

Odderson et al.¹³ tend to consider dysphagia as a manifestation of greater neurological and functional deficits. The results of our survey confirm this theory since 56% of patients evaluated with FESS present cerebrovascular problems, 16% have ALS and 14% Parkinson's disease: all these patients are hospitalized because of the severe neurological or systemic complications resulting from these conditions, the course of which is, initially, often compatible with normal life and only when the clinical condition becomes worse do they have need of hospital care. Therefore, we conclude that a neurological patient with dysphagia is a more critical patient due to the worse clinical conditions.

Another aspect to be taken into consideration is that FESS confirms a clinical diagnosis and, sometimes, permits the first diagnostic hypothesis to be formulated. We have suspected the presence of *Myasthenia Gravis* in 6 patients with dysphagia as the symptom of presentation, which was then confirmed by electrophysiological studies. Only a few other Authors have reported a similar experience^{14,15}.

Conclusions

The FESS is a valid, effective, low cost technique that assesses swallowing in a bedside examination. As far as concerns the neurological patient, it results in better management of hospitalization, since with a simple procedure, like FESS, we are able to give a precise indication to the nutritional modalities, specific for the clinical case, not exposing him/her to useless risks of pneumonia. In our opinion, when and where FESS is available, it must always be requested before deciding the nutritional modality of the patient, otherwise we can be exposed to medical conduct, which can be pursued by law.

References

- 1 Dray TG, Hillel AD, Miller RM. *Dysphagia caused by neurologic deficits*. *Otolaryngol Clin North Am* 1998;31:507-24.
- 2 Mackay LE, Morgan AS, Bernstein BA. *Swallowing disorders in severe brain injury: risk factors affecting return to oral intake*. *Arch Phys Med Rehabil* 1999;80:365-71.
- 3 Marik PE, Kaplan D. *Aspiration pneumonia and dysphagia in the elderly*. *Chest* 2003;124:328-36.
- 4 Loeb M, McGeer A, McArthur M, Walter S, Simor AE. *Risk factors for pneumonia and other lower respiratory tract community-acquired pneumonia and other lower respiratory tract infections in elderly, residents in long-term care facilities*. *Arch Intern Med* 1999;159:2058-64.
- 5 Hanning C, Wuttge-Hanning A, Hormann M, Hermann IF. *Cinematographic study of the pathological mechanisms of aspiration pneumonia*. *ROFO* 1989;150:260-7.
- 6 Ding R, Logemann JA. *Pneumonia in stroke patients: a retrospective study*. *Dysphagia* 2001;15:51-7.
- 7 Palmer JB, Kuhleimer KV, Tippet DC, Lynch C. *A protocol for the videofluorographic swallowing study*. *Dysphagia* 1993;8:209-14.
- 8 Langmore SE, Schatz K, Olsen N. *Fiberoptic endoscopic examination of swallowing safety: a new procedure*. *Dysphagia* 1988;2:216-9.
- 9 Leder SB. *Serial fiberoptic endoscopic swallowing evaluations in the management of the patients with dysphagia*. *Arch Med Rehabil* 1998;79:1264-9.
- 10 Farneti D. *Valutazione videoendoscopica*. In: Schindler O, Ruoppolo G, Schindler A, editors. *Deglutologia*. Torino: Omega; 2001. p. 167-88.
- 11 Kaye G, Horowitz R, Barades S. *Role of flexible laryngoscopy in evaluating aspiration*. *Ann Otol Rhinol Laryngol* 1997;106:705-9.

- ¹² Trate D, Parkmann H, Fisher R. *Dysphagia: Evaluation, diagnosis and treatment*. Gastroenterology 1996;23:417-32.
- ¹³ Odderson IR, Keaton JC, McKenna BS. *Swallow management in patients on an acute stroke pathway: quality is cost effective*. Arch Phys Med Rehabil 1995;76:1130-3.
- ¹⁴ McIntyre K, McVaugh-Smock S, Mourad O. *An adult patient with new-onset dysphagia*. CMAJ 2006;175:1203-7.
- ¹⁵ Pautas E, Milleron O, Bouchon JP, Laurent M, Roger M, Verny M. *Myasthenia in the aged: a case with unusually late onset*. Presse Med 2000;29:835-7.