Amyotrophic lateral sclerosis: sonographic evaluation of dysphagia

Sclerosi laterale amiotrofica: valutazione ecografica della disfagia

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Abstract

Purpose. The authors sought to determine the role of video ultrasonography (VUS) in the diagnostic assessment of dysphagia in patients with amyotrophic lateral sclerosis (ALS).

Materials and methods. Nine patients underwent simultaneous static and dynamic VUS examination and videofluoroscopy (VFS) of swallowing.

Results. At the static phase, VUS showed 5/9 patients had lingual atrophy. Abnormal bolus position was observed in 6/9 patients at VUS and 3/9 at VFS. Both techniques identified an inability to keep the bolus in the oral cavity in 4/9 patients. At the dynamic phase, reduced lingual movement was observed in 5/9 patients at VUS and 2/9 at VFS. Disorganised tongue movement was seen in 3/9 patients at VUS and in 2/9 at VFS. Fragmented swallowing was only visualised at VUS. Stagnation of ingested material was never visualised at VUS, whereas it was clearly depicted in 2/9 patients at VFS.

Conclusions. VUS can be integrated into the diagnostic protocol for evaluating swallowing in patients with ALS, as it has higher sensitivity than VFS in assessing the dynamic factors that represent the early signs of dysphagia.

Keywords Dysphagia · Amyotrophic lateral sclerosis · Ultrasound · Videofluoroscopy

Riassunto

Obiettivo. Scopo di questo lavoro è stato stabilire quale ruolo abbia l’ecovideografia (EVG) nel protocollo diagnostico dei pazienti disfagici con sclerosi laterale amiotrofica (SLA).

Materiali e metodi. Nove pazienti sono stati sottoposti contemporaneamente a esame con videofluoroscopia (VFS) ed EVG (stadio statico e dinamico) della deglutizione.

Risultati. Per quanto riguarda la fase statica, all’EVG 5 pazienti presentavano atrofia linguale. La posizione anomala del bolo è stata osservata in 6/9 pazienti all’EVG e in 3/9 alla VFS. Quattro pazienti presentavano incapacità a trattenere il bolo nella cavità orale in entrambe le metodiche. Per quanto riguarda la fase dinamica, il movimento linguale ridotto è stato visualizzato in 5/9 pazienti all’EVG e in 2/9 alla VFS. La disorganizzazione del movimento linguale è stata osservata in 3/9 pazienti all’EVG e in 2/9 alla VFS. La deglutizione frammentaria è stata osservata solo all’EVG.

Conclusioni. L’ecovideografia può essere integrata nel protocollo diagnostico dello studio della deglutizione nei pazienti con SLA grazie alla maggiore sensibilità rispetto alla VFS nel valutare i reperti dinamici che rappresentano segni precoci di disfagia.

Parole chiave Disfagia · Sclerosi laterale amiotrofica · Ecografia · Videofluoroscopia
Introduction

In patients with amyotrophic lateral sclerosis (ALS), or Lou Gehrig’s disease, dysphagia is caused by degeneration of bulbar motor neurons and mainly involves difficulty initiating the voluntary oral phase of deglutition [1, 2]. Assessing dysphagia in patients affected by ALS relies on a multidisciplinary approach involving neurologists, gastroenterologists, radiologists and speech therapists that aims at evaluating the symptoms and signs of dysphagia and providing indications for treatment. Despite the poor prognosis of ALS, it is possible to control dysphagia by adequately modifying the diet and adopting postural compensation manoeuvres to maintain oral feeding and defer the need for percutaneous endoscopic gastrostomy (PEG) for as long as possible [3–7].

The swallowing act is divided into three successive phases: the oral (preparatory and propulsive) phase, the pharyngeal phase (oropharyngeal and hypopharyngeal) and the oesophageal phase (cervical and thoracoabdominal), all of which are functionally related and interdependent [2]. In patients with dysphagia, radiological imaging is indicated both for diagnostic purposes and treatment planning [8]. Videofluoroscopy (VFS) consists in video-recording fluoroscopic images obtained during ingestion of a barium sulphate suspension and allows morphological, dimensional and dynamic evaluation of bolus passage through the aerodigestive tract. However, although excellent for depicting the pharyngeal and oesophageal phases, VFS is limited in the study of the oral phase, as it is unable to evaluate the muscular structure of the tongue and floor of the mouth [2, 7, 9–11]. Ultrasonography allows easy visualisation of the aerodigestive tract involved in the oral phase of deglutition without the use of ionising radiation. Shawker et al. were the first to suggest the use of video ultrasonography (VUS) for documenting tongue motility, hyoid elevation and formation and appearance of the lingual bolus [12]. VUS also enables real-time measurements to be made on 2D and 3D images [13]. The aim of our study was to determine the role of VUS in diagnostic assessment of dysphagic patients with ALS.

Materials and methods

Patients

This study, approved by the ethics committee, was conducted over 12 months (January-December 2008) in cooperation with the referral centre for motor neuron diseases, which follows approximately 70 ALS patients.