Combined videofluoroscopy and manometry in the diagnosis of oropharyngeal dysphagia: examination technique and preliminary experience

La videofluoromanometria nella diagnosi di disfagia orofaringea: tecnica d’esame e nostra esperienza preliminare

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Abstract

Purpose. Dysphagia is a symptom of different pathological conditions characterised by alteration of the swallowing mechanism, which may manifest at different levels. We report our experience in the evaluation of the swallowing mechanism with combined videofluoroscopy and manometric recordings.

Materials and methods. For the combined study, we used a Dyno Compact computerised system (Menfis Biomedical s.r.l., Bologna, Italy) equipped with: (1) graphics card for the management of ultrasonographic or radiological images; (2) A.VI.U.S. dedicated software package, which enables digital-quality recording (PAL/NTSC, composite video or S-Video) of the videofluoroscopy study in AVI format with 320×240 resolution and 25 Hz acquisition frequency. The delay introduced by the process of image digitalisation is in the order of 200 ms, so for analysis purposes, the images can be considered synchronised with the manometric recordings. The videomanometry study was performed with the administration of contrast material either in bolus form or diluted. Data were collected on a specifically designed grid for the evaluation of 46 videofluoroscopic items, of which 34 are derived from the laterolateral view (seven in the oral preparatory phase, 15 in the oral transport phase and 12 in the pharyngeal phase) and 12 in the anteroposterior view (six in the oral preparatory phase and six in the oropharyngeal phase). A positive finding for the individual parameters is expressed in a binary fashion. Manometric evaluation was based on 11 items divided into four major and seven minor criteria.
Results. Dynamic videofluoroscopy swallow study combined with concurrent manometry enabled the simultaneous recording of anatomical alterations and the functional data of oropharyngeal pressure, thus providing a picture of the anatomical, biomechanical and physiological conditions of swallowing and the manner of bolus propulsion and transit.

Conclusions. An early and effective diagnosis of oropharyngeal dysphagia means being able to effectively implement appropriate rehabilitation techniques, improve the patient’s quality of life, and minimise the complications associated with swallowing disorders (choking, aspiration pneumonia, malnourishment). Distinction of the anatomical level of dysphagia is not a matter of simple classification; rather, it is essential in that different clinical presentations require different diagnostic strategies, and a precise definition of the anatomical–functional substrate is required to implement the correct therapeutic approach. This study presents the authors’ experience with the use of combined videofluoroscopy and manometry with particular emphasis on the examination technique.

Keywords Phazynx · Videofluoromanometry · Dysphagia

Introduction

Swallowing is a complex physiological mechanism during which the food bolus passes from the mouth to the digestive tract via the pharynx [1–5]. Swallowing is generally divided into three phases: the oral phase is voluntary, whereas the pharyngeal and oesophageal phases are involuntary [2].

Dysphagia is a symptom of different pathological conditions characterised by alteration of the swallowing mechanism, which can occur at different levels. It is classified according to the level at which the functional alteration occurs: oropharyngeal and oesophageal dysphagia (Table 1) [6]. Differentiation of the level at which dysphagia occurs is not simply a matter of classification; rather, it is essential in that the different clinical presentations require different diagnostic approaches. Therefore, the precise definition of the anatomical-functional substrate responsible for the symptom influences the therapeutic approach. Clinically, patients affected by oropharyngeal dysphagia present symptoms characterised by difficulty in the initial phase of swallowing, such as cough, sense of choking associated with aspiration of food into the airways, nasal regurgitation and sialor-