POSITION PAPER

ADI nutritional recommendations for dysphagia

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Introduction

(S.G. Sukkar)

In November 2006 at the Azienda Ospedaliera Universitaria San Martino, Genoa, Italy, a Consensus Meeting on "Nutritional Recommendations for Dysphagia" took place. It was organised by the Artificial Nutrition section of the Italian Dietetics and Clinical Nutrition Association (Associazione Italiana di Dietetica e Nutrizione Clinica), which gathered a multidisciplinary group of national experts on the subject. Official participants of the Consensus Meeting were the Italian Association of Speech Therapists (Associazione Italiana dei Logopedisti) as well as the study group for Cerebrovascular Disease, which is affiliated to the Italian Neurology Society (Società Italiana di Neurologia, SIN)

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The Consensus Meeting drew up a set of recommendations which, under the aegis of the society, could constitute a useful tool in the management of the dysphagic patient. The method for drafting the document was based upon the manual: "How to produce, distribute and update recommendations for clinical practice", published in May 2002 by the Italian Superior Institute for Health (*Istituto Superiore di Sanità*), reproduced here in the following sections.

Selection of topics

The epidemiological method (relevance in terms of incidence, mortality, etc.), the availability of evidence (database analysis of the availability of the latest information on the effectiveness of actions on the identified health problems) and the opinions of health-care workers have been combined in a semistructured way.

Selection of the work group

The choice was made according to experts' specific competencies, their curriculum vitae and the representativeness of the topic.

Definition of the topics treated

- Diagnostic framework and clinical tests
- Endoscopy

- Video fluoroscopy (VFS)
- Nutritional indications during oncological dysphagia
- Nutritional indications during chronic neurological dysphagia
- Nutritional indications during acute neurological dysphagia
- Nutritional indications during functional dysphagia
- Nutritional indications in diabetic dysphagic patients
- Predictive factors in neurological dysphagia
- Speech therapy rehabilitation and indications for refeeding in neurogenic dysphagia after brain damage
- Speech therapy rehabilitation and indications for refeeding in dysphagia after surgery
- Nutritional management of the patient with penetration, silent aspiration and ingestion pneumonia

Gathering of evidence

A hierarchical structure was used for research and assessment of the evidence. Proofs of efficacy and safety were mainly looked for in systematic reviews (CDSR) produced by the Cochrane Groups. Alternatively other reference databases were consulted (Medline, Medscape, etc.) in order to identify single trials and/or non-randomised comparative studies.

In particular, the following guidelines were taken into consideration:

- ACCP (evidence-based clinical practice guidelines) 2006
- AHPR (Agency for Health Care Policy and Research) 2001
- ASHA (Medical Review Guidelines for dysphagia services – American Speech Language Hearing Association) 2004

- ECGD (Diagnostic and Therapeutic Guidelines in Neurology from the German Neurology Society) 2005
- Joanna Briggs Institute. Identification and nursing of dysphagia in adults with neurological impairment. (Best practice 4(2), 2000)
- College of Audiologists and Speech Language Pathologists of Ontario. Preferred practice guidelines for dysphagia, 2000
- Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke: identification and management of dysphagia.
- SPREAD (Stroke Prevention and Educational Awareness Diffusion): Italian Guidelines, March 2005
- Reviews, clinical case studies from Pubmed

Drafting and development of the recommendations

Once the evidence had been gathered and evaluated (synthesised on specific charts regarding the assigned topic) the work group proceeded with the first draft of the recommendations.

Assignment grading

Recommendations were classified according to a specific evidence level and strength of recommendation, respectively referred to Roman numerals (from I to VI) and in letters (from A to E) (Tables 1 and 2). Evidence levels refer to the probability that a given amount of knowledge is derived from the planned trial, which is conducted in such a way as to produce valid data without systematic errors. The strength of recommendation

Level	Quality of evidence
I	Evidence obtained from randomised controlled clinical trials and/or systematic reviews of randomised trials
II	Evidence obtained from a single randomised trial of adequate design
III	Evidence obtained from non-randomised cohort trials with concurrent or historic controls or their meta-analysis
IV	Evidence obtained from retrospective trials such as case-controlled trials or their meta-analysis
V	Evidence obtained from case studies ("series of cases") without a control group

Table 2 Strength of recommendations

Table 1 Recommendation evidence levels

Grade	Definition
А	The specific procedure or diagnostic test is strongly recommended. Indicates a particular recommendation supported by good quality scientific evidence even if not of type I or II.
В	Doubts exist as to whether a particular procedure or operation should always be recommended, but it is thought that carrying it out should be carefully considered.
С	There is substantial doubt as too whether the procedure or operation can be recommended.
D	The procedure is not recommended.
E	The procedure is highly inadvisable.

Evidence based on authoritative expert opinions or committees of experts as shown in the guidelines or consensus conference

VI

refers to the probability that the practical application of a recommendation brings about an improvement in the state of health of the general population, which is the aim of the recommendation. There are several grading systems to prove efficacy and strength of recommendations reported in literature. The system adopted for the drafting of the recommendation was based on the reelaboration, finely tuned by the Centre for the Evaluation of the Effectiveness of Health Care (CeVEAS). The main characteristic of this system is that the strength of the recommendation is not just based on the design of the study but also considers other factors such as feasibility, acceptability and the economic sustainability of the operation.

The EBM scores were elaborated according to the NHS Research and Development Centre for Evidence-Based Medicine (CEBM – Phillips R, Ball C, Sackett D, Badenoch D, Strauss S, Haynes B, Dawes M) [1].

Graphic layout of recommendations

The recommendations were graphically laid out to allow a rapid and easy consultation as well as learning and memorisation. The overall structure of the documents and the characteristics of form and style (regarding the texts and graphics) were streamlined, despite changes required by the various topics, as in the structure presented below.

The main text must be preceded by some essential information:

- 1 The authors' recommendations and their qualifications specified together with their role in the collaboration.
- 2. The date when the document was written and, where possible, an indication as to the foreseeable duration of validity before updating.
- 3. Title, topic and the area of the recommendations.
- 4. Structure of the document. This starts with a specific question with an explicit identification of the key decisions posed in clinical practice concerning the category of patients and the actions under examination. The recommendations formulated by the authors, on the basis of critical evaluation using the best empirical evidence available, are associated with each relevant decisional question. Each recommendation is accompanied by the evidence level and the strength of the recommendation.
- 5. The document ends with the references.

Publication and distribution of the recommendations

The recommendations will be published on a predetermined date through the Associazione Italiana di *Dietetica e Nutrizione Clinica* – Italian Dietary and Clinical Nutrition Association (via the site www.ADIITALIA.com), journals belonging to other scientific societies and other hard-copy media or training courses for health personnel.

Updating the recommendations

The recommendations will be updated every 2 years, except in those cases where there are errors, significant omissions or where the basis of evidence has changed in such a manner as to render the recommendations or their grading obsolete.

Clinical assessment of dysphagia

(O. Schindler, A. Schindler)

The following text does not meet the criteria of the ADI Recommendations being an abstract from the "Comitato Promotore Logopedisti Italiani. Guidelines on phonic and speech therapy management of adult patients with dysphagia, Turin, 29 January 2007".

When should dysphagia be evaluated?

- 1. The risk of dysphagia should be determined in all stroke patients before the administration of food or drink (SIGN 2) [1].
- 2. Screening and evaluation must be carried out in all those patients with suspected dysphagia (signs or symptoms, start of complications) prior to administering food or drink.

In general, patients with both acute and chronic neurological diseases, neurodegenerative disorders or those with dysphagia secondary to other causes such as vascular disease, trauma, etc. may show a dysphagic picture relative to one or more phases of swallowing such as the silent type [2–7]. Appropriate management of dysphagia reduces the risk of complications and the associated costs.

A considerable number of studies, particularly between 1980 and 2000, describing specific tests dedicated to the management of dysphagia, were found on Medline and Cinhal using the keyword "dysphagia" [8–10].

How to evaluate dysphagia: screening procedures

3. The water bolus test should be part of screening for the risk of aspiration in stroke patients (SIGN 2.1.1.) [1].

- 4. The water bolus test should be part of screening for the risk of aspiration in patients with the diseases.
- 5. The screening procedures for swallowing should include:
 - initial observation of the patient's level of awareness and
 - observation of the level of postural control.

If the patient is capable of actively collaborating and is able to maintain the trunk in an upright position, the procedure should include:

- observation of oral hygiene,
- observation of the control of oral secretions and
- if appropriate, water bolus test (SIGN 2.2.1.) [1].

Screening protocols must provide clear indications of action (i.e., further specialist examination, nil by mouth, possible oral feeding) regarding all possible outcomes (SIGN 2.2.1.) [1].

Screening is strongly recommended to identify patients at risk of dysphagia and to put early care into place so as to prevent symptoms of dysphagia and reduce the risks [11].

Only some studies suggest that screening for dysphagia (i.e., the set of simple methodologies of which the principal diagnostic references are represented by the signs of dysphagia) in stroke patients can result in a reduction in pneumonia, hospital stay, costs and care of the patient [12–15]. There are not many studies on the benefits of screening in patients with other causes of dysphagia, but one study found that patients can generally benefit from screening procedures (including screening for dysphagia) [16].

In clinical practice, screening can be carried out by appropriately trained personnel (e.g., nursing staff) in order to identify patients who need to undergo specialist care (audiology, speech therapy).

Screening procedures must take into consideration, as prerequisites to swallowing, some basic clinical characteristics (awareness, attention, orientation). Among the screening procedures to be carried out is the water bolus test (sensitivity >70%, specificity 22–66%) [13–17]. The water bolus test is contra-indicated in patients in whom aspiration is probable or marked on the basis of other signs.

How to evaluate dysphagia: clinical evaluation

- 1. A standard clinical evaluation (bedside assessment) should be carried out by a competent professional in the management of dysphagia (usually the speech therapist) (SIGN 3.1) [1].
- 2. Standard clinical evaluation (bedside assessment) is recommended according to the Logemann Protocol or similar codified protocols (SIGN 3.1) [1].

3. Communication skills, cognitive functions and decisional ability must always be assessed in patients with dysphagia (SIGN 6.5) [1].

Examination without using instruments usually includes four aspects: general and specific medical history, observation of the patient and the clinical examination of swallowing. General and specific medical history must include information regarding clinical diagnosis, history of the beginning and progress of swallowing difficulties, current drug treatment, nutritional status, respiratory function (with particular attention to possible pulmonary complications), communicational and cognitive abilities [18–20].

Clinical observation and assessment are the most commonly used methods to evaluate dysphagia, which must adhere to specific protocols [21, 22]. These protocols must include the noting of the prerequisites (awareness, attention and orientation), assessment of sensitivity of the oropharyngeal and laryngeal motor and praxic structures, and performance of swallowing tests with substances and/or food of different consistencies. Finally the presence or absence of pathological signs (manifestation of reflexive cough associated with the act of swallowing, a wet or gargle-like voice, traces of bolus present from stoma or the tracheal channel, index of inhalation).

The clinical evaluation tests used by clinicians are not often supported by scientific evidence [23, 24]. Therefore it is advisable to refer to codified tools or check lists [1, 25] and to complete the diagnosis through instrumental examination.

Necessary training to carry out screening and assessment

Screening

Standard training for nursing staff necessary to carry out screening for dysphagia must include:

- identification of risk factors,
- identification of early warning signs,
- observation of eating habits (including the way in which the meal is eaten),
- water bolus test,
- monitoring of level of hydration and
- monitoring of weight and the risk of malnutrition (SIGN 4.1) [1].

Results

1. All qualified personnel involved in the discovery and management of dysphagia should be trained

on the basis of the criteria identified by the Scottish Intercollegiate Guidelines Network (SIGN 4.2.4) [1].

- 2. If the management or continuity of care of a patient cannot be guaranteed by qualified personnel, then communication among clinicians and the exchange of knowledge and support tools are crucial.
- 3. Standard criteria must be established for the interpretation of results of radiological and fibreoptic endoscopic examinations (SIGN 4.2.4) [1].

Personnel involved in the clinical care of patients should be ready to recognise and identify swallowing difficulties early in order to contact specific personnel (audiologists and speech therapists). A systematic review of descriptive studies indicates that the theoretical and practical training of nursing staff must include the identification of risk factors, the observation of eating habits, monitoring of hydration and weight, evaluation of the risk of malnutrition and knowledge of the bolus water test. Specific theoretical and practical training will allow early referral to specialized personnel and the appropriate steps to be taken [26, 27]. Theoretical and practical training must include all personnel involved in the management of dysphagia and must meet the criteria identified by the representative of the relevant professional association. Radiological and fibreoptic endoscopic evaluations must provide results according to standard criteria for unequivocal interpretation [28].

The principal assessment parameters for endoscopy can be codified [29, 30] and are such as to adopt flexible endoscopic evaluation of swallowing (FEES) as a routine methodical tool in the diagnosis and treatment of dysphagia. These parameters are identifiable on VFS. FEES and VFS allow the documentation of:

- Spillage: direct evaluation VFS/FEES.
- *Penetration/inhalation prior to swallowing*: direct evaluation VFS/FEES.
- Inhalation while swallowing: direct evaluation VFS/indirect evaluation FEES.
- Inhalation after swallowing: direct evaluation VFS/FEES.
- Assessment of stagnation: direct evaluation VFS/FEES.

Quantitative parameters for the evaluation of radiological and endoscopic methods have not yet been agreed.

Where the continuity of treatment of a patient is not possible by qualified personnel, due to geographical or environmental limitations or the lack of resources or other factors, communication among clinicians is crucial. Those personnel with greater experience should supervise and support those personnel with less experience (CASLPA, 2002).

Fibreoptic endoscopic investigation of swallowing (*B. Travalca Cupillo*)

Introduction

The current guidelines suggest the formulation of best clinical practice recommendations regarding the standardisation of some criteria adopted in flexible endoscopic evaluation of swallowing (FEES).

FEES was introduced into clinical practice more than 10 years ago. It is minimally invasive and is usually carried out on an outpatient basis.

Using a flexible rhinolarygoscope the pharyngeal cavity and epiglottic tract can be reached through the nasal fossa. Once the instrument is in position, examination of the anatomofunctionality of the palate, pharynx and larynx is carried out, including assessment of the sensitivity of the larynx and subsequently an examination of swallowing with the administration of food according to the needs of each case. With respect to this last aspect, FEES allows evaluation of spillage of bolus, penetration, inspiration (before and after swallowing), efficacy of the voluntary and reflex cleansing cough and stagnation after swallowing, and allows compensative posture to be verified and some pharyngeal and laryngeal trigger zones to be elicited.

This study is also valid for the remedial programme since the decision whether to feed the patient orally or not is based on the outcome. If the patient can be nourished orally, how this can be achieved (alone or with supervision, which foods, the way the food should be administered and in what position, etc.), whether other nutritional means, for example nasogastric tube, percutaneous endoscopic gastrostomy (PEG), are necessary, whether double nutrition is feasible (i.e., PEG plus oral), whether speech therapy is necessary and how drugs are to be administered are indicated. Finally, through the use of informed counselling, information will be gathered for the care of the patient (precautionary behaviour, manner of oral hygiene, dentures and prosthesis, the use of aids).

- Some critical points are as follows: When to use this type of investigation compared to
- VFS of swallowing.Who should carry out the fibre endoscopic examina-
- Who should carry out the fibre endoscopic examination.
- The need to use FEES to monitor weaning from enteral nutrition.
- The possibility of complications.

What can we learn from FEES?

FEES with sensory testing (FEESST) allows the following to be examined: the morphology and functionality of the nose, pharynx, base of the tongue and larynx, pharyngeal reflex, spillage, stagnation after swallowing, penetration, aspiration prior to and after swallowing, some pharyngeal and laryngeal trigger zones. Furthermore, the efficacy of the voluntary and reflex cleansing cough can be evaluated, signs of fatigue noted and compensative posture verified.

Instrumental assessment (e.g., modified barium study of swallowing, FEESST, modified barium study of swallowing with manual fluorographics) is advisable for patients with suspected dysphagia or those at high risk of dysphagia.

Video-recorded endoscopic evaluation of swallowing (i.e., FEES) involves fibreoptic rhinopharyngoscopy to evaluate the pharyngeal phase. Detailed information is obtained on swallowing and the relative functions of the superior aerodigestive tract. During this examination, therapeutic manoeuvres are carried out to achieve the intake of a safe diet and to improve the efficacy of swallowing.

Video recorded endoscopic evaluation of swallowing which tests the sensitivity of the larynx (also called FEESST) involves fibreoptic rhinopharyngoscopy to evaluate endoscopic functionality of swallowing and simultaneously sensitivity (FEESST). Sensitivity testing is completed by rhythmically administering air with sequenced pressure in order to elicit abduction of the larynx. Thus a level of sensitivity is established. Swallowing tests using the laryngoscope provide motor and sensory data on swallowing which are both thorough and objective [31]. Fibreoptic laryngoscopy is a valid method of evaluating dysphagia [32]. FEES is an additional examination to clinical assessment and is used to directly visualise the structure and physiology of swallowing in the oral cavity, pharynx and larynx in order to determine alterations and compensative or therapeutic strategies that increase the safety and efficiency of swallowing [33].

Strength of recommendation: This is a synthesis and not a recommended behaviour.

Can FEES be adopted to monitor dysphagia in weaning from enteral nutrition, and as a diagnostic tool and means of orientating procedures for remedial speech therapy or nutrition?

Compensatory procedures (changes in posture, swallowing techniques) in certain dysphagias are very effective. Equally effective are dietary procedures, for example the thickening of liquids, providing that they are monitored with VFS and/or fibreoptic endoscopy [34] (Grade A).

It is important to closely evaluate weaning from enteral nutrition in patients with favourable prognostic indexes. Weaning should be carried out in a standard manner including clinical monitoring, VFS and/or endoscopy by qualified personnel [35]. Repeated FEES allows the objective monitoring of dysphagia symptoms and the timely implementation of changes to diet and/or therapeutic strategies for the safe continuation of oral nutrition and the maintenance of an optimal quality of life [36].

Progressive chronic conditions

A clinical and instrumental evaluation may be recommended to investigate the risk of inspiration by the patient and possible need to make dietary changes or institute alternative nutritional approaches [37]. FEES reveals dysphagia in more than 50% of patients intubated for more than 48 h, many of whom show silent aspiration. Dietary recommendations based on the results of FEES prevent clinically significant cases of aspiration [38].

FEES is also recommended to objectively monitor, over a period of time, the progress of dysphagia symptoms as well as the remedial treatments undertaken with regard to both compensatory and dietary procedures (including any necessary changes to diet) in order to monitor weaning from enteral nutrition.

Strength of recommendation: B

Can FEES be carried out by any health-care staff?

The guidelines of the Royal College of Speech and Language Therapists and the opinion of other experts agree that fibreoptic endoscopy should be carried out by appropriately trained qualified health-care personnel [39]. All personnel involved in determining and managing dysphagia should be trained in accordance with the recommendations of a relevant professional institution [1].

It is advisable to closely assess weaning from enteral nutrition in those patients with a favourable prognosis and such assessment should be carried out in a standard fashion including clinical monitoring, VFS and/or endoscopy by qualified personnel [35]. Audiologists who use FEES must in any case carry out the procedure in accordance with the rules of the relevant professional institution [18]. FEESST is a safe and well tolerated procedure to objectively assess patients with dysphagia when carried out by a qualified audiologist [40]. Endoscopic evaluation of swallowing should ideally be carried out by an audiologist [41]. It is recommended that FEES is carried out by an audiologist or alternatively by an otorhinolaryngologist, both of whom must have full knowledge of the physiopathology of swallowing and rehabilitation criteria

Strength of recommendation: B

Are FEES and VFS of swallowing both valid? Is one better than the other?

The diagnostic procedures of VFS and transnasal endoscopy of swallowing are complementary in their diagnostic potential (Grade A); besides endoscopy, at least upon initial diagnosis, VFS should be carried out so as not to neglect the (frequent) dysfunctions of the superior oesophageal sphincter [34]. Probably fluoroscopy and endoscopy are equally valid in achieving the aims of monitored swallowing [34]. VFS and endoscopic evaluation of swallowing are both valid methods for the assessment of dysphagia. Clinicians must consider which one is more appropriate for each patient in different settings [1]. There is no evidence that FEES is superior or inferior to VFS of swallowing with regard to reliability and validity [33]. From the available literature it appears that FEES and VFS of swallowing are both valid diagnostic examinations that are best considered complementary rather than alternative [42].

If a dysphagic outpatient has management and behaviour guided by the results of VFS of swallowing and FEESST, the results concerning the incidence of ingestion pneumonia and the healthy intervals between episodes are essentially the same [43]. FEES and VFS of swallowing can be considered valid and complementary instrumental evaluations. It is recommended in clinical practice that the clinician assesses which is the more appropriate.

Strength of recommendation: B

Does FEES induce any complications?

FEESST is a safe and well tolerated procedure to objectively evaluate patients with dysphagia when carried out by an expert audiologist [40]. The audiologist who uses FEES must be well aware of the risks, which include epistaxis, mucosal damage, retching, allergic reactions to the local anaesthetic, laryngeal spasm, vasovagal response, etc. [18]. FEESST is a safe method for assessing dysphagia in a third-level care setting and it can also have an application in a chronic care setting [32].

Aviv et al. [44] have reported the experience of various authors regarding possible complications. Reported complications included epistaxis, vasovagal syncope, laryngeal spasm and allergic reactions to lidocaine. The incidence of complications is extremely low; epistasis is the most frequent; ingestion reactions, in some cases more complex (vasovagal syncope, laryngeal spasm, allergic reactions to lidocaine), have an incidence lower that 1/1000.

The use of blue dye to make food used in swallowing tests visible must be avoided in patients who show a

deficit in glucose-6-phosphate dehydrogenase (favism): the possibility of triggering a haemolytic crisis is significant from a clinical point of view [45].

The incidence of complications is extremely low, but it is advisable not to submit patients to FEES who show clinical states that could induce complex reactions such as vasovagal crisis, laryngeal spasm, allergic reactions to local anaesthetics and allergies to dairy products. In patients with favism, blue dye should be avoided as a tracer in the bolus test.

Strength of recommendation: A

VFS and other imaging techniques

(F. Barbiera, E. Juliani)

Which instrumental examinations are useful in the evaluation of patients with oropharyngeal dysphagia?

The most suitable instrumental examinations in patients with oropharyngeal dysphagia are VFS and rhinoendoscopy, which is the gold standard for the evaluation of the structural causes (organic lesions) of oropharyngeal dysphagia.

Evidence level: I *Strength of recommendation*: A

What is the role of VFS in evaluating patients with oropharyngeal dysphagia?

VFS is considered the gold-standard method in evaluating oropharyngeal dysphagia as it reveals the presence of silent aspirations in a more accurate manner than clinical evaluation (20–40% of undetected inspirations) [46].

Evidence level: I Strength of recommendation: A

Who should evaluate the dysphagic patient?

Evaluation is necessarily multidisciplinary, but in the first instance it is the audiologist who, after clinical assessment and if necessary endoscopy, decides if VFS should be used.

Evidence level: VI *Strength of recommendation*: A

Is VFS a screening tool?

VFS cannot be used in all patients, it cannot be carried out with the patient in bed and specific equipment is necessary. Thus the test with water appears to be the best and most simple screening tool. The risk of dysphagia is therefore definable in a sufficiently accurate manner with the use of simple clinical evaluation such as the Bedside Swallowing Assessment (BSA). Furthermore, clinical evaluation cannot be avoided, but VFS, because of the risks associated with exposure to ionising radiation, should ONLY be performed if there are genuine clinical indications for its use (Italian Legislative Decree 187/2000).

Evidence level: I Strength of recommendation: A

Is there a correlation between the presence of inspiration and pulmonary infection?

Numerous studies have shown a significant association between fluoroscopic evidence of inspiration of barium and the risk of developing pulmonary complications [35].

A recent study has shown that VFS can predict the risk of respiratory infection. In particular, of 381 patients, those with laryngeal penetration, tracheal-bronchial inspiration or silent inspiration had, respectively, 4 times (p = 0.008), 10 times (p < 0.0001) and 13 times (p < 0.0001) the risk of developing pneumonia compared to patients with normal swallowing [47, 48].

Evidence level: I *Strength of recommendation*: A

When should VFS be carried out?

VFS should be used when clinical and endoscopic evaluation are insufficient to determine or exclude swallowing dysfunctions with the risk of inhalation. There is no doubt when there is dysfunction in the pharyngeal phase (i.e., disease of the superior oesophageal sphincter), for which VFS represents the diagnostic "gold standard".

Evidence level: I *Strength of recommendation*: A

What are the most common cases for the use of VFS?

- In suspected inspiration including silent or penetration inspiration: complementary to clinical evaluation and endoscopy, VFS is indicated to identify the altered swallowing phase that is caused by the inspiration.
- In order to establish the manner of feeding (oral or non-oral) and the consistency of foods allowed.

- Mediterr J Nutr Metab (2009) 2:49-80
- In guiding nutritional rehabilitation as well as using the most adequate compensatory postures to evaluate efficacy.
 Evidence level: I Strength of recommendation: A

What is the most appropriate method of monitoring speech therapy?

Laryngoscopy and VFS are complementary examinations. The above-mentioned considerations are relevant for radiological examination with regard to the diagnostic use of ionising radiation.

Evidence level: IV Strength of recommendation: A

Recommendations

In carrying out radiological investigation, the radiologist's choice of consistency of barium enema depends on the clinical question and the type of dysphagia. Thus each case must be evaluated individually.

Evidence level: VI *Strength of recommendation*: A

When carrying out a radiological assessment of the patient with oropharyngeal dysphagia, the radiologist must consider all the causes of oesophageal dysphagia, completing the examination, when considered appropriate, with a study of the oesophagus.

Evidence level: VI *Strength of recommendation*: A

In suspected dysfunctional oesophageal pathologies, radiological examination can be considered valid as an initial examination providing that it is carried out with excellent technique (in ortho- and clinostatism).

Evidence level: VI *Strength of recommendation*: A

Nutritional indications during oncological dysphagia (S. Riso, N. Facchin)

What criteria should be adopted in evaluating indications for a modified diet or artificial nutrition?

In the presence of sufficiently safe swallowing, oral nutrition (with a modified diet consistency) represents the first choice [49]. Artificial nutrition is advisable in

cases of serious dysphagia (when oral nutrition is contraindicated).

Evidence level: VI *Strength of recommendation*: A

When is artificial nutrition advisable in patients being nourished orally?

Artificial nutrition is recommended in patients who are being nourished orally but whose intake is <60% of calorie-protein requirements [50].

When should nutritional support be adopted?

The use of nutritional support (thickened if necessary) is advisable when intake is <60% of calorie-protein requirements (in practice, if nutritional support of up to 600 kcal/day is needed).

Evidence level: VI Strength of recommendation: B

Level of nutritional support

In the absence of specific data it would seem reasonable to recommend, for non-obese cancer patients, the following support [51]:

- Calories: 30–35 kcal/kg ideal weight in a mobile patient; 20–25 kcal/kg ideal weight in a bedridden patient.
- Protein: 1.2–1.5 g/kg of ideal weight.

- Water requirements: 30–35 cm³/kg of current weight. *Evidence level*: VI

Strength of recommendation: B

What type of diet should be given in a patient undergoing radiotherapy?

Radiotherapy to the head and neck or thorax can cause dysphagia, mucositis, xerostomia, hypo-/dysgeusia and oesophagitis.

It may be necessary from time to time to modify the consistency of the diet (from semiliquid/fine purée to light/soft), avoid food and drinks which can cause/ag-gravate pain (e.g., fruit juices, acidic fruit), consider sensitivity to the various temperatures of food, add moist foods such as sauces/condiments and drink during meals, and use artificial aromas, spices and strong-tasting foods (bitter, sour, spicy) [52, 53].

Evidence level: VI Strength of recommendation: B What type of diet should be given to patients with an oesophageal prosthesis?

In order to avoid the risk of occlusion, a diet with a modified consistency is advisable, from fine soft to semiliquid purée. The patency of the lumen can be maintained by drinking fizzy drinks during meals. Some foods may be best avoided (e.g., large portions of fruit and fresh vegetables). Meals must be eaten sitting up straight [52].

Evidence level: VI *Strength of recommendation*: B

Which patients should receive nutritional support?

Patients undergoing radiotherapy for oesophagus or head and neck cancer [54, 55], where advisable, should receive nutritional support and nutritional counselling, which are effective in increasing calorie-protein intake and in preventing loss of weight [56] and the interruption of therapy [57].

Evidence level: II *Strength of recommendation*: A

When should nutritional support begin?

Nutritional support must begin in the presence of malnutrition or when a period of serious dysphagia of more than 7 days or the ingestion of <60% of requirements of at least 10 days is foreseen [50].

Evidence level: VI *Strength of recommendation*: B

Which route of administration should be adopted?

In patients with oesophagus or head and neck cancer, where the gastrointestinal tract is accessible and functioning, enteral nutrition is the route of choice. Enteral nutrition is effective in minimising weight loss [58, 59], preventing dehydration and the interruption of radio-/chemotherapy [58], reducing the frequency of hospitalisation [58] and improving the quality of life [59, 60].

Evidence level: II Strength of recommendation: B

Which access route of administration should be used?

In the presence of oesophageal or head and neck cancer, enteral nutrition may be administered through a nasogastric tube or, if the duration of nutritional support foreseen is >3-4 weeks, through a PEG (or percutaneous fluoro-scopic gastrostomy) [61–63].

Evidence level: VI *Strength of recommendation*: B

When is prophylactic gastrostomy tube insertion advisable in patients selected for radio-/chemotherapy?

In those patients at a high risk of serious dysphagia (e.g., if high-dose radiotherapy or integrated radio-/chemotherapy is planned, or in those with stage II–IV tumours), prophylactic gastrostomy (or jejunostomy) insertion is recommended. Prophylactic placement of the enteral access significantly reduces the likelihood of subsequent hospitalisation for malnutrition and dehydration [59, 64–67].

Evidence level: III *Strength of recommendation*: B

Which nutritional parameters should be assessed at the beginning of nutritional treatment and during follow-up?

The following parameters must be evaluated at the beginning of nutritional treatment and during follow-up: oral ingestion (calories, protein, liquids), type of diet (consistency and division of meals), state of hydration (skin tone, mucus hydration, water balance, haematocrit, average corpuscular volume, azotaemia, sodium loss), anthropometric parameters (weight, or in patients whose body weight cannot be evaluated, plical triceps and arm circumference), biochemical (albumin and, if possible, vitamins and minerals) and functional (total lymphocytes, handgrip) [68].

Evidence level: VI *Strength of recommendation*: A

When should nutritional support or diet be suspended?

In patients who recommence oral feeding, enteral nutrition must be continued until about 75% of nutritional requirements are met by oral feeding [69].

The intake of liquids must also be carefully evaluated. It would appear reasonable to suggest maintenance of the enteral nutrition access (sometimes only necessary for the administration of liquids) for a sufficient time (some months or more) after the recommencement of oral nutrition.

Evidence level: VI Strength of recommendation: B Nutritional indications during mucositis associated with hematopoietic stem cell transplantation (S.G. Sukkar, M.T. Van Lint)

What recommendations should be made during dysphagia due to mucositis in stem cell transplant?

Dysphagia and odynophagia with grade III–IV mucositis occur in 67–98% of patients who have undergone heterologous stem cell transplantation and completed the conditioning period [70].

For this reason a change in diet and resort to artificial nutrition are mandatory in the majority of patients with a treatment duration of approximately 30 days.

The aim of nutritional support is to prevent and cure malnutrition, thus limiting nutritional sequelae from conditioning regimens, complications from the transplant itself or rejection (GVHD) and venoocclusive disease (VOD) and from the increased needs linked to catabolic stress and haematological reconstruction [70–73]. Nutritional support is also associated with an increase by the time of relapse and by disease-free survival [74].

Evidence level: I *Strength of recommendation*: A

Which route of access should be used for artificial nutrition?

Numerous clinical studies have evaluated the use of parenteral compared to enteral nutrition in patients undergoing haematopoietic stem cell transplantation. Considering the high occurrence of grade III–IV mucositis in heterologous stem cell transplantation, artificial parenteral nutrition is recommended through a central venous access, which allows better modulation in administering liquids, ions and macronutrients [75–77].

Evidence level: I *Strength of recommendation*: A

During autotransplantation the use of the enteral route provides numerous potential advantages compared to the parenteral route: recovery of intestinal function, a reduction in cholestasis by stimulation of the gallbladder and a reduction in bacteraemia as a result of reduced bacterial translocation [78].

With regard to the route of access, the nasojejunal tube is preferable to the nasogastric tube. It is inserted for prophylactic purposes during the transplant, prior to the occurrence of mucositis, which would make placement difficult. Moreover, it should be associated with prophylactic and important antiemetic treatment to prevent its dislodgement [79]. *Evidence level*: III

Strength of recommendation: B

When should nutritional support begin?

There is no consensus on the criteria for starting parenteral nutritional support, which in any case must be based upon the general condition of the patient, the grade of mucositis and the effective weight loss. Furthermore, it should be remembered that metabolic/nutritional intervention must be considered as an integral part of the supportive treatment for patients undergoing haematopoietic stem cell transplantation.

Evidence level: VI *Strength of recommendation*: B

What are the nutritional requirements?

With regard to energy requirements, estimates are at around 130–150% (30–35 kcal/kg/day) of the basic theoretical energy expenditure [75, 80, 81].

The contribution of protein via the enteral route is estimated at about 0.2 g/kg unless the patient has a BMI of $<30 \text{ kg/m}^2$, in which case it must be reduced to 75%.

The parenteral contribution of protein, in standard amino acidic solution form, is stabilised at 1.4–1.5 g/kg/day [82–84].

Long-chain or long-/medium-chain triglycerides should supply 30–40% of non-protein energy, which is particularly useful in those patients in whom iatrogenic hyperglycaemia develops or infections arise [75, 80].

Evidence level: II *Strength of recommendation*: B

What role does glutamine play in enteral or parenteral pharmaconutrition?

Effects of oral integration of glutamine vs. placebo

As regards the use of oral glutamine, taken in the form of eye drops, a significant reduction in the time necessary for the normalisation of the level of circulating neutrophils (6.82 days, 95% CI 1.67–11.98; p = 0.0009) has been observed. In contrast, there do not appear to be significant results regarding hospitalisation, changes in body weight, the duration of nutritional support, the number of positive haemocultures and survival at 100

days [85]. Therefore indications on the use of enteral glutamine do not exist.

Evidence level: II *Strength of recommendation*: D

Effects of parenteral integration with glutamine vs. placebo

Regarding parenteral glutamine, one of the most significant results is a reduction in hospital stay of 6.62 days (95% CI –9.77 to 3.47; p = 0.0004). The odds ratio for these patients to develop positive haemocultures is significantly lower than for patients treated with standard parenteral nutrition (OR 0.23; 95% CI 0.08–0.65; p =0.006) [86].

In contrast, significant differences have not been reported with regard to the severity of mucositis, changes in body weight, duration of nutritional support, GVHD incidence >2, duration of neutropenia and survival at 100 days.

Thus, on the basis of data in the currently available literature and from a practical point of view, it is advisable to use glutamine routinely in patients who are going to undergo bone marrow transplantation whereas prolonged intestinal insufficiency is foreseen [87].

Evidence level: I Strength of recommendation: B

Nutritional indications during acute neurological dysphagia

(L. Rovera, P. Nanni)

Which nutritional parameters should be monitored?

The following should be carried out [35, 88]:

- Screening for malnutrition 24–48 h after hospitalisation using the Nutritional Risk Screening (NRS) tool or the Malnutrition Universal Screening Tool (MUST), to be repeated once a week in not at-risk patients.
- Assessment of dietary intake once a week if intake meets 75–100% of protein-calorie requirements and twice a week if intake is <75% of daily requirements. In at-risk patients, a more thorough nutritional evaluation is necessary, which involves:
- 1. Clinical assessment to identify possible conditions that could alter nutritional requirements.
- 2. Essential anthropometric measurements and indexes (body weight, BMI, weight loss, brachial circumference in order to evaluate body fat). Weight measurements are recommended once a week.

 Essential biochemical assessment (albumin, plasma protein at slowest half-life, lymphocyte count). Weekly checks of plasma protein at slowest half-life. Evidence level: VI Strength of recommendation: A

Which criteria should be used to evaluate recommendations for a modified diet or artificial nutrition?

Criteria to evaluate recommendations for a modified consistency diet or artificial nutrition are the state of awareness, the severity of dysphagia and the presence of malnutrition.

The modified consistency diet must be used in presence of sufficiently safe swallowing. Artificial nutrition (enteral) is recommended in coma, severe dysphagia and in association with a modified consistency diet if this does not guarantee meeting daily requirements (<60% of requirements for 3 days) and in non-dysphagic patients who have insufficient dietary intake confirmed over a period of time [35].

Evidence level: VI *Strength of recommendation*: A

What type of nourishment?

In non-dysphagic patients nourishment should be in accordance with the Healthy Eating Guidelines, possibly enriched with nutritional support in malnourished patients.

In dysphagic patients the diet must be, where possible, pleasant and well presented and include different levels of consistency (from the "puréed" diet to a normal one) according to the ability to swallow solids and liquids. The division of meals, posture and behaviour suitable for safe swallowing can favour dietary intake [1, 89].

In those patients unable to consume adequate volumes of food, the use of high-caloric density foods is necessary.

Evidence level: VI *Strength of recommendation*: A

Which nutritional requirements?

Energy requirements can be measured using an indirect calorimeter, but in the absence of specific data, energy requirements can be obtained using the factorial method (predicted metabolic base \leftrightarrow 1.1).

Protein requirement in uncomplicated cases is 1 g/kg/day and in the presence of hypercatabolic conditions or bed sores 1.2–1.5 g/kg/day.

Vitamin and mineral requirements for normally nourished patients overlap with those of the general population in terms of age, sex and body weight, while for malnourished patients estimates must be made on an individual basis.

Water requirement where there are losses not related to disease is 30–35 ml/kg/day and in the elderly 25–30 ml/kg/day, but this should be reassessed where disease-related losses or environmental conditions change or on the basis of specific clinical situations [66].

Evidence level: VI *Strength of recommendation*: B

When should nutritional support be used?

Oral nutritional support must be used when intake is 75% of requirements, preferably in malnourished non-dys-phagic patients [90].

Evidence level: II *Strength of recommendation*: A

Which thickeners are preferable? When should jellied water be adopted?

There is no agreement on the use of supplements in dysphagic patients [1].

In the presence of dysphagia, "commercially" available fluid thickeners effectively and in a stable manner modify viscosity, making the administration of fluids possible as well as improving swallowing functions and reducing the risk of inhalation [89, 91].

Thickeners and jellied water do not meet fluid requirements, but jellied water can favour greater intake [92].

Evidence level: VI *Strength of recommendation*: B

When should artificial nutrition begin?

Artificial nutrition of choice is enteral. Starting enteral nutrition no later than 5–7 days in normally nourished patients and no later than 24–48 h in malnourished patients has a favourable effect on survival [35, 93].

Evidence level: II Strength of recommendation: B

Which route?

Parenteral nutrition is recommended if enteral nutrition cannot be achieved, is contraindicated or is unable to meet daily nutritional requirements (in this case both methods can be used simultaneously) [35].

Evidence level: VI

Strength of recommendation: A

Which access?

The nasogastric tube, if there are no contraindications to its placement, is the preferred route of access [93] in the first 2–3 weeks after stroke in order to achieve the best impact on outcome; insertion of the PEG must not be carried out earlier than 4 weeks after the stroke enteral nutrition of a duration of more than 2 months is foreseeable.

Evidence level: II *Strength of recommendation*: A

Where evident risk of aspiration exists, the placement of a jejunal tube is recommended [66].

Evidence level: VI *Strength of recommendation*: A

What should be monitored?

In those patients receiving a modified consistency diet it is necessary to monitor dysphagia, the risk of inspiration, the contribution of foods (macro- and micronutrients) and fluids, whether daily nutritional requirements are being met and the progress of the diet on the basis of swallowing capacity.

In patients receiving enteral nutrition, the contribution and whether daily nutritional requirements are being met should be monitored together with the position of the patient, the presence of gastrooesophageal reflux, gastric stagnation and the speed of administration.

All patients should be monitored for nutritional status (weekly weighing and biochemical parameters) and state of hydration (hydration of mucus, water balance, azotaemia, natraemia, haematocrit).

Evidence level: VI *Strength of recommendation*: B

How long should treatment last? When should diet or artificial nutrition be suspended?

The suspension of the modified consistency diet and the intake of a normal diet depend on the progressive recovery of safe and effective swallowing [89]. The suspension of enteral nutrition is recommended when oral intake is adequate (meeting approximately 75% of nutritional requirements) and is possible without complications [61].

Nutritional indications during chronic neurological dysphagia

(A. Crippa, A. Bosetti)

Introduction

By chronic neurological dysphagia we mean compromised swallowing which manifests itself during a progressive neurological disease, for example Parkinson's disease, Parkinsonism, amyotrophic lateral sclerosis (ALS), multiple sclerosis, neurodegenerative dementia and dementia secondary to chronic cerebral vasculopathy. Also included in this framework is dysphagia in the elderly, which comprises both difficulty swallowing secondary to primary alterations in ageing or presbyphagia and dysphagia with a multifactorial aetiology, which are often difficult to insert into a diagnostic structure and have a neurodegenerative aetiopathogenicity.

Common characteristics of these conditions are deceptive onset of swallowing difficulties with a slow and progressive evolution of symptoms; difficulty in early diagnosis due to a subtle and unclear appearance in the complexity of symptomatology of the disease that caused it; nutritional rehabilitation influenced by the progression of symptomatology, which aims to maintain safe oral nutrition, even partial, as long as possible.

The absence of specific guidelines in the literature regarding nutritional treatment of chronic dysphagia in progressive neurological diseases must be highlighted.

What role do nursing staff play in recognising and treating swallowing difficulties in neurologically impaired adults?

The literature that attributes recognition and treatment of dysphagia to non-medical professionals is not based upon clinical trials or the opinion of experts [94]. Thus there is no evidence of its efficacy. This review discusses the role of the nurse in recognising and evaluating dysphagia, interventions and treatment of the dysphagic patient, and the role of education of relatives and nonprofessional carers.

Nursing staff have an important role in recognising and treating dysphagia. It is necessary that information on risk factors, strategies for the early discovery and monitoring of symptoms, safe and effective strategies, posture, diet, how to present and position food, and other important behavioural and environmental factors is made available to carers [95].

Strength of recommendation: B

Which patients should be checked for dysphagia?

All patients suffering from multiple sclerosis should undergo a close evaluation of their swallowing functions, especially those with bulbar compromise and elevated levels of disability [96, 97]. Symptoms must be looked for as patients often do not complain about them. Dysphagia is more severe and frequent in advanced forms of multiple sclerosis but it is also present in less severe disease [97].

Evidence level: V Strength of recommendation: B

In other cases where there are no specific indications, the following recommendations can be made:

Dysphagia should be considered in all patients suffering from chronic neurological disease and in the elderly in general who show a weight loss >5% in 3–6 months, probably secondary to hypophagia and not otherwise explainable and/or those with repeated lower respiratory tract infections.

How to intervene with dysphagia?

Evidence in the literature is scarce. In multiple sclerosis the frequency of other concomitant problems makes a useful multidisciplinary approach. The personnel and respective roles are [98]:

- Speech pathologist, to define the ability to swallow.
- Physiotherapist, to define posture during meals.
- Occupational therapist, to define the need for auxiliary tools (cutlery).
- Physician, to identify nutritional requirements.
- Physician/pharmacist, to evaluate possible drug interference with appetite and nutritional status.
- Dietician, to formulate an appetising diet that respects the nutritional requirements, swallowing ability and the patient's tastes. A homogeneous diet can be insipid and boring if it is not given particular attention, thus favouring weight loss.

In Parkinson's disease there is no evidence from controlled clinical trials that non-pharmacological treatment of swallowing is effective in preventing inspiration. The 201 protocol is currently underway to study the effects of postural treatment and treatment with thickened fluids in preventing episodes of inspiration [99].

In neurodegenerative dementia and dementia secondary to chronic cerebral vasculopathy, there is no sufficient evidence to suggest that rehabilitative intervention may be effective in improving dysphagia. In patients with Huntington's chorea some preliminary evidence suggests that exercise (speech therapy) may reduce the risk of inspiration in patients with low-grade disease [100]. When should non-oral or modified oral nutrition be introduced?

Specific indications are lacking and as weight loss in these patients is partly due to the clinical progression of the disease itself, the difficulty in providing indications regarding nutritional parameters is obvious.

According to the guidelines of the American Gastroenterological Association (AGA), indications for enteral nutrition for dysphagia must meet the following criteria [100].

After discovering dysphagia the first decision to be taken is in relation to the introduction of non-oral feeding. This decision depends on the probability that the patient can maintain safe orally feeding and on the (unproven but reasonable) grounds that non-oral feeding probably reduces the risk of pneumonia from aspiration. This decision should be taken together with the speech therapist who can, on the basis of the VFS examination of swallowing and therapeutic manoeuvres, estimate the chances of reducing the risks from oral feeding and improving the efficacy of swallowing with such manoeuvres (posture or compensatory strategies). The choice between oral and non-oral feeding will also be influenced by the natural progression and prognosis of the underlying disease as well as the patient's cognitive capability.

At this stage the introduction of dietary changes and specific therapies for swallowing is advisable. According to AGA, the treatment of oropharyngeal dysphagia is not an exact science. The quality of the evidence in support of much that is generally accepted, representing current best practice, is not particularly high but is sustained by reasonable evidence of the biological plausibility and the weight of clinical opinion.

Evidence level: VI Strength of recommendation: B

When is the best time to change to enteral nutrition?

In patients with ALS there is no evidence of the best time to move to tube feeding (PEG placement). Generally, in equally serious conditions (the principal predictive significance seems to be linked to respiratory conditions, however the factors involved are numerous), survival appears to be correlated with the early placement of a PEG. Studies on whether enteral support can improve or stabilise maximum vital capacity, and therefore research on the different nutritional conditions, are necessary [101].

In the absence of evidence, the American Academy of Neurology's recommendation is still valid, even though it is not well substantiated, i.e., that PEG is indicated "when dysphagia is significant and there is a loss of weight" [102].

In multiple sclerosis there is no evidence concerning the best time to change to tube feeding (PEG placement). As a general rule, if weight decreases, with or without dysphagia, despite dietary intervention then enteral nutrition should be considered using a nasogastric tube in those in whom the intervention is an interim or temporary measure, and PEG in those undergoing continual nutrition [102]. Whereas percutaneous radiological gastrostomy appears to be safer than PEG in patients with ALS with moderate or severe respiratory impairment, and has been followed by a longer survival in a non-randomised study, Chiò et al. [cited in 102] and other authors did not find differences between the two methods (Desport et al. and Shaw et al., cited in 102]).

In elderly patients the guidelines of the main Scientific Societies for clinical nutrition, including the Società Italiana di Nutrizione Parenterale ed Enterale (SINPE), European Society of Parenteral and Enteral Nutrition (ESPEN) and American Society of Parenteral and Enteral Nutrition (ASPEN), give indications for artificial nutrition in the following cases:

- Serious or moderate protein-energy malnutrition (weight loss >10% in the last 6 months) with a dietary contribution foreseen or estimated as insufficient (<50% of requirement) for a period of more than 5 days. In such cases the aim of artificial nutrition is to correct existing malnutrition.
- Normal nutritional status with an estimate or prediction of insufficient oral nutrition for at least 10 days. In such cases the aim of artificial nutrition is to prevent malnutrition [103].

These conditions also apply to dysphagic patients.

In general, the route of administration of the nutrition varies on the basis of the capacity to meet the nutritional requirements and the risk of aspiration according to the following progression:

- Oral feeding: using strategies that deliver incremental dietary adjustments of specific food consistency with natural characteristics to be re-evaluated over time.
- Mixed nutrition: from oral feeding as the principal source+nutritional integration/water via a tube (some-times intravenously for hydration only) up to enteral nutrition as the principal source+secondary oral integration.
- Total enteral nutrition.

Is enteral nutrition nutritionally advantageous?

In patients with ALS there is weak but positive evidence. It appears obvious that patients who are unable to swallow could benefit from PEG placement, but evidence is lacking in favour of nutritional improvement in those patients who lose weight for reasons not related to dysphagia [104].

Evidence level: III *Strength of recommendation*: B

Prospective studies are needed to compare the outcome in patients who have undergone PEG at different nutritional stages and malnutrition. Enteral nutrition in multiple sclerosis can improve the nutritional status, reduce the risk of pneumonia from aspiration, reduce the risk of ulcer from pressure and reduce to a minimum tiredness associated with feeding. Oral feeding can often be continued and in some cases a complete recovery of total oral nutrition can be achieved [98].

In Alzheimer's disease it is not clear whether the loss of weight which accompanies the advanced stages of the disease can be completely prevented by optimising the treatment of dysphagia [105].

Is enteral nutrition advantageous to survival?

In patients suffering from ALS there is some evidence that radiologic gastrostomy placement may be advantageous *vs.* PEG [104, 106].

Evidence level: III *Strength of recommendation*: B

Further trials are necessary as there are many factors, apart from PEG placement, which influence survival.

Pneumonia in Alzheimer's disease is a common cause of morbidity and death. The risk of pneumonia is not only correlated with dysphagia and the risk of aspiration but also with motor independence, nutritional status and immune response. Prevention of pneumonia through the appropriate treatment of dysphagia is not supported by empirical evidence. The potential role of tube feeding in patients with advanced Alzheimer's disease is small [105].

Evidence level: VI *Strength of recommendation*: C

Which nutritional parameters should be monitored?

There is no available evidence. We are dealing with patients who lose weight for reasons that are unrelated to dysphagia; these include sarcopaenia, immobility, possible metabolic alterations, altered organ function, reduced functional reserve up to organ insufficiency for the disease itself or for concomitant diseases.

Evidence level: VI

What impact does PEG have on the quality of life?

In patients with ALS there is no evidence of an improvement in the quality of life after PEG placement (two trials) [104].

Evidence level: III

The performance of this procedure in order to improve quality of life is doubtful [106].

Strength of recommendation: C

Patients with multiple sclerosis may see artificial nutrition as frightening, representing the last resort. Artificial nutrition also has an effect on the level of support for the carer when the patient leaves hospital. After careful consideration of the needs of the patient, artificial nutrition should be discussed with sensitivity and a treatment plan agreed upon by both the patient and carer [98].

Nutritional indications during "functional" dysphagia

(F. Cortinovis, P. Pallini)

Introduction

The term "functional dysphagia" is used to define different frameworks:

 The area of functional gastrointestinal disorders (different groups and variable combinations of chronic or recurrent gastrointestinal symptoms which are not attributable to organic, structural or biochemical alterations, and do not recognise an identified physiopathological mechanism).

Dysphagia is defined as an abnormal sensation when passing bolus via the oesophagus. In order to make a diagnosis morphological lesions must be excluded as well as gastroesophageal reflux and oesophageal motor diseases.

Criteria must be present for at least 3 months and symptoms must have arisen at least 6 months prior to diagnosis [105].

- 1. The area of motility disorders as a cause of dysphagia: Primary motility disorders
 - achylia
 - diffuse oesophageal spasm [107]
 - nutcracker-like oesophagus
 - nonspecific motility disorders
- 2. Secondary motility disorders
 - GER (gastroesophageal reflux) [108, 109]
 - eosinophilic oesophagitis [110]
 - collagen diseases (particularly scleroderma)
 - neuromuscular diseases
 - endometabolic diseases

- 3. The area of psychological-psychiatric diseases. In this field dysphagia is characterised by:
 - avoidance of food
 - fear of suffocation or vomiting
 - absence of cognitive distortions regarding weight and/or body shape
 - absence of morbid preoccupations regarding weight and/or body shape
 - absence of organic diseases or psychosis.

It is recommended that all patients with functional dysphagia undergo a thorough investigation of their eating history, which assesses food intake. This could underline possible self-imposed limitations potentially capable of creating nutritional deficiencies.

The diseases from the first area normally do not require to change the usual oral diet. If the patient plans to exclude some foods from the diet, the possible consequences over time must be evaluated [103, 105].

Only in some diseases in the second area (particularly collagen diseases and neuromuscular diseases) may the use of modified consistency diets or artificial nutrition be necessary. These patients have a reduced food intake. Variations in body weight are an indicator that constitutes the best ratio between reliability and low cost. For a more thorough and precise diagnosis, the patient must undergo an exhaustive nutritional assessment comprising anthropometric information (as a minimum: determination of the plica and circumference of the central third of the arm) and blood chemistry (at least haemochrome with the leucocytic formula, protein electrophoresis, transferrin, pre-albumin). In order to obtain a complete evaluation of a patient's nutritional state it is also advisable to perform instrumental examinations, including impedance testing and DEXA.

Nutritional requirements do not vary from the standard provided on the basis of energy expenditure for the various types of individuals described by LARN (Italian Recommended Dietary Allowances). The modified diet should be suggested jointly among the various professionals involved in the clinical management of the patient: speech pathologist, speech therapist, nutritionist and dietician. Each professional prescribes the characteristics on the basis of his or her professional competence (the speech pathologist and speech therapist will contribute with the consistency, while the nutritionist and dietician will define the nutrient composition).

The use of nutritional support is advisable where natural foods do not meet the nutritional requirements. When dysphagia is such that a modified diet does not exclude the risk of penetration and inspiration then artificial nutrition is instituted starting with enteral nutrition with the creation of an artificial stoma (gastric or jejunal); the latter is preferable in cases of gastric reflux. Parenteral nutrition should be reserved for those cases where the digestive tract is not accessible. During enteral nutrition patients must undergo the monitoring examinations provided for in the SINPE and/or ESPEN guidelines.

Resorting to a modified diet or artificial nutrition is not necessary and can be counterproductive in diseases from the third area [111].

In which functional dysphagia-related diseases is a modified diet or artificial nutrition indicated?

It is not a matter of disease! The intensity of dysphagia must be assessed together with the aetiology, the probability of therapeutic success and the time necessary to carry out treatment, and with these criteria the actual and potential consequences can be evaluated, and a therapeutic strategy and/or a strategy to prevent malnutrition established. It must be remembered that in the case of dysphagia from diseases of the third area, a modified diet can be counterproductive.

Evidence level: VI *Strength of recommendation*: B

Which nutritional parameters should be monitored (startup and follow-up)?

Body weight (or rather the change in weight) and food actually eaten (evaluation of left-overs) should be monitored. If necessary pre-albumin as rapid response parameter to the variation in food intake should also be determined.

Evidence level: VI *Strength of recommendation*: A

What are the nutritional requirements?

These should be estimated or rather measured for every patient (indirect calorimetry) (see also the *Introduction*). *Evidence level*: VI *Strength of recommendation*: A

Which type of nutrition should be adopted in the various functional disorders?

The aetiological and physiopathological diagnosis of dysphagia together with the associated disorders must be evaluated.

Evidence level: VI *Strength of recommendation*: B When should nutritional support be used

Nutritional support should be instituted when a reduction in nutritional intake in the last week is equal to or more than 10% of the energy required to balance requirements.

Evidence level: VI Strength of recommendation: B

When should artificial nutrition begin?

Artificial nutrition should begin when dysphagia is such that a reduction in nutritional intake in the last week is equal to or more than 20% and the risks of penetration and aspiration are no longer balanced by an advantage to the patient (psychological, nutritional, social).

Evidence level: VI *Strength of recommendation*: B

Which route should be adopted?

The ideal route for enteral nutrition is through a PEG, provided it is not contraindicated for clinical or age-related reasons (see ESPEN guidelines). The ideal route for parenteral nutrition is through a central venous catheter. Total parenteral nutrition via a peripheral route is useful for very short periods and if the intention is to provide nutritional support.

Evidence level: VI *Strength of recommendation*: A

What should be monitored?

Weight, glycaemia, pre-albumin, electrolytes, stool frequency.

Evidence level: VI *Strength of recommendation*: A

How long should the patient undergo treatment?

This depends on the cause of dysphagia and the therapeutic aim: prevention or cure of malnutrition? *Evidence level*: VI *Strength of recommendation*: B

How to carry out enteral nutrition during serious gastroesophageal reflux?

When there is a lack of scientific evidence enteral nutrition should be carried out via a jejunal tube with continuous administration. In persistent gastroesophageal reflux a jejunostomy is preferable. *Evidence level*: VI *Strength of recommendation*: A

When should enteral nutrition or diet be suspended?

When dysphagia has been cured and when the patient is able to meet his or her own requirements with spontaneous feeding without the risk of penetration or inspiration of foods.

Evidence level: VI *Strength of recommendation*: A

Predictive factors for neurogenic dysphagia

(C. Gandolfo, G. Ravera, M.P. Sormani, F. Leonardi)

Introduction

Neurological dysphagia can arise in a whole number of diverse diseases that somehow negatively interfere with the swallowing mechanism. Alterations to the superior neurological functions (awareness and cognition) can be present as well as alterations to motor coordination (paralytic disorders) or alterations to automatic and reflex mechanisms of swallowing. The muscles assigned to swallowing can be altered in a temporary or chronic/progressive manner. In a general sense then, we can have chronic-degenerative diseases or acute-subacute diseases which affect the central nervous system (CNS) or the peripheral nervous system (PNS) or both, as well as diseases or syndromes in which the dysfunction is primarily muscular.

Among the acute-subacute diseases of the CNS, encephalic vascular disorders predominate due to both their high incidence and prevalence and to the great frequency with which they determine transitory or pro-

longed dysphagia, which is sometimes indefinite. Thus they are associated with important nutritional concerns as they are the basis of potentially significant complications.

Dysphagia is often seen in acute stroke. Available data greatly vary on the basis of a whole series of factors, some of which are easily understood while others are harder to perceive. They concern, on the one hand, the characteristics of the patient (age, sex, neurological severity, pre-existing disabilities, comorbidities) and on the other, the time of observation (hyperacute phase, first days or weeks, neurologically stabilised patients). The scientific evidence from hospital cases (which are more common) may be very different from the evidence from population studies (which are extremely rare).

Clinical severity (usually evaluated using a neurological "impairment" or disability or dependence scale) is considered the most relevant factor in the occurrence of prolonged dysphagia in stroke patients. Analysis of the literature is complicated by the different methodologies adopted, the different settings in which the various authors have worked and the different selection procedures for case studies.

What is the frequency of dysphagia in stroke patients?

Dysphagia, which is often correlated with serious and sometimes fatal complications, is present in a high percentage of stroke patients oscillating between 40% and 80%, being higher in the acute phase and progressively diminishing in the subsequent weeks and months and then stabilising between 20% and 30% (Table 3).

Instrumental techniques (VFS) reveal a higher incidence of dysphagia than clinical assessment techniques.

Evidence level: I

Reference	Year	Time of assessment	Methodology adopted	Case-study method	%
117	1997	Acute phase	VFS	Hospital case-study	71
118	1999	Acute phase	VFS	Hospital case-study	64
112	2000	Acute phase	Swallowing test	Hospital case-study	51
113	2005	Acute phase	Clinical trials	Meta-analysis (different populations)	51-55
113	2005	Acute phase	Instrumental tests	Meta-analysis (different populations)	64–78
14	2001	Acute phase	Meta-analysis (different methods)	Meta-analysis (different populations)	43-80
114	2007	Acute phase	Swallowing test	Population study	48
115	2005	Acute phase	Swallowing test	Hospital case-study	62
115	2005	Acute phase	Swallowing test	Hospital case-study	34
119	2006	Chronic phase	VFS	Hospital case-study	87
116	2000	Acute phase	Swallowing test	Hospital case-study	71

Table 3 Frequency of dysphagia after stroke

67

Reference	Year	Case-study method	Predictive factors for chronic dysphagia
120	2003	Acute phase	Severity of stroke, lesions of the insula, dysphagia
121	2004	Acute phase	Altered awareness, grave facial paralysis
122	2007	Acute phase	Lesions to the trunk, bi-hemispherical lacunar lesions, female sex, advanced age
112	2000	Acute phase	Severity of stroke, male sex, palatal asymmetry, incomplete oral hygiene
118	1999	Acute phase	Age >70 years, male sex, evidence of aspiration on VFS
123	2006	Review	Lesions to the dominant hemisphere
115	2005	Acute phase	Severe stroke (TACI), nutritional status
116	2000	Acute phase	Deviating tongue, severity of stroke, incomplete oral closure, "wet" voice after swallowing water

Table 4 Factors associated with chronic dysphagia after stroke

In about 3% of acute stroke victims chronic dysphagia is so serious as to render PEG necessary.

Evidence level: I *Strength of recommendation:* B

Is it possible to foresee how long dysphagia will persist in stroke?

The factors that appear to be related to the persistence of dysphagia after the acute stroke phase (Table 4) are:

- Clinical severity of the stroke itself (NIHSS, modified Rankin score, SSS)
- Advanced age
- Encephalic trunk or bi-hemispherical lesions
- Lesions to the insula
- Coexistence of dysphagia
- Severe deficits in cranial nerves VII, X and XII *Evidence level*: II

Swallow rehabilitation and oral nutrition recovery in neurogenic dysphagia after brain damage

(M.G. Ceravolo, N. Facchin, C. Flosi, U. Raiteri)

What is the prognosis for oral feeding recovery in patients undergoing enteral nutrition for dysphagia after stroke?

Spontaneous recovery of safe swallowing is expected in the majority of patients within 6 months of stroke [20, 124]. Variations in recovery rates reported by different authors can be attributed to the diverse composition of case-mix and the inconsistent reliability of clinical trials.

Evidence level: level III clinical trials

Strength of recommendation: NA (this is a statement and not a recommendation)

What are the adverse prognostic indicators for prolonged dysphagia lasting longer than six months?

It is currently not possible to identify specific independent clinical predictors for the lack of recovery of safe swallowing [125–132]. The prognosis for recovery from dysphagia seems to be independent of the lesion site, while being correlated with the size of the representation of the pharynx in the cortical motor area of the healthy hemisphere, which takes the place of the affected side. The lesion site (cortical or subcortical, within the hemisphere or brainstem) influences the clinical features of dysphagia, but it does not appear to be constantly correlated with a predictable clinical evolution, although the involvement of the frontal and insular cortex has been associated with prolonged dysphagia in a prospective study.

Prognostic evaluation should take into consideration that the following parameters emerging from prospective clinical trials have been correlated with an unfavourable outcome:

- Persistence of dysphagia longer than 3–4 weeks after stroke.
- Severe residual disability (Barthel index <20/100).
- Previous stroke.
- Advanced age (>70 years).
- Male sex.
- Clinical test, in the acute phase, of at least four of the following six signs of impaired swallowing: dysphonia, dysarthria, altered swallowing reflex, reduced/absent voluntary cough, cough upon swallowing and voice changes after swallowing.
- VFS evidence of a delayed or absent swallowing reflex and/or a delay in oral transit.

Only one prospective trial has validated the reliability of a clinical indicator (the Royal Adelaide Prognostic Index for Dysphagic Stroke; RAPIDS), when applied during the acute phase (within 48 h), in predicting the risk of prolonged dysphagia over 14 days or of death correlated with dysphagia.

Evidence level: mostly level III clinical trials

Strength of recommendation: NA (this is a statement and not a recommendation).

Which patients undergoing enteral nutrition for dysphagia after stroke are candidates for weaning procedures?

There are no shared predictors for the recovery from dysphagia in patients undergoing enteral nutrition after brain damage [133–148].

Considering the value represented by oral feeding it is recommended that attempts should be made to wean *all* patients where the following safety criteria are guaranteed:

- Low risk of aspiration or alternatively a low risk of aspiration pneumonia
- A body mass index that is not indicative of malnutrition
- Ability to maintain alertness during meals
- Adequate cooperation *Evidence level*: the most representative level is IV *Strength of recommendation*: B

What resources (human, instrumental, structural) are required to start weaning from enteral nutrition?

There are no indications with respect to the most appropriate setting where the weaning from enteral nutrition should be performed.

Considering the need to monitor risk indicators for malnutrition and aspiration pneumonia during weaning, it is recommended that the procedure be carried out in a setting that guarantees a multidisciplinary approach (involving the neurologist, speech therapist, physiotherapist, nurse, nutritionist and dietician).

In particular, the assessment of the risks correlated with the reintroduction of oral feeding and the monitoring of functional swallowing ability must be assigned to specialised professionals (i.e., speech and swallow therapist). Likewise the monitoring of the nutritional status and nutritional support should be the responsibility of the nutritionist and dietician [35, 149].

Evidence level: the most representative level is IV *Strength of recommendation*: B

What are the most effective and efficient weaning strategies?

In general terms, the therapeutic approaches during weaning fall into two categories: compensatory strategies (conservative treatment) and rehabilitative strategies (restorative treatment). The compensatory strategies are aimed at guaranteeing the prevention of risks linked to oral feeding; the rehabilitative strategies are aimed at speeding up the functional recovery process [150–156].

Recourse to formal rehabilitative approaches is not recommended compared to conservative ones in order to achieve a faster recovery of functional swallowing. *Evidence level*: the most representative level is I *Strength of recommendation*: B

In candidates suitable for weaning from enteral nutrition, a conservative approach is recommended which aims at minimising the risk of respiratory infections while awaiting swallow recovery.

Evidence level: the most representative level is IV *Strength of recommendation*: B

What is the appropriate schedule for rehabilitative approaches?

Early and high-intensity rehabilitative interventions are recommended [157–159].

Evidence level: only one level II trial *Strength of recommendation*: B

What are the most effective compensatory strategies?

The use of compensatory strategies, including both the modification of the texture and viscosity of foods and postural strategies, is recommended in order to reduce the risk of complications during weaning [160, 161].

There are four levels of achievable combinations of food texture and viscosity when modifying diet to prevent aspiration pneumonia due to dysphagia. The use of food thickeners is required for this. Even though the international literature distinguishes between four and five dysphagia severity levels with corresponding dietary models, there is no agreement based on medical evidence concerning the use of the above-mentioned models. Roughly, two levels of intervention may be proposed for the management of neurogenic dysphagia, which are assigned to different patterns of dysphagia, respectively identified as type I (dysphagia for liquids) and type II (partial defect in bolus preparation, decreased pharyngeal transit or problems at a pharyngeal transit level).

Evidence level: Homogeneous trials IIa–IIb–III *Strength of recommendation*: B

How can the adaptation of the rheological component of foods during weaning from enteral nutrition be optimised?

Instruments for measuring food density are recommended in order to guarantee the formulation of less dense consistencies while supplying a more adequate intake of fluids without increasing the risk of aspiration [162, 163].

Evidence level: a few trials, mostly level II *Strength of recommendation*: B

Which rehabilitative techniques are indicated to complement conservative approaches?

The adoption of either exercises to open the oesophageal sphincter or electric stimulation are recommended as useful complements to compensatory strategies. There is not sufficient evidence to support the use of tactile or thermal stimulation or biofeedback techniques [164–171].

Evidence level: a few trials, mostly level III–IV *Strength of recommendation*: C

Are there effective drugs to promote weaning from enteral nutrition?

The effectiveness of drugs such as nifedipine and ACE inhibitors in reducing the risk of aspiration is only supported by cohort studies and case series. Furthermore, their use in clinical practice does *not* currently appear to be recommended [172, 173].

Evidence level: few trials, mostly level IV–V *Strength of recommendation*: D

Which nutritional indicators should undergo monitoring during weaning?

It is recommended that nutritional status is monitored via the repeated Nutritional Risk Score (NRS) which covers weight assessment and previous habits of food intake [174-176]. The NRS must be carried out at the beginning of the nutritional intervention and then repeated by scheduling follow-up intervals according to the established individual risk. The measurement of weight in the presence of protein energy malnutrition must be repeated three times a week. When a hoist weighing scale is not available, it is advisable to determine the central arm circumference and to measure the triceps plica twice a week in bedridden patients. Assessment of dietary intake and the recording of food eaten by the patient in collaboration with a nurse permits the verification of the adequacy of contributions to nutritional requirements, the need for nutritional support or a change in the nutritional route. If protein energy malnutrition is present this must be done on a daily basis.

When oral feeding is possible but intake is insufficient, nutritional support with a caloric density of 1 kcal/ml with or without a dietary indication is recommended. The choice of support with a polymer module is evaluated according to the patient's nutritional requirements and the palatability of the supplement.

Evidence level: few trials, mostly level V *Strength of recommendation*: B

Speech rehabilitation and indications for re-nourishment in postsurgical dysphagia

(M. Petrelli, G. Ruoppolo)

Should the placement of a feeding tube be planned prior to head and neck surgery?

Advanced planning for the placement of a feeding tube is necessary in patients undergoing surgery that will alter swallowing (calorie intake <60% of requirements for more than 10 days) or compromise swallowing (for more than 7 days) [177]. A PEG should be placed if dysphagia is foreseen for >4 weeks (otherwise a nasogastric tube) and the patient has a normally functioning gastrointestinal tract. Parenteral nutrition via a central route is recommended only if the gastrointestinal tract is not functioning so that the caloric quota administered enterally is less than 60% [178, 179].

Evidence level: III Strength of recommendation: A

When should feeding begin?

In patients with a high nutritional risk (easily identified by at least one of these situations:

- Weight loss >10-15% in 6 months
- BMI <18.5 kg/m²
- Serum albumin <30 g/l without other causes

Nutritional support must begin 10–14 days prior to surgery and continue afterwards [179, 180]. In patients with a good nutritional status, nutritional support must begin immediately until improvement/resolution of dysphagia [181].

Evidence level: II *Strength of recommendation*: A

Which patients are suitable candidates for weaning from enteral nutrition?

Patients suitable for weaning from enteral nutrition are those who have undergone surgery which has not removed or permanently altered the anatomical structures for chewing and swallowing and those who have undergone plastic surgery (maxillofacial, ENT) aimed at restructuring or repairing anatomical structures governing chewing and swallowing [1]. Postsurgical radiotherapy is not an impediment to weaning, but it can slow the process [182, 183].

Evidence level: IV *Strength of recommendation*: B

In which phase after head and neck surgery should weaning from enteral nutrition begin?

Two weeks after surgery is an appropriate time to carry out a clinical-instrumental examination of the patient's swallowing ability [184]. It will be possible to decide whether to start weaning with creamy foods without the risk of aspiration or delay this phase on the basis of the assessment results [1, 185]. Radiotherapy after surgery does not impede weaning, but it can slow the process [186].

Evidence level: III *Strength of recommendation*: B

Which personnel are involved in the preliminary clinicalfunctional assessment for weaning?

The surgeon, speech therapist, radiologist, nutritionist, dietician, nurse and care-giver [1, 187] are involved.

Evidence level: VI Strength of recommendation: B

Which clinical and instrumental indicators predict the success of the re-nourishment procedures?

Patients with dysphagia should be reassessed on a regular basis by a professional competent in the management of dysphagia; the frequency is relative to the clinical characteristics of the dysphagia and nutritional status [178, 188]. VFS with a modified barium study or a fibreoptic endoscopic study of swallowing are both valid methods to accurately evaluate the possibility of re-nourishment [43, 189]. Patient age, gastroenteric function and compliance are factors to take into consideration [188, 190].

Evidence level: II Strength of recommendation: A

In which setting (hospital, home) can weaning start?

Ideally it is appropriate to begin weaning in a hospital setting (prior to discharge or in day-hospital) in order to carefully assess the effective adherence to the proposed nutritional protocol and avoid the risks of aspiration [1, 191]. After this initial phase, the setting is moved to home where the patient can continue to follow the schemes and protocols provided. Integration between the hospital and local structures is desirable.

Evidence level: VI *Strength of recommendation*: B

What role does speech rehabilitation play during weaning?

At the end of a complete appraisal of swallowing indications must be provided regarding relative dietary changes and compensatory techniques (posture and manoeuvre) [1, 187]. In some dysphagic frameworks, compensatory procedures should be used (compensative posture, swallowing techniques) in order to significantly reduce the risk of aspiration [192].

The adoption of a modified diet must be included in the treatment plan, providing that its effect is monitored with VFS and/or fibreoptic endoscopy [1, 187].

Treatment of the buccal structures (sensitivity, motility, praxia) is indicated in association with other types of approaches (dietary changes, compensatory techniques, postural changes) [193].

Evidence level: V *Strength of recommendation*: B

Which indicators must be monitored during weaning?

All of the following [186, 194, 195]:

- Body weight
- Postural changes
- Choice of foods and dietary changes
- Appetite and food preparation management
- Management of behaviour and environmental factors
- Oral hygiene
- Psychological state Evidence level: II Strength of recommendation: A

Clinical nutrition management in the patient with penetration, silent aspiration and ingestion bronchopneumonia

(D. Vassallo, A. Seneghini, F. Raganini)

Introduction

According to some authors, ingestion pneumonia is the principal cause of death in stroke [196]. Treatment con-

sists of maintaining vital functions, controlling arterial hypertension and hyperglycaemia, suspending oral feeding if unsafe and the preference for postpyloric parenteral or enteral nutrition [197].

Classically, dysphagia is diagnosed with VFS, a diagnostic examination that highlights oropharyngeal motility, duration of the laryngeal phase, laryngeal penetration and aspiration. With respect to the last two severe complications, according to Schmidt et al. [198] "laryngeal penetration" is present when the contrast medium enters the vestibule and "aspiration" is present when the contrast medium goes beyond the vestibule and below the true vocal cords. The SPREAD guidelines (Stroke Prevention and Education Awareness Diffusion [35]) advise that upon hospital admission or rehabilitation, stroke patients must be assessed for the risk of malnutrition using the NRS or the MUST recommendation 11.15, grade D [35]. This recommendation is derived from strong evidence that protein-energy malnutrition in patients affected by acute stroke is very frequent and has a considerable impact upon the possible functional recovery and overall management of the patient.

Assessment of the patient's nutritional status is fundamental to rapidly identifying malnutrition and to maintaining or re-establishing an adequate nutritional status. Adequate nutrition is important in order to avoid complications, reduce hospital stay, improve the quality of life and to make treatment more simple and effective (synthesis 11.6 [35]). Assessment of nutritional status and nutritional intervention are thus indicated as essential components in clinicotherapeutic protocols for stroke both during the acute phase and during rehabilitation (recommendation 11.15, grade D [35]).

The placement of a nasogastric tube may not eliminate the risk of inhalation in those with delayed gastric emptying, particularly in patients with more serious cerebral lesions. In these patients the risk of inhalation is reduced if the bolus is inserted far from the pylorus, beyond Treitz corner [35, 47, 199].

The use of jejunostomy is indicated where there is a risk of bronchopulmonary aspiration (and in those with oesophageal reflux, gastroparalysis in the presence of inoperable gastric, or pancreatic cancer with subocclusion or occlusion). The advantage of this access is the decreased risk of aspiration. The technique is carried out surgically under general anaesthesia. Also feasible is a percutaneous endoscopic jejunostomy (PEJ) which uses the PEG technique with the final passage of a duodenal tube and endoscopic control [200].

Practical recommendations [201, 202] are as follows:

1. PEG is the preferred technique for patients who will undergo long-term enteral nutrition that can be preceded by a period of nasogastric nutrition; the latter can be adopted definitively when PEG is not suitable.

- 2. During enteral nutrition via a nasogastric tube it is advisable to:
 - prevent coughing, regurgitation and vomiting (even pharmacologically),
 - make sure the patient does not fiddle with or dislodge the tube and
 - wash the tube regularly in order to avoid obstruction.

PEJ and jejunostomy are indicated in cases where there is a risk of ingestion pneumonia, oesophagitis from reflux, gastroparalysis, gastrectomy, and gastric and pancreatic cancer.

Which dietary treatment should be adopted in suspected penetration, aspiration or ingestion pneumonia?

Prior to commencing oral feeding in neurological patients, swallowing ability and the risk of aspiration must be evaluated (level B according to SINPE 2002 guidelines) [63]. The following strategies are considered useful and recommended in order to compensate for slight swallowing defects:

- Sitting straight when eating.
- Sitting with head and neck supported.
- The use of semisolid foods.
- The use of boluses smaller than a teaspoon.
- Restriction of liquid foods.
- Use of a cup or spoon as opposed to a straw for fluids.
- A gentle cough after swallowing.
- Swallow several times, even for small boluses, in order to completely empty the oesophagus.
 The recommendations in paragraph 11 [35] note that:
- In patients in whom oral feeding is possible the use of routine nutritional support is unnecessary as it is not associated with an improvement in prognosis. The use of nutritional support must be guided by the results of the nutritional status evaluation (grade B).
- Standard monitoring of swallowing function is advisable in order to prevent secondary complications to dysphagia (grade D).
- Clinical assessment of the risk of dysphagia should be carried out using the BSA and a simple test of swallowing water, which in view of evidence-based medicine are the most appropriate in acute stroke patients.
- In specialised Centres, more sophisticated approaches can be adopted, such as an examination by the speech therapist or a VFS.

Functionally aimed swallowing treatment is a fundamental point in dietary treatment. Swallowing is the responsibility of the speech therapist with specialist training. It is improved further by a multidisciplinary approach also involving medical nutritionists and dieticians. In fact, the extreme complexity of neurogenic dysphagia and the numerous causes of the alterations require close cooperation between medical and different therapeutic and rehabilitative disciplines.

The aim of treatment is to minimise the consequences of neurogenic dysphagia. Outcome measurement should follow a special scale; a proposed scale is shown in Table 5 [141].

The penetration aspiration scale of Rosenbek et al. [203] allows quantification of the level of severity both endoscopically and radiologically. A questionnaire has been formulated on the quality of a special route for dysphagia: the "SWAL-QQL/SWAL-CARE" [204]. In a complementary manner they are also useful for assessing radiological and endoscopic severity (Table 6).

Which dietary treatment should be adopted in the presence of suspected penetration, silent aspiration or ingestion pneumonia?

After an assessment of swallowing ability (BSA) the following are indicated:

- 1. Change in food consistency.
- 2. Administer semisolid boluses in small quantities.
- 3. Monitor swallowing function in order to prevent complications secondary to dysphagia; where possible an examination by a speech therapist is indicated.
- 4. Patients who are able to swallow 10 ml of water in one sip can tolerate oral feeding with the control of the dimensions of the bolus, the consistency of the diet and posture during feeding.

Evidence level: I *Strength of recommendation*: A

Which type of artificial nutrition should be carried out in suspected penetration, silent aspiration or ingestion pneumonia?

Patients who cannot be orally fed within 1 week should receive special feeding. If the impediment is for a short or uncertain time (2–4 weeks) then enteral nutrition via a nasogastric tube should be started and indeed in acute stroke, for example, this can even be considered to lead to a superior outcome [10].

If dysphagia persists it would be wise to evaluate the indications for the placement of an endoscopic gastrostomy PEG. Usually a PEG is placed when enteral nutrition is indicated for a period of more than 30 days. In any case as the risk of gastropharyngeal reflux and aspiration is high, postpyloric nutrition is advisable in patients at high risk of aspiration (the elderly, those with previous gastropharyngeal reflux, the presence of hiatus hernia, those in whom prokinetic drugs may be appropriate). For patients in whom intragastric nutrition is used, some warnings are necessary:

- Keep the patient's trunk at a $30-40^{\circ}$ angle.
- Check at least every 4 hours for stagnation (>150–200 cm³ aspirated fluid).
- Use a maximum rate of 150 ml/h for administering the enteral mixture.

Aspiration is the most severe complication during enteral nutrition. Often it is silent and is not identified until symptoms appear. Prevention is carried out by

 Table 5 Outcome scale for the assessment of compromised swallowing. With changes to posture or special swallowing techniques: 0–3 severity, oral feeding is possible; 4–6 severity, special partial feeding is necessary

Grade	Definition
0	No limits
1	Complete oral feeding with compensatory techniques but without consistency limits
2	Complete oral feeding without compensatory techniques but without consistency limits
3	Complete oral feeding with compensatory techniques and consistency limits
4	Partial oral feeding
5	Oral feeding with compensatory techniques
6	Exclusive tube feeding

Table 6 Radiological assessment of the level of severity in penetration-aspiration (modified from [205])

Level	Definition
0	No penetration or aspiration
1	Vestibular laryngeal penetration or Morgagni ventricular penetration
2	10% inferior aspiration with conservation of cough reflex
3	10% inferior aspiration with alteration of cough reflex, or 10% superior aspiration with conservation of cough reflex
4	10% superior aspiration with alteration of cough reflex

minimising the risk of regurgitation and vomiting. Guidelines agree on advising frequent monitoring of gastric stagnation, especially during the initial phases of the infusion and in all at-risk patients. Should gastric stagnation be >200 ml, enteral nutrition should be suspended or the rate of infusion reduced, possible causes eliminated and stagnation rechecked after 2 h. If after rechecking stagnation is <200 ml, the infusion can be recommenced with reduced volumes and rate. If repeated episodes of gastric stagnation of >200 ml persist, then it might be useful to consider a postpyloric or jejunal infusion.

During enteral nutrition the patient should be maintained where possible in the Fowler position or in the right lateral decubitus position.

In acute stroke patients the artificial nutrition treatment of choice is enteral nutrition. It is recommended that enteral nutrition be started early on and in any case after no more than 5–7 days in normally nourished patients and no more than 24–72 h in malnourished patients (recommendation 11.17, grade B [35]).

Parenteral nutrition is exclusively indicated where enteral nutrition is not feasible, contraindicated or as a supplement to enteral nutrition whenever the latter does not allow the administration of adequate nutrients (recommendation 11.17b, grade D [35, 63]).

In the case of ingestion pneumonia enteral nutrition should be stopped and corrective medical measures taken together with the commencement of parenteral nutrition.

Evidence level: II *Strength of recommendation*: A

Which EN route should be considered?

The placement of a nasogastric tube is recommended when dysphagia occurs, assessed according to the previously described methods. The timing for the insertion of a nasogastric tube is theoretical. Early treatment is advisable (between 24 and 72 h) for malnourished patients.

PEG is the preferred technique for those patients undergoing long-term enteral nutrition, possibly preceded by a period of nasogastric feeding. This latter route may be chosen definitively when PEG is no longer feasible.

The conditions for the application of PEG are:

- 1. Persistent dysphagia after stroke.
- 2. Prolonged dysphagia possibly for more than 2 months.
- 3. Timing for the placement of a PEG assessable within 30 days of the occurrence of disease and with the above-mentioned conditions. *Evidence level*: III

Strength of recommendation: B

When to suspend enteral nutrition in the presence of suspected penetration, silent aspiration or ingestion pneumonia?

There are no conclusive data indicating a preference for the use of pre- or postpyloric nutrition. The preference for postpyloric nutrition has been widely discussed [63, 93] and we feel in any case it is always better to optimise the use of enteral nutrition while diminishing the risks [93].

The composition of the mixture influences gastric emptying and reflux. Mixtures rich in fats (caloric quota from lipids more than 50%) prolong gastric emptying compared to mixtures that have a moderate fat content. The types of fatty acids, proteins and polypeptides modulate gastric movement and can delay gastric emptying and increase the prevalence of stagnation.

The majority of pneumonias from inspiration are caused by a lack of control of secretions rather than by reflux of enteral mixture. Furthermore, the site used for the infusion does not affect this problem [206].

The principal factors favouring the risk of aspiration with enteral nutrition can be summarised as follows:

- A state of altered awareness
- Altered swallowing
- Previous episodes of aspiration into the airways
- Serious gastroesophageal reflux
- Gastric paralysis
- Pyloric obstruction

These factors must be borne in mind in order to prevent and optimise nutritional intervention, remembering that silent aspiration represents a grave risk for acute stroke patients. In conclusion, It does not appear to be possible to establish a standardised timing for the occurrence of each of these complications, which must be evaluated clinically and within the framework of each case. Therefore, we assign an evidence level of VI (based on the opinions of experts or members of the work group) and a strength of recommendation of C.

Evidence level: VI *Strength of recommendation*: C

What is the access site, infusion rate and the manner of infusion in patients receiving enteral nutrition with penetration, silent aspiration or ingestion pneumonia?

In the cases discussed above it is advisable if possible to suspend enteral nutrition. Intravenous nutritional support and clinical and instrumental monitoring are indicated. If pneumonia is confirmed, the access site must be postpyloric.

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References

- 1. Scottish Intercollegiate Guidelines Network (2004) Management of patients with stroke. Identification and management of dysphagia. http://:www.sign.ac.uk
- Agency for Healthcare Research and Quality (1999) Diagnosis and treatment of swallowing disorders (dysphagia) in acute-care stroke patients. Evidence Report/Technology Assessment no. 8. http://www.ahcpr.gov/clinic/epcsums/dysphsum.htm

- Bloem BR, Lagaay AM, Van Beek W et al (1990) Prevalence of subjective dysphagia in community residents aged over 87. BMJ 300:721–722
- Calcagno P, Ruoppolo G, Grasso MG et al (2002) Dysphagia in multiple sclerosis: prevalence and prognostic factors. Acta Neurol Scand 105:10–13
- Daniels SK, Ballo LA, Mahoney MC, Foundas AL (2000) Clinical predictors of dysphagia and aspiration risk: outcome measures in acute stroke. Arch Phys Med Rehabil 81:1030–1033
- Kaiser-Jones J (1999) Dysphagia among nursing home residents. Geriatr Nurs 20:77–84
- Kuhlemeier KV (1994) Epidemiology and dysphagia. Dysphagia 9:209–217
- Reilly S, Perry A (2001) Is there an evidence base to the management of paediatric dysphagia? Asia Pac J Speech Language Hearing 6:1–8
- Cherney LR, Cantieri CA, Pannel JJ (1986) Clinical evaluation of dysphagia. Rehabilitation Institute of Chicago procedure manual. Aspen System Collaboration, Maryland
- Doggett DL, Turkelson CM, Coates V (2002) Recent developments in diagnosis and intervention for aspiration and dysphagia in stroke and other neuromuscular disorders. Curr Atheroscler Rep 4:311–318
- De Pippo KL, Holas MA, Reding MJ (1994b) The Burke dysphagia screening test: validation of its use in patients with stroke. Arch Phys Med Rehabil 75:1284–1286
- Martino R, Pron G, Diamant N (2000) Screening for oropharyngeal dysphagia in stroke. Insufficient evidence for guidelines. Dysphagia 15:19–30
- Perry L, Love CP (2001) Screening for dysphagia and aspiration in acute stroke: a systematic review. Dysphagia 16:7–18
- Perry L (2001) Screening swallowing function of patients with acute stroke. Part one: Identification, implementation and initial evaluation of a screening tool for use by nurses. J Clin Nurse 10:463–473
- Ding R, Logemann JA (2000) Pneumonia in stroke patients: a retrospective study. Dysphagia 15:51–57
- New South Wales Community Services Commission (2001) Disability, death and the responsibility of care. NSW Government, Sydney
- Gottlieb D, Kipnis M, Sister E et al (1996) Validation of the 50ml drinking test for evaluation of post stroke dysphagia. Disabil Rehabil 18:529–532
- Martino R, Meissner-Fishbein B, Saville D et al (2007) Preferred practice guidelines for dysphagia. Quality improvement: preferred practice guidelines. http://www.caslpo.com/Portals/0/ppg/Dysphagia_PSG.pdf
- Barba R, Morin MD, Cemillan C et al (2002) Previous and incident dementia as risk factors for mortality in stroke patients. Stroke 33:1993–1998
- Barer DH (1989) The natural history and functional consequences of dysphagia after hemispheric stroke. J Neurol Neurosurg Psychiatry 52:236–241
- American Speech-Language Hearing Association (2001) Clinical indicators for instrumental assessment of dysphagia. ASHA Special interest report. http://www.asha.org/nr/rdonlyres/4fdee27b-baf5-4d06-ac4d-8d1f311c1b06/0/19446_1.pdf
- 22. Ellul J, Watkins C, Barer D. Frequency, clinical course and complications of dysphagia in acute stroke, studied using a standardised bedside swallowing assessment. http://www.ncl.ac.uk/stroke-research-unit/costar/papD1.doc. (Last accessed 12 December 2005). Cited in: Trapl M, Enderle P, Nowotny M et al (2007) Dysphagia bedside screening for acute-stroke patients: the Gugging Swallowing Screen. Stroke 38:2948–2952
- McCullough GH, Wertz RH, Rosembek JC (2001) Sensitivity and specificity of clinical bedside examination signs for detec-

ting aspiration in adults subsequent to stroke. J Common Disord 34:55–72

- Linden P, Kuhlemeier KV, Patterson C (1993) The probability of correctly predicting subglottic penetration from clinical observation. Dysphagia 8:170–179
- 25. Logemann JA, Veis S, Colangelo L (1999) A screening procedure for oropharyngeal dysphagia. Dysphagia 14:44–51
- Davies S, Taylor H, MacDonald A, Barer D (2001) An interdisciplinary approach to swallowing problems in acute stroke. Int J Lang Commun Disord 36[Suppl]:357–362
- Magnus V (2001) Dysphagia training for nurses in an acute hospital setting – a pragmatic approach. Int J Lang Commun Disord 36[Suppl]:357–358
- Royal College of Physicians (2004) National clinical guideline for stroke. Intercollegiate Stroke Working Party. http://www.rcplondon.ac.uk/pubs
- Leder SB, Karas DE (2000) Fiberoptic endoscopic evaluation of swallowing in the pediatric population. Laryngoscope 110:1132–1136
- Leder SB, Acton LM, Lisitano HL, Murray JT (2005) Fiberoptic endoscopic evaluation of swallowing (FEES) with and without blue-dye food. Dysphagia 20:157–162
- Aviv JE, Kim T, Thomson IE et al (1988) Fiberoptic endoscopic evaluation of swallowing with sensory testing (FEESST) in healthy controls. Dysphagia 13:87–92
- 32. Aviv JE, Kaplan ST, Thomson JE et al (2000) The safety of flexible endoscopic evaluation of swallowing with sensory testing (FEESST): an analysis of 500 consecutive evaluations. Dysphagia 15:39–44
- 33. College of Audiologists and Speech-Language Pathologists of Ontario (2007) Instrumental assessment: Resource Requirements N. (a) Fiberoptic Endoscopic Evaluation of Swallowing (FEES*) in Practice Standards and Guidelines for Dysphagia Intervention by Speech-Language Pathologists. http://www.caslpo.com/english_site/pdfdocs/5Dysphagia_PSG_Draft_for_M ember_Feedback_2007.pdf
- 34. European Study Group for Dysphagia and Globus (EGDG) Guidelines for evaluation and treatment of patients with dysphagia and globus. http://www.egdg.org/
- 35. Stroke Prevention and Educational Awareness Diffusion (2005) Ischemic stroke: Italian guidelines on prevention and treatment, 4th Edn. Publicazioni Catel, Milan
- Leder SB, Novella S, Patwa H (2004) Use of fiberoptic endoscopic evaluation of swallowing (FEES) in patients with amyotrophic lateral sclerosis. Dysphagia 19:177–181
- American Speech-Language Hearing Association (2004) Medical review guidelines for dysphagia. ASHA, Rockville, MD
- Ajemian MS, Nirmul GB, Anderson MT et al (2001) Routine fiberoptic endoscopic evaluation of swallowing following prolonged intubation: implications for management. Arch Surg 136:434–437
- Royal College of Speech and Language Therapists (1999) Professional Standards Board: invasive procedures guideline. RCSLT, London
- 40. Cohen MA, Setzen M, Perlman PW et al (2003) The safety of flexible endoscopic evaluation of swallowing with sensory testing in an outpatient otolaryngology setting. Laryngoscope 113:21–24
- Diener HC (2005) Leitlinien fur Diagnostik und terapie in der Neurologie. Thieme, Stuttgart, pp 746–756
- 42. Langmore SE (2003) Evaluation of oropharyngeal dysphagia: which diagnostic tool is superior? Curr Opin Otolaryngol Head Neck Surg 11:485–489
- Aviv JE (2000) Prospective, randomized outcome study of endoscopy versus modified barium swallow in patients with dysphagia. Laryngoscope 110:563–574

- 44. Aviv JE, Kidder TM, McCulloch T; American Academy of Otolaryngology – Head and Neck Surgery Foundation (2001) Swallowing disorders: otolaryngologic aspects. American Academy of Otolaryngology – Head and Neck Surgery Foundation, Alexandria, VA, USA
- 45. Beutler E (1994) G6PD deficiency. Blood 84:3613-3636
- Malagelada JR, Bazzoli F, Elewaut A et al (2005) Practice guideline – dysphagia. S Afr Gastroenterol Rev 3:9–14
- Prosiegel M (2004) Guidelines of the German Society of Neurology (DGN) on neurogenic dysphagia. European Study Group for Dysphagia and Globus. http://www.egdg.org
- Pikus L, Levine MS, Yang YX et al (2003) Videofluoroscopic studies of swallowing dysfunction and the relative risk of pneumonia. AJR Am J Roentgenol 180:1613–1616
- Nitenberg G, Raynard B (2000) Nutritional support of the cancer patient: issues and dilemmas. Crit Rev Oncol Hematol 34:137–168
- Arends J, Bodoky G, Bozzetti et al; ESPEN (European Society for Parenteral and Enteral Nutrition) (2006) ESPEN guidelines on enteral nutrition: non-surgical oncology. Clin Nutr 25:245–259
- Barrera R (2002) Nutritional support in cancer patients. JPEN J Parenter Enteral Nutr 26:S63–S71
- Wordsworth H, Ashton J (2000) Head and neck cancer and upper gastrointestinal cancer. In: Shaw C (ed) Current thinking: nutrition and cancer. Novartis Consumer Health, Horsham, pp 13–24
- Travalca Cupillo B, Sukkar S, Spadola Bisetti M (2001) disfagia.eat. Quando la deglutizione diventa difficile. Gli aspetti nutrizionali. Omega Edizioni, Turin, pp 104–140
- Arnold C, Richter MP (1989) The effect of oral nutritional supplements on head and neck cancer. Int J Radiat Oncol Biol Phys 16:1595–1599
- 55. Elia M, van Bokhorst-de van der Schueren MAE, Garvey J et al (2006) Enteral (oral or tube administration) nutritional support and eicosapentaenoic acid in patients with cancer: a systematic review. Int J Oncol 28:5–23
- 56. Isenring EA, Capra S, Bauer JD (2004) Nutrition intervention is beneficial in oncology outpatients receiving radiotherapy to the gastrointestinal or head and neck area. Br J Cancer 91:447–452
- 57. Nayel H, el-Ghoneimy E, el-Haddad S (1992) Impact of nutritional supplementation on treatment delay and morbidity in patients with head and neck tumors treated with irradiation. Nutrition 8:13–18
- Bozzetti F, Cozzaglio L, Gavazzi C et al (1998) Nutritional support in patients with cancer of the esophagus: impact on nutritional status, patient compliance to therapy and survival. Tumori 84:681–686
- 59. Lees J (1997) Nasogastric and percutaneous endoscopic gastrostomy feeding in head and neck cancer patients receiving radiotherapy treatment at a regional oncology unit: a two year study. Eur J Cancer Care 6:45–49
- Thiel HJ, Fietkau R, Sauer R (1988) Malnutrition and the role of nutritional support for radiation therapy patients. Rec Res Cancer Res 108:205–226
- Löser C, Aschl G, Hébuterne X et al (2005) ESPEN guidelines on artificial enteral nutrition – percutaneous endoscopic gastrostomy (PEG). Clin Nutr 24:848–861
- 62. American Society of Parenteral and Enteral Nutrition (ASPEN) Board of Directors (2002) Access for administration of nutrition support. JPEN J Parenter Enteral Nutr 26:33SA–41SA
- Italian Society of Parenteral and Enteral Nutrition (SINPE) (2002) SINPE guidelines for artificial nutrition in hospital. Access for enteral nutrition. Riv Ital Nutr Parenter Enter 20:S19–S20
- Lee JH, Machtay M, Unger LD et al (1998) Prophylactic gastrostomy tubes in patients undergoing intensive irradiation for cancer of the head and neck. Arch Otolaryngol Head Neck Surg 124:871–875

- 65. Magne N, Marcy PY, Foa C et al (2001) Comparison between nasogastric tube feeding and percutaneous fluoroscopic gastrostomy in advanced head and neck cancer patients. Eur Arch Otorhinolaryngol 258:89–92
- 66. Beaver ME, Matheny KE, Roberts DB, Myers JN (2001) Predictors of weight loss during radiation therapy. Otolaryngol Head Neck Surg 125:645–648
- 67. Scolapio JS, Spangler PR, Romano MM et al (2001) Prophylactic placement of gastrostomy feeding tubes before radiotherapy in patients with head and neck cancer: is it worthwhile? J Clin Gastroenterol 33:215–217
- 68. Politzer Shronts E, Fish JA, Pesce-Hammond K (1998) Nutrition assessment. In: Merrit RJ (ed) The ASPEN nutrition support practice manual. American Society for Parenteral and Enteral Nutrition, Silver Spring, MD, pp 1–17
- Brody R (1999) Nutrition issues in dysphagia: identification, management and the role of the dietitian. Nutr Clin Pract 14:S47–S51
- Wardley AM, Jayson GC, Swindell R et al (2000) Prospective evaluation of oral mucositis in patients receiving myeloablative conditioning regimens and haemopoietic progenitor rescue. Br J Haematol 110:292–299
- Stuart RK, Sensenbrenner LL (1979) Adverse effects of nutritional deprivation on transplanted hematopoietic cells. Exp Hematol 7:435–442
- 72. Bistrian BR, Blackburn GL, Scrimshaw NS, Flatt JP (1975) Cellular immunity in semistarved states in hospitalized adults. Am J Clin Nutr 28:1148–1155
- Papadopoulou A, Lloyd DR, Williams MD et al (1996) Gastrointestinal and nutritional sequelae of bone marrow transplantation. Arch Dis Child 75:208–213
- 74. Weisdorf SA, Lysne J, Wind D et al (1987) Positive effect of prophylactic total parenteral nutrition on long-term outcome of bone marrow transplantation. Transplantation 43:833–838
- 75. Szeluga DJ, Stuart RK, Brookmeyer R et al (1987) Nutritional support of bone marrow transplant recipients: a prospective, randomised clinical trial comparing total parenteral nutrition to an enteral feeding program. Cancer Res 47:3309–3316
- Papadopoulou A, Williams MD, Darbyshire PJ, Booth IW (1998) Nutritional support in children undergoing bone marrow transplantation. Clin Nutr 17:57–63
- 77. Charuhas PM, Fosberg KL, Bruemmer B et al (1997) A doubleblind randomized trial comparing outpatient parenteral nutrition with intravenous hydration: effect on resumption of oral intake after marrow transplantation. JPEN J Parenter Enteral Nutr 21:157–161
- Papadopoulou A, MacDonald A, Williams MD et al (1997) Enteral nutrition after bone marrow transplantation. Arch Dis Child 77:131–136
- 79. Steward W, Hunter A, O'Byrne K, Snowden J (2001) Chemotherapy and haemopoietic stem cell transplantation. In: Nightingale J (ed) Intestinal failure. Greenwich Medical Media, Cambridge, pp 65–86
- Weisdorf S, Hofland C, Sharp HL et al (1984) Total parenteral nutrition in bone marrow transplantation: a clinical evaluation. J Pediatr Gastroenterol Nutr 3:95–100
- Hutchinson ML, Clemans GW, Springmeyer SC, Flournoy N (1984) Energy expenditure estimation in recipients of marrow transplants. Cancer 54:1734–1738
- Cunningham BA, Lenssen P, Aker SN et al (1983) Nutritional considerations during marrow transplantation. Nurs Clin North Am 18:585–596
- Kaproth PL, Barber JR, Moore R, Shronts EP (1990) Parenteral nutrition in a bone marrow transplant patient with hepatic complications. Nutr Clin Pract 5:18–22
- Driedger L, Burstall CD (1987) Bone marrow transplantation: dietitians' experience and perspective. J Am Diet Assoc 87:1387–1388

- Karatzas T, Scopa S, Tsoni I et al (1991) Effect of glutamine on intestinal mucosal integrity and bacterial translocation after abdominal radiation. Clin Nutr 10:199–205
- Murray SM, Pindoria S (2002) Nutrition support for bone marrow transplant patients. Cochrane Database of Systematic Reviews, Issue 2, Art. no. CD002920
- Biffi R, Gavazzi G, Muscaritoli M et al (2004) GLUTAMITALY 2003: Consensus Paper SINPE on GLN in adult artificial nutrition. Riv Ital Nutr Parenter Enter 22:115–133
- Kondrup J, Allison P, Elia M et al (2003) ESPEN guidelines for nutrition screening 2002. Clin Nutr 22:415–421
- British Dietetic Association and Royal College of Speech and Language Therapists (2002) National descriptors for texture modification in adults. http://www.bda.uk.com/Downloads/dysphagia.pdf
- Dennis MS, Lewis SC, Warlow C; FOOD Trial Collaboration (2005) Routine oral nutritional supplementation for stroke patients in hospital (FOOD): a multicentre randomised controlled trial. Lancet 365:755–763
- Clavé P, de Kraa M, Arreola V et al (2006) The effect of bolus viscosity on swallowing function in neurogenic dysphagia. Aliment Pharmacol Ther 24:1385–1394
- Whelan K (2001) Inadequate fluid intakes in dysphagic acute stroke. Clin Nutr 20:423–428
- Dennis MS, Lewis SC, Warlow C; FOOD trial collaboration (2005) Effect of timing and method of enteral tube feeding for dysphagic stroke patients (FOOD): a multicentre randomised controlled trial. Lancet 365:764–772
- 94. Ramritu P, Finlayson K, Mitchell A, Croft G (2000) Identification and nursing management of dysphagia in individuals with neurological impairment. Systematic review no. 8. The Joanna Briggs Institute, Royal Adelaide Hospital, Adelaide, Australia
- Calcagno P, Ruoppolo G, Grasso MG et al (2002) Dysphagia in multiple sclerosis – prevalence and prognostic factors. Acta Neurol Scand 105:40–43
- Thomas FJ, Wiles CM (1999) Dysphagia and nutritional status in multiple sclerosis. J Neurol 246:677–682
- Payne A (2001) Nutrition and diet in the clinical management of multiple sclerosis. J Hum Nutr Diet 14:349–357
- Deane KH, Whurr R, Clarke CE et al (2001) Non-pharmacological therapies for dysphagia in Parkinson's disease. Cochrane Database of Systematic Reviews, Issue 1. Art. No.: CD002861. DOI: 10.1002/14651858.CD002816
- 99. Bilney B, Morris ME, Perry A (2003) Effectiveness of physiotherapy, occupational therapy, and speech pathology for people with Huntington's disease: a systematic review. Neurorehabil Neural Repair 17:12–24
- Cook IJ, Kahrilas PJ (1999) AGA technical review on management of oropharyngeal dysphagia. Gastroenterology 116:455–478
- 101. El-Serag HB, Satia JA, Rabeneck L (2005) Dietary intake and the risk of gastro-oesophageal reflux disease: a cross sectional study in volunteers. Gut 54:11–17
- 102. Miller RG, Rosenberg JA, Gelinas DF et al (1999) Practice parameter: the care of the patient with amyotrophic lateral sclerosis (an evidence-based review): report of the Quality Standards Subcommittee of the American Academy of Neurology; ALS Practice Parameters Task Force. Neurology 52:1311–1323
- 103. Toigo G, Zamboni M, Sergi G et al (2005) Linee guida pr la nutrizione artificiale nel paziente anziano. G Gerontol LIII:603–616
- 104. Langmore SE, Kasarskis EJ, Manca ML, Olney RK (2006) Enteral tube feeding for amyotrophic lateral sclerosis/motor neuron disease. Cochrane Database of Systematic Reviews. Issue 4. Art. No.: CD004030. DOI: 10.1002/14651858. CD004030.pub2

- Chouinard J (2000) Dysphagia in Alzheimer disease: a review. J Nutr Health Aging 4:214–217
- 106. Drossman DA, Li Z, Andruzzi E et al (1993) U.S. householder survey of functional gastrointestinal disorders. Prevalence, sociodemography, and health impact. Dig Dis Sci 38:1569–1580
- 107. Dalton CB, Castell DO, Hewson EG et al (1991) Diffuse esophageal spasm: a rare motility disorder not characterized by high-amplitude contractions. Dig Dis Sci 36:1025–1028
- 108. Rey E, Elola-Olaso CM, Rodriguez-Aralejo F et al (2006) Prevalence of atypical symptoms and their associations with typical symptoms of gastroesophageal reflux in Spain. Eur J Gastroenterol Hepatol 18:969–975
- 109. Castell DO (1975) Diet and the lower oesophageal sphincter. Am J Clin Nutr 28:1296–1298
- 110. Yan BM, Shaffer EA (2006) Eosinophilic esophagitis: a newly established cause of dysphagia. World J Gastroenterol 12:2328–2334
- 111. American Psychiatric Association (2002) DSM-IV-TR. Diagnostic and statistical manual of mental disorders. ICD-10/ICD-9-CM. American Psychiatric Association, Arlington, VA
- 112. Mann G, Hankey GJ, Cameron D (2000) Swallowing disorders following acute stroke: prevalence and diagnostic accuracy. Cerebrovasc Dis 10:380–386
- Martino R, Foley N, Bhogal S et al (2005) Dysphagia after stroke: incidence, diagnosis, and pulmonary complications. Stroke 36:2756–2763
- 114. Smithard DG, Smeeton NC, Wolfe CD (2007) Long-term outcome after stroke: does dysphagia matter? Age Ageing 36:90–94
- 115. Sukkar SG, Ragni G, Ceravolo MG et al (2005) Predictive factors of neurogenic dysphagia in post ictus. ADI-SIN Study. ADI Magazine no. 4, p 635
- Wojner AW, Alexandrov AV (2000) Predictors of tube feeding in acute stroke patients with dysphagia. AACN Clin Issues 11:531–540
- 117. Akpunonu BE, Mutgi AB, Roberts C et al (1997) Modified barium swallow does not affect how often PEGs are placed after stroke. J Clin Gastroenterol 24:74–78
- 118. Mann G, Hankey GJ, Cameron D (1999) Swallowing function after stroke: prognosis and prognostic factors at 6 months. Stroke 30:744–748
- 119. Terre R, Mearin F (2006) Oropharyngeal dysphagia after the acute phase of stroke: predictors of aspiration. Neurogastroenterol Motil 18:200–205
- Broadley S, Croser D, Cottrell J et al (2003) Predictors of prolonged dysphagia following acute stroke. J Clin Neurosci 10:300–305
- 121. Dziewas R, Ritter M, Schilling M et al (2004) Pneumonia in acute stroke patients fed by nasogastric tube. J Neurol Neurosurg Psychiatry 75:852–856
- 122. Gandolfo C, Balestrino M, Del Sette M et al (2007) PEG in dysphagia due to cerebrovascular disease. A 10-year-long experience. Riv Ital Nutr Parenter Enter 25:40–43
- 123. Singh S, Hamdy S (2006) Dysphagia in stroke patients. Postgrad Med J 82:383–391
- 124. Hussain A, Woolfrey S, Massey J et al (1996) Percutaneous endoscopic gastrostomy. Postgrad Med J 72:581–585
- 125. Ickenstein GW (2005) Predictors of survival after severe dysphagic stroke. J Neurol 252:1510–1516
- 126. Schroeder MF, Daniels SK, McClain M et al (2006) Clinical and cognitive predictors of swallowing recovery in stroke. J Rehabil Res Dev 43:301–310
- 127. Smithard DG, O'Neill PA, England R et al (1997) The natural history of dysphagia following stroke. Dysphagia 12:188–193
- 128. Smithard DG, O'Neill PA, Parks C, Morris J (1996)

Complications and outcome after acute stroke: does dysphagia matter? Stroke 26:1–5

- Teasell RW, Back D, McRrae M (1994) Prevalence and recovery of aspiration post stroke. A retrospective analysis. Dysphagia 9:35–59
- Broadley S, Cheek A, Salonikis S et al (2005) Predicting prolonged dysphagia in acute stroke: the Royal Adelaide Prognostic Index for Dysphagic Stroke (RAPIDS). Dysphagia 20:303–310
- 131. Bulow M, Olsson R, Ekberg O (2005) Do dysphagic patients with an absent pharyngeal swallow have a shorter survival than dysphagic patients with pharyngeal swallow? Prognostic importance of a therapeutic videoradiographic swallowing study. Acta Radiol 46:126–131
- 132. Hamdy S, Aziz Q, Rothwell JC et al (1998) Recovery of swallowing after dysphagic stroke relates to functional reorganization in the intact motor cortex. Gastroenterology 115:1104–1112
- 133. Han DS, Chang YC, Lu Ch, Wang TG (2005) Comparison of disordered swallowing patterns in patients with recurrent cortical/subcortical stroke and first-time brainstem stroke. J Rehabil Med 37:189–191
- Horner J, Braser SR, Massey EW (1993) Aspiration in bilateral stroke patients: a validation study. Neurology 43:430–433
- 135. James A, Kapur K, Hawthorne AB (1998) Long-term outcome of percutaneous endoscopic gastrostomy feeding in patients with dysphagic stroke. Age Ageing 27:671–676
- Johnson ER, McKenzie SW, Sievers A (1993) Aspiration pneumonia in stroke. Arch Phys Med Rehabil 74:973–976
- 137 Leff B, Cheuvront N, Russell W (1994) Discontinuing feeding tubes in a community nursing home. Gerontologist 34:130–133
- Miller AJ (1986) Neurophysiological basis of swallowing. Dysphagia 1:91–100
- Mosier K, Patel R, Liu WC et al (1999) Cortical representation of swallowing in normal adults: functional implications. Laryngoscope 109:1417–1423
- 140. Prosiegel M, Heintze M, Wagner-Sonntag E, et al (2002) Deglutition disorders in neurological patients. A prospective study of diagnosis pattern of impairment therapy and outcome. Nervenarzt 73:364–370
- 141. Rehman HU, Knox J (2000) There is a need for a regular review of swallow ability in patients after PEG insertion to identify patients with delayed recovery of swallowing. Dysphagia 15:48
- 142. Buchholz AC (1998) Weaning patients with dysphagia from tube feeding to oral nutrition: a proposed algorithm. Can J Dietetic Pract Res 59:208–214
- 143. Denk DM, Bigenzahn W (2005) Management of oropharyngeal dysphagia: current status. HNO 53:661–672
- 144. Logemann JA (1990) Factors affecting ability to resume oral nutrition in the oropharyngeal dysphagic individual. Dysphagia 4:202–208
- 145. Lucas C, Rodgers H (1998) Variation in the management of dysphagia after stroke: does STL make a difference? Int J Lang Commun Disord 33[Suppl]:284–289
- 146. Mari F, Matei M, Ceravolo MG et al (1997) Predictive value of clinical indices in detecting aspiration in patients with neurological disorders. J Neurol Neurosurg Psychiatry 63:456–460
- 147. Rehman HU, Knox J (2000) There is a need for a regular review of swallowing ability in patients after PEG insertion to identify patients with delayed recovery of swallowing. Dysphagia 15(1):48
- Bath PMW, Bath-Hextall FJ, Smithard DG (1999) Interventions for dysphagia in acute stroke. Cochrane Database Systematic Rev (4):CD000323
- Carnaby G, Hankey GJ, Pizzi J (2006) Behavioural intervention for dysphagia in acute stroke: a randomised controlled trial. Lancet Neurol 5:31–37

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- 150. Bisch EM, Logemann JA, Rademaker AW et al (1994) Pharyngeal effects of bolus volume, viscosity, and temperature in patients with dysphagia resulting from neurologic impairment and in normal subjects. J Speech Hear Res 37:1041–1059
- DePippo KL, Holas MA, Reding MJ et al (1994) Dysphagia therapy following stroke: a controlled trial. Neurology 44:1655–1660
- 152. Garon BR, Engle M, Ormiston C (1997) A randomised control study to determine the effects of unlimited oral intake of water in patients with identified aspiration. J Neurol Rehabil 11:139–148
- 153. Logemann JA (1996) Screening, diagnosis and management of neurogenic dysphagia. Semin Neurol 16:319–327
- 154. Neumann S, Bartolome G, Buchholz D, Prosiegel M (1995) Swallowing therapy of neurologic patients: correlation of outcome with pretreatment variables and therapeutic methods. Dysphagia 10:1–5
- 155. Odderson IR, Keaton JC, McKenna BS (1995) Swallow management in patients on an acute stroke pathway: quality is cost effective. Arch Phys Med Rehabil 76:1130–1133
- 156. Raut VV, McKee GJ, Johnston BT (2001) Effect of bolus consistency on swallowing does altering consistency help? Eur Arch Otorhinolaryngol 258:49–53
- Rosenvinge SK (2005) Improving care for patients with dysphagia. Age Ageing 34:587–593
- 158. Ruoppolo G, Virdia P, Romualdi P et al (1992) Rehabilitation of oro-pharyngeal dysphagia of neurogenic etiology using radiological examination: preliminary results. Acta Otorhinolaryngol 12[Suppl 36]:1–27
- Schindler O, Grosso E, Tiddia C et al (2003) Swallowing disorders: management data. Acta Otorhinolaryngol 23:180–184
- 160. Smith Hammond C, Goldstein LB (2006) Cough and aspiration of food and liquids due to oral-pharyngeal dysphagia: ACCP evidence-based clinical practice guidelines. Chest 129[Suppl 1]:154S–168S
- 161. Finestone HM, Foley NC, Woodbury MG, Green-Finestone L (2001) Quantifying fluid intake in dysphagic stroke patients: a preliminary comparison of oral and nonoral strategies. Arch Phys Med Rehabil 82:1744–1746
- 162. Goulding R, Bakheit AM (2000) Evaluation of the benefits of monitoring fluid thickness in the dietary management of dysphagic stroke patients. Clin Rehabil 14:119–124
- Steele CM, Van Lieshout PH (2004) Influence of bolus consistency on lingual behaviors in sequential swallowing. Dysphagia 19:192–206
- 164. Crary MA, Carnaby GDM, Groher ME et al (2004) Functional benefits of dysphagia therapy using adjunctive sEMG biofeedback. Dysphagia 19:160–164
- 165. Fraser C, Power M, Hamdy S et al (2002) Driving plasticity in human adult motor cortex is associated with improved motor function after brain injury. Neuron 34:831–840
- 166. Huckabee ML, Cannito MP (1999) Outcomes of swallowing rehabilitation in chronic brainstem dysphagia: a retrospective evaluation. Dysphagia 14:93–109
- 167. Kahrilas PJ, Logemann JA, Krugler C et al (1991) Volitional augmentation of upper esophageal sphincter opening during swallowing. Am J Physiol 260:G450–456
- Lazarra G, Lazarus C, Logemann JA (1986) Impact of thermal stimulation on the triggering of the swallow reflex. Dysphagia 1:73–77
- 169. Logemann JA, Kahrilas PJ, Kobara M et al (1989) The benefit of head rotation on pharyngoesophageal dysphagia. Arch Phys Med Rehabil 70:767–771
- 170. Shaker R, Easterling C, Kern M et al (2002) Rehabilitation of swallowing by exercise in tube-fed patients with pharyngeal dysphagia secondary to abnormal UES opening. Gastroenterology 122:1314–1321

- 171. Shanahan TK, Logemann JA, Rademaker AW et al (1993) Chindown posture effect on aspiration in dysphagic patients. Arch Phys Med Rehabil 74:736–739
- 172. Arai T, Yasuda Y, Takaya T et al (1998) ACE inhibitors and symptomless dysphagia. Lancet 352:115–116
- 173. Perez I, Smithard DG, Davies H et al (1998) Pharmacological treatment of dysphagia in stroke. Dysphagia 13:12–16
- 174. Beck AM, Balknäs UN, Fürst P et al; Council of Europe (the Committee of Experts on Nutrition, Food Safety and Consumer Health of the Partial Agreement in the Social and Public Health Field) (2001) Food and nutritional care in hospitals: how to prevent undernutrition – report and guidelines from the Council of Europe. Clin Nutr 20:455–460
- 175. Sukkar S, Machello N, Gradaschi R et al (2006) Disfagia. In: Binetti P, Marcelli M, Baisi R (eds) Manuale di nutrizione clinica e scienze dietetiche applicate. Società Ed. Universo, Rome, pp 145–153
- 176. Cairella G, Berni Canani R (2006) Malnutrizione. In: Binetti P, Marcelli M, Baisi R (eds) Manuale di nutrizione clinica e scienze dietetiche applicate. Società Ed. Universo, Rome, pp 21–40
- 177. Van Bokhorst-de van der Schuer, van Leeuwen PA, Kuik DJ et al (1999) The impact of nutritional status on the prognoses of patients with advanced head and neck cancer. Cancer 86:519–527
- Meuric J, Garabige V, Blanc-Vincent MP et al (1999) Good clinical practice in nutritional management of head and neck cancer patients. Bull Cancer 86:843–854
- 179. Weimann A, Braga M, Harsanyi L et al; DGEM (German Society for Nutritional Medicine); Jauch KW, Kemen M, Hiesmayr JM et al; ESPEN (European Society for Parenteral and Enteral Nutrition) (2006) ESPEN Guidelines on Enteral Nutrition: surgery including organ transplantation. Clin Nutr 25:224–244
- Von Meyenfeldt MF, Meijerink WJ, Rouflart MM et al (1992) Perioperative nutritional support: a randomised clinical trial. Clin Nutr 11:180–186
- 181. Bruning PF, Halling A, Hilgers FJ et al (1988) Postoperative nasogastric tube feeding in patients with head and neck cancer: a prospective assessment of nutritional status and well-being. Eur J Cancer Clin Oncol 24:181–188
- 182. Duncan GG, Epstein JB, Tu D et al (2005) National Cancer Institute of Canada Clinical Trials Group. Quality of life, mucositis, and xerostomia from radiotherapy for head and neck cancers: a report from the NCIC CTG HN2 randomized trial of an antimicrobial lozenge to prevent mucositis. Head Neck 27:421–428
- 183. Epstein JB, Stevenson-Moore P, Jackson S et al (1989) Prevention of oral mucositis in radiation therapy: a controlled study with benzydamine hydrochloride rinse. Int J Radiat Oncol Biol Phys 16:1571–1575
- 184. Smit M, Balm AJ, Hilgers FJ, Tan IB (2001) Pain as sign of recurrent disease in head and neck squamous cell carcinoma. Head Neck 23:372–375
- 185. Boysen M, Lovdal O, Tausjo J, Winther F (1992) The value of follow-up in patients treated for squamous cell carcinoma of the head and neck. Eur J Cancer 28:426–430
- 186. Nguyen NP, Sallah S, Karlsson U, Antoine JE (2002) Combined chemotherapy and radiation therapy for head and neck malignancies: quality of life issues. Cancer 94:1131–1141
- 187. Promoter Comittee of the Italian Speech Therapists' Federation (2007) Management guidelines of dysphagia in adults in phoniatry and speech therapy. http://www.alplogopedia.it/lgbreve.pdf
- 188. Eisbruch A, Lyden T, Bradford CR et al (2002) Objective assessment of swallowing dysfunction and aspiration after radiation concurrent with chemotherapy for head-and-neck cancer. Int J Radiat Oncol Biol Phys 53:23–28

- Kreuzer SH, Schima W, Schober E et al (2000) Complications after laryngeal surgery: videofluoroscopic evaluation of 120 patients. Clin Radiol 55:775–781
- 190. de Luis DA, Aller R, Izaola O et al (2002) Postsurgery enteral nutrition in head and neck cancer patients. Eur J Clin Nutr 56:1126–1129
- 191. Stroud M, Duncan H, Nightingale J; British Society of Gastroenterology (2003) Guidelines for enteral feeding in adult hospital patients. Gut 52[Suppl 7]:vii1–vii12
- 192. Furia CL, Kowalski LP, Latorre MR et al (2001) Speech intelligibility after glossectomy and speech rehabilitation. Arch Otolaryngol Head Neck Surg 127:877–883
- 193. Graville D, Gross N, Andersen P et al (1999) The long-term indwelling tracheoesophageal prosthesis for alaryngeal voice rehabilitation. Arch Otolaryngol Head Neck Surg 125:288–292
- 194. Hammerlid E, Silander E, Hornestam L, Sullivan M (2001) Health-related quality of life three years after diagnosis of head and neck cancer – a longitudinal study. Head Neck 23:113–125
- 195. Hammerlid E, Wirblad B, Sandin C et al (1998) Malnutrition and food intake in relation to quality of life in head and neck cancer patients. Head Neck 20:540–548
- 196. Hénon H, Godefroy O, Leys D et al (1995) Early predictors of death and disability after acute cerebral ischemic events. Stroke 26:392–398
- 197. Chiò A, DiVito N (2001) Disfagie neurogene. In: Schindler O (ed) Deglutologia. Omega edition, Turin

- 198. Schmidt J, Holas M, Halvorson K, Reding M (1994) Videofluoroscopic evidence of aspiration predicts pneumonia and death but not dehydration following stroke. Dysphagia 9:7–11
- 199. Evidence-based Medicine Group (2002) Guideline for ischemic stroke. Hospital San Giovanni Battista, Torino. http://www.cpo.it/lineeguida/lgictusischemico.pdf
- 200. Pacifici A, De Blasio E (2002) Guidelines for a Rianimation Centre. In: Nutrizione Parenterale ed Enterale, Antonio Delfino Editor, Rome
- Sergio Z, Franco M (1998) Nutrizione enterale ruolo infermieristico e gestione. Act Congress ANIARTI. http://www.aninpe.it/allegati/zava.doc
- 202. Working Group ASSR (Agency for the Regional Sanitary Services) (2006) Guidelines for home parenteral and enteral nutrition. http://www.sinpe.it/Linee_Guida_NAD_ministeriali.pdf
- Rosenbek JC, Robbins JA, Roecker EB et al (1996) A penetration-aspiration scale. Dysphagia 11:93–98
- 204. McHorney CA, Robbins J, Lomax K et al (2002) The SWAL-QOL and SWAL-CARE outcomes tool for oropharyngeal dysphagia in adult: III. Documentation of reliability and validity. Dysphagia 17:97–114
- 205. Hannig C, Wuttge-Hannig A (1999) Radiological diagnosis. In: Dysphagia. Urban & Fischer, Munich
- 206. Scottish Intercollegiate Guidelines Network (1997) Management of patients with stroke. http://www.sign.ac.uk/pdf-/sign64.pdf