GUIDELINE DEVELOPMENT

Methods

A team consisting of clinical nutritionists (HN, IR), a speech and language therapist (MTB), stroke nurses, and physicians (MK, MTK) developed these guidelines, following the Appraisal of Guidelines, Research and Evaluation (AGREE) framework [AGREE collaboration 2003].

PubMed was searched for English language papers published between 1.1.2007 and 1.6.2012 (updated until 30.6.14), using the MeSH terms stroke, humans, dysphagia and nutrition. Titles and abstracts were screened for relevant content to retrieve articles providing the evidence base for the guidelines. Levels of evidence and grades of recommendations were assessed by three of the authors (SHJ, MK, MTK) applying the SIGN methodology, which classifies the strength of recommendations from grade A (highest level of evidence) to D [SIGN 2013].

The International Guideline Library (www.g-i-n.net) and National Guideline Clearinghouse Home (www.guideline.gov) were searched using the terms stroke and dysphagia/nutrition.

Results

The search of the literature retrieved more than 300 publications. Nine guidelines, 1 systematic review, and reports of 12 individual studies were formally evaluated (Tables 1 and 2) and provide the evidence base for the recommendation that patients with acute stroke should be screened for undernutrition and nutritional risk and that a swallow test should be performed before offering food or drink to the patients (Table 3). The guideline, containing an instructional video showing how to perform the swallow test, was published in June 2012 [Kampman and Johnsen 2012].

Conclusion

We graded the recommendation for both nutritional risk screening and for performing a swallow test before offering food or drink as SIGN grade B [SIGN 2013], which is in accordance with most published guidelines (Table 1).

Table 1. Recommendations in evidence-based guidelines (published 2007 or later, sorted by descending year of last update)

Guideline hyperlink (last updated)	Nutritional risk screening	Grade*	Swallow screen	Grade*
Canadian Best Practice Recommendations for Stroke Care 2010 (2013)	The nutritional status should be screened as early as possible, ideally on the day of admission, using validated screening tools.	Grade B	The swallowing status should be screened as early as possible, ideally on the day of admission, using validated screening tools.	Grade B
AHA/ASA: Guidelines for the Early Management of Patients With Acute Ischemic Stroke. (2013)	---	---	Assessment of swallowing before the patient begins eating, drinking, or receiving oral medications is recommended.	Grade B
Royal College of Physicians: National Clinical Guideline for Stroke (2012)	All patients should be assessed within a maximum of 4 hours of admission for their nutritional status by trained staff using a structured assessment such as the Malnutrition Universal Screen Tool (MUST).	---	All patients should be assessed within a maximum of 4 hours of admission for their ability to swallow, using a validated swallow screening test (e.g. 50 ml water swallow) administered by an appropriately trained person.	---
Norwegian Directorate of Health: Behandling og rehabilitering ved hjerneslag [Norwegian stroke guideline] (2010)	BMI, serum albumin	---	A swallow test should be performed before oral intake of fluids or food	---
SIGN: Management of patients with stroke: identification and management of dysphagia (2010)	Assessment of nutritional risk should be carried out within the first 48 hours using a valid and reliable screening procedure suitable for stroke patients.	Grade D	All stroke patients should be screened for dysphagia before being given food or drink. The water swallow test should be used as a part of the screening for aspiration risk in stroke patients.	Grade C Grade B
Clinical practice guideline for the management of stroke rehabilitation Department of Veterans Affairs/ Department of Defense (2010)	Recommend all patients receive evaluation of nutrition and hydration, as soon as possible after admission. Food and fluid intake should be monitored in all patients, and body weight should be determined regularly.	---	A bedside swallow screening should be completed before oral intake. All patients should be screened for swallowing deficits by appropriately trained clinicians, using standardized and valid screening tools.	--- Grade C
Clinical Guidelines for Acute Stroke Management. National Stroke Foundation Australia (2010)	All patients with stroke should be screened for malnutrition using a validated assessment tool.	Grade B	Patients should be screened for swallowing deficits before being given food, drink or oral medications by trained personnel using a validated tool.	Grade B

NICE: Diagnosis and initial management of acute stroke (2008)	All hospital inpatients on admission should be screened for malnutrition and the risk of malnutrition. The Malnutrition Universal Screening Tool (MUST), for example, may be used to do this.	Consensus	On admission, people with acute stroke should have their swallowing screened by an appropriately trained healthcare professional before being given any oral food, fluid or medication.	Consensus
European Stroke Organisation: Guidelines for Management of Ischaemic Stroke and Transient Ischaemic Attack (2008)	---	---	Swallowing assessment is recommended	Good clinical practice

* Grading of practice recommendations A highest-D lowest [SIGN 2013]

Evidence base for recommendations in the Norwegian guidelines

Table 2a. Screening for malnutrition and nutritional risk should be performed in patients with acute stroke

Reference	Design	Findings	Evidence*	Grading*
[Martineau et al. 2005]	Retrospective cohort, n=73 (62% of eligible)	Undernutrition (subjective global assessment, SGA) within 48 hours after admission: 19% undernourished, associated with longer length of stay, increased complications – poor design	Malnutrition (SGA) – longer length of stay, increased complications **level 2-**	**Grade B**
[Gariballa et al. 1998]	Prospective cohort stroke patients, n=201, mean age 77.9 years	Low S-albumin within 48 hours after admission strong and independent predictor death. 31% BMI <20 at admission.	Low serum albumin is a strong and independent predictor of death **level 2+**	
[Shen et al. 2011]	Acute Stroke registry, n=483	Malnutrition (BMI, cholesterol, albumin) was independent risk factor for poorer functional outcomes at 6 months (OR 2.6 (13.-5) for Barthel Index < 75)	Malnutrition predicts functional outcome at 6 months **level 2+**	
			S-albumin predicts death at 3 months **level 2+**	
[Yoo et al. 2008]	Prospective cohort, n=131	5-parameter assessment of nutritional risk: undernutrition 1 week after admission independently predicted poor outcome (modified Rankin Scale) at 3 months	Undernutrition 1 week after admission independently predicted poor outcome at 3 months **level 2+**	
FOOD trial Collaboration [2003]	Observational study, 15 countries, n=2955	Undernourished (subjective global assessment, n=275/2955) more likely pneumonia, infections, GI bleeding. Undernutrition predicts death (adjusted OR 1.82) and death or modified Rankin scale ≥3 (=dependent) (adjusted OR 1.52)	Undernutrition predicts death and "death or being dependent" at 6 months **level 1+**	

* SIGN methodology was applied to assess levels of evidence and grades of recommendations (detailed below).

Table 2b. Patients with acute stroke should be screened for dysphagia before offering food or drink

Reference	Design	Findings	Evidence*	Grading*
[Martino *et al.* 2005]	Systematic review 1966-2005, mostly small studies, different swallow tests	Increased pneumonia risk in patients with dysphagia (RR, 3.17; 95% CI, 2.07, 4.87)	Swallow test identifies patients at risk of pneumonia **level 2++**	**Grade B**
[Hinchey *et al.* 2005]	Observational study, 15 countries, n=2532, different swallow tests	Lower pneumonia risk in patients screened using formal protocol (formal protocol n=742, 2.4% pneumonia; informal protocol n=1790, 5.4% pneumonia; P=0.0016)	Lower pneumonia risk in patients screened using formal protocol **level 2++**	
[Lakshminarayan *et al.* 2010]	Acute stroke registry, n= 18017	Pneumonia rate was doubled in 4509 unscreened patients compared with 8406 patients who were screened and passed (OR 2.2; 95% CI 1.7 to 2.7), 38% screened failed	Lower pneumonia risk in patients who passed swallow screen **level 2++**	
[Sellars *et al.* 2007]	Prospective cohort (n=412)	Failed water swallow test independent predictor pneumonia	Higher pneumonia risk in patients who failed swallow screen **level 2+/2++**	
[Yeh *et al.* 2011]	Prospective cohort; n=74 pre- and 102 post intervention	Stroke-associated pneumonia reduced after introduction swallow screen in ICU (OR 0.42; 95% CI 0.18 to 1.00; p=0.05)	Halved pneumonia risk after introduction swallow screen **level 2+**	
[Ickenstein *et al.* 2010]	Observational study, n= app. 700 pre (2007) and app. 700 post (2009) intervention	3-step protocol (nurse screening, SLT assessment, endoscopy) reduced pneumonia (7.4% to 2.8%) and in-hospital mortality (8.0% to 4.2%).	Halved pneumonia risk and in-hospital mortality after introduction 3-step swallow assessment **level 2+**	
[Middleton *et al.* 2011]	Single-blind cluster RCT 19 acute stroke units, n= 1696	Proactive management of fever, hyperglycaemia, and swallowing dysfunction resulted in better 90 day outcome: dead or modified Rankin scale ≥2 (=dependent): p=0.002; BI (n.s.)	Multiple interventions including management of swallowing dysfunction resulted in decreased risk of being dead or dependent at 90 days **level not assigned**	
[Titsworth *et al.* 2013]	Single-centre prospective interrupted time series trial, n=1686 pre- and 648 post intervention	Implementation of dysphagia screen without oral challenge coincided with drop in hospital-acquired pneumonia from 6.5 to 2.8%	Halved pneumonia risk after introduction swallow screen **level 2++**	

* The SIGN grading system was applied: grade A (highest level of evidence) to D. Good practice points (GPP) are based on the clinical experience of the guideline development group [SIGN 2013].

Table 3. Summary of the recommendations for screening in the Norwegian guideline [Kampman and Johnsen 2012]

Recommendation	Grading
Screening for undernutrition and nutritional risk in patients with acute stroke **NRS 2002** should be performed soon after admission and be repeated regularly because undernutrition may develop or worsen during hospitalisation.	Grade B

Screening for dysphagia
    A swallowing screen should be performed before offering food or drink to patients with acute stroke.
    Nurses should repeat the swallowing screen when deterioration is suspected and to monitor possible improvement in patients who are not followed up by a speech and language therapist.
	Grade B
	
	GPP

Recommendations are graded applying the SIGN grading system [SIGN 2013] from grade A (highest level of evidence) to D. Good practice points (GPP) are based on the clinical experience of the guideline development group. The evidence base for the recommendations regarding screening for nutritional risk and dysphagia is summarized in Table 2.

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