LETTERS TO THE EDITOR

PREVENTION OF GASTROESOPHAGEAL REFLUX USING AN APPLICATION OF HALF-SOLID NUTRIENTS IN PATIENTS WITH PERCUTANEOUS ENDOSCOPIC GASTROSTOMY FEEDING

To the Editor: Although percutaneous endoscopic gastrostomy (PEG) feeding is widely used as a convenient method of long-term nutritional support,[1] administration of liquid nutrients often accompanies complications such as vomiting or diarrhea. Gastroesophageal reflux (GER) presumably causes vomiting, which may result in aspiration. Therefore, half-solid nutrients were used for PEG feeding, and whether this approach can reduce GER was examined.

Seventeen patients (mean age ± standard deviation = 79.9 ± 10.5) who were on PEG feeding participated in this study. Written informed consent was obtained from all patients. Liquid or half-solid nutrients were administered via PEG tubing in a randomized order. Half-solid nutrients were prepared by mixing 5 g of agarose with 500 mL of liquid nutrients diluted with the same volume of water. Incidence of GER was assessed using computed tomography (CT) scan of the esophagus. Liquid nutrients were administered over 15 minutes in portions of 400 mL containing 20 mL of the water-soluble contrast material, Gastrografin® (methylglucamine diatrizoate). The half-solid nutrients were administered via bolus injections of the same volume of nutrients, which were contained separately in 50 mL syringes. Thirty minutes after the administration, a CT scan was performed in 1-cm-thick slices of the esophageal portion. GER was confirmed if the Hounsfield number exceeded 100 in each slice examined. A Hounsfield number of 100 was employed because it can unequivocally distinguish the mixture of the nutrients containing contrast material from the esophageal and other surrounding tissues. A radiologist who was not informed of the type of nutrients used assessed the CT images. Statistical comparison of the incidence of GER between the two types of nutrients was made using McNemar test.

GER was confirmed in 10 of the 17 subjects (58.8%) when they received liquid nutrients. By contrast, when they received half-solid nutrients, only four of 17 subjects (23.5%) showed evidence of GER from CT findings ($\chi^2 = 6.0$, $df = 1$, $P = .014$, by McNemar test) (Table 1).

The advantages of PEG feeding over nasogastric feeding have been discussed elsewhere, although there have been some complications reported.[2] Of the complications, vomiting can be a cause of fatal aspiration due to a reflux of the administered nutrients.[3] The tubing used for PEG feeding has made it possible to apply half-solidified nutrients, which we hypothesized would cause less reflux from the stomach.[4] As expected, less evidence of GER was observed when using half-solid nutrients than when using

Table 1. Occurrence of Gastroesophageal Reflux by Liquid and Half-Solid Nutrients

			Gastroesophageal Reflux		Range of Reflux*		Distance from the Esophageal-Cardiac Junction†	
Age	Sex	Clinical Profile	Liquid	Half-Solid	Liquid	Half-Solid	Liquid	Half-Solid
82	F	Dementia	(–)	(–)				
81	F	Dementia	(–)	(–)				
90	F	Dementia	(+)	(+)	7	6	13	13
53	F	Cerebral infarction	(–)	(–)				
87	F	Dementia	(+)	(–)	4		13	
80	F	Dementia	(+)	(+)	9	4	9	10
82	M	Dementia	(+)	(+)	4	4	13	13
87	F	Cerebral infarction	(+)	(–)	1		4	
84	M	Cerebral infarction	(+)	(–)	12		15	
68	F	Cerebral infarction	(+)	(–)	13		13	
82	F	Dementia	(–)	(–)				
89	F	Cerebral infarction	(–)	(–)				
91	F	Cerebral infarction	(+)	(–)	1		2	
84	F	Cerebral infarction	(+)	(+)	15	10	15	10
87	F	Dementia	(–)	(–)				
68	M	Cerebral infarction	(–)	(–)				
64	M	Cerebral hemorrhage	(+)	(–)	5		8	

*Number of slices in which contrast materials were confirmed in the esophagus.
†Distance from the esophageal-cardiac junction to the upper limit of the slices where contrast materials were confirmed (cm).

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liquid nutrients. It was also confirmed that solidifying nutrients using agarose did not clog the tube. Continuous infusion and careful observation of the patient's symptoms are considered necessary to reduce the risk of GER in PEG feeding. Also, the patients are advised to remain in a sitting position during administration, which may increase the risk of developing or exacerbating decubitus ulcers. Thus, this pilot study suggests that the use of rapid administration of half-solid nutrients in PEG feeding can reduce the risk of GER substantially and may eventually contribute to a reduction of complications and to improvement in the quality of life of patients and their caregivers.

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THE ROLE OF POSITRON EMISSION TOMOGRAPHY IN THE DIAGNOSIS OF ALZHEIMER'S DISEASE

To the Editor: We would like to address several issues raised by a recent article by Gill et al.[1] purporting to review the evidence-based literature regarding the potential value of positron emission tomography (PET) in the diagnosis of dementia. It concludes that there is little evidence to support the integration of PET in the clinical evaluation of patients with suspected or established dementia. Several features of this article and the data reviewed challenge this conclusion.

First, the article presents itself as a cost-benefit analysis of PET in the diagnosis of Alzheimer's disease (AD), but no cost-benefit or economic analysis was performed beyond stating the cost of these scans in Ontario, Canada. Such analyses have been conducted using established cost-benefit methods based on imaging and other costs and accounting for such advantages as early introduction of therapy, deferral of nursing home placement, and reduction in use of unnecessary testing. A formally conducted cost-benefit analysis demonstrated that PET is, under the most conservative analysis, at least cost neutral and, under more-realistic conditions, cost advantageous when added to the dementia evaluation.[2]

Second, the authors stated that they conducted a systematic review of the peer-reviewed literature from Medline from 1975 to 2001, but they did not identify the largest single-institutional study examining the relationship between PET-based and autopsy-based diagnoses, published in 2000.[3] In addition, they excluded from their main analysis the largest multicenter study to examine this relationship,[4] although its publication fell within the specified time, and they note that this latter article had several advantages over the articles examined. This article demonstrated 94% sensitivity and 73% specificity for PET in the diagnosis of AD, comparable with or better than most clinical diagnostic studies.

Third, the authors do not provide criteria for deciding how PET was judged to be beneficial. They conducted no critical assessment or comparisons of sensitivity, specificity, or accuracy measures for clinical diagnoses or PET-based diagnoses. Moreover, they included only papers in their main analysis that had as their primary criterion standard the clinical diagnosis of AD, excluding those papers that used the more definitive standard of autopsy-confirmed diagnosis.[3,4] There was consequently no way their analysis could demonstrate any incremental value of PET over clinical diagnosis by the way they constructed and performed their evaluation.

Fourth, the authors repeatedly assert that clinical diagnosis of probable AD is straightforward and accurate in up to 90% of cases, thereby seeming to obviate a priori the need for neuroimaging. They identify only one study in support of this claim,[5] a paper that the American Academy of Neurology (AAN) recently identified as having Class II quality of evidence. The paper showed that, to achieve a sensitivity of 90% (as occurs with PET), clinical specificity fell to below 40%. Three papers that the AAN rated as having Class I quality of evidence demonstrated a mean accuracy rate of clinical diagnosis of less than 70%.

Fifth, Table 3 of the Gill et al.[1] article lists the 16 articles or publications included in their review. Of these 16, five were published before the advent of any Food and Drug Administration–approved therapy for AD, and five more were published in 1993 and 1994, when tacrine, a little-used compound, was the only available treatment. Thus, 10 of the 16 articles precede the contemporary era of pharmacotherapeutics in the management of AD. This is important because an early and accurate diagnosis becomes more urgent once therapy is widely available.

Sixth, the two Class A or B articles identified by the authors and published in 1996 (the only ones in the current era of neurotherapeutics for AD) were supportive of the use of PET. One study[6] found high inter- and intraobserver agreement in PET interpretation of patients with probable AD, possible AD, mild cognitive impairment, and normal controls. Another study[7] found that three-dimensional