Why I Like the Free Water Protocol

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Abstract

In this opinion piece, I present my major reasons for advocating for the free water protocol (FWP). Although there is a lack of strong direct evidence in support of the FWP, there are multiple bits of indirect evidence supporting it: patients do not like thick liquids and avoid them; thick liquids are more harmful to the lungs than are thin liquids; feeding tubes are associated with high rates of pneumonia; and thin liquids, especially water, are relatively benign to the lungs. We need solid evidence in the form of a randomized clinical trial, but, in the meantime, decisions regarding allowing free water to patients who aspirate this consistency should be made on a case-by-case basis.

Over 25 years ago, in 1984, Kathy Panther and colleagues began the free water protocol (FWP) at Frazier Rehabilitation Hospital in response to a situation in which patients who resided in their Rehabilitation Center and were "ordered" to refrain from consuming thin liquids drank water anyway. After determining that the overall pneumonia rates in their institution were very low and noting that the compliance rate with water restriction was poor, the clinicians instituted a policy to allow patients who aspirated thin liquids to drink water "freely." Since the policy was begun, the incidence of pneumonia has continued to be very low at that facility; in fact, over a period of 18 months, only 2 out of 134 patients on the protocol developed pneumonia (Panther, 2005). Over the years, the FWP has undergone several refinements, including the requirement that oral care be given to all patients on the FWP, and has been presented regularly at scientific meetings and seminars. In 2005, Kathy Panther wrote a comprehensive overview of the rationale for this policy and the evidence supporting it in *Perspectives on Swallowing and Swallowing Disorders*, and I recommend this article to everyone reading this current opinion piece.

Today, many speech-language pathologists (SLPs) have embraced the FWP. It is a formal policy in many rehabilitation hospitals and even in some acute care facilities. Others have declined to consider it, taking the "safe" road and disallowing thin liquids for any patient who aspirates them. What is my position? I am a "believer" in the philosophy of the FWP, but I have not attempted to formally implement it at my medical center. Why not? Because the scientist in me tells me to wait until we have more solid evidence specifying the safety of water aspiration in different populations and conditions. After all, pneumonia is a serious complication and cannot be taken lightly. However, on a case-by-case basis, I frequently endorse a patient's desire to drink water, in spite of aspirating thin liquids, on a formal dysphagia evaluation. I do this because of indirect evidence supporting the safety of the practice and because it is sometimes critical for a patient's quality of life (QOL), as has been made apparent to me in conversations with patients with a swallowing problem.

I submit that the FWP should be considered for certain patients and in certain conditions for the interim—that is, until someone conducts a randomized controlled trial that yields strong evidence that supports or refutes the safety of this policy. I base my decision on the following indirect evidence: (a) patients who are restricted to drinking thick liquids may develop pneumonia at comparable or higher rates than patients who drink thin liquids, and patients who are restricted to drinking thick liquids are at high risk of becoming dehydrated; (b) there is evidence that some patients who receive their nutrition via feeding tubes develop higher rates of pneumonia than do patients who drink thin liquids; and (c) some patients who drink (and aspirate) thin liquids may not increase their risk for pneumonia and may be better hydrated and have better QOL.

The Thick Liquid Alternative

Prescribing thick liquids is an extremely common recommendation for patients who are suspected of aspirating or are known to aspirate thin liquid. Garcia, Chambers, Clark, Helverson, and Matta (2010) reported that one quarter to three quarters of patients in hospitals, rehabilitation facilities, and nursing homes were ordered this diet, in many cases without the benefit of an instrumental evaluation. Yet, there are known adverse effects of imposing this on patients. Anecdotal evidence from clinicians across the country supports the notion that most people do not like drinking thick liquids. Consequently, patients tend to drink less fluids and, thus, increase their risk of dehydration. This has been documented in hospitalized patients on thick liquids (Vivanti, Harvey, Ash, & Battistutta, 2008) and found to be an even more significant problem for patients ordered to take a “honey thick” liquid (Robbins et al., 2008). Adherence to a thick liquids regimen in this latter study was only fair: 67–73% of patients complied with nectar thick and 56%–91% complied with honey thick liquid recommendations, which suggests that many patients may have been drinking thin liquids instead.

What is the evidence that patients who aspirate thick liquids have an increased risk of pneumonia? Panther (2005) cited two important studies in the 1990s—Schmidt, Holas, Halvorson, and Reding (1994) and Holas, DePipppo, and Reding (1994)—that reported patients who aspirated thick liquids were more likely to develop pneumonia than were patients who aspirated thin liquids only or who did not aspirate. More recently, a study done in the United States with more than 700 patients in nursing homes (Robbins et al., 2008) found patients who aspirated thick liquids had significantly higher rates of pneumonia than did patients who did not aspirate thick liquids. Presumably, thick liquids are harder for the lungs to clear.

The Percutaneous Endoscopic Gastrostomy Tube (PEG) Alternative

Does the percutaneous endoscopic gastrostomy tube (PEG) protect against pneumonia? First of all, if aspiration of all consistencies is present and occurs regularly and of sufficient volume, then yes, tube feeding does prevent aspiration of food and liquid. Two such cases in point are (a) a patient with bulbar amyotrophic lateral sclerosis (ALS) whose musculature is too weak to generate an effective swallow and (b) a patient with a brainstem cerebrovascular accident (CVA) who has lost the ability to swallow. These are examples of such severe dysphagia that, not only is aspiration pneumonia a likely complication, but excessive weight loss is likely to occur due to inadequate nutritional intake. However, there are many more patients who aspirate a mild to moderate amount of all consistencies on some or most swallows and are closer to the “fence,” where a decision regarding tube feeding is not so clear cut.

One major reason for hesitating before inserting a feeding tube is that feeding tubes carry their own risks for pneumonia and, so, may not prevent the very complication they were intended to prevent. Why not? Because they do not eliminate aspiration of oral, nasal, and pharyngeal secretions, which can, by themselves, cause pneumonia. Second, they often result in less frequent oral care (because the patient is not eating orally); this, in turn, increases the

bacterial count of the secretions, which, if aspirated, are pathogenic to the lungs. Third, the patient may reduce frequency of dry/saliva swallowing simply because there is no oral intake, which is responsible for stimulating salivary flow. Frequency of spontaneous swallowing will also decrease if the patient's secretions are suctioned. With less frequent spontaneous swallowing, secretions build up and dry up within the hypopharynx. These thick, tenacious secretions are difficult for the patient to clear and are loaded with bacteria. Finally, tube feeding is known to increase gastroesophageal reflux (Balan et al., 1998) and lead to an aspiration pneumonitis.

One large group of patients who frequently receive feeding tubes are persons in institutions who have chronic progressive neurologic disease with dementia and have become difficult for staff to feed (i.e., the patient who "stops eating" due to dementia). In this group, there is no evidence that PEG protects against pneumonia or malnutrition; in fact, higher rates of pneumonia are generally seen in those patients who get feeding tubes, contrary to the intention of placing them (Croghan, Burke, Caplan, & Denman, 1994; Finucane, Christmas, & Travis, 1999; Mitchell, Kiely, & Lipsitz, 1997).

For all patients with feeding tubes who are told to refrain from drinking water, the clinician should consider the question of comfort and QOL. If you restrict water to the pharynx but continue to deliver adequate hydration, is thirst satisfied? One very interesting study suggests this is not the case. Figaro and Mack (1997) reported on 7 healthy subjects who voluntarily used a nasogastric tube (NGT) to deliver hydration directly to the stomach after exercising to the point of dehydration. All the subjects continued to be thirsty even after they had been given enough fluid to rehydrate them. Apparently, the pharynx needs direct flushing with water to eliminate the "thirsty throat" symptom.

Thin Liquids and Pneumonia

Over the years, several research studies have concluded that aspiration of thin liquids, especially water, does not pose a serious risk for pneumonia (Feinberg, Kneble, & Tully, 1996; Feinberg, Kneble, Tully, & Segall, 1990; Olson, 1970; Splaingard, Hutchins, Sulton, & Chaudhuri, 1988). More recently, two studies lent further support to this conclusion.

In 2008, Robbins and colleagues reported on the results of a large, randomly controlled trial (RCT) that involved 515 nursing home patients with Parkinson's disease and dementia. The major focus of the study was to determine whether incidence of aspiration pneumonia was significantly different in patients who received chin tuck, as opposed to thick liquids, as an intervention to prevent aspiration of thin liquids. The results of the study showed no difference in outcome of pneumonia between the two groups, with the incidence of pneumonia approximately 10% in each group. As a secondary aim of the study, researchers analyzed a large subset of patients (345) who aspirated thin and thick liquids and for whom neither intervention prevented aspiration. The patients were randomly assigned to receive one of two treatments, with half of the patients receiving thick liquids (and aspirating them) and half of the patients delegated to "chin tuck" while drinking thin liquids (and aspirating them). Outcomes showed that, overall, the patients who aspirated contracted significantly more pneumonia than did the patients who did not aspirate (< .05). When the patients were subdivided into the two different treatment groups, it was found that the incidence of pneumonia was significantly higher in the sub-group of patients who aspirated thick liquids than in the group that did not aspirate thick liquids ($p < 0.05$). However, the incidence of pneumonia in the sub-group of patients who aspirated thin liquids was not significantly different from the group that did not aspirate thin liquids (Anonymous, personal communication, 2009); thus, one may question whether aspiration of thin liquids was a benign event for this group (Robbins et al., 2008).

Patients with head and neck cancer (HNC) are also frequently found to aspirate thin liquids on a regular basis. In a recent study, researchers looked at outcomes for this group.

They conducted swallow studies and CT scans to assess the lung function of 116 patients who had undergone partial laryngectomy surgeries 3–13 years earlier to treat cancer (Simonelli et al., 2010). All of the patients had pre-existing chronic pulmonary disease (COPD). Results of the modified barium swallow (MBS) or fiberoptic endoscopic examination of swallowing (FEES) studies showed 39% of the patients aspirated, mostly on thin liquids. The researchers compared the swallow studies and CT scans to results for a control group of 45 COPD patients who did not have cancer and did not aspirate on the swallow studies. Results showed no lung abnormalities on CT in the HNC patients that were distinguishable from the control COPD patients and no reported events of aspiration pneumonia. The researchers concluded that HNC patients post-surgery can tolerate small amounts of aspiration.

Aspiration pneumonia, by definition, develops after colonized oropharyngeal material is aspirated into the lungs. Water is not the same as secretions. Far fewer bacteria exist in water—less than in any other drink, food, and, certainly, less than in saliva (100–1000 bacteria/ml in water compared to 1,000,000,000 bacteria/ml in saliva). The bacteria in water are not pathogenic to lungs and are cleared easily by being absorbed into the bloodstream (Feinberg et al., 1990). Thus, the only reasons aspiration of water might cause pneumonia are (a) a huge volume is aspirated, literally causing a drowning episode or (b) the water washed bacteria from the oropharyngeal secretions into the lungs.

Concluding Thoughts

After all these years, why don't we have more good (conclusive) evidence for this very appealing protocol? There have been three published studies that have supported the FWP. Two studies had weak research designs, being retrospective, cohort studies (Frey, 2011) or single cohort prospective studies (Carlaw et al., 2011). There has been only one very small RCT done by Garon, Engle, and Ormiston (1997), and it was too underpowered to be useful. A proper RCT would be a complex, expensive study and would require experienced researcher-clinicians with the insight, interest, time, and skill to obtain funding. The impact, however, would be huge.

In the meantime, I look at the individual risks for pneumonia faced by each patient I see. Given similar findings on an instrumental swallow study for two patients (including aspiration of thin liquids), but differences regarding other known risks for pneumonia (e.g., a patient who is ambulatory, living at home, and managing his/her own oral care versus a patient who is acutely ill, bedbound, and dependent on nursing for feeding and oral care), one can imagine which patient I am more likely to let drink thin liquids.

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