

Frazier Water Protocol Permitting Dysphagic Patients to Have Free Water

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Aspiration Pneumonia Risk

Conventional wisdom holds that aspiration of any material into the lungs can lead to aspiration pneumonia.

Questions remain regarding the pathogenesis of aspiration pneumonia.

Aspiration Pneumonia Risk

A confounding thread in the literature suggests that pulmonary aspiration of differing materials may not present an equal risk for the development of aspiration pneumonia.

Aspiration Pneumonia Risk

Olson (1970) using animal models found that aspiration of water is less injurious to the pulmonary system than milk or a 5% glucose solution in water.

Splaingard (1988) suggested that pulmonary aspiration is common and usually well tolerated.

Aspiration Pneumonia Risk

Schmidt (1994) reported aspiration of thicker fluids and semi-solids was predictive of aspiration pneumonia and death.

Aspiration Pneumonia Risk

The odds ratio was 5.6 times greater for the development of aspiration pneumonia and 9.2 times greater for death in those who aspirated thick liquids or more solid consistencies as compared to those who did not aspirate or who aspirated thin liquids only.

Aspiration Pneumonia Risk

The risk of developing aspiration pneumonia was significantly greater if thick liquid or more solid consistencies were aspirated.

(Holas, DePippo, & Reding, 1994)

Aspiration Pneumonia Risk

The frequency of aspiration pneumonia was not significantly different among patients who aspirated thin liquids and those who did not aspirate. (Feinberg, et al, 1996)

Aspiration Pneumonia Risk

“Dysphagia and aspiration are necessary but not sufficient conditions for development of pneumonia.”

(Langmore et al, 1998)

Aspiration Pneumonia Risk

Aspiration must be present, but will result in pneumonia only if the aspirated material is pathogenic to the lungs and host resistance to the aspirated material is compromised.

Strongest Predictors of Aspiration Pneumonia

Dependence for feeding

Dependence for oral care

Number of decayed teeth

Tube feeding

More than one medical diagnosis

Number of medications prescribed

Smoking

(Langmore et al., 1998)

Predictors of Aspiration Pneumonia

Reduced activity level

GER

Esophageal dysmotility

Aspiration of food

Pharyngeal delay

Low spillage point

Excess residue

Xerostomia

(Langmore et al., 1998)

Predictors of Aspiration Pneumonia

Single strongest predictor of aspiration pneumonia was dependence for feeding. (Langmore et al., 1998)

Predictors of Aspiration Pneumonia

Independence in self feeding is the last functional activity to be lost according to hierarchy of dependence research. (Katz & Akpom, 1976)

Dehydration

Dehydration is a serious and common problem encountered in health care particularly in the elderly dysphagic patient.

Dehydration

A portion of the general population may be chronically and mildly dehydrated. (Kleiner, 1999)

Dehydration

Normal aging is associated with changes in body composition, thirst perception, renal function and hormonal regulatory mechanisms required to maintain the balance of water and sodium in the body.

Dehydration

Dehydration is the most common fluid and electrolyte disturbance in the geriatric population. (Sansevero, 1997; Chernoff, 1994)

Dehydration

As we age our thirst perception may be altered with a resultant inability to sense the need for fluids.
(Volkert, Kreuel, & Stehle, 2004; Kositzke, 1990)

Dehydration

Xerostomia reportedly affects more than 70% of the geriatric population which can significantly and negatively impact nutrient intake.

Dehydration

Cognitive and communicative impairments often interfere with a patient's ability to express a need for food and liquids. (Copeman, 2000)

Dehydration

Compromised mobility, dexterity, and visual acuity can lead to decreased fluid intake.
(Hoffman, 1991; Vogelzang, 1999; Copeman, 2000)

Dehydration

The health care expense associated with dehydration is enormous.

Dehydration

The potential for reduction in health care spending related to avoidable hospitalizations in dehydrated patients could have been as much as 1.14 billion dollars in 1999. (Xiao, Barber, & Campbell, 2004)

Dehydration

Dehydration is often overlooked and untreated due to inadequate staff training to recognize causes and symptoms of dehydration.

(Copeman, 2000; Vogelzang, 1999)

Dehydration

It has been reported that institutionalized geriatric patients are not offered enough fluid outside of medication administration times.

(Chidester & Spangler, 1999)

Dehydration

Dehydration can lead to a variety of negative health consequences including:

changes in drug effects

infections

poor wound healing

pressure sores

decreased urine volume

urinary tract infections

Dehydration

confusion

lethargy

constipation

altered cardiac function

acute renal failure

weakness

declining nutritional intake

(Gross et al., 1992; Copeman, 2000; Kleiner, 1999)

Dehydration

Patients experiencing dehydration will generally not be able to fully participate or progress well in rehab therapies which may result in decreased functioning and quality of life.

Dehydration

Some of the recommendations made by dysphagia clinicians may slow down the rate of intake and decrease fluid intake.

Dehydration

Patients with restricted intake of thin liquids may find it difficult to consume the daily recommended intake of six to eight cups of fluid via thickened liquids. (Whelan, 2001)

Dehydration

Patients often find thickened liquids to be unpalatable and frequently refuse to drink them.

Dehydration

Dysphagic stroke patients receiving thickened liquids failed to meet fluid intake requirements. (Finestone et al., 2001)

Compliance

The reality of patient compliance with safe-swallowing instructions and diet modifications when unsupervised or when discharged home merits consideration.

Compliance

Compliance is less likely to occur if recommendations are generally preventative in nature.

(Meyer et al., 1985; MacDonald et al., 1977; Marlatt & Gordon, 1984)

Compliance

If there is not immediate pain or complication related to the intervention patients are less prone to comply.

(Meyer et al., 1985; MacDonald et al., 1977; Marlatt & Gordon, 1984)

Compliance

The longer a recommendation is required, the less likely compliance will persist.

(Meyer et al., 1985; MacDonald et al., 1977; Marlatt & Gordon, 1984)

Compliance

Compliance decreases as complexity of a recommendation increases especially if lifestyle changes are recommended. (Stone, 1979)

Compliance

Dysphagia clinicians' predictions of compliance with safe-swallowing instructions were significantly greater than actual compliance in a dysphagic geriatric population.

(Leiter & Windsor, 1996)

compliance

Clinicians estimated the dysphagic patients would comply with safe swallowing instructions at a mean level of 71.9%. The actual mean compliance level was 35.6%.

compliance

Study patients were generally able to state the safe-swallowing instructions but not all agreed these were necessary.

Quality of Life

A patient's quality of life should be considered when recommending an altered diet.

Balancing safety, hydration and nutrition with quality of life can be a struggle.

Quality of Life

Many clinicians, patients, and caregivers have expressed concern that long term orders for thickened liquids or tube feedings without an option for water or ice chips denies a very primitive and basic drive to refresh the senses.

Safety of Water

The safety of allowing dysphagic patients who aspirate thin liquids to drink water has long been and will likely continue to be debated.

Safety of Water

Currently there is no published research that will give dysphagia clinicians a definitive scientific basis for the safe delivery of water to dysphagic patients.

Absorption of Fluid in the Lungs

The ability of the lung to rapidly absorb water is well known.

Absorption of Fluid in the Lungs

The pulmonology literature describes the safety of the bronchoalveolar lavage procedure where a volume of saline solution is injected into the lungs and only a small volume is removed via suction at the conclusion of the procedure. (Mayer et al., 1994; Martin et al., 1987)

Absorption of Fluid in the Lungs

Effros (1997) reported the discovery of the aquaporin water channels in the lungs as the mechanism for water absorption.

Absorption of Fluid in the Lungs

Aquaporins act like a sieve.

When water enters the alveoli, it is taken up into the blood vessels. Water is then carried out to the bloodstream fairly rapidly.

Absorption of Fluid in the Lungs

Aspiration during water drinking trials is a benign event.

Water is rapidly absorbed by the lungs and even massive entry may cause only transient respiratory changes in cases of near drowning. (Feinberg, 1990)

Fluids in the Lungs

The quantity and type of aspirate that can be safely tolerated by the lungs has not been clearly defined.

Fluids in the Lungs

A volume of 25 ml of highly acidic contents carries more risk than pH neutral fluids of the same volume. (Schwartz, 1980)

Fluids in the Lungs

Clear liquids do not pose an aspiration pneumonia risk unless the pH is very high or very low or if the quantity is great enough to cause asphyxiation. (Crossley & Thum, 1989)

Fluids in the Lungs

Most municipal tap water is a nearly neutral pH and very close to the pH of bodily fluids (pH = 7.2).

Therefore, the presence of water in the pulmonary system should not cause a chemical injury to the mucosa of the lungs.

Pathogens and Tap Water

Tap water and well water can be contaminated by bacteria in some locales.

Pathogens and Tap Water

Pathogens including Cryptosporidium, Escherichia coli, Giardia and cyclospora can cause public health problems in infants, the elderly, and immunocompromised individuals. (Whitmire, 2000)

Pathogens and Tap Water

Water-filtering devices that are "rated for cyst reduction" are adequate for filtering out these pathogens.

Municipalities' water programs are required to conduct ongoing water quality analyses.

Pathogens and Tap Water

Public drinking contaminant and analysis reports are required by the U.S. Environmental Protection Agency (EPA) and are available to the public.

Medical institutions are likely to have current water quality analyses on record.

Pathogenic Secretions

An obvious source of pathogens is the mouth itself as any liquid or solid that is aspirated must pass through the oral cavity and may be contaminated by pathogenic bacteria in colonized oropharyngeal secretions.

Pathogenic Secretions

Aspiration of water carries the risk of delivering these pathogens to the pulmonary system.

Pathogenic Secretions

Pathogenic secretions by themselves are often aspirated and can lead to pulmonary infection.

Pathogenic Secretions

Preventive measures to promote oral and dental health may reduce the likelihood of pathogenic bacteria being present in the oral cavity and being aspirated either alone or in combination with foods or liquids.

Pathogenic Secretions

Preventive activities may include:
aggressive oral hygiene;
dental treatment to address suspected dental disease;
and medication adjustments to increase salivary flow when xerogenic medications are given.
(Langmore et al., 1998; Yoneyama et al., 2002)

Evidence Base for Water Protocol

To date the only published research related to the consumption of water by dysphagic patients was conducted by Garon, Engle & Ormiston (1997).

Evidence Base for Water Protocol

Twenty stroke survivors in acute rehab were randomly assigned to two groups.
In both groups, all patients were observed to aspirate thin liquids on videofluoroscopic exam.

Evidence Base for Water Protocol

A control group of patients received thickened liquids, while an experimental group of patients received thickened liquids and water between meals.

Evidence Base for Water Protocol

No patients in either group developed aspiration pneumonia or dehydration during the study or during a 30 day follow up period.

Evidence Base for Water Protocol

A significant difference in thickened fluid intake per day was found between the groups with the control group taking more.

Evidence Base for Water Protocol

The experimental group patients drank more fluids overall with a mean amount of 1318 cc/day including a mean amount of 463 cc/day of water.

The mean amount of daily liquid intake in the control group patients was 1210 cc/day.

Evidence Base for Water Protocol

Garon et al. found patients who were allowed water expressed a high degree of satisfaction and reported thickened liquids did not quench thirst.

Evidence Base for Water Protocol

None of the patients in the control group reported satisfaction with thickened liquids and all reported a desire for water or ice chips to quench thirst.

History of Frazier Rehab Institute's Water Protocol

The water protocol was implemented in 1984 as a response to non-compliant patients who were covertly consuming thin liquids or refusing to drink thickened liquids.

History of Frazier Rehab Institute's Water Protocol

Our non-compliant patients were not developing aspiration pneumonia despite evidence of aspiration on videofluoroscopy.

History of Frazier Rehab Institute's Water Protocol

We held the conventional view that all aspirating patients were at risk of developing aspiration pneumonia.

History of Frazier Rehab Institute's Water Protocol

In 1984, dysphagia clinicians generally did a very good job of preventing aspiration pneumonia often by recommending thickened liquids along with compensatory maneuvers and behaviors.

Thickened Liquid Usage

Thickened liquids as a dysphagia intervention continue to be highly recommended.

Thickened Liquid Usage

Castellanos et al (2004) surveyed the prevalence of thickened liquid use in 252 randomly selected skilled nursing facilities across the U.S.

Approximately 20% of freestanding skilled nursing facilities nationally and 25,470 residents were studied.

Thickened Liquid Usage

A mean of 8.3% (range 0% to 28%) of residents were receiving thickened liquids.

Thickened water was provided to residents in 91.6% of the institutions.

History of Frazier Rehab Institute's Water Protocol

In 1984 many of our patients refused to believe they were going to get pneumonia.

As we observed that many did not, we felt the need to alter our approach to strict dysphagia intervention.

History of Frazier Rehab Institute's Water Protocol

The Frazier Water Protocol was developed through the multidisciplinary cooperation of physicians, speech-language pathologists and a dietitian.

Aspiration Pneumonia Incidence

In the early 1990s over an 18 month period, we conducted a retrospective chart review of 234 dysphagic inpatients who received thickened liquids during their admissions.

Two of the 234 patients developed aspiration pneumonia (.9%). Both were suspected of aspirating solid foods.

Frazier Water Protocol Methods

Our clinicians recommend dysphagia interventions based on:

- instrumental exam findings;
- review of patients' medical histories;
- current medical condition; and
- clinical observations.

Frazier Water Protocol Methods

Thickened liquids are recommended and provided, but water is permitted between meals.

Frazier Water Protocol Methods

Interventions to minimize aspiration of water as well as thickened liquids and foods are provided therapeutically.

Frazier Water Protocol Methods

Compensatory maneuvers and behaviors are taught to patients, families and staff as is deemed appropriate for each patient.

Dehydration Incidence

Frazier's belief is that the water protocol offers dysphagic patients an additional opportunity to reduce the likelihood of the development of dehydration.

Dehydration Incidence

In the same chart reviews of 234 inpatients, we found five cases of dehydration severe enough to require IV fluids.

Less severe dehydration may not have been identified by our chart reviews due to variable medical management of the cases.

Informed Recommendations

Clinicians who decide to pursue allowing dysphagic patients to drink water should be aware of the risks and benefits, and be prepared to make informed recommendations.

Informed Recommendations

The clinician should be sure that the water source is safe.

Informed Recommendations

Our hospital's internal water tests meet and in most cases exceed the strict requirements enacted by the Environmental Protection Agency.

This information gives us a high degree of comfort with the safety of the water the patients are receiving in our facility.

Informed Recommendations

The dysphagia clinician should also make an independent consideration of the patient population served.

Informed Recommendations

A team of Frazier speech-language pathologists practices at an acute care hospital where the patient population is less robust than the population being served at our rehabilitation hospital.

Informed Recommendations

We recommend water for acute care patients on a case-by-case basis and require physician orders for the initiation of water intake.

Informed Recommendations

Ice chips are more likely the first step toward allowing water in our acute care setting.

Frazier Water Protocol Guidelines

The guidelines have been tailored to meet the needs of the patients in our facility.

Patient Characteristics

In Frazier's acute rehab environment, patients are generally out of bed much of the day.

Patient Characteristics

The acute rehab population is generally upright, mobile, and relearning to manage functional activities.

Patients can typically tolerate three hours of therapy or more each day.

Frazier Water Protocol Guidelines

All patients referred to speech-language pathology are screened with water on the initial bedside visit to the patient.

Frazier Water Protocol Guidelines

The purpose of the screening is:

to determine if patients are demonstrating signs and symptoms of dysphagia;

to check for level of alertness and presence of impulsivity;

and to decide if further dysphagia evaluation is warranted.

Frazier Water Protocol Guidelines

Instrumental swallow exams to determine pathophysiology of dysphagia are conducted on nearly all dysphagic patients referred to speech-language pathology.

Results of the exams guide treatment planning for dysphagic intervention.

Frazier Water Protocol Guidelines

Patients exhibiting impulsivity or excessive coughing and discomfort will be restricted to water taken under supervision.

Frazier Water Protocol Guidelines

Patients with extreme choking may not be permitted oral intake of water due to the physical discomfort of coughing. This is a rare occurrence.

Frazier Water Protocol Guidelines

Occasionally, a physician may order strict NPO for a patient and water or ice chips will not be permitted.

Frazier Water Protocol Guidelines

For patients on oral diets, water is permitted between meals.

Frazier Water Protocol Guidelines

Water intake is unrestricted prior to a meal and allowed 30 minutes after a meal.

The period of time following the meal allows spontaneous swallows and gravity to clear pooled solid or thickened liquid residues.

Frazier Water Protocol Guidelines

NPO patients are permitted water any time.

Frazier Water Protocol Guidelines

Patients who are thin liquid restricted wear yellow armbands to communicate the liquid restrictions to all staff.

Frazier Water Protocol Guidelines

Typically, the band reads, "No thin liquids except water between meals".

Frazier Water Protocol Guidelines

The wording on the band is individualized as appropriate when specific compensations are recommended.

For example, a band may read “No thin liquids except water by teaspoon between meals”.

Frazier Water Protocol Guidelines

Water is freely offered to patients according to the guidelines documented on the yellow band throughout the day.

Frazier Water Protocol Guidelines

Patients for whom compensations, e.g. chin tuck, head turn, etc., have proven to be successful are encouraged to use compensations while drinking water.

Compensations are included on the yellow bands.

Frazier Water Protocol Guidelines

Water gives opportunity to clinically check a patient's progress, to judge when a patient may be ready to have a diet advanced.

Frazier Water Protocol Guidelines

Patients sip water during therapy sessions while the SLP watches for changes in the cough response.

SLPs use the presence and frequency of a cough to gauge swallowing progress.

Frazier Water Protocol Guidelines

Aggressive oral care should be provided to those patients who are unable to clean their own teeth and mouths so that pathogenic bacteria are less likely to contaminate secretions.

Frazier Water Protocol Guidelines

Medications are never given with water.
Pills are given in a spoonful of applesauce, pudding, yogurt or thickened liquid.

Frazier Water Protocol Guidelines

Family education emphasizes the rationale for allowing water intake.

Frazier Water Protocol Guidelines

The SLP, dietitian, and nurse repeat the guidelines for water intake during the education process.
Written material is provided to patients and families.
Education is documented in the medical record.

Keys to Success

Teamwork and communication are essential to our success at Frazier.

Keys to Success

All staff are oriented to the water protocol to ensure consistency across disciplines and in any environment the patient and family may encounter while at Frazier.

Keys to Success

Nursing competency includes a module on the water protocol.
Therapeutic recreation reinforces the protocol on outings and at events.

Family Training

Families are generally cooperative and appear to understand the water protocol.

Family Training

The guidelines are very clear and easy to teach.

The water protocol is thoroughly taught at each family teaching session with printed handout material provided.

Family Training

Educational emphasis is placed on the guidelines, the difference between water and other thin liquids, and that water is the only thin liquid allowed.

Family Training

Nurses reinforce that medications are never given with water.

Family Training

Maintaining hydration after discharge by balancing water and thick liquid intake is emphasized.

Where Do We Go From Here?

A large, randomized controlled study is necessary to empirically determine the safety of water in the diets of individuals with dysphagia.

Barring successful completion of such a study, clinicians need to continue to look at all aspects of patients' health and functioning, their personal preferences, and their environments.

Quality of Life Improvements

Frazier clinicians feel that quality of life has been improved for patients who have been permitted water.

Patients frequently report their strong satisfaction with being allowed water to drink.

Quality of Life Improvements

The water protocol that is followed at Frazier may not be workable in all settings and with all patients, but there are variations that can be adapted according to environment and specific patient conditions and needs.