

SAFE PRACTICES *in Patient Care*

Helping to promote a culture of safety

In January 2004 JACHO launched Perspectives on Patient Safety requiring accredited health care organizations to focus attention on a series of specific actions to prevent medical mistakes such as confusion in identifying patients, miscommunication among caregivers, wrong-site surgery, unsafe use of infusion pumps, medication mix-ups, and problems with equipment alarm systems. As major users of medical services, elderly patients stand to be the prime beneficiaries of these new efforts. In this issue of Safe Practices in Patient Care, we focus on improving patient safety in long-term care (LTC).

Undernutrition and dehydration are common in the elderly. From 30% to 60% of residents in LTC facilities suffer from malnutrition and inadequate fluid intake has been reported at 35%. In her article, Dr. Guenter provides information on hydration and enteral nutrition for LTC residents, along with safe-practice guidelines for optimal therapy and the prevention of complications.

LTC facilities have long been the subject of intense scrutiny over wound prevention and treatment. Due to state and federal initiatives to reduce nosocomial pressure ulcers and published standards of care, LTC facilities are constantly re-examining their current practices in wound care. Ms. Milne describes, in her article, prevention-associated interventions to enhance wound healing.

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Enteral Nutrition and Hydration in Long-term Care

By *Peggi Guenter, PhD, RN, CNSN*

By the year 2050, more than 20% of the American population will be over the age of 65 years.¹ Most elderly live at home; however, it is estimated that more than 40% of those who reach 65 years of age will enter a nursing home. More than half will reside there for more than one year.²

Undernutrition and dehydration are common in the elderly. Among those residing in long-term care facilities, the prevalence of malnutrition has been reported to range from 30% to 60%.³⁻⁴ Malnutrition in long-term care residents is associated with an elevated risk of infections, pressure ulcers, cognitive impairment, decreased mobility, and reduced quality of life. Among nursing-home residents who progressed to cognitive impairment or dementia, 34% had feeding tubes.⁵ Dehydration of nursing-home residents ranked as one of the ten most frequent diagnoses at admission to Medicare hospitals.⁶ This article provides information on hydration and enteral nutrition for long-term care residents, along with safe-practice guidelines for optimal therapy and the prevention of complications.

Undernutrition and dehydration

Nutrition and hydration issues are identified in long-term care facilities with the Resident Assessment Instrument (RAI). This program uses the Minimum Data Set (MDS) to collect information and the Resident Assessment Protocols (RAP), if certain conditions or triggers are met, in order to develop a comprehensive care plan. The MDS evaluates oral problems, height and weight, weight change, altered taste, hunger, uneaten meals, food intake and the use of nutrition support, mechanically altered food and therapeutic diets. Other nutrition-associated areas are also evaluated, such as dental care, skin condition and hydration. These evaluations must occur in all Medicare and Medicaid-certified nursing facilities.⁷

The federal government is proactive in its approach to nutrition and hydration issues in nursing-home residents.⁸ In 1998, the Center for Medicare and Medicaid Services of the Department of Health and Human Services began a national campaign called the National Medical Education Program (NMEP) to educate nursing-home workers on the prevention of weight loss and dehydration among residents. The goal of this program was to increase awareness of preventative steps that can be taken to maintain residents' weight and normal levels of hydration. The program provides practical tools and resources to identify the important risk factors and warning signs for the residents, along with action steps to implement.

Hydration

Inadequate fluid intake among nursing-home residents has been reported at 35%. Dehydration can lead to higher rates of morbidity and hospitalization.⁹⁻¹¹ Dehydration is defined as a loss of total body water and is the most common fluid and electrolyte disorder among long-term care residents.¹² Factors contributing to dehydration in the elderly include:

- decreased sense of thirst
- impaired cognitive ability
- dependence on caregivers for help in consuming liquids
- diarrhea
- swallowing problems
- fever
- diuretics
- inability to concentrate urine
- enteral feedings
- open wounds

Common signs of dehydration include:

- decreased or dark urine output
- elevated body temperature
- weight loss



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Safe Practices in Long-term Wound Care

By Catherine T. Milne, APRN, MSN, BC, CWOCN

Long-term care facilities have long been the subject of intense scrutiny over wound prevention and treatment. Due to state and federal initiatives to reduce nosocomial pressure ulcers, published standards of care and increasingly common litigious forces, long-term care facilities are constantly re-examining their current practices in wound care. Adopting a structure to evaluate and implement a comprehensive wound-care program enables clinicians to systematically review current standards. The following “Ps and Q” framework can assist this approach.

The “Ps and Q” framework

The “Ps and Q” framework uses three “Ps” – Prevention, Process and Protocols – coupled with a “Q” – quality. Most long-term care facilities use pressure-ulcer prevention policies, procedures and protocols to initiate treatment. Few examine quality in terms other than the percentage of nosocomial wounds. Quality serves as both the base and zenith of this framework (Fig. 1). It assumes that quality will be achieved by high-caliber interventions, which are aimed at prevention and instituted through systemic processes adopted by a facility that supports research-based protocols. “Ps and Q” should be viewed from both aspects of wound management: prevention and treatment.

Quality and prevention

The Center for Medicare and Medicaid Services (CMS) has adopted initiatives in long-term care that directly impact the management and treatment of wounds. Influenced by other regulatory agencies, societal health-care policies and accreditation agencies, these initiatives focus on the following steps:



Figure 1

- Determine if the development of a pressure ulcer was avoidable or unavoidable.
- Determine the efficacy and comprehensiveness of the facility’s pressure ulcer prevention and treatment program.
- Determine if the minimum standard of care was provided to the patient.

The CMS has defined an avoidable pressure ulcer as one that develops in a resident who is classified as low risk or one who has entered the facility without a pre-existing pressure ulcer but whose clinical condition has deteriorated. The facility is required to show that an individual receives necessary treatment and services to promote healing and to prevent infection and new ulcers.¹

In a comprehensive prevention program, evidence of regular risk assessment, routine skin assessment with evidence-based skin care, adequate pressure/friction/shear reduction, incontinence management and the identification and correction of nutritional deficiencies serve as minimum standards of quality. A well-accepted body of evidence supports the role of these areas of care in the prevention of pressure ulcers. The recently published *Guideline for the Prevention and Treatment of Pressure Ulcers*² has replaced AHRQ publications³ as the NCQA-accepted clinical practice guideline in this domain.

Risk assessment

Risk assessment is a standard tool that determines which resident is most likely to develop a pressure ulcer. Many facilities use either the Braden or Norton Scale. Changing these tools to meet individual institutional needs is not advised, as they have undergone rigorous clinical studies to validate their ability to ascertain risk. Altering them invalidates their quality.

While it is common practice for facilities to assess risk at admission, pre-admission assessment can be considered and, if possible, achieved by a thorough review of patient status from an on-site evaluator.

In addition to the total numerical score, each subset category of the risk assessment tool needs to be closely examined. For example, a Braden Scale score of 20 is considered as low risk but, when examining subset categories, if

the patient has a numerical score of 1 in the nutritional area, this high-risk area needs immediate attention. The causes of poor nutrition are identified and associated interventions are placed on the care plan and communicated to all clinical staff. Failure to treat individual risk categories independently places the resident at higher risk.

Quality standards suggest that risk assessment should be performed on admission, weekly for four weeks, then quarterly thereafter. Most facility-acquired pressure ulcers happen within the first four weeks of admission.⁴ Any time that the resident’s condition changes, his or her risk needs to be reevaluated. By using a simple form, nursing assistants can accurately predict changes in resident condition up to seven days before a decline is visible to licensed staff.⁵

Risk assessment tools are helpful, but they fail to account for a prior history of ulceration or the presence of a wound on admission. If either condition exists, the resident has a higher risk of skin breakdown. Scar tissue does not have the same tensile strength as normal dermis. At full-scar maturity, which can occur up to two years after the wound has epithelialized, the area is only 60% to 80% as strong as original skin.

Research has not associated any specific nutritional deficit with the accurate prediction of skin breakdown. Albumin is not a sensitive indicator of current protein stores. Prealbumin, unlike albumin, is not sensitive to hydration status. Its short half-life provides an excellent determination of real-time protein stores.

It is generally recognized that the loss of lean body mass and dehydration place patients at greater risk.⁶ Physiologically, decreases in muscle and subcutaneous mass allow bony prominences to compress circulation more readily over an external surface.

Direct measurements of lean body mass and hydration are cumbersome in the clinical setting. Standard indirect measurements are traditional weigh scales, skin-turgor assessments and intake-and-output readings. These tasks, often completed by a certified nursing assistant, are overseen by a licensed health-care professional.

The importance of determining a resident’s hydration status cannot be understated. Except for exacerbation of heart failure, any change of condition increases hydration needs. A significant number of elderly in the general population has been found to be chronically dehydrated. More than one million people over the age of 65 are hospitalized annually for dehydration. Adequate hydration, defined as 30-35 cc of fluid intake per kilogram of weight, has been shown to reduce the incidence and severity of pressure ulcers.⁷ Unfortunately, when oral hydration is prescribed, a significant number of residents do not adhere to the regimen, as co-morbid disease most often prevents

easy access to or ability to take fluids. Behavior changes seen in dementia often preclude oral intake despite nursing staff attempts to offer needed hydration

In residents receiving enteral-tube feeding, changing the pump to a model that incorporates an automatic flush feature that safely and easily adjusts free-water delivery is advised. In addition to assuring free-water needs are met, these pumps are a cost-effective way to prevent tube clogging, which can cost up to \$2,000 to recitify.⁸ Any impediment of enteral feeding or free water to the GI tract may adversely impact skin integrity, regardless of cause.

Support surfaces

Immobility is generally accepted as the greatest threat to the development of a nosocomial wound.⁹ Most healthcare workers recognize the importance of placing a high-risk patient on a hospital replacement mattress and adhering to a patient-turning schedule.

Medicare has specifically defined the three groups of mattresses. Group I surfaces are designed for high-risk patients and patients with stage I and II ulcers. They are composed of foam, water, gel or static air. Group II surfaces have greater pressure-reduction capabilities. Most Group II surfaces are comprised of alternating pressure or low air-loss beds. Group II surfaces are indicated for long-term residents who have multiple Stage II wounds, a non-healing Stage II wound in the presence of good ulcer care, and all Stage III and IV ulcers. They are used successfully in residents who have intractable pain with repositioning. Group III surfaces consist of air-fluidized beds. They are usually reserved for residents with a post-muscle flap. Air flow through the Group III bed typically exceeds 100 liters per minute, placing the elderly resident at risk of developing dehydration and hypernatremia.¹⁰

When choosing a mattress, quality standards demand the use of support surfaces that match patient needs. If, for example, the patient is beginning to develop hyperemic areas over bony prominences and is not responding to a Group I surface, the resident should be placed on a Group II surface, even if reimbursement is not available. Each grouping must meet specific standards for pressure reduction. It is not in the scope of this article to review these criteria, however, resources are available to assist the consumer in making informed choices without manufacturer or distributor bias.^{10,11}

While facilities may individualize support surfaces to meet patient needs, few apply the same concept to seating surfaces. As a rule, if the resident requires a pressure-reduction surface in bed, they will have similar needs for a seating surface. Currently, there is no standard grouping for seating surfaces. Generally, seating surfaces fall into four categories: standard, low pressure, position and combination low pressure/position cushions.¹² Standard, as the name implies, provides “comfort only” and has

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no pressure-reduction qualities. Positioning cushions, often seen in custom wheelchairs, lack pressure-reduction capabilities. While low-pressure cushions suggest pressure-reduction capabilities, there are no industry guidelines. The caveat? There are wide variations in the pressure-reduction capabilities of low-pressure and low-pressure/positioning cushions; therefore, a broad range of pressure reductions is achieved with their use.

If a low-risk resident suddenly becomes high risk, the seating-surface cushion will need to be changed. Seating surfaces are available as foam, water, gel, static air or a combination of these materials.

Familiarity with the manufacturer’s data on tissue-interface pressure is necessary to match the best cushion to a resident’s needs. Ideally, the resident should undergo pressure mapping with different wheelchair cushions to determine which product best produces the desired results. Unfortunately, this service is not routinely available. With increasing lawsuits and surveyor fines, the facility should seek vendors who can provide this service.

Incontinence and ulceration

Urinary and fecal incontinence is strongly associated with skin breakdown.^{13,14} Individualized bowel and bladder programs should be in place soon after the resident’s admission. While not all incontinent episodes can be avoided, when they occur, prompt cleaning with pH-balanced perineal cleansers is recommended. Nonionic cleansers maintain the skin-lipid barrier more effectively than ionic cleansers. Products containing Polysorbate 80, sorbitan oleate, sucrose oleate, polyethylene glycol (4) sorbitan laurate, Poloxamer 407, or dihydroxyethylcocamide oxide are typically nonionic.¹⁵

Skin protectants should be used liberally. Generally speaking, zinc oxide provides more skin protection against fecal incontinence than petrolatum or dimethicone-based protectants. Recent data suggest that an ointment containing trypsin, castor oil, balsam Peru and aluminum stearate (Xenaderm®, Healthpoint, Fort

Worth, Texas) improves blood flow, minimizes transepidermal water loss and functions as a moisture barrier.¹⁴ Decreased healing times have been shown in patients with perineal dermatitis.¹⁴ Underpads, briefs or diapers that do not wick away moisture from the skin are not recommended.

Prevention programs

Any quality-based prevention program routinely provides education for staff, residents and their families. Successful programs often have a wound-care team with representation from clinical staff, including certified nursing assistants. Teams that attend focused meetings with an emphasis on clinical rounds achieve the best outcomes.¹⁶

Outcome studies indicate that the use of a board-certified wound, ostomy, incontinence nurse decreases the incidence of nosocomial skin alterations and improves healing rates.¹⁷ Facility leadership support, emphasizing the importance of prevention and accountability for implementation of protocols, can enhance outcomes.¹⁸

Wound treatment

Wound assessment

Residents are often admitted from the acute-care or community setting with one or multiple wounds. Prevention-associated interventions are almost universally applicable to the treatment of wounds. Adequate nutrition, hydration, pressure and edema reduction, and a bowel and bladder program to minimize incontinence are key to wound healing.

Obtaining prealbumin levels on a monthly basis is helpful to determine the patient’s enteral needs for wound healing. Caloric needs dramatically increase in patients with open wounds. Depending on wound size, residents with Stage IV pressure ulcers may require up to 3500 calories/day. Many residents cannot meet the even the smallest nutritional needs for wound healing, as chronic illness and pain promotes anorexia. In these situations, the temporary placement of a feeding tube for caloric and hydration supplementation greatly aids wound healing. Because of staffing concerns, increased resident acuity and new technology, it is now possible to use an enteral feeding pump that can be programmed to the resident’s weight. This system, currently available with the ePump (Kendall), holds the distinct advantage of appropriately delivering adequate hydration to meet the 30-35 cc/kg requirement rather than relying on a pre-determined set amount.

Wound assessment on admission and weekly thereafter are minimum standards of care. Any change in the resident’s condition will impact wound healing and require wound reassessment, which includes measurements of wound length, width and depth; drainage characteristics; and a description of tissue in the

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**Enteral Nutrition and Hydration in
Long-term Care – Continued**

- mucosal dryness
- skin turgor changes
- mental confusion

Rehydration may be provided by increasing fluid intake either orally or through a feeding tube or the patient may require intravenous fluids. Prevention of fluid loss is the primary goal. Generally, fluid needs of the elderly can be met with 30 mL/kg of body weight per day (about 2100 mL of fluid for a 70-kg man).¹³

The NMEP action steps for nursing assistants to maintain hydration include⁷:

- Report observations and warning signs to nurse and dietitian.
- Encourage residents to drink every time you see them.
- Offer 2-4 ounces of water or liquids frequently.
- Record intake and output.
- Offer ice chips frequently, unless resident has a swallowing problem.
- Check for swallowing precautions and offer sips of liquids between bites of food at meals and snacks.
- Drink fluids with residents, if allowed.
- Make sure pitcher and cup are near enough and light enough for resident to lift.
- Offer appropriate assistance, as needed, if resident cannot drink without help.

Enteral nutrition

Enteral nutrition can be defined as nutrition provided via the gastrointestinal (GI) tract, usually through a tube, catheter or stoma that delivers nutrients distal to the oral cavity.¹⁴ Tube feeding and enteral nutrition are terms often used interchangeably. Enteral nutrition is indicated when a patient will not, should not or cannot eat but has a functional GI tract.

In long-term care residents, particularly those with progressive cognitive impairment, the decision to place a feeding tube and begin enteral nutrition may be a difficult one. Careful consideration of the resident's long-term prognosis is necessary and, if there is a reasonable expectation of recovery, aggressive nutrition intervention is a legitimate option. Many older individuals have living wills that may guide clinicians and decision makers.¹⁵

Tube feeding provides a viable and cost-effective option to deliver nutrients to long-term care residents. While a reasonably safe therapy, tube feeding is associated with risks and complications. Those most highly associated with the elderly include mechanical complications, aspiration, diarrhea and dehydration. The nurse should implement safe-practice protocols with enteral nutrition to identify these risks and minimize complications.

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Mechanical complications

Mechanical complications can be categorized into four types: tube displacement, tube injury, tube clogging and injury due to presence of the tube. Tube displacement and tube occlusion are discussed here in further detail.

Tube displacement

Displacement can occur if the tube slides in or is pulled out of the GI tract. If a gastrostomy tube slides into the lower stomach, the distal end can block the gastric outlet, causing nausea and vomiting. An unsecured jejunal tube can be pulled by peristalsis further into the small bowel, causing obstruction, or it can be pulled out. If the internal gastric balloon becomes deflated or if the external tube suture, bumper or disk is inadvertently removed, the tube may slide out and the tube tract will quickly close. This loss of enteral access will often precipitate a return to the operating, endoscopy or radiology suite for tube replacement. Having the tube tip out of position may also deliver formula into the wrong anatomical area, such as the esophagus or peritoneal cavity, potentially causing aspiration or peritonitis.¹⁶

The auscultation method of listening for insufflated air over the epigastrium to check for tube placement is not always reliable. Bronchial sounds can be transmitted to the epigastric area and a pulmonary-placed tube can sound like a gastrically placed tube.¹⁷ Using this technique and checking the tube for gastric or intestinal contents are fairly reliable predictors of placement.¹⁸ If there is any question of tube migration or displacement or if the nurse is unable to determine tube placement, an x-ray should be requested.

Causes of displacement include intense coughing, nasotracheal suctioning or vomiting, accidental pulling on the tube by patients or staff, or loss of a securing device, such as tape, suture, gastrostomy disk or balloon. The incidence of accidental tube removal varies from less than 1% in one large series of surgically placed jejunostomies¹⁹ up to 68% with small-bore nasoenteric feeding tubes, which are the most commonly displaced.¹⁶

Prevention of tube displacement can be accomplished by a combination of measures. Using the external marks on the tube, assess the length of tube outside of the body. If no marks

exist on the tube, place a mark at the level of the exit site and document this length in the nursing record. The external length needs to be verified by the nurse on each subsequent shift. The nurse should check that the disk, suture or attachment device holding the tube externally is secure and that the attached feeding set tubing is not being pulled on by the patient or staff. A number of tube-anchoring devices are available to secure tubes.

Signs of displacement include difficulty in infusing formula or flushing, leakage of fluid around the exit site or change in length of external portion of the tube.²⁰ It is essential that the tube be replaced or repositioned within a few hours to ensure adequate caloric intake and/or prevent closure of the GI tract. Depending on practice area, practice privileges and type of tube, the nurse may need to replace or reposition the feeding tube. Otherwise, the physician should be notified immediately and arrangements made for replacement. Patient and/or staff must be reeducated on methods to prevent further tube displacement.

Tube occlusion

Tube occlusion or clogging is one of the most frequent complications of enteral nutrition. Occlusions can be caused by inappropriate administration of medications, poor flushing techniques, thick formulas, formula contamination leading to coagulation, or even reflux of gastric or intestinal contents into the tube. This change in pH, resulting from digestive enzymes mixing with intact formula protein in the tube tip, causes protein denaturation (similar to curdling), which clogs the tube.²¹

A recent development in pump technology is the automatic water flush system, designed to decrease clogged feeding tubes and provide additional water.²² Several clinical trials of the automatic flush pump have shown less tube clogging, as compared to manual flushing.²³⁻²⁵ In addition to feeding formula, the pumps provide up to hourly water flushes, which often assist in meeting a patient's daily fluid requirements. When the patient is fluid-restricted, the automatic water flush feature can be turned



Figure 1. Kangaroo ePump® (Covidien)

Clogging complications cost over \$2,000 per month and include nursing and physician time to replace clogged tubes and new-tube, x-ray and operating-room costs to replace clogged permanent jejunostomies.

off and a manual water flush (30 ml per shift) performed to maintain tube patency.

The two automatic flush pumps currently on the market are the Kangaroo Entriflush Pump (Tyco Healthcare/Kendall, Mansfield, MA) and the Flexflo Quantum Pump (Ross Laboratories, Columbus, OH). In a cost analysis conducted by this author, use of the flush bag sets and automatic flush pump system was found to be highly cost-effective, as compared to the standard non-flush system. Clogging complications cost over \$2,000 per month and include nursing and physician time to replace clogged tubes and new-tube, x-ray and operating-room costs to replace clogged permanent jejunostomies. These costs far outweighed the difference in the cost of automatic flush pump sets over standard sets. A new programmable pump called ePump (Tyco Healthcare/Kendall, Mansfield, MA) provides the flexibility to flush from 10-500cc of water in intervals from 1 hr to 24 hrs. This enables the healthcare worker to personalize the hydration regimen based on the individual patient's needs. (Fig. 1).

Many nurses use a variety of flush fluids to prevent clogging or restore patency of occluded tubes. Cranberry juice and carbonated cola beverages have been used and noted in the literature. These beverages are acidic and may actually contribute to tube clogging from protein denaturation. Water has been shown thus far to be the best flush solution.²⁷

Flushing with 20-30 ml of water before and after checking for residuals, administering medications or intermittent feedings, and every 4-6 hours during continuous feedings is ideal for preventing tube occlusion. Other clogging prevention measures include choosing the appropriate tube size to maximize formula flow (usually 8 Fr or greater), selecting a less calorically dense formula and using a feeding pump with an automatic water flush feature.²²

General rules and written guidelines for medication administration can provide nursing staff with clear steps to take to avoid tube occlusion and optimize therapeutic response.

If an occlusion occurs, immediate attention is important. Using enteral pumps with occlusion alarms, which notify the nurse of an occlusion, increase safety and allow for early correction. The first step is to check for kinks in the feeding tube. Then, place your flushing syringe into the tube end and gently pull back on the plunger to dislodge the clog. If the blockage remains, instill warm water into the tube. Gentle pressure alternating with syringe suction will relieve most obstructions. A successful technique for declogging tubes includes the instillation of a pancreatic enzyme and sodium bicarbonate solution, as described by Mancuard.²⁸

Aspiration

Aspiration is defined as entry of material from the oropharynx into the larynx below the true vocal folds. Patients can aspirate oral secretions (most common) or refluxed stomach contents containing tube-feeding formula.²⁹

Although aspiration of tube-feeding formula into the lungs is a less frequent complication of enteral nutrition, it represents a significant hazard, because it may cause pneumonia or death. Much of what nurses do in administering tube feedings is directed at preventing this event.

Conflicting reports exist about the frequency of pulmonary aspiration. It is the most serious common complication of enteral and can occur in 23% to 58% of geriatric patients with gastric feedings.³⁰ Associated risk factors include a reduced level of consciousness, diminished swallowing function, gastroesophageal reflux, use of a large bore nasogastric feeding tube, dislodgement of tubes, failure to elevate head of bed during feedings, mechanical ventilation and a previous history of pneumonia.³¹ Signs and symptoms of aspiration include restlessness, a decreased level of consciousness or dyspnea, which may indicate hypoxia. The patient may have a new-onset productive cough, wheezing, rales, rhonchi or fever.³²

Nursing methods should be used to lessen the potential for pulmonary aspiration. They include elevating the head of the bed by 45 degrees, checking gastric residuals every 4 to 6 hours and holding, if greater than 150 ml, use of small-bore feeding tubes, use of continuous feedings, use of PEG tubes instead nasogastric tubes, and feeding beyond the stomach into the small bowel, when possible. Although all of these suggestions have not been thoroughly proven to decrease risk, they are the best practice guidelines to follow until further research is completed.³³

Diarrhea

Diarrhea is a common problem in patients receiving tube feeding with an incidence

ranging from 5% to 30% of tube-fed elderly.³⁴ Diarrhea is generally defined as three or more liquid stools per day.³⁵ Common causes of this problem include medications (either hyperosmolar medications or antibiotics), GI infection, rapid infusion, formula contamination, GI dysfunction (hypermotility, malabsorption or fecal impaction) or hyperosmolar or low-fiber formulas. The cause of diarrhea is often multifactorial, particularly in very ill patients.³⁶ The clinician must consider each factor before identifying the cause and adjusting the plan of care. Simply turning off the tube feeding does not usually correct the problem and will result in underfeeding.

It is essential for nurses to quantify stool output in a fashion that can be serially tracked over time to assess treatment effectiveness. Nurses often state that the patients has "diarrhea", whether they have 3 loose stools or 12 watery stools per day.

Generally, while the exact cause of diarrhea is being determined, symptom management can begin. The patient's stool must be collected and checked for infection, particularly *Clostridium difficile*, before antimotility agents can be used. Nursing measures include³⁷:

- Provide adequate fluid and electrolyte replacement.
- Monitor and document associations between administration of enteral nutrition or medications and change in stool output.
- Administer antidiarrheal agents.
- Maintain perianal skin integrity.
- Provide psychosocial support.

A potentially serious consequence to diarrhea in the elderly, tube-fed resident is the contribution of fluid loss to dehydration.

Dehydration

Besides the loss of fluid through diarrhea, enteral nutrition alone may not provide enough fluid or free water to fulfill the needs of long-term care residents. Isotonic enteral formulas are generally about 80% water. If a resident requires 2000 mL of fluid per day and receives 1800 mL of enteral formula, this provides only about 1440 mL of water; an additional 600 mL of fluid per day is required. In a resident who depends on the feeding tube exclusively for all intake, additional water can be given via the tube with medication flushes, water boluses or by way of an automatic enteral flush pump.²²

Conclusion

Elderly long-term care residents are at risk for malnutrition and dehydration. Enteral nutrition and adequate hydration may decrease morbidity associated with undernutrition and dehydration in these individuals. Safe-practice protocols are essential to minimize complications and allow the long-term care resident to receive adequate nutrition and hydration. Enteral flushing may be part of a safe-practices

protocol as it automates the hydration process in a healthcare environment where worker shortage is a chronic problem.

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Safe Practices in Long-term Wound Care – Continued

wound base and periwound area. A determination of wound stage rounds out the assessment.

The current MDS encourages backstaging of wounds. For example, a full-thickness Stage IV wound encompasses destruction of muscle, fascia or bone. (Fig 2). As the wound heals, the wound deficit is filled with granulation tissue, not regrowth of functional muscle, fascia or bone. Thus, a Stage IV wound physiologically always remains, even as the deficit is filled.

However, the MDS reporting requirements contradict wound-healing physiology. The Stage IV wound, as granulation tissue mounts, can then be considered a Stage III.

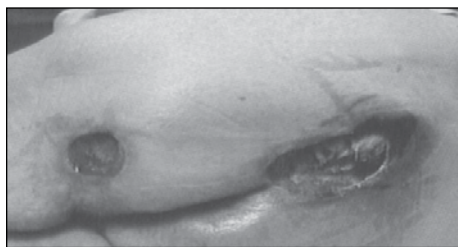


Fig. 2. Stage IV pressure ulcer

When granulation tissue meets the level of the surrounding skin, that same wound is then considered a Stage II. Future versions of the MDS will eliminate this confusing aspect of wound assessment.

The use of a wound-healing scale, which will be recommended in the next MDS version, is extremely helpful and gives bedside clinicians a better way to organize assessment data. Using a similar format as risk assessment tools, each assessment parameter has a numerical value. The numbers are tallied on completion of wound assessment. Over time, if the total score increases, the wound is deteriorating. Conversely, decreasing scores indicate wound healing.

The PUSH tool¹⁹ is the wound-healing scale most likely to be incorporated into the next MDS version. Facilities should consider using this tool.

Wound-healing dressings

The use of topical moist wound-healing dressings remains a staple in wound care. However, a number of newer modalities are available to promote wound healing. Adequate wound debridement must occur prior to the application of topical agents that promote wound healing. Debridement can be achieved by mechanical methods, such as whirlpool and pulsed lavage or by surgical or enzymatic means. Debridement can be enhanced with a combination of methods, as they are synergistic, decreasing time to achieve clean red tissue in the entire wound.

Bacterial colonization markedly reduces wound healing.²⁰ Wounds with excess colonization do not show signs of clinical infection. Often, the absence of a decrease in wound length and width is the only indication of infection. Other signs of bioburden include large amounts of serous drainage and a friable, clean wound bed.

Use of a topical antimicrobial dressing is imperative to redirect the wound onto a healing trajectory. Common topical antimicrobials include cadexomer iodine, acetic acid, Dakin's solution, silver-impregnated dressings and gentian violet/methylene blue-impregnated foam. The use of acetic acid and Dakin's solution are making a resurgence in wound care, as at least one study suggests that these agents are not cytotoxic in vivo, as once thought.²¹

The use of adjunctive modalities has improved wound-healing outcomes. Hyperbaric oxygenation, negative pressure wound therapy (VAC, KCI, San Antonio, TX), electrical stimulation, ultrasound, shortwave diathermy, and cell proliferation induction are viable options for non-healing wounds that have not responded to more traditional wound-healing treatment. Application of a topical growth factor (Regranex, Ortho-McNeil, Raritan, NJ) can be highly successful in all wound types, provided that bioburden and chronic wound inflammation are minimal. Research-based protocols or algorithms outlining specific

treatment interventions should be developed by the wound-care team and reviewed by a board certified wound specialist.

Measuring outcome

Quality, the zenith of the “Ps and Q” framework, is measured by outcome. Most facilities measure the prevalence of skin breakdown over a specified period by simple statistics, usually percentage. Many facilities break the data into smaller pieces, e.g., by wound type (pressure, vascular, surgical wound, skin tear) or origin (community-acquired versus facility-acquired). To determine quality, healing rates should be calculated by wound type. This rate can be determined on an individual basis with the following formula:

Wound length x width (cm) of last known measurement minus Current length x width X 100 divided by wound length x width (cm) of last known measurement

For example, a wound that now measures 2 cm x 1 cm, as compared to a previous measurement of 4 cm x 1 cm, fits into the formula as follows:

$$\frac{(4 \times 1) - (2 \times 1)}{4 \times 1} = \text{a 50\% healing rate}$$

The wound-care team can then analyze the aggregated data. The quality-improvement cycle restarts as the team develops an evidence-based action plan to improve quality. Any improvement initiatives should be communicated to all levels of clinical staff.

Conclusion

By using a framework of quality-based prevention interventions with processes and protocols for wound treatment, long-term care facilities can streamline care and achieve positive outcomes in wound prevention and treatment.

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Upon completion of this offering the learner will be able to:

- Identify long-term care residents at risk for dehydration and poor nutrition.
- Explain three safe practice procedures to prevent enteral nutrition-related complications.
- Discuss the role of hydration in the prevention of altered skin integrity.
- Describe the components of a comprehensive wound assessment.
- List common adjunctive therapies to treat wounds.

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1. Which of the following conditions is a risk factor for undernutrition in a long-term care resident?
 - a. hypercholesterolemia
 - b. body mass index > 25
 - c. consuming > 75% of meal
 - d. dysphagia due to CVA
2. The Minimum Data Set assessment tool does not evaluate:
 - a. food intake
 - b. prealbumin level
 - c. hydration state
 - d. dental care
3. Factors contributing to dehydration in the elderly does not include:
 - a. impaired cognitive ability
 - b. infection
 - c. increased sense of thirst
 - d. use of diuretics
4. What is the correct fluid requirement for an older adult per day?
 - a. 20 mL/kg body weight
 - b. 30 mL/kg body weight
 - c. 40 mL/kg body weight
 - d. 50 mL/kg body weight
5. Additional water should be given to the tube-fed patient by which methods:
 - a. diluting the isotonic enteral formulas
 - b. via an automatic flush pump
 - c. water boluses every 8 hours
 - d. before and after medication flushes
6. Which of the following nursing measures may decrease aspiration risk in the tube-fed patient?
 - a. keep head of bed flat
 - b. hold feedings if gastric residual less than 100 ml.
 - c. keep head of bed elevated less than 30 degrees
 - d. hold feedings if gastric residual greater than 150 mL
7. Tube-feeding diarrhea may be related to:
 - a. hyperosmolar medications
 - b. contaminated formula
 - c. continuous infusion
 - d. antibiotic use
8. Most isotonic enteral formulas contain what percentage of water?
 - a. 60%
 - b. 70%
 - c. 80%
 - d. 90%
9. CMS classifies an avoidable pressure ulcer as one that:
 - a. develops in a resident at low risk
 - b. develops in a resident at medium risk
 - c. develops in a resident at high risk
 - d. develops in a resident at no risk
10. CMS initiatives aimed at reducing pressure ulcers in long-term care include:
 - a. identifying the comprehensiveness of the facility's prevention and treatment plan
 - b. determining if a pressure ulcer was avoidable or unavoidable
 - c. determining if a minimum standard of care was provided to the patient
 - d. all of the above
11. Risk assessment tools fail to consider:
 - a. resident nutritional status and previous history of pressure ulcers
 - b. mobility status and presence of an open wound
 - c. mobility status and nutritional status
 - d. Previous history of pressure ulcers and presence of an open wound
12. Adequate hydration plays a key role in wound prevention by:
 - a. improving renal function
 - b. improving muscle and subcutaneous mass so tissue cannot be easily compressed over bony prominences
 - c. improving muscle and subcutaneous mass so tissue can be easily compressed over bony prominences
 - d. improving blood flow to wounded areas
13. Direct measurements of nutritional and hydration status can be obtained by:
 - a. intake and output and serum prealbumin levels
 - b. lean body mass and cell water content levels
 - c. weight and liver function tests
 - d. skin turgor and lean body mass measurements
14. A resident with a Stage IV ischial pressure ulcer would most benefit from the use of:
 - a. Group I surface and standard seat cushion
 - b. Group III surface and positioning cushion
 - c. Group II surface and positioning cushion
 - d. Group II surface and low pressure/positioning cushion
15. A comprehensive wound assessment includes:
 - a. measurements of wound length x width x depth
 - b. description of wound bed tissue and periwound condition
 - c. drainage characteristics
 - d. all of the above

| What is the highest degree you have earned (circle one) ? | | | | | | 1. Diploma 2. Associate 3. Bachelor's | | | | | | 4. Master's 5. Doctorate | | | | | | Mark your answers with an X in the box next to the correct answer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 4. Describe the components of a comprehensive wound assessment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 15 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name & Credentials _____ Position/Title _____ Address _____ City _____ State _____ Zip _____ Phone _____ Fax: _____ | | | | | | Mail to: Saxe Communications, PO Box 1282, Burlington, VT 05402 Fax: 802.872.7558 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| For immediate results, you may take this test online at www.saxetesting.com | | | | | | Safe Practices. V.1 No. 3 | | | | | | Score | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |