

Nutrition and Wound Healing

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Risk Factors for Impaired Healing

- Advanced age
- Cognitive impairment/altered sensory perception
- Diabetes
- Inadequate perfusion/ oxygenation/circulation
- Incontinence/moisture
- Infection
- Medications
- Malnutrition
- Obesity
- Preoperative illnesses/co-morbidities
- Underweight

Many of these risk factors are related either directly or indirectly to nutrition status!

Nutrition and Wound Healing

- We know good nutrition is essential for wound healing
- Present nutrition recommendations for wound healing are based on small studies and expert opinion – lacks a lot of real evidenced-based research

Let's talk about what we know so far...

Nutrition Assessment

The WOCN Guideline for the Prevention and Management of Pressure Ulcers:

Recommends that “patients who are at risk for the development of pressure ulcers maintain adequate nutrition that is compatible with the patient’s wishes or condition to maximize the potential for healing.”

The Role of the RD on the Wound Care Team

- RD should assess all patients with pressure ulcers and other skin integrity issues
- Nutrition interventions must be **individualized** to the patient/resident, and based on pressure ulcer stage, meal intake, calorie, protein, and nutrient needs, patient /resident likes and dislikes.
 - Don't use a “one-size-fits-all approach” to nutrition therapy!

Nutrition Assessment

- **RD should assess:**
 - **Energy stores, somatic protein stores, hydration, and vitamin and mineral status.**
 - **Diet history: how and what the patient usually eats.**
 - **Get info by talking with patient, family, and clinical staff to get the most complete history.**

Assessing Nutrition Needs

- Energy requirements
- Protein requirements
- Fluid requirements
- Micronutrient requirements



Energy Requirements for Patients with Pressure Ulcers

***Adequate Calories = essential for wound healing.
Promotes anabolism, nitrogen and collagen
synthesis and healing***

30 – 35 kcal/kg body weight daily

- ***Agency for Health Care Policy and Research and the European Pressure Ulcer Advisory Board***

**35 – 40 kcal/kg body weight daily for patients who are
underweight or losing weight**

- ***National Pressure Ulcer Advisory Panel***

Protein

- Why so important?
 - Increased protein intake decreases net nitrogen losses
 - Essential for new cell growth
 - Protein is an essential part of collagen and other structural components

NOTE: Excessive protein (greater than estimated needs) does NOT encourage faster healing and potentially lead to dehydration

Protein Requirements

Goal: Provide adequate protein for positive nitrogen and to spare energy.

Patient Type	Estimated Daily Protein Needs
Healthy Adults	0.8 – 1.0 g/kg
Elderly Patients	1.0 – 1.2 g/kg
Patients at Risk for Pressure Ulcers	1.0 – 1.5 g/kg

Protein

- Be careful not to give excessive dietary protein
 - More than 1.5 – 2.0 g/kg per day could be a risk factor for dehydration
 - especially true in our elderly patients
- Typically 1.2 – 1.5 g/kg of protein is recommended to promote wound healing (unless contraindicated by medical condition)

Arginine

- Non-essential amino acid.
- Some studies have shown that arginine increases concentrations of hydroxyproline, which is an indicator of collagen deposition and protein in the wound site.
- May increase blood flow to wound (so increased nutrient delivery)
- Found in some specialty oral supplements and tube feeding formulas.

Glutamine

- Sometimes referred to as “conditionally essential”
- May help stimulate collagen production
- Further research is needed before any specific recommendations are made
- Is being added to many supplements/tube feeding formulas

Albumin as an Indicator of Nutrition Status

- Clinicians have used this in the past to indicate nutrition status
- No longer recommended as an accurate measurement of nutrition status because of:
 - long half-life (12 to 21 days)
 - multiple factors which decrease albumin levels even when protein intake is adequate (e.g., infection, acute stress, surgery, cortisone excess, hydration status)

Diet Liberalization

- Patients with pressure ulcers should be on the least restrictive diet as possible
- Helps improve oral intake
- Patients have more foods to choose from
- High fat foods are more calorie dense

Diet Liberalization

Unintended Weight Loss in Older Adults Evidence-based Nutrition Practice Guideline

Released October 2009

“Seven studies were evaluated regarding liberalized diets, meal patterns and composition in older adults. Three studies report little scientific evidence to support the use of restrictive diets in the elderly. Resident involvement in menu planning, as well as flexibility of the meal pattern and composition, may result in improved intake of food and fluid.”

Fluid Requirements

- General Adult Fluid Needs:
 - 30-40 mL/kg per day or 1-1.5 mL/kcal expended
- Monitoring hydration status in patients with pressure ulcers is essential for quality care
 - Fluid needs are usually increased because of losses caused by evaporation from open pressure ulcers, wound drainage, and fever

Vitamin and Mineral Supplementation

- “If vitamin and mineral deficiencies are confirmed or suspected, it is recommended to provide a multivitamin/mineral supplement that contains the RDI for micronutrients with a role in wound healing. In the absence of confirmed or suspected vitamin and mineral deficiencies, data do not exist to indicate that supplementation will decrease pressure ulcer risk or aid in pressure ulcer wound healing (Reddy 2008).”
 - ADA Nutrition Care Manual
- So we as clinicians need to consider both the potential benefits AND risks whenever using pharmacologic doses of any nutrient

Vitamin C

- Works with amino acids proline and lysine during collagen synthesis.
- Routine supplementation of Vitamin C is likely safe for most patients, however it's unlikely that it will accelerate wound healing in non-deficient patients.

Zinc

- Role in cellular proliferation and protein synthesis.
- No evidence-based research that supports the routine use of supplemental zinc to promote healing of pressure ulcers.
- In fact, high doses of zinc can adversely effect copper status (another important mineral in wound healing).
- Should only be ordered if there is a suspected deficiency.
- general practice is to give ZnSO₄ 220 mg (50 mg elemental zinc) for no longer than two to three weeks.

Other Important Micronutrients

- Vitamin A
 - Allows epithelization, collagen synthesis, and collagen cross-linking
 - Too much may exacerbate inflammatory response
- Vitamin E:
 - Responsible for collagen synthesis
 - Assists in wound healing
 - DOES NOT prevent scar formation
 - Needed systemically not topically
- Copper:
 - Cofactor for connective tissue production
 - Collagen polymerization
 - Formation of cross linkages to enhance scar strength

Nutrition Interventions

- Encourage intake of high-quality protein foods (meat, milk, eggs, yogurt, and cheese), at meals and snacks
- Provide double portions of high-quality protein foods
- Provide in-between meal nourishments based on patient/residents likes/dislikes
- Consider commercial supplements based on likes/dislikes of patient/resident, if meal intake is inadequate
- Encourage intake of fluids—juice with every meal, water with every meal, etc
- Offer and encourage small frequent feedings Recommend appetite stimulants
- Provide protein powder, 1 scoop in milk, juice, or beverage of choice with each meal
- Use combination PO and enteral nutrition, if PO is consistently not adequate

Different Nutrition Interventions for Different Patients:

- Best Choices for Patients/Residents who have a good appetite:
 - Foods fortified with protein and/or calories
 - Large portions of meat and eggs
- Best Choices for Patients/Residents who need extra protein and calories but don't have a good appetite
 - 2.0 kcal/ml medication pass: 60-90 cc TID or QID provides supplemental protein, calories, and vitamins and minerals
 - Liquid protein supplement at med pass (usually 30 cc BID)

Different Nutrition Interventions for Different Patients:

- Best Choices for Patients/Residents who are drinking better than they are eating:
 - Fortified juice-type beverages that contain protein and vitamins and minerals such. Serve between meals if possible
 - Shake-type beverages. Serve between meals if possible
- Best Choices for Patients/Residents who like desserts:
 - Fortified pudding or ice cream
- Best Choices for Patients/Residents who need extra protein without too many extra calories:
 - Protein powders mixed with food and/or beverages

Educational Goals for Patients/Residents

- Increased awareness of the risk factors associated with pressure ulcer development.
- Increased knowledge of dangers associated with over-supplementation of nutrients, especially zinc.
- Increased knowledge of food and nutrition intake needed for wound healing.

Nutrition Monitoring and Evaluations

- Weight
- Anthropometrics
- Laboratory tests (N-balance, electrolytes, glucose)
- Nutrient intake, quantity and quality (oral, enteral, parenteral)
- Wound stage/healing
- Hydration status (I&Os, BUN/Creatinine ratio, Hct)

Clinical Team

- Communication between Nursing Staff and the Registered Dietitian is essential to maintain optimal nutrition for our patients.

References

- American Dietetic Association. *ADA Nutrition Care Manual*. Available to subscribers at: www.nutritioncaremanual.org. Accessed February 12, 2010.
- Reddy M, Sudeep SG, Kalkar SR, et al. Treatment of pressure ulcers: A systematic review. *JAMA*. 2008;300(22):2647-2662.
- Wound, Ostomy, and Continence Nurses Society (WOCN). *Guidelines for Prevention and Management of Pressure Ulcers*. Glenview, IL:Wound, Ostomy, and Continence Nurses Society (WOCN). 2003;2:52.
- Castellanos, VH, Litchford, MD, Campbell WW. Modular Protein Supplements and Their Application to Long-Term Care. *Nutrition in Clinical Practice* 21:485-504, 2006