Nutrition and Pressure Ulcers: Current Thinking

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Faculty Disclosure

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Mrs. Moore has listed no financial interest/arrangement that would be considered a conflict of interest.

Prevalence of Pressure Ulcers-2011

NPUAP Prevalence and Incidence Monograph

- 5% to 32% in acute care
- 4% to 3% in home care
- 5-21% in long term care

2010 cost - $3.85 million
Pressure Ulcers: Regulations

- 2008 CMS Hospital Regulations
  - Stage III and Stage IV pressure ulcers are “reasonably presentable”
  - Reimbursement changed for hospital acquired
- 2010 CMS Revisions
  - Addressed unavoidable pressure ulcers
  - Necessary treatment and services
  - Civil money penalties
- 2012 CMS Hospital Readmissions Reduction Program

Pressure Ulcers and Quality of Care

- Perception of pressure ulcers
  - Substandard Care
- Quality of Care indicator
  - Public and government
  - Healthy People 2020 Older Adults
- Viewed as modifiable

Risk Factors for Development of Pressure Ulcers

- Urinary and/or fecal incontinence
- Impaired/decreased functional ability
- Impaired circulation
- Co-morbid conditions
- Decreased functional ability
- Malnutrition/undernutrition/Dehydration
- Obesity
- Medications
- Advanced age
- History of pressure ulcers
Factors Affecting Wound Healing

- Decreased Mobility
- Co-morbid Conditions
- Drug Therapies
- Non-compliance with Care Plan
- Infection
- Loss of Lean Body Mass/weight loss
- Undernutrition, Malnutrition, Hydration Deficits
- Hyperglycemia

Nutrition Risk Factors

- Protein Energy Malnutrition (PEM)
  - Deficiency of energy (calories) and protein
  - Most common cause of malnutrition
  - Synonymous with undernutrition
- Lean Body Mass (LBM)
  - All body tissue except fat
  - Metabolically active
- Unintended Weight Loss
  - 5% in 30 days, 7.5% in 90 days, 10% in 180 d.
  - Can be insidious

Loss of LBM/Weight Loss

- Sarcopenia
  - Loss of muscle mass and strength with age
  - Happens to everyone with normal aging
- Cachexia
  - Involuntary loss of LBM and fat mass
  - Driven by hypercatabolism and hypermetabolism
- Starvation
  - Involuntary loss of weight
  - Inadequate nutrition and anorexia
Importance of LBM

- 75% of normal body weight
- Metabolically active
- Contains all of the body’s protein content
  - Essential for wound healing
  - Skin integrity-component of muscle, blood cells, connective tissue
  - Metabolic processes
  - Immune function

Loss of Lean Body Mass

- 10%
  - Wound healing has priority for protein
- 20%
  - Restoration of LBM competes with wound healing process
- 30%
  - Restoration and maintenance of LBM is most important. Wound healing stops
- 40%
  - Death
  (Demling, 2001)

PEM/Undernutrition

2012 Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition Consensus Statement on Malnutrition
Characteristics for Diagnosis

Presence of 2 or more:
* Insufficient energy intake
* Weight loss
* Loss of muscle mass
* Loss of subcutaneous fat
* Localized or generalized fluid accumulation
* Diminished functional status

Role of Stress Response

Flight or Flight Response
Occurs with acute illness or chronic conditions

Hormonal response to inflammation
Increased | Decreased
Catecholemines | Anabolic hormones
Cortisol | Testosterone
Glucagon | Growth hormone

Role of Stress and Inflammation

- Increased catabolism
  - Progressive loss of LBM
- Hypermetabolism
  - Increased energy demands
- Metabolic Changes
  - Anorexia, GI changes
Metabolic Response to Inflammation

<table>
<thead>
<tr>
<th>Normal</th>
<th>Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein → protein synthesis (LBM)</td>
<td>Protein → energy production first</td>
</tr>
<tr>
<td>CHO → energy production</td>
<td>CHO → energy production</td>
</tr>
<tr>
<td>Fat → energy storage</td>
<td>Fat → used for energy</td>
</tr>
</tbody>
</table>

Hepatic Proteins

- Albumin
  - Half-life of 18-21 days
  - Low sensitivity for changes in protein status
  - Reflective of inflammation
  - Affected by hydration status

- Prealbumin
  - Half-life of 48-72 hours
  - More sensitive than albumin
  - Less affected by hydration status
  - May reflect inflammation

- Transferrin

- Historically linked to nutritional status

- Negative acute phase protein
  - Decrease in response to infection, injury, wounds
  - Increase with recovery
Hepatic Proteins

- Decrease in presence of inflammation
- Increase as inflammation decreases regardless of protein intake
- Useful indicators of severity of illness
- Can help to identify persons as risk for malnutrition
- Do not accurately measure nutritional repletion

The Real Truth About Albumin and Prealbumin

- Are not indicators of nutritional status
- Indicate morbidity, mortality and recovery for acute and chronic illness
- Shouldn’t be used to evaluate changes in protein status when acute or chronic inflammatory conditions exist

Biochemical Data

- How recent is the lab data?
  - Too old?
  - Too frequent?
- Recent blood transfusion?
- Used as part of a nutrition focused assessment
Medical Nutrition Therapy

Goals
Provide adequate nutrients on a daily basis
- Calories
- Protein
- Fluids
- Vitamins and Minerals

Maintain and/or restore weight and LBM

Determine need for adjunctive therapy
* Amino Acids

Best Practice

- Use evidence-based clinical practice guidelines
- NPUAP/EPUAP Pressure Ulcer Guidelines
- Address prevention and treatment
- Released in 2009.

General Recommendations

- Screen and assess nutritional status for each individual with a pressure ulcer at admission and with each condition change and/or when progress toward pressure ulcer closure is not observed.
  - Have nutrition screen protocols in place
  - Use a valid, reliable, practical screening tool that is easy to use.
General Recommendations

- Screen and assess nutritional status
  - Refer all individuals with a pressure ulcer to the dietitian for early assessment and intervention of nutritional problems.
  - Assess weight status for each individual to determine weight history and significant weight loss from usual body weight.
  - Assess ability to eat independently.
  - Assess adequacy of total nutrient intake (food, fluid, oral supplements, enteral/parenteral feedings).

Nutrition Screening Tools

- Mini-Nutritional Assessment (MNA)
- Malnutrition Universal Screening Tool (MUST)
- Subjective Global Assessment (SGA)
- Braden Risk Assessment Tool

Nutrition-Focused Nutrition Assessment

- Completed by Registered Dietitian
- Food/nutrition related history
- Anthropometric measures
- Biochemical data
- Medical Tests and Procedures
- Nutrition Focused Physical Finding
- Client History
- Nutrition Diagnosis/Interventions/Monitoring
### Calories

- Provide sufficient calories
  - Provide 30-35 Kcalories/kg body weight.
  - Adjust formula based on weight loss, weight gain or level of obesity.
  - Liberalize dietary restrictions when limitations result in decreased food and fluid intake.
  - Provide enhanced foods and/or oral supplements between meals if needed.
  - Consider nutritional support (enteral or parenteral nutrition) when oral intake is inadequate, consistent with individual goals.

### Protein

- Provide adequate protein for positive nitrogen balance for an individual with a pressure ulcer
  - Offer 1.25 - 1.5 grams protein/kg body weight when compatible with goals of care
  - Reassess as condition changes
  - Assess renal function to ensure high levels of protein are appropriate for the individual

### Protein Distribution

- Study by Paddon-Jones and Rasmussen in 2009
  - 25-30 mg protein per meal stimulates muscle synthesis

- Implications for practice?
Fluid

• Provide and encourage adequate daily fluid intake for hydration.
  ➢ Monitor individuals for signs and symptoms of dehydration
  ➢ Provide additional fluid for individuals with dehydration, elevated temperature, vomiting, profuse sweating, diarrhea or heavily draining wounds.
  ➢ 30 ml/kg/day or 1 ml/calorie per day

Vitamins and Minerals

• Provide adequate vitamins and minerals
  ➢ Encourage consumption of a balanced diet which includes good sources of vitamins and minerals
  ➢ Offer vitamin and mineral supplements when dietary intake is poor or deficiencies are confirmed or suspected

Vitamins/Minerals – Vitamin A

• Vitamin A
  – Fat soluble vitamin
  – Promotes collagen formation
  – Enhances cell proliferation
  – Needs may increase w/corticosteroids
• DRI-10000 IU
Vitamins/Minerals – Vitamin C

- Vitamin C
  - Water soluble vitamin
  - Enhances cell proliferation
  - Stimulates collagen synthesis
  - Supports immune function
  - Important for iron absorption
  - Additional needed for smokers
  - Contraindicated with kidney stones and renal failure

Vitamins/Minerals - Zinc

- Zinc
  - Trace mineral
  - Protein synthesis
  - Cellular growth
  - Immune function
  - Transported by albumin
  - Deficiency may occur with draining wounds, poor dietary intake, excessive GI losses
  - Prolonged use may impair copper absorption

Vitamins/Minerals – Zinc Supplementation

If deficiency, use ≤ 40 mg.
Consider “stop” order

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Dose</th>
<th>Elemental Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc Sulfate</td>
<td>110 mg</td>
<td>25 mg</td>
</tr>
<tr>
<td></td>
<td>220 mg</td>
<td>51 mg</td>
</tr>
<tr>
<td>Zinc Gluconate</td>
<td>110 mg</td>
<td>16 mg</td>
</tr>
<tr>
<td></td>
<td>220 mg</td>
<td>31 mg</td>
</tr>
<tr>
<td>Zinc Chloride</td>
<td>110 mg</td>
<td>53 mg</td>
</tr>
</tbody>
</table>
Amino Acids

- Indispensable
  - Essential
- Dispensable
  - Non-essential
- Conditionally indispensable
  - Conditionally essential

Amino Acids - Arginine

- Conditionally indispensable
- Stimulates collagen synthesis
- Helps support immune function
- Assists with cell growth
- Substrate for nitric oxide synthesis

Amino Acids - Glutamine

- Enhance cell proliferation
- Preserves LBM
- Supports immunity
- Supports gut integrity
Other Supplements?

- **Leucine**
  - Branched-chain amino acid
  - Regulates protein synthesis
  - Helps maintain nitrogen balance

- **HMB (beta hydroxy-beta-methylbutyrate)**
  - Metabolite of amino acid leucine
  - Precursor for the manufacture of cholesterol
  - Helps regulate muscle synthesis and degradation
  - Supports immune function

Nutrition Care Plan

- Formulated by nutrition professional
- Based on
  - Severity of nutritional compromise
  - Rate of weight loss with reason for weight loss or appetite deline
  - Causes/prognosis/projected clinical course
  - Patient and family wishes

Nutrition Support

150# male with stage 2 pressure ulcer
- 2040-2380 calories
- 82-102 gm protein
- 2040 ml fluid

Meal intake
- 2 cups milk; 9-12 oz meat, eggs
- 8-9 cups fluid
Nutrition Support

120# female w/stage 2 pressure ulcer
- 1650-1925 calories
- 66-82 gm protein
- 1650 ml fluid

Meal intake
- 2 cups milk; 7-10 oz meat, eggs
- 6-7 cups fluid

Consider
- Enhanced foods
- Oral nutrition supplements
- Modular protein supplements
- Modular calorie supplements

Litigation
- 87% of verdicts and out of court settlements against facilities were awarded to the plaintiffs
- Average monetary recovery more than $13.5 million
- Awards of up to $312 million
- Highest awards given for PU caused by single factor--inadequate nutrition
Avoiding or Defending Litigation

Failure to implement facility policies and to be diligent with documentation procedures increases a facility’s exposure to liability.

Keys to Reduce Liability
- Development and implementation of facility policies
- Comprehensive documentation in the medical record

Implement Facility Policies

- Use recognized clinical practice guidelines
  - NPUAP International Guidelines
  - ADA Evidence Analysis Library
  - American Medical Director’s Association
  - Academy of Nutrition and Dietetics *Nutrition Care of the Older Adult*

Comprehensive Documentation

- Include all aspects of nutrition care
  - Evaluation of weight status
  - Evaluation of contributing factors that may affect wound healing
  - Assessment of nutrient needs
  - Comparison of needs vs. food and fluid consumption
  - Specific nutrition interventions
- If you have a negative outcome, was it clinically unavoidable?
Comprehensive Documentation

• Refusal of recommendations and reason
• Acceptance or refusal of diet, meals, nutritional interventions

Use Nutrition Care Process

NUTRITION DX: Increased need for energy and protein related to increased demands for healing as evidenced by the presence of a stage IV pressure ulcer

GOAL: Resident will consume calculated needs of 2000-2100 calories, 75-80 gm protein, 1500-1800 ml fluid daily

INTERVENTIONS: Serve Mechanical Soft Diet for approx. 2400 calories, 80 gm protein, 1740 ml fluid.
Offer high calorie supplement of 60 ml qid for 480 calories, 20 gm protein
Consult physician with request to add vitamin/mineral supplement

MONITORING/EVALUATION: Monitor intake of meals and supplements of resident. Monitor pressure ulcer healing using facility skin monitoring weekly report

NPUAP Resources

NPUAP website www.npuap.org
• International Guidelines for Prevention and Treatment
• The Role of Nutrition in Pressure Ulcer Prevention and Treatment: National Pressure Ulcer Advisory Panel White Paper, 2009
• Pressure Ulcer Prevention Points, 2007
• Pressure ulcer staging diagrams
• Select Treatment & Prevention Topics Slide Sets