Malnutrition and Nutrition Focused Physical Exam (NFPE)

Objectives:

- Identify etiology-based malnutrition and the role of inflammation
- Discuss the diagnostic characteristics needed to identify and document adult malnutrition in the clinical setting
- Know how to perform an adult nutrition-focused physical exam

Historical Perspective

- International Global Guidelines Group–2009 reps from multiple international societies
- Developed etiology-based approach to diagnosis adult malnutrition in acute care setting
- Etiology based terminology was proposed –incorporated a current understanding of inflammation

Proposed Etiology–Based Terminology

- Starvation–related malnutrition
  - Chronic starvation without inflammation
  - Anything that limits access to food: food insecurity or compromised intake related to psych. issues
- Chronic disease–related malnutrition
  - Chronic inflammation of mild to moderate degree
  - Organ failure, cancer, RA, HIV, diabetes, sarcopenic obesity, CHF, pressure ulcers

Proposed Etiology–Based Terminology

- Acute disease or injury–related malnutrition
  - Acute inflammation of severe degree
  - Sepsis, SIRS, infection, severe burns, ARDS, trauma, or closed head injury

Endorsed by ASPEN and ESPEN

Jointly published in the March 2010 issues of JPEN and Clinical Nutrition

Jensen GL. et al. *JPEN* 2010; 34(2): 156-159
Malnutrition is most simply defined as any nutritional imbalance.

Adult undernutrition typically occurs along a continuum of inadequate intake and/or increased requirements, impaired absorption, altered transport and altered nutrient utilization.

White et al, JPEN, 2012 Consensus Statement

"Malnutrition is a major contributor to increased morbidity and mortality, decreased function and quality of life, increased frequency and length of hospital stay and higher healthcare costs."

Current estimates of the prevalence of adult malnutrition range from 15% to 60% depending on the patient population and criteria used to identify its occurrence.

Only about 3% of patients admitted to acute care settings in the U.S. are diagnosed with malnutrition.

Nutrition Risk Identified

Compromised intake or loss of body mass

Inflammation present? No or Yes

No

Starvation related malnutrition (pure chronic starvation, anorexia, splanchnic starvation)

Mild to Moderate Degree

Chronic Disease-Related Malnutrition (organ failure, Cancer, rheumatoid arthritis, sarcopenic obesity)

Severe Inflammation (Acute inflammation)

Examples:

Major infection/sepsis
Systemic inflammatory response syndrome (SIRS)
Acute respiratory distress syndrome
Burns
Trauma
Close head injury
Major surgery
Acute pancreatitis
Cellulitis

Acute Inflammation

Chronic Inflammation

Fever (> = 99.9 F)
Swelling
Erythema
Hypothermia (< 95 F)
Hyperglycemia
Hypertension
 EAlevated BP
EAlevated CRP
Leukocytosis
Tachycardia (HR > 100 beats/min)
Purpose: defense, repair

Lack of classic signs of inflammation
Minor elevation of CRP
Purpose: maintain homeostasis

Inflammation present: No or Yes

Yes

Nutrition Risk Identified: Compromised intake or loss of body mass

Mild to Moderate Degree

Severe Inflammation (Acute inflammation)

Examples:

Major infection/sepsis
Systemic inflammatory response syndrome (SIRS)
Acute respiratory distress syndrome
Burns
Trauma
Close head injury
Major surgery
Acute pancreatitis
Cellulitis

Jensen GL, ASPEN Adult Core Curriculum, 3rd edition 2012

11/10/2015
**Why is Inflammation Important?**

- Inflammation increases the risk for or may worsen severity of malnutrition
- Acute inflammatory response:
  - Increases catabolism and decreases protein synthesis
  - Increases REE, leads to negative nitrogen balance

**Imaging Studies and Inflammation**

- EGD/colonoscopy: colitis, gastritis, inflammatory bowel disease
- Chest x-ray: presence of infiltrates, pneumonia
- Abdominal X-ray: abscess, pancreatitis, hepatitis, bowel obstruction

**Inflammatory Biochemical Markers**

- Negative acute phase response proteins: Albumin, transferrin, prealbumin
- Positive acute phase response proteins: CRP (>1 mg/dl reflective of significant inflammation)
- Elevated blood glucose
- High or low WBC

**Academy of Nutrition and Dietetics**

- The academy accepted ASPEN/ESPEN definitions
- May 2012, AND/ASPEN published Consensus Statement
- 6 standardized characteristics recommended to identify and document adult malnutrition; incorporated the current understanding of role of inflammation

**6 Characteristics to Identify and Document Malnutrition**

- Insufficient energy intake
- Unintentional weight loss
- Loss of body fat
- Loss of muscle mass
- Fluid accumulation
- Diminished functional capacity

**Characteristics of Non-Severe Malnutrition**

<table>
<thead>
<tr>
<th></th>
<th>Acute Illness or Injury</th>
<th>Chronic Illness or Disease</th>
<th>Environmental or Social Circumstance (Starvation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced Dietary Intake</td>
<td>&gt;7d intake &lt;75% total EER</td>
<td>≥ 1 mo intake &lt;75% total EER</td>
<td>≥ 3 mo intake &lt;75% total EER</td>
</tr>
<tr>
<td>Unintended Wt Loss</td>
<td>1-2% in 1 wk 5% in 1 mo 7.5% in 3 mo</td>
<td>5% in 1 mo 7.5% in 3 mo 10% in 6 mo 20% in 1 yr</td>
<td>≥ 5% in 1 mo ≥ 7.5% in 3 mo ≥ 10% in 6 mo ≥20% in 1 yr</td>
</tr>
<tr>
<td>Loss of Subcutaneous Fat</td>
<td>Mild Loss</td>
<td>Mild Loss</td>
<td>Mild Loss</td>
</tr>
<tr>
<td>Muscle Loss</td>
<td>Mild Loss</td>
<td>Mild Loss</td>
<td>Mild Loss</td>
</tr>
<tr>
<td>Fluid Accumulation</td>
<td>Mild Edema</td>
<td>Mild Edema</td>
<td>Mild Edema</td>
</tr>
<tr>
<td>Reduced Grip Strength</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**White et al. JPEN, 2012 Consensus Statement**
### Characteristics of Severe Malnutrition

Minimum of 2 characteristics needed for diagnosis

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</thead>
<tbody>
<tr>
<td>Reduced Dietary Intake</td>
<td>≥50% total EER</td>
<td>≥1 mo intake</td>
<td>≥1 mo intake</td>
</tr>
<tr>
<td>Unintended Wt Loss</td>
<td>&gt;5% in 1 wk</td>
<td>&gt;7.5% in 1 mo</td>
<td>&gt;10% in 6 mo</td>
</tr>
<tr>
<td></td>
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<td>Severe Loss</td>
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</tr>
<tr>
<td>Fluid Accumulation</td>
<td>Moderate to Severe Edema</td>
<td>Severe Edema</td>
<td>Severe Edema</td>
</tr>
<tr>
<td>Reduced Grip Strength</td>
<td>Measurably Reduced</td>
<td>Measurably Reduced</td>
<td>Measurably Reduced</td>
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</table>

White et al. JPEN, 2012 Consensus Statement

### How are NFPE Findings Gathered?

- Nutrition focused physical assessment
- Patient interview
- Medical record
- Collaboration with other healthcare team members

### Basic NFPE Exam Techniques

- **Inspection**
  - Broad observation of color, shape, texture, size. Involves senses of sight, smell and hearing.

- **Palpation**
  - Examining body structures using touch (assess texture, size, temp, tenderness, mobility)

- **Percussion**
  - Assessment of “sounds”

### Performing a Nutrition–Focused Physical Exam

### Getting Started

- Review Medical record, food intake data, H&P, nursing notes
- Identify nutrition-related concerns
- Introduce yourself and shake hands
- Ask questions r/t health & nutrition history
- Explain what you would like to do
- Ask the patient’s permission before starting

### Physical Characteristics to Note During Interview

- Body habitus – physique or body type
  - Ectomorphic – underweight
  - Mesomorphic – Normal weight
  - Endomorphic – Overweight or obese
Assessing Fat and Muscle Loss

- Areas of subcutaneous fat loss (3): Orbital fat pads, triceps, thoracic/lumbar region
- Areas of muscle loss (7): temples, shoulders, clavicles, scapulae, hands, thighs, calves

Subcutaneous Fat Loss

Subcutaneous Fat Loss: Orbital Fat Pads

Examine region surrounding the eye
View patient when standing directly in front of them. Inspect for loss of bulge under eye (fat pad); characterized by hollow eye

- **Normal**: Slightly bulged fat pad
- **Mild-Moderate**: Slightly dark circles, somewhat hollow
- **Severe fat loss**: Pronounced, hollow, depressed, dark circles, loose skin

Periorbital edema

- Fluid collection or “puffiness” around eyes:
  - May be caused by: fluid retention, CHF, renal failure, nephrotic syndrome, hypoalbuminemia, allergies, steroid use, periorbital cellulitis, myxedema

Patient with bilateral thyroid eye disease

Subcutaneous Fat Loss: Triceps

Inspect upper arm region:

With arm bent at 90 degree angle, pinch skin over the triceps muscle between thumb and forefinger (do not include muscle in pinch)

- **Normal**: Ample fat tissue between folds of skin
- **Mild-Moderate fat loss**: Fingers almost touch, some depth to pinch
- **Severe fat loss**: Very little space between folds or fingers touching
Subcutaneous Fat Loss: Triceps

- **Normal**: ample fat tissue; chest wall or ribs should not be visible
- **Mild-Moderate**: loose skin; somewhat apparent ribs
- **Severe**: skin is stretched; prominent, well-defined ribs

Subcutaneous Fat Loss: Thoracic/Lumbar Region

- Have patient press hands against solid object or against dietitian’s hand. Observe for loss of fullness or loose skin in area of ribs, lower back, midaxillary line
- **Normal**: ample fat tissue; chest wall or ribs should not be visible
- **Mild-Moderate**: loose skin; somewhat apparent ribs
- **Severe**: skin is stretched; prominent, well-defined ribs

Subcutaneous Fat Loss: Thoracic/Lumbar Region

- **Well-nourished**: adequate fat tissue
- **Mild-Moderate**: loss of fat tissue, skin may be present
- **Severe**: prominent ribs

Bilateral Muscle Wasting

- Upper body more susceptible to muscle loss
- Muscle loss from inactivity or bedrest is most prominent in the pelvis and upper leg
- Muscle wasting determined by palpation for volume and tone; flat areas or hollow areas where muscle should be; prominence of bone

Potential Causes of Bilateral Muscle Wasting:

- Immobility, bed-bound
- Paraplegia, Quadriplegia
- ALS, muscular dystrophy
- CVA
- Myeloproliferative disorder
- Injury
- Burns
- Spinal cord injury
- Rheumatoid arthritis
- Malnutrition
**Bilateral Muscle Wasting (Upper Body)**

- Observe patient straight on, then ask patient to turn head side to side; look for prominence of brow bone; scooping or hollowing indicating wasting of temporalis muscle
  - **Normal** - can observe and feel well-defined muscle
  - **Mild-Moderate** - slight depression
  - **Severe** - hollowing, scooping depression

- Observe pectoral and deltoid muscle. Look for prominent protrusion of bone. Protrusion of bone indicates wasting of pectoral and deltoid muscles
  - **Normal** - clavicle bone not prominent in men but visible in women
  - **Mild-Moderate** - some protrusion of clavicle
  - **Severe** - protruding / prominent bone

- Observe patient straight on with arms at side, sitting upright (if possible) looking for squaring of shoulders. Loss of roundness at junction of shoulder and neck & shoulder and arm (significant loss of deltoid muscle)
  - **Normal** - rounded, curves at the junction of shoulder and neck & shoulder and arm
  - **Mild-Moderate** - some protrusion of acromion process
  - **Severe** - protruding or prominent bone; “squaring of shoulder”
Bilateral Muscle Wasting: Scapulae

- Ask patient to extend hands straight out, push against solid object or against dietitian's hand
- Normal: Bones not prominent, no significant depressions
- Mild–Moderate: Mild depression or bone may show slightly
- Severe: Prominent, visible bones, depressions, between ribs/scapula or shoulder/spine

Bilateral Muscle Wasting: Interosseous

- Observe interosseous muscle between thumb and forefinger with palm down (back of hand). Have patient press thumb and forefinger back and forth with pressure to inspect muscle (Make the "OK" sign)
- Normal: may bulge in male and be flat/bulge in female
- Mild–Moderate: slightly depressed or flat
- Severe: flat or depressed area between thumb and forefinger
Muscle Wasting (Lower Body)

- Anterior Thigh: Quadriceps
- Patellar Region: Quadriceps
- Posterior Calf: Gastrocnemius Muscles

Lower Body Muscle Wasting: Patellar Region– Quadriceps

- Ask patient to sit with leg propped up, bent at the knee
- Normal– Muscles protrude, bones not prominent
- Mild–Moderate– Knee cap more prominent, less rounded
- Severe– Bones prominent, little sign of muscle around knee

Lower Body Muscle Wasting: Anterior Thigh– Quadriceps

- Ask patient to sit, prop leg up on low furniture. Grasp quads to differentiate muscle tissue from fat tissue
- Normal– well rounded, well developed
- Mild–Moderate– mild depression on inner thigh
- Severe– depression/line on thigh, obviously thin

Bilateral Muscle Wasting: Quadriceps

- Normal
- Mild to Moderate
- Severe

- Normal muscle
- Atrophied muscle
Grasp the calf muscle to determine amount of tissue

- Normal: well-developed muscle
- Mild-Moderate: not well developed
- Severe: Thin, minimal to no muscle definition

Hydration

Apply pressure to patient’s nail bed for a few seconds, then release

- Normal: 1–2 seconds
- Mild dehydration: 4 seconds
- Severe dehydration: >4 seconds

Skin turgor is the skin’s ability to change shape and then return to normal (elasticity)

- Grasp the patient’s skin on the back of the hand or lower arm between two fingers so that it is tented up; Hold for a few seconds then release
- Decreased skin turgor (slower return to normal) reflects late stages of dehydration

Assessing Dehydration: Capillary Refill

Assessing Edema

- Pitting edema
- Non-pitting edema
- Pulmonary edema
- Pleural edema
- Peripheral edema
- Pedal edema
- Ascites
- Anasarca
Take thumb and press on top of ankle, foot and/or shin for 5 seconds.

0+ Non-pitting edema
1+ Mild pitting edema. 2mm depression that disappears rapidly.
2+ Moderate pitting edema. 4mm depression that disappears in 10–15 seconds.
3+ Moderately severe pitting edema. 6mm depression that may last more than 1 minute.
4+ Severe pitting edema. 8mm depression that can last more than 2 minutes.

Assessing Edema

- Distended neck veins
- Pulmonary edema
- Pleural edema

Pulmonary edema: Abnormal fluid build-up in air sacs of lungs, causing SOB
Pleural edema: excess fluid that accumulates between the two pleural layers

- Peripheral edema, hand
- Pedal edema

Edema in feet and legs or arms and hands
Fluid accumulation in the feet

Assessing Edema

- Ascites
- Anasarca

Ascites: Accumulation of fluid in the peritoneal cavity; commonly due to liver failure or metastatic cancer
Anasarca: Extreme generalized edema/swelling of skin due to effusion of fluid into the extravascular space; usually caused by cirrhosis, renal disease, heart failure and severe malnutrition

Ingalls Hospital Experience

- Clinical RDs formed a Malnutrition Task Force
- Developed an resource booklet to assist RDs, interns in performing NFPE
- Abbott Nutrition rep presented malnutrition education programs to RDs, RNs (information documentation specialists)
- RDs collaborated with info. doc. RNs on NFPE findings for individual patients
How to put NFPE into practice

- Start with a small sample population
- Develop a checklist or measurement tool
- Compare findings with peers

NFPE Case Study–KZ

- 45 year-old female admitted through ER
- Dx: altered mental status, abdominal pain, diarrhea
- PMH: diagnosis of Crohn's disease of small intestine 9 months PTA
- Test Results: CT head negative, CT abd/pelvis- chronic inflammation of small bowel
- Nutrition Triggers: decreased appetite >5 days PTA, wt loss 25 lbs (16%) in past 9 months, diarrhea >5 days PTA
- RD assessed patient day 2 of admit

Physical Exam–KZ

- Subcutaneous Fat
- Orbital Fat Pads– hollow, dark circles, loose skin
- Triceps– fingers touching each other
- Ribs/ Midaxillary– skin is stretched, well-defined ribs
  - Loss of Subcutaneous Fat– SEVERE!!!

NFPE Case Study–KZ

- Ht: 5'10", admit wt: 125 lbs, usual wt: 150 lbs
- Unintentional wt loss: 25 lbs in 9 months (16%)
- Husband reports pt has had no appetite with intake of 25% of usual past couple of months
- Liquid bowel movement after all meals
- Labs: Albumin-2.0 g/dl

Resources:

- Abbott Nutrition Health Institute (ANHI) simulation course: “Patient Simulation”
  www.ANHI.org
- FNCE, Nashville, TN. NFPE: Identifying Malnutrition with Hands–On Training Sunday Oct. 4, 10a–11:30a
- Dietitians in Nutrition Support Symposium
  Annually in June
- Contact Nestle representative for upcoming NFPE workshops by Cleveland Clinic RDs
- Nutrition-focused physical assessment webinar by Academy Medical Systems

Muscle Wasting (Upper Body)

- Temples– hollowed depression
- Clavicles– severe protruding bone
- Shoulders– squaring of shoulder, protruding acromion process
- Scapulae– protruding bone, muscle depression on both sides of bone
- Interoosseous– no bulge between thumb and forefinger, muscle wasting between finger bones
Physical Exam–KZ

- **Muscle Wasting (Lower Body)**
  - **Quadriceps**: prominent knee cap, little muscle around knee, thigh muscles concave
  - **Calves**: very thin calves with no muscle definition

  - Muscle Loss: SEVERE!!!

Physical Exam–KZ

- **Fluid accumulation**: 3–4+ pitting edema
- **Functional status**: bedridden for past month
- Is the patient malnourished? Yes  No
- Etiology of Malnutrition: Social, Chronic, Acute
- Severity of Malnutrition: Moderate  Severe

Nutrition Care Process

**PES Statement**

- **Severe malnutrition** of chronic illness
- **Related to**: decreased appetite, malabsorption of nutrients
- **As evidenced by**: 16% wt loss in past 9 months, consuming less than 25% of energy needs for greater than 1 month, diarrhea after all meals, severe bilateral muscle loss to upper and lower body, and severe loss of subcutaneous fat to orbital fat pads, triceps and ribs

Questions?