Stroke Complications Related to Nutrition

Description/Etiology
Stroke is an interruption of blood supply to the brain due to vessel blockage by a blood clot (i.e., ischemic stroke) or rupture of a vessel, causing blood to leak into the brain (i.e., hemorrhagic stroke). Depending on the location and extent of infarction, stroke can produce a wide range of physical, cognitive, perceptual, and affective complications. Poor nutritional status is a potentially dangerous complication that may be brought on by a variety of stroke-related changes.

Dysphagia, or difficulty swallowing, is common in patients who have had a stroke and may disrupt healthy eating patterns and lead to aspiration. Swallowing impairments are associated with an increased risk of death. Stroke impairs the preparatory, oral, and pharyngeal stages of swallowing.

Other manifestations of stroke that can disrupt healthy eating patterns are arm weakness, paralysis, and apraxia (i.e., loss of coordination). Patients may be afraid to eat due to fear of choking, decreased palatability of food, fatigue, depression, and cognitive impairments. The patient may lack the ability or have a diminished ability to grasp utensils, cut and prepare foods, bring food to the mouth, and maintain an upright posture while eating.

Some patients may require tube feeding to provide nutrition and to administer medications. Complications related to tube feeding include involuntary removal of the tube, aspiration pneumonia, and peritonitis.

Partial or complete hemianopsia (i.e., blindness in half of the visual field) or visual neglect (i.e., lack of attention to the visual space) can impair the patient's ability to locate and attend to all food items on a tray or plate. A shortened attention span and impaired short-term memory can prevent the patient from completing meals and can interfere with the relearning of eating skills.

Communication problems can significantly interfere with communication of meal preferences, cooperation following verbal instructions at mealtimes, and the relearning of eating skills.

Potential complications of nutritional deficits in the post-stroke patient include severe malnourishment and dehydration which can lead to deep vein thrombosis (DVT). Treatment is aimed at restoring nutritional status, preventing complications of compromised eating and nutrition, and providing much needed psychological and emotional support during recovery.

Facts and Figures
Reported incidences of malnutrition after a stroke have a very wide range, 6-62%, due to variation in assessment tools used. Individuals who experience dysphagia after a stroke are more likely to become malnourished during the rehabilitation period. Undernourishment immediately following stroke has been linked to increased mortality, diminished functional ability, dependency, and poor quality of life up to six months later.

Risk Factors
Risk factors for compromised nutritional status in the post-stroke patient include a history of malnutrition prior to stroke and the presence of complications that may hinder proper eating, including dysphagia, visual deficits, cognitive or attention deficits, muscle weakness, and...
paralysis. Patients who live alone or who have limited family, social, or other support are at increased risk for post-stroke malnutrition because of lack of assistance during mealtimes.

**Signs and Symptoms/Clinical Presentation**

The patient may not present with outward signs of poor nutritional status despite report of impaired functional ability and reduced consumption, or the patient may present with marked weight loss, signs of dehydration, and skeletal fractures. Swallowing difficulties, motor dysfunction, and communication deficits may be noted.

**Nutritional Assessment**

› **Patient Medical History**
  - Obtain information about the type (i.e., ischemic or hemorrhagic) and severity of stroke
  - Review treating clinician’s orders for dysphagia considerations
  - Obtain patient’s history including assessing for/asking about
    – any past medical history or related medical conditions (e.g., diabetes, cardiovascular disease)
    – recent unexpected weight loss
    – activity level
  - Post-stroke deficit assessment may reveal factors that interfere with nutritional intake (e.g., hemiplegia, dysphagia, hemianopsia, motor apraxia)
  - The patient’s living arrangements may indicate a need for supportive in-home services

› **Patient Dietary History**
  - A 24-hour dietary recall can be used to assess individual’s usual intake. Evaluate usual nutrition intake by asking the patient or family members to complete a 24-hour dietary recall identifying foods generally consumed and food preferences and cultural/religious beliefs related to food, and medically prescribed dietary interventions
  – In the outpatient setting a 24-hour dietary recall when combined with a 3-day diet history may be useful tools for evaluating the patient’s usual dietary intake (i.e., patient recall of all foods and beverages consumed in a 3-day period, that includes 1 weekend day)
  – Ask about the use of any nutritional supplements and food consistency modifications

› **Anthropometric Data and Calculations**
  - Calculate the patient’s body mass index (BMI) by dividing body weight (kilograms) by height (meters squared); or 703 multiplied by weight (pounds) and divided by height (inches squared)
    – Underweight: < 18.5; **normal: 18.5-24.9;** overweight: 25-29.9; obese: > 30
    – In patients over 65 years of age, evidence suggests that a slightly higher BMI (25-27) may help prevent bone deterioration and is associated with a lower risk of mortality
    – In some cases, body composition testing (e.g., dual-energy x-ray absorptiometry [DXA] scan, skin calipers) may be necessary
  - Significant undesirable weight changes are as follows: +/- 5% during a 30-day period or +/- 10% during a 180-day period
    – Weight loss of 10-20% in a 180-day period indicates moderate protein-calorie malnutrition
    – Weight loss of > 20% in a 180-day period indicates severe protein-calorie malnutrition
    – Fluid retention can impact weight variables and should be taken into account when considering the significance of weight changes
  - Estimate daily energy requirements in calories (kcal) by calculating the resting metabolic rate (RMR), also called basal energy expenditure (BEE), by use of the Harris-Benedict equation (for individuals with a BMI ≤ 30) or the Mifflin-St. Jeor equation (for obese individuals), multiplied by the appropriate activity factors (AFs) and injury factors (IFs) as shown below
    – Lb/kg and in/cm conversion: 1 lb = 2.2 kg; 1 in = 2.54 cm
    – Harris-Benedict equation (for individuals with a BMI ≤ 30):
      - Men: $RMR = 66 + 13.8 \times \text{weight in kg} + 5.0 \times \text{height in cm} - (6.8 \times \text{age})$
      - Women: $RMR = 655 + 9.6 \times \text{weight in kg} + 1.8 \times \text{height in cm} - (4.7 \times \text{age})$
    – Mifflin-St. Jeor Equation (for individuals with a BMI > 30):
      - Men: $RMR = 10 \times \text{weight in kg} + 6.25 \times \text{height in cm} \times \text{age} + 5$
      - Women: $RMR = 10 \times \text{weight in kg} + 6.25 \times \text{height in cm} - 5 \times \text{age} - 161$
    – Daily kcal requirement = $RMR \times \text{AF} \times \text{IF}$
    - AF: Confined to bed: 1.2; moderately active: 1.3; active: 1.4
- IF: Minor surgery: 1.2; skeletal trauma: 1.3; major sepsis: 1.6; severe burn: 2.1
- To encourage weight gain or loss (of 1-2 lbs/week), add or subtract 500 kcal/day respectively and monitor for weight changes

### Laboratory Tests and Diagnostic Tests of Particular Interest to the Nutritionist
- Serum chemistry panel may show electrolyte abnormalities
- Swallow screening tests (i.e., Toronto Bedside Swallowing Screening Test, Water Swallow Test, Bedside Swallowing Assessment, Standardized Swallowing Assessment, Gugging Swallow Screen, Acute Stroke Dysphagia Screening, Modified Mann Assessment of Swallowing Ability) may reveal dysphagia or aspiration

### Other Diagnostic Tests/Studies
- Video fluoroscopy may identify dysphagia
- Motor skills tests may show arm impairment
- Confrontation testing may identify a visual field impairment
- Close observation during eating may be ordered to assess muscle strength and chewing capability

## Treatment Goals

### Restore Nutritional Status and Prevent Complications
- Monitor weight, vital signs, and intake and output, as ordered
- Evaluate nutritional status by assessing all physiologic systems for compromise and reviewing laboratory/diagnostic study results; report abnormalities in nutritional status, including electrolyte imbalances and administer treatment, as ordered
- Provide patient and family with education on nutrition, including meal planning, and appropriate food choices to maintain or improve nutritional status
- If necessary, provide feedings enterally or parenterally with formulations that correct individualized deficits, as ordered
- Supervise all eating activity to prevent aspiration during eating; follow facility protocols if respiratory distress develops
  - Position patient in an upright with head flexed slightly forward, if possible
  - Modify dietary textures according to the patient’s ability to chew and swallow
- Reduce risk of oral injury by educating the patient to use the unaffected hand to test food and fluid temperatures if sensation is impaired; assist with feeding, as appropriate
- Reduce risk of further malnutrition and dehydration; if vision is impaired,
  - place the food at a suitable height and distance from the patient, within the patient’s visual field; if possible, serve favorite foods
  - keep the room quiet and well-lit, without unpleasant smells, during meals

### Maintain Emotional Well-Being and Educate
- Assess patient/family member anxiety level and coping ability; educate and encourage discussion about the recovery process, the importance of optimum nutrition, and individualized prognosis
- Request clinician referral, if appropriate, to a social worker for identification of local resources for stroke support groups, meal delivery/grocery shopping services, and information available on the Internet (e.g., http://www.americanstroke.org/)

## Food for Thought
- The Malnutrition Universal Screening Tool (MUST) is useful in screening and treating patients at risk. A study of 543 ischemic stroke patients showed that malnutrition, as assessed using MUST, was positively associated with increased mortality, length of stay, and hospitalization costs at 6 months post stroke (Gomes et al., 2014)
- Obese or overweight stroke patients have a significantly lower early and long-term mortality rate, based on body mass index (BMI) alone, versus patients with a normal BMI (Vemmos et al., 2010)
- According to another recent study, obesity is an independent factor of unfavorable clinical outcome and mortality in patients with acute ischemic stroke who are treated with intravenous thrombolytics (Sarikaya et al., 2011)

## Red Flags
- Oral feeding is contraindicated if the patient lacks a gag reflex

## What Do I Need to Tell the Patient/Patient’s Family?
- Proper nutrition during recovery from stroke is essential; poor post-stroke nutrition is linked with longer recovery time, increased dependence on caretakers, and increased mortality
Developing compensatory strategies is important, including use of the unaffected arm, asking for assistance during mealtimes, preparing simple meals with fewer ingredients and utensils, and getting help with grocery shopping and cooking.

References