

# MOVING ALBUMIN INTO TARGET RANGE

## HELPFUL HINTS

### Albumin facts

Albumin is the most abundant plasma protein and is produced by hepatocytes. Albumin functions as the major determinant of plasma oncotic pressure and serves as a transport protein for drugs, hormones, and waste products such as bilirubin; it also serves as a source of amino acids for the synthesis of other proteins.

Albumin is responsible for much of the colloidal osmotic pressure of the blood, and thus is very important factor in regulating the exchange of water between the plasma and the interstitial compartment (space between the cells). Because of hydrostatic pressure, water is forced through the walls of the capillaries into the tissue spaces. This flow of water continues until the osmotic pull of protein (albumin) molecules causes it to stop. A drop in the amount of albumin in the plasma leads to an increase in the flow of water from the capillaries into the interstitial compartment. This results in an increase in tissue fluid which, if severe, becomes apparent as edema.

Albumin serves also as a transport protein carrying large organic anions, such as fatty acids, bilirubin, and many drugs, and also hormones, such as cortisol and thyroxine, when their specific binding globulins are saturated.

An individual with severe renal disease may lose as much as 20 to 30 g of plasma proteins in the urine in one day.

The half-life of plasma albumin typically is 19-21 days and there is no significant difference limits between males and females.

Increases of serum albumin typically are secondary to hemoconcentration caused by dehydration, prolonged tourniquet use during blood collection, or specimen evaporation.

The main causes for decreased albumin include protein loss (example: nephrotic syndrome), increased albumin turnover (example: glucocorticoids), decreased protein intake (example: malnutrition) and liver disease. Other conditions such as malnutrition and extensive burns may result in serious decrease of plasma proteins.

Plasma albumin is rarely decreased in acute hepatitis because of its long half-life, but in chronic hepatitis albumin gradually falls with progression to cirrhosis.



Albumin is most commonly measured by automated techniques employing one of two dye-binding methods, bromcresol green (BCG) and bromcresol purple (BCP). Quantification of albumin by use of BCG or BCP is based on the color change that results when these dyes bind to albumin. The binding is rapid and the color change is directly proportional to the amount of albumin over a concentration range suitable for the determination of albumin in concentrations typically encountered in serum.

*(Dumas, BT & Peters, T. (2000). Serum Albumin: a progress report on measurement and clinical significance. Clinical Chemistry).*

*(Johnson, R & Feehally, J. (2008). Comprehensive Clinical Nephrology)*



## Renal Dietitian – Nutritional Status and the ESRD Conditions for Coverage

RD responsibilities:

### 1. V509: Assess nutritional status

#### A. Nutritional Assessment:

- a. Nutrition-focused physical examination (See appendix)
- b. If the patient doesn't cook for him/herself:
  - i. Obtain consent from the patient to talk to the caregiver and then
  - ii. Gather information from whoever provides meals for the patient including nursing homes or similar facilities
  - iii. Maintain consistent contact with the identified individuals in order to develop an effective plan of care for the patient

### 2. V545: Implement a plan to achieve and sustain an effective nutritional status

*To meet the requirement to “achieve and sustain an effective nutritional status”, the medical records of patients with outcomes lower than the expected standard should demonstrate continuing efforts tailored, implemented, assessed for success, and revised to address the individual patient challenges in this area. (Payne, G. Dallas.2009).*

#### A. Nutritional Plan of Care

- a. Review serum albumin results
- b. Analyze trend in albumin
- c. Compare monthly results with the other clinical indicators and make clinical correlations
- d. Develop improvement plan if serum albumin is not meeting established target goal
- e. Identify and document contributing factors for poor nutritional status
- f. Document actions to overcome these factors
- g. Review patient's weight
- h. Medication adjustment as needed
- i. Dietary adjustment as needed

## Appendix

# Nutrition-Focused Physical Examination

(Core Curriculum for Nephrology Nursing, 5<sup>th</sup> edition, ANNA 2008).

### 1. General Survey

#### a) Nutrition focus:

- i. Body weight and height compared with normal height-weight chart
- ii. General wasting of muscle and/or loss of adipose tissue.
- iii. Alertness, orientation
- iv. Note skin condition

#### b) Nutrition implications:

- i. Insufficient calories and proteins
- ii. Inability to feed self
- iii. Food preparation
- iv. Poor wound healing and pressure ulcers associated with protein, vitamin C, and zinc deficiencies

### 2. Vital Signs

- i. Temperature. Fever increases energy and fluid needs
- ii. Respirations. Increased rate or work of breathing can impact calorie and protein requirements, quantity of food eaten, and acid-base status
- iii. Pulse. Heart rate may increase with anemia
- iv. Blood pressure. May indicate need for diet modification, sodium or fluid restriction

### 3. Head and Face

#### a) Nutrition focus:

- i. Inspect and palpate shape and symmetry
- ii. Note texture, distribution, and quantity of hair
- iii. Palpate temporomandibular joint while patient opens and closes mouth

#### b) Nutrition implications:

- i. Bilateral temporal wasting may reflect protein-calorie deficiency
- ii. Problems with temporomandibular joint may influence the ability to eat

#### 4. Eyes

##### a) Nutrition focus:

- i. Inspect appearance of sclerae, conjunctivae, and corneae. Is the eye drying or tearing?
- ii. Inquire about problems with adjustments to darkness or visual impairment

##### b) Nutrition implications:

- i. May suggest vitamin A deficiency or B-carotene deficit, though very rare in dialysis dependent patients:
  1. Dull, rough appearance to inner lids (conjunctival xerosis)
  2. Softening of cornea (keratomalacia)
  3. Foamy or cheesy raised lesions noted on the temporal side of the sclera (bitot's spots)
  4. Dull, milky, hazy/opaque appearance of cornea (cornea xerosis) or night blindness
- ii. Vision impairment can affect ability to cook, shop, eat, or follow written dietary guidelines

#### 5. Upper extremities

##### a) Nutrition focus:

- i. Inspect skin and nail characteristics
- ii. Palpate hands, arms and shoulders
- iii. Assess amount of subcutaneous fat in triceps and biceps and any evidence of interosseous wasting
- iv. Check range of motion in wrists, elbows, and shoulders
- v. Assess muscle and grip strength bilaterally

##### b) Nutrition implications:

- i. Fat and muscle wasting reflect protein and calorie deficiency
- ii. Swollen painful joints may suggest vitamin C deficiency
- iii. Range of motion in upper extremities affects ability to feed independently
- iv. Muscle and grip strength may indicate need for assistive devices or assistance with food preparation

#### 6. Chest and lungs

##### a) Nutrition focus:



- i. Inspect, palpate, percuss, auscultate
  - b) Nutrition implications:
    - i. Prominent bony skeleton with muscle and fat wasting reflect inadequate calorie and protein intake
    - ii. Crackles and wheezes suggest fluid overload and may influence fluid requirements and nutrition regimen
    - iii. Increased work of breathing increases energy needs
  
- 7. Cardiovascular
  - a) Nutrition focus:
    - i. Inspect, palpate, percuss, auscultate
  - b) Nutrition implications:
    - i. Jugular venous distention and edema will influence fluid requirements
    - ii. Edema may be related to protein deficiency
    - iii. Dysrhythmias may be related to potassium, calcium, magnesium, or phosphorus imbalances
    - iv. Tachycardia and heart failure have been associated with thiamin deficiency
    - v. Cardiac cachexia is associated with inability to eat and digest adequate quantities of food; loss of lean body mass may not be detected if hidden by fluid overload
  
- 8. Abdomen
  - a) Nutrition focus:
    - i. Inspect skin, contour, muscle development
    - ii. Auscultate for bowel sounds
    - iii. Percuss for tone
    - iv. Palpate all quadrants
  - b) Nutrition implications:
    - i. Poor wound healing may reflect inadequate calories, protein, zinc, or vitamin C
    - ii. Presence of ascites may impact fluid, sodium, and protein requirements
    - iii. Absent or hypoactive bowel sounds will influence feeding route
    - iv. Hepatomegaly may reflect protein deficiency or excessive vitamin A intake



9. Lower extremities

a) Nutrition focus:

- i. Inspect skin and nails
- ii. Palpate thigh, calf, feet bilaterally
- iii. Evaluate range of motion and muscle strength of lower extremities
- iv. Test deep tendon reflexes bilaterally
- v. Sensory exam in three dermatomes

b) Nutrition implications:

- i. Muscle wasting and prominent skeleton suggest inadequate calorie and protein intake
- ii. Poor wound healing associated with inadequate calorie, protein, zinc, and vitamin C intake
- iii. Motor weakness in lower extremities associated with thiamin deficiency
- iv. Hypoactive reflexes may reflect thiamin or B12 deficiency
- v. Peripheral neuropathy associated with thiamin, B12, and pyridoxine deficiency

Please don't hesitate to contact me if you need further educational information. You may contact me via email at [Dkulawik@nw7.esrd.net](mailto:Dkulawik@nw7.esrd.net) or via phone at 813-865-3330.