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This issue contains an article for CPE Credit (see page 6)

The Use of Appetite Stimulants and Anabolic Agents in Hemodialysis Patients

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Indices of malnutrition related to morbidity and mortality in the hemodialysis population have been well-established. Many steps are taken to prevent malnutrition and the increased morbidity and mortality risk in this population. However, data is limited regarding

the benefit of the reversal of malnutrition. Several nonrandomized studies show decreased mortality with the provision of nutritional supplementation to these patients (1). The cause of protein-calorie malnutrition is often multifactorial and the provision of increased nutrients may not be the only solution.

This article reviews the pharmacological approaches to increase appetite and weight gain in the hemodialysis population.

It includes information about appetite stimulants and anabolic agents used in other patient populations that may have limited or no data regarding their use in the hemodialysis population. Table I summarizes the nutritional benefits, dosage and administration information, and side effects of these pharmacologic approaches. Several appetite stimulants have demonstrated varying results in

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Table 1. Appetite Stimulants and Anabolic Agents

Name of Drug	Description	Nutritional Benefits	Dosage and Administration	Potential Side Effects	Precautions
Megestrol Acetate (Megace)	Oral derivative of the steroid progesterone	Increased oral intake and weight gain (mostly fat, not lean body mass), increased albumin	Low dose-40-160 mg/d up to 400 mg/d Available in 40 mg/mL suspension and 20 and 40 mg tablets	Fluid retention, diarrhea, irregular menses, hypervolemia, encephalopathy, depression, impotence	Diabetics-monitor carefully. DVT risk in immobile pts. Monitor for adrenal suppression.
Cyproheptadine (Periactin)	Antihistaminic and antiserotonergic agent	Increased appetite is a side effect of this drug	4 mg tablets. In adult HD pts, give 1 tablet at bedtime to alleviate sedating effect during the day	Increased appetite, Central Nervous System depression	Overdosage in kids; cautious use in patients with asthma, hyperthyroidism, CVD and HTN
Dronabinol (Marinol)	Synthetic Delta-9-Tetrahydrocannabinol which is a naturally occurring component of cannabis	Treatment of anorexia associated with wt. loss in AIDS; for N/V from chemotherapy after conventional treatment failure	Round, soft gelatin capsules containing either 2.5mg, 5 mg, or 10 mg dronabinol. 2.5 mg before lunch and dinner average dose	Feeling high, dizziness, confusion, somnolence	Allergy to sesame oil. Not studied in peds. Do not use with history of CVD, substance abuse, psychological disease
Growth Hormone (recombinant human growth hormone)	Most abundant hormone produced by the pituitary, responsible for tissue growth and repair	Increased growth velocity in children. Possibly decreased atherogenesis in children	.5-1.0 IU/kg/week in pediatric hemodialysis pts. 0.05IU/kg/day in adults. SubQ or IM injection	Carpal tunnel syndrome, gynecomastia	Caution in patients with diabetes, infection, malignancy, or steroid use.
Testosterone (Depo-Testosterone)	Androgenic Hormone	Increased lean body mass, weight gain	Available in 100 mg/mL and 200 mg/mL solutions for IM injection ONLY. 50-400 mg q2-4 wks.	Edema, gynecomastia, hirsutism, nausea, jaundice, nitrogen and electrolyte retention, hypercalcemia	Allergy to cottonseed oil. Can cause growth retardation in children. Monitor for hypercalcemia
Oxandrolone (Oxandrin)	Anabolic steroid that is a synthetic derivative of testosterone	Weight gain after weight loss due to extensive surgery, trauma; offset catabolism due to steroid use	2.5 mg tablets 2-4 times daily	Electrolyte retention, hepatotoxicity, cholestatic jaundice, hypercalcemia	Increased prothrombin time, decreased clotting factors. Monitor for hypercalcemia

From the Editor's Desk

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Articles about successful programs, research interventions, evaluations and treatment strategies, educational materials, meeting announcements and information about educational programs are welcome and should be sent to the Managing Editor by the next deadline.

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Thomas Jefferson once said, "We never repent of having eaten too little." Unfortunately, in the midst of this country's obesity epidemic, many renal patients do eat too little and cannot maintain their weight or protein stores. This issue of the Renal Nutrition Forum has several tools for revving up diets with additional calories and protein. Melinda Carter contributes a nutrition education handout as a first-step approach to reaching patients with poor protein intake. Melinda owns Nutradition Dietetics, LLC, a company that specializes in nutrition education for non-traditional learners. The next time your patients need special teaching methods, contact Melinda for a diet instruction on a music CD! Melinda can be reached at nutradiet@starband.net or 602-739-0271.

You may want a pen and pad of paper handy while reading this issue's "Kidney Friendly Food Facts." Sharon Schatz offers plenty of practical advice for improving the caloric density of patients' diets with fats and sugars. If none of Sharon's helpful hints will charge your patients' appetites, a pharmaceutical approach may be in order. In our cover article, Cheryl Gullickson provides an excellent review of appetite stimulants and anabolic agents available for patients with chronic kidney disease (CKD). Cheryl volunteers as a peer reviewer for the Renal Nutrition Forum. She recently spoke at the Georgia-South Carolina NKF Annual Update on nutrition support in CKD.

Aluminum toxicity is a real and present danger in hemodialysis patients. Russell Dimmitt expands on aluminum content of water in our Technical Column.

Having worked in an ICU for several years, the word "infection" sends chills up my spine. My heart rate increases just reading about infection, so this issue's continuing professional education (CPE) article provided me serious cardiac training! Philippa Norton Feiertag shares a fabulous article on the effects that infection may play on the patients with CKD. Members may use this article for one CPEU from the Commission on Dietetic Registration. Be looking for additional CPE credit in JADA with ADA's new self-study article program, which is advertised in this issue.

Your input is important to the direction of this practice group. I personally value your opinion in determining the focus of this publication. Please submit your ideas for future columns, topics and educational materials to me at sarahc1966@yahoo.com. "Together Everyone Achieves More" as a TEAM, so let's work together to help renal dietitians succeed!

Sarah Carter

The Use of Appetite Stimulants ...

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improving nutritional status: megestrol acetate (Megace), cyproheptadine (Periactin), and dronabinol (Marinol).

Megestrol acetate is an oral derivative of the steroid progesterone. It has been used successfully in cancer and HIV patients to improve appetite and promote weight gain. It has been shown to decrease interleukin-6 and tumor necrosis factor-alpha, which negatively affect nutritional status by leading to increased muscle wasting, inhibited albumin synthesis, and decreased food intake (2). Several studies and case reports have examined its use in dialysis patients. Varying low-to-moderate doses of 40-320 mg/day improved appetite, increased serum albumin levels (although not statistically significantly), and promoted weight gain (3-5). These studies reported no negative side effects with this dosage. However, there are reported side effects in other patient groups with higher doses: fluid retention, diarrhea, irregular menses, hypervolemia, encephalopathy, depression, impotence, rash, adrenal suppression, and hyperglycemia (6-8). Caution should be used in patients with histories of deep vein thromboses (DVT) or immobile patients at higher risk for DVT because megestrol acetate may lead to a hypercoagulability state (9). Megestrol acetate has been shown to increase fat mass, but not lean body mass (6). Weight, blood pressure, electrolytes, and interdialytic weight gain (IDWG) should be monitored in hemodialysis patients receiving this drug. Glycemic control should be monitored in diabetics receiving megestrol acetate.

Cyproheptadine is an oral antihistamine with a side effect of appetite stimulation. Data is inconclusive regarding its effect on nutritional parameters (10, 11). There are no randomized controlled trials demonstrating the effect of cyproheptadine on nutritional parameters in hemodialysis patients. However, it has been used safely in adult hemodialysis patients with varying results. It should be used cautiously in children. One case report revealed toxic psychosis in a child on hemodialysis receiving cyproheptadine (12).

Dronabinol is a cannabinoid derivative that stimulates appetite and acts as an antiemetic.

Other properties include analgesic, muscle relaxation, immunosuppression, anti-inflammation, antihistamine, mood elevation and sedation (13). The major negative side effect of dronabinol, however, is that it impairs cognition (14). Dronabinol also caused pressor, renal, and mesenteric vasoconstriction and hindquarter vasodilation in Sprague-Dawley rats (15). There are no studies examining cannabinoid use in hemodialysis patients. Dronabinol is not recommended for use in patients with a history of substance abuse, depression or cardiovascular disease.

Other approaches to improved nutritional status in hemodialysis patients have focused on restoring lean body mass. Anabolic agents such as growth hormone, testosterone and oxandrolone are reviewed below.

The anabolic effects of growth hormone on stature have been studied in children on hemodialysis. Pediatric dialysis patients who have received recombinant human growth hormone (rhGH) have a higher growth velocity and are more likely to achieve near-normal adult height. Growth hormone has been most effective on final height if given in the early stages of chronic renal failure in children (16, 17). Growth hormone may also have a role in the prevention of atherogenesis in children (18).

Growth hormone has been studied in the malnourished adult hemodialysis patient with less promising outcomes. Nutritional and anthropometric measures have not been shown to improve with rhGH, whereas bone turnover was shown to increase with a reduction in bone mineral density at the lumbar spine. Total body fat decreases with rhGH, but lean body mass has not been shown to increase. Phagocytic activity of polymorphonuclear leukocytes increased with rhGH, which is relevant in patient populations at risk of infections (19-21). When given to elderly hemodialysis patients, rhGH decreased triglyceride levels, had no effect on blood pressure, and increased bone metabolism (22). Insulin-like growth factor (rhIGF-I) is the major component of rhGH responsible for its actions. However, rhIGF-I given alone has negative side effects: jaw pain, nausea, hypoglycemia, impaired

cognition, and cardiac arrhythmias (23). It can adversely affect glycemic control in diabetics.

The anabolic agent testosterone has been used widely in hemodialysis patients to treat impotence. Improvements in nutritional and anthropometric measures have been observed with its use in geriatric patients: anabolism and weight gain. However, patients receiving testosterone experience androgenic side effects (24). Oxandrolone is an oral anabolic agent approved for the treatment of weight loss. It increases anabolism greater than testosterone without the androgenic side effects. Data is limited regarding its use in hemodialysis patients (25, 26).

Malnutrition in hemodialysis patients remains a complex problem. Treating malnutrition must focus on the multifactorial causes of involuntary weight loss and hypoalbuminemia. There are pharmacological treatments to increase appetite and promote anabolism, however, the research elucidating their benefits and side effects is limited.

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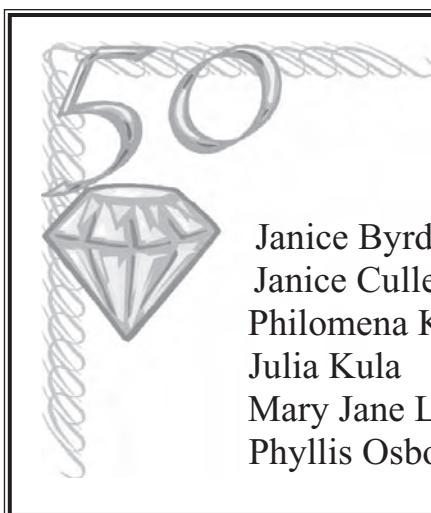
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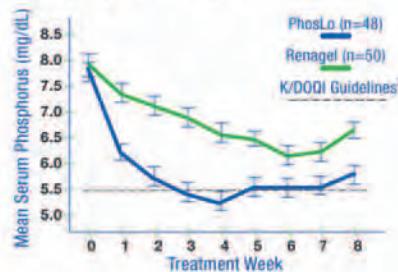
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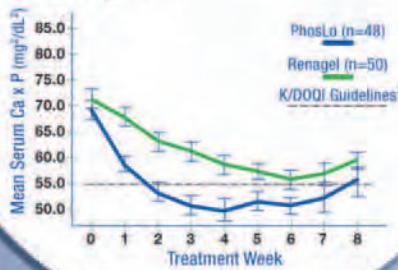
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Advances in Practice

Impact of Infection and the Immune Response on Nutritional Status in Patients with Chronic Kidney Disease Undergoing Maintenance Dialysis Therapy

By Philippa Norton Feiertag, MEd, RD, LD. Philippa is a clinical analyst/renal nutrition specialist with Clinical Computing, Inc. in Cincinnati, Ohio. She can be reached at feier@fusenet.com.

Patients with chronic kidney disease (CKD) undergoing maintenance dialysis therapy have a lower immune response than healthy subjects, and this increases their susceptibility to infection (1,2). Information from the United States Renal Data System (USRDS) indicates that infection accounts for approximately 12% of deaths in patients undergoing hemodialysis (HD) and 15% of deaths in patients undergoing peritoneal dialysis (PD) in the United States (3).

The majority of deaths attributed to infection in maintenance dialysis patients result from sepsis. Bacterial sepsis (bacteremia) is the second leading cause of death in HD patients (4,5). Bacteremia may lead to the development of infective endocarditis, which affects the endocardium and heart valves, and has a one-year mortality rate of approximately 50% in patients receiving HD therapy (6,7).

Infection may directly affect nutritional status of maintenance dialysis patients by contributing to loss of appetite and development of malnutrition (8). Findings from a recent study of vascular access infections in patients undergoing maintenance HD indicate that a low pre-infection level of serum albumin – one of a panel of nutritional markers in patients with CKD – is associated with increased risk of access infection (9). There is also evidence to suggest that improving nutritional status may decrease the incidence of sepsis (4).

An understanding of the relationship among infection, the immune response and nutritional status might enhance the ability of the renal dietetics professional to provide effective intervention for their patients with CKD. This article will provide an overview of immune system components, examine the relationship between infection

and nutritional status in maintenance dialysis patients, and review interventions for improving clinical outcomes in this population. The relationship between inflammation and nutritional status will be the subject of a future column.

Components of the immune system

The immune system protects the body against invading microorganisms and consists of nonspecific mechanisms and a specific immune response.

Nonspecific mechanisms comprise nonadaptive immunity and include the physical barriers, mucosal secretions and enzymes provided by the skin, respiratory tract and gastrointestinal tract respectively (10). In addition, phagocytic cells including polymorphonuclear granulocytes ingest and destroy microorganisms. Neutrophils are granulocytes with potent bactericidal enzymes, while chemical granules in natural killer cells destroy virus-infected cells.

The specific immune response supplements nonspecific mechanisms and provides the ability to destroy microorganisms based on recognition of antigens on their cell membranes (10). Cell-mediated immunity involves specific cells of the immune system. T lymphocytes (T cells) detect and destroy foreign cells, and activate phagocytic cells. Macrophages, which develop from monocytes, recognize and bind antigens before presenting them to T cells. Humoral immunity refers to the actions of antibodies, or immunoglobulins (Ig), produced by B-lymphocytes (B cells) in attacking antigens.

Other key components of the immune system include complement, cytokines and eicosanoids. The complement system consists of proteins that defend the body against infectious agents by functioning as enzymes or binding proteins. Complement (e.g. C3, C4) promotes attachment of antibodies and phagocytes to antigens, and damages cell membranes of invading microorganisms. Cytokines are chemical

messengers controlling multiplication of immune cells and stopping the immune response when it is no longer needed. Cytokines include the interleukins, which enhance the immune response, and tumor necrosis factor, which attracts phagocytic cells and promotes destruction of anti-gens. Eicosanoids, derived from fatty acids, include prostaglandins, leukotrienes, prostacyclins and thromboxanes. Collectively, eicosanoids control migration of phagocytic cells, regulate blood clot formation and direct proliferation of lymphocytes.

Infection and nutritional status in maintenance dialysis patients

Studies in animals and humans have demonstrated that nutritional deficiencies impair synthesis of molecules needed for the immune response, and increase infection and mortality rates.

Malnutrition has a significant impact on maturation of T cells, leading to a reduction in functional T cells and decreased ability to destroy foreign cells by phagocytosis (11). Specific nutritional deficiencies also have detrimental effects on immunocompetence. Inability to synthesize complement in protein malnutrition further impairs phagocytosis (11). Iron and zinc are prerequisites for nucleic acid synthesis and cell replication, and a deficiency of these minerals prevents an effective immune response to infection (11,12). Vitamin D deficiency is associated with increased susceptibility to infection (13). Immune system cells have vitamin D receptors, and vitamin D may enhance antibody-mediated immunity.

In patients with impaired renal function, cell-mediated immunodeficiency occurs in the early stages of CKD and worsens as renal failure progresses (14,15). The number of T cells is significantly reduced in patients undergoing maintenance HD for more than one year (16). This decline in T cells is accompanied by decreased

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phagocytic activity, an important predictor of infection-related hospitalizations (17).

Patients undergoing maintenance HD and PD also show significantly higher production of interleukins and tumor necrosis factor compared with healthy controls (18,19). When serum concentrations of these cytokines were measured in 331 maintenance HD patients, higher levels were associated with greater hospitalization rates, higher mortality and diminished appetite (20).

The relationship between nutritional status and immunocompetence has been evaluated in both the HD and PD patient populations. In a prospective, non-intervention study of protein-energy malnutrition (PEM) in 37 patients undergoing maintenance HD, a PEM score was derived at baseline and every 4 months based on serum albumin, body mass index (BMI), fat mass, fat-free mass and bone-free arm muscle area (21). Infection-related hospitalizations during a 26-month period showed significant correlation with both baseline and mean PEM scores. This suggests that PEM in maintenance HD patients is an important contributor to infection-related morbidity, possibly via its effects on the immune system.

Patients undergoing continuous ambulatory peritoneal dialysis (CAPD) were categorized according to the length of time they had been on dialysis and were assessed for nutritional status and immunocompetence (22). While body weight, BMI, fat stores and muscle mass were greater in patients who had been undergoing CAPD for a longer time period, protein intake was higher in patients beginning dialysis. Percentage of β cells and immunoglobulins decreased with time on dialysis. These changes in immune cell numbers and immunoglobulins may be responsible for immunological disturbances and infectious processes in patients undergoing CAPD.

Interventions for improving clinical outcomes

As renal disease advances, immunocompetence declines and risk of infection is further increased by sub-optimal

nutritional status in patients undergoing maintenance dialysis therapy (12,21,22). Improving nutritional status in maintenance dialysis patients decreases the risk of sepsis and vascular access infections (4,9).

The renal dietetics professional plays a key role in reducing infection risk in this population by monitoring nutritional status, providing nutrition education and encouraging adequate intake to meet nutritional needs.

Evidence suggests that fructooligosaccharides (FOS) occurring naturally in wheat, onions, bananas, honey, garlic and leeks, and incorporated into some medical nutritional formulas as NutraFlora®, may stimulate the immune system and decrease infection rates (23-25). FOS ingestion promotes growth of the bifidobacterium population in the large intestine (24). Acetic and lactic acids, along with other anti-microbial compounds produced by bifidobacteria, inhibit growth of Clostridium difficile and other pathogens (24-26).

Growth of the bifidobacterium population after FOS ingestion also results in immunoglobulin A secretion by Peyer's patch cells in the intestinal mucosa (27). These antibodies form the first line of immune defense by inhibiting attachment of microbes to the intestinal mucosa and destroying viruses intracellularly (28,29).

Recombinant human growth hormone (rhGH), which has been proposed as therapy for malnutrition due to its anabolic effects, has also been investigated for its impact on immune function. Administration of rhGH to maintenance HD patients results in significant increase in protein stores and improved muscle function (30,31). In a placebo-controlled, double blind study, phagocytic activity of polymorphonuclear granulocytes increased significantly in malnourished HD patients after 3 months of rhGH therapy and remained stable after 12 months of therapy (32,33). Thus, rhGH may provide a viable option in treating malnutrition and decreasing infection risk in this population.

It is likely, however, that medical nutrition therapy and anabolic growth factors will need to be combined with other therapeutic strategies to improve clinical

outcomes. Patients with CKD frequently show high serum concentrations of cytokines, and appetite often improves when cytokine levels decline (8, 18-20). Cytokines may attach to receptors in the brain and stimulate release of eicosanoids, which also mediate anorexia (34). Targeting elevated cytokine and eicosanoid levels might therefore improve appetite and nutritional status.

Activity of the cytokine tumor necrosis factor has been blocked in persons with rheumatoid arthritis using monoclonal antibody therapy, and the possibility of using other substances to block cytokine and eicosanoid synthesis is under investigation (34,35). Another approach to cytokine removal is adsorption of these molecules onto a synthetic membrane during continuous venovenous hemofiltration (CVVH) (36).

Treatment of the anemia and secondary hyperparathyroidism often present in CKD also impacts the immune response and nutritional status. Intravenous iron therapy and iron overload have been linked to increased infection risk in HD patients (5). Findings from a recent study suggest that iron supplementation in patients receiving maintenance HD changes the balance of tumor necrosis factor and interleukins, to the detriment of the immune response to invading pathogens (37). This suggests that research is needed to determine the optimal iron dose for correcting anemia, while minimizing infection risk in these patients.

Parathyroid hormone (PTH) also has an adverse effect on the immune response, and treatment of secondary hyperparathyroidism with active vitamin D analogs may decrease the incidence of immunological disorders in patients with CKD (38). Treatment of HD patients with I-alpha, 25-dihydroxyvitamin D3 has been shown to regulate monocytes and neutrophils, which play important roles in antigen binding and phagocytosis respectively (39). Maintenance dialysis patients with severe secondary hyperparathyroidism showed improvements in both nutritional status and humoral immunity 12 months after parathyroidectomy (40).

Continued on page 8

Summary

A decrease in immunocompetence and increased infection risk accompany CKD. While infection affects nutritional status by contributing to anorexia, compromised nutritional status also increases infection risk. In order to break this cycle, renal dietetic professionals must provide aggressive medical nutrition therapy to meet their patients' macronutrient and micronutrient needs. Incorporating FOS into the diet may also enhance immunocompetence. Other potential therapies for improving the immune response and nutritional status in patients with CKD include rhGH and mechanisms for blocking the actions of cytokines and eicosanoids, which mediate anorexia. Proper attention to iron status and PTH levels may also impact the immune response and nutritional status.

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RPG Election Results: **Chair-Elect - Patricia Weber Treasurer - Pamela Kent**

Nominating Committee:
**Paula Frost - 3 year term
Kathleen Madigan - 2 year term**



Renal Nutrition Forum - CPE Questions

Impact of Infection and the Immune Response on Nutritional Status in Patients with Chronic Kidney Disease Undergoing Maintenance Dialysis Therapy

By Philippa Norton Feiertag, MEd, RD, LD

Objective: Participant will learn the roles that infection and the immune response may have on the nutritional status of patients with CKD undergoing dialysis.

This activity is approved for 1.0 CPEU, Level 3, by the Commission on Dietetic Registration (CDR) for registered dietitians and dietetic technicians, registered who are members of the Renal Practice Group. Valid through May 31, 2006. After reading the continuing professional education article, please answer the following questions by indicating your responses on the self-assessment questionnaire form (see insert). Please be sure to submit your registration number and write legibly, or you may not receive credit. Upon mailing the questionnaire to the assistant editor, you may fill out the certificate of completion on page 13, retain it in your portfolio, and record the activity on your Step Activity Log. Members will not receive mailed certificates of completion. Answers to the continuing professional education questions can be found on page 13.

Multiple Choice

1. Examples of specific immune response include:
 - A. Gastrointestinal tract enzymes
 - B. Mucosal secretions
 - C. Physical barriers
 - D. None of the above
2. Which of the following treatments pose a link to increased infection risk by changing the balance of tumor necrosis factor and interleukins to the detriment of the immune response?
 - A. EPO therapy
 - B. Intravenous iron therapy
 - C. Treatment of secondary hyperparathyroidism
 - D. Parathyroidectomy
3. _____ are chemical messengers controlling multiplication of immune cells and stopping the immune response when no longer needed.
 - A. Cytokines
 - B. Neutrophils
 - C. Phagocytic cells
 - D. T cells
4. The roles of the complement system (C3, C4) include all except one below
 - A. Attachment of antibodies to antigens
 - B. Attachment of phagocytes to antigens
 - C. Destroying cell walls of bacteria
 - D. Damaging cell membranes of invading microorganisms
5. Examples of nutrient deficiencies which impair the immune system include
 - A. All of below
 - B. Lack of vitamin D
 - C. Lack of iron
 - D. Lack of zinc

6. Fructooligosaccharides (FOS) may stimulate the immune system and decrease infection rates by all except one of the following
 - A. Promoting growth of clostridium difficile through NutraFlora®
 - B. Promoting growth of the bifidobacterium population in the large intestine
 - C. Promoting antibodies by inhibiting attachment of microbes to the intestinal mucosa
 - D. Destroying viruses intracellularly
7. Lowering levels of cytokines could
 - A. Improve appetite
 - B. Be accomplished by using monoclonal antibody therapy
 - C. Be accomplished by CVVH
 - D. All of the above
8. Recombinant human growth hormone (rhGH) may be a viable option to improving malnutrition and decreasing infection risk through multiple pathways?
 - A. True
 - B. False
9. USRDS indicates overall hemodialysis patients have a higher infection death risk than peritoneal dialysis due to catheter sepsis.
 - A. True
 - B. False
10. Cell-mediated immunodeficiency occurs in the late stages of CKD and worsens as renal failure progresses.
 - A. True
 - B. False

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Of course, if you're using the Portfolio recertification process, the articles need to match the learning needs identified in your Learning Plan. With **24** *Journal* articles to choose from annually and **120** articles in five years, you're bound to find many that meet your particular needs.

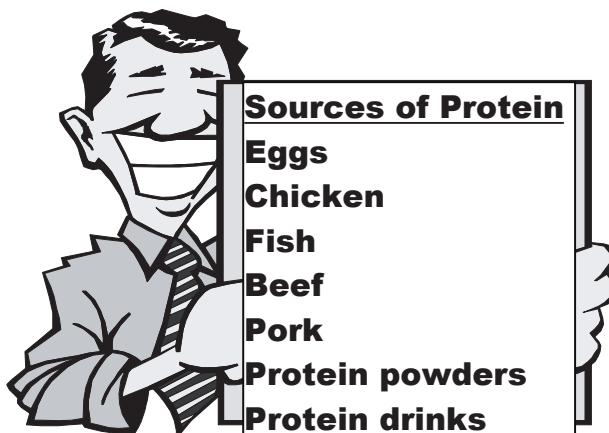
 **American
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Eating protein to stay healthy

By Melinda S. Carter, RD

As a person on dialysis, there may be times when you do not want to eat. For good health, eating enough calories and protein can keep you from losing weight or getting sick. To stay healthy, you should eat enough protein foods to maintain levels of protein in your blood. This protein is called albumin. Albumin helps keep your immune system in good working order. Ideal albumin levels are 4.0 g/dl and higher. Research shows that low levels of this protein (<3.5 g/dl) put people on dialysis for risk of getting sick more often and even dying.

Protein comes from both animal and vegetable food groups. The most complete sources of protein come from animal foods. Animal protein sources include: eggs, chicken, fish, turkey, beef, pork, rabbit, venison, and other wild game meats. A serving size of protein is 3 ounces, the width and size of a deck of cards. Your age, gender, body size and state of health will determine how much protein that you need. Try to eat at least 2-3 servings of protein daily. If you have a poor appetite, eat your meat or entree foods first. To keep mineral levels like phosphorus and potassium in check, limit organ meats, dairy foods and dried beans and peas. Your dietitian can help you set and reach your individual calorie and protein goals.



Health problems, other than kidney disease, that can keep this protein low include diabetic sores or pressure ulcers, infection, liver disease, and congestive heart failure with fluid overload.

For a healthy albumin level

- Know your albumin level
- Eat high quality animal protein foods
- Eat 2-3 servings of protein each day
- Add cooked eggs to casseroles and salads
- Shred beef, pork, chicken, or turkey on noodle or rice dishes
- Use protein powder on foods
- Use protein drinks that your dietitian recommends within your fluid allowance

CERTIFICATE OF COMPLETION

Impact of Infection and the Immune Response on Nutritional Status in Patients with Chronic Kidney Disease Undergoing Maintenance Dialysis Therapy

Title of Program

Date of Completion

Renal Nutrition Forum

Commission on Dietetic Registration CPE Accredited Provider

AM 003

CPE Provider Accreditation Number



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Participant's Name

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Sarah Carter, RD CDE, Editor, Renal Nutrition Forum

Signature of CDR CPE Accredited Provider

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Answers to CPE questions:

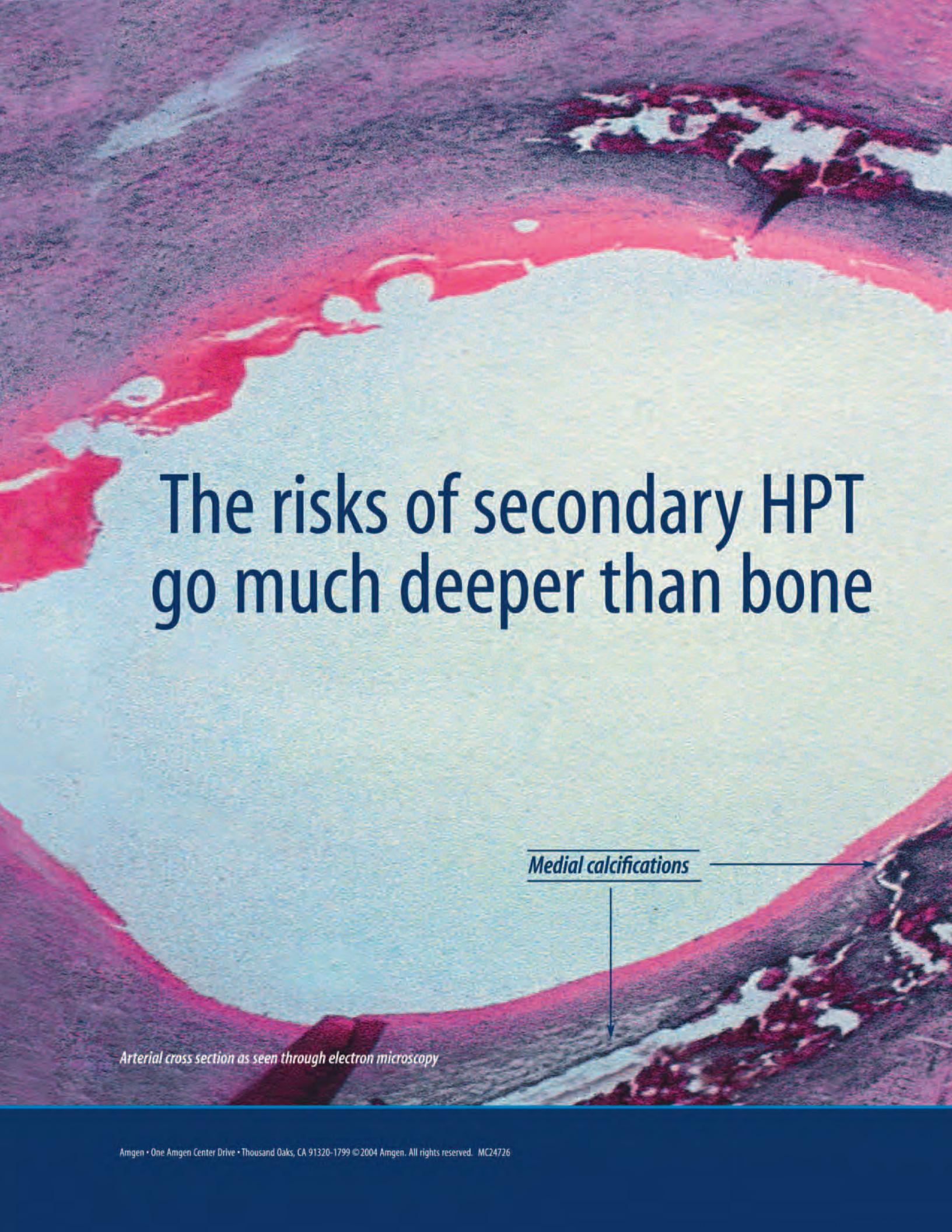
1. D
2. B
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4. C
5. A
6. A
7. D
8. A
9. B
10. B

Missing issues? Trying to de-clutter your office?

RPG's website (www.renalnutrition.org)
contains back issues in pdf format from Summer 2003.

The 'members only' section also contains:

- 2005 Election Information
- Lending Library Resource List and Request Form
- Legislative Tips
- Nationwide area coordinator map
- Application for the conference and meeting Stipend Award
- Application for the Outstanding Service Award
- Mentor/Mentee application, Reprints order form
- ADA's House of Delegates and committee reports
- Renal Practice Group's Resource Guide
- AND MUCH MORE!

An electron micrograph showing a cross-section of an artery. The interior of the artery is light blue, while the outer layers and the surrounding tissue are stained red. A prominent feature is a thick, irregular layer of white, calcified material deposited along the inner wall of the artery, particularly towards the bottom right.

The risks of secondary HPT
go much deeper than bone

Arterial cross section as seen through electron microscopy

Medial calcifications

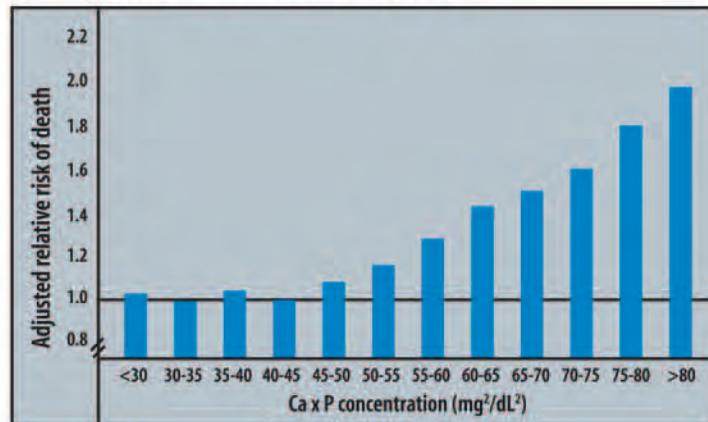
Failure to achieve NKF-K/DOQI™ bone metabolism goals* increases the risk of patient mortality¹⁻³

Uncontrolled secondary HPT can be harmful for your patients on dialysis. In addition to bone disease and parathyroid gland hyperplasia, adverse outcomes include soft-tissue and cardiovascular calcification, increased hospitalizations, cardiovascular events, and increased mortality risk.^{1,2,4} The majority of CKD patients on dialysis have metabolic parameters outside the K/DOQI™ goals despite use of traditional therapies.⁵

Only 17% of patients meet K/DOQI™ goals for both PTH and Ca x P, and only 8% meet all 4 goals^{5,6}

A new analysis confirms that patients with PTH and Ca x P values outside the K/DOQI™ goal range are at significantly increased risk of mortality.¹ And the risk begins at relatively lower lab parameters: one retrospective study of over 40,000 patients showed that any Ca x P above 45 mg²/dL² increased death and hospitalization rates.¹

New analyses show the adverse consequences of uncontrolled secondary HPT¹



Adapted from Block et al.¹

This significant increase in risk caused by secondary HPT can be controlled. Through optimal clinical management of bone metabolism parameters, more patients can achieve the 4 key K/DOQI™ goals and patient outcomes can potentially be improved.⁴

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*NKF-K/DOQI™ Guidelines for Bone Metabolism and Disease in Chronic Kidney Disease.
K/DOQI is a trademark of the National Kidney Foundation, Inc.

Kidney Friendly Food Facts

Fattening and Sweetening Caloric Intake

By Sharon Schatz, MS, RD, CSR, CDE

Sharon is a renal dietitian with Gambo Healthcare in Lumberton, NJ. She can be reached at Srsmsrd@aol.com or sharon.schatz@us.gambro.com

Stimulating poor appetites is a never-ending challenge! Trying to decipher why someone doesn't want to eat sometimes requires the wisdom of Confucius and the patience of Job. We need to be aware of subtle comments that the patient may make regarding appetite, since these statements may precede serious medical problems, subsequent weight loss, and/or the start of protein malnutrition. It is important to determine whether the person only needs additional calories to promote weight gain or deter weight loss or requires combined protein-calorie sources for repletion. Let's explore possible ways to deal with this dilemma.

Dietitians should not underestimate the value of encouragement and simple food suggestions to increase caloric intake. Often new preparation of commonly eaten foods can bring positive results. Sometimes it is best not to overwhelm the patient and provide hints gradually. A patient may keep a food suggestion grab bag with dietitian's ideas written on individual notes. When lacking meal inspiration, he may pull out a piece of paper for food recommendations.

Before discussing specific foods, it is noteworthy to mention the atmosphere in which they are served. Regular meal times can be a reminder to eat. Presentation on the plate with attention to color, texture, and arrangement can make ordinary fare more appealing. Decorating tuna salad with radish rosettes and green pepper rings may lure someone to a protein-rich meal. Enticing aromas can trigger the desire to eat as attested to by the wafting odor of cinnamon buns in the mall food court. To stimulate the senses, suggest heating baked and serve rolls or cookies or frozen fruit pies instead of using ready to eat baked goods. Conversely, foods with strong odors could be deemed less tempting.

Encourage consumption of nutrient dense foods to maximize intake and discourage "filling" or high volume foods. Calorie-rich foods that are low in sodium, potassium, and/or phosphorus may contain more fat or sugar. In the presence of diabetes, caution may be needed for potential impact on glycemic control and lipid levels.

Fats provide flavor and mouth feel as well as calories. Their ability to coat and make food more enticing to the palate makes them versatile. In the hospital setting, cups of melted margarine could be served on meal trays. Margarine is easier to apply when it is already melted; and it can be poured over cooked vegetables or potatoes (dialyzed), rice, noodles, pancakes, waffles, or French toast. Stir melted margarine into hot cereal. Season melted margarine with lemon or lime juice and herbs for basting baked or broiled poultry or fish or as a sauce for cooked seafood. Solid margarine can be turned into spreads for bread or toast by blending with garlic, Italian seasoning or honey.

Oils have many applications. Flavored oils are now commercially available and can be utilized in cooking or on salads. To learn about flavoring olive oil, go to http://www.oliveoilsource.com/flavoring_olive_oils.htm. For information about olive oil designations, definitions, and its use in frying, refer to the International Olive Oil Council site, http://www.internationaloliveoil.org/oliveworld_usingoil.asp. Check out <http://www.oliveoilsource.com/recipes.htm> for recipes using olive oil and a margarine/butter olive oil conversion chart. In lieu

of broiling or baking, try frying chicken or fish. Scampi style shrimp cooked with oil and garlic can be served over rice or pasta. Sauté onions and green, red, and/or yellow peppers to add color and calories as well as taste to hamburger or steak. Instead of spreading margarine on crusty bread, dip the bread in olive oil and then drizzle with balsamic vinegar for extra zing. Canola oil is especially good when drizzled over vegetables when roasting them.

Cream cheese is often avoided when trying to control phosphorus. However, 2 tablespoons of cream cheese provide 101 calories with 86 mg sodium, 35 mg potassium, 23 mg calcium, and only 30 mg phosphorus. Commonly spread on bagels, it is also good on graham crackers topped with jelly or preserves. For a quick appetizer place a brick of cream cheese onto a plate, pour either green mint jelly or green or red pepper jelly over it, and serve with low sodium crackers. Combine softened cream cheese with mayonnaise and herbs for vegetable dips. Whip cream cheese with cinnamon and brown sugar or orange marmalade for a fruit dip. Flavored cream cheeses such as strawberry or chive and onion are available. See www.kraftfoods.com for cream cheese recipes.

Two tablespoons of sour cream has 62 calories, 15 mg sodium, 41 mg potassium, 33 mg calcium, and only 24 mg phosphorus. It, too, can be mixed with mayonnaise for making vegetable dips. Stir horseradish and/or Dijon mustard into sour cream to make a sauce for roast beef. Add brown

Continued on page 17

"Cream Products" per 15 ml					
Item	Calories	Na (mg)	K (mg)	Ca (mg)	Phos (mg)
Generic non-dairy creamer	21	12	29	1.4	10
International Delight (except for chocolate crème)	41	5	26	0	12
International Delight chocolate crème	41	N/A	45	N/A	15
Light cream	30	6	19	15	12
Half & Half	20	6	20	16	14
Heavy cream	52	6	11	10	9

Source: www.internationaldelight.com and ESHA Food Processor version 8.4

Kidney Friendly Food Facts

continued from page 17

sugar to sour cream to serve atop berries. Puree cauliflower with sour cream to make "mock mashed potatoes". Blend sour cream with pureed low potassium fruit or strained baby fruit to make a dessert sauce for a plain cake.

Mayonnaise, spreads such as Miracle Whip, dressings such as French or Thousand Island, and tartar sauce can provide extra calories with a moderate amount of sodium (depending upon the brand). Patients may need to employ caution with many oil based commercial salad dressings since some can be rather high in sodium. Incorporate generous amounts of mayonnaise or Miracle Whip when making egg, tuna, chicken, or shrimp salad; or spread them thickly on bread for sandwiches. Thousand Island dressing offers an alternative spread for sandwiches, especially roast beef. Tartar sauce can accompany fish or cooked, cold shrimp.

Liquid non-dairy creamers have several applications. They can be poured over canned fruits, baked apples or pears, fruit crisps or cobblers, or hot cereal. Combine them with pureed low potassium vegetables and roux to make cream soup. Non-dairy creamers offer flavors such as amaretto, French vanilla, hazelnut, Irish cream, and cinnamon; and they transform coffee into a special treat. Pour French vanilla or chocolate creme creamer into cream soda to simulate an ice cream soda. Brand availability may vary per locale, and individual portions that are shelf stable are being sold on-line. Check out www.coffeemate.com and www.internationaldelight.com to learn about the array of products and flavors. Nutrient data may vary per specific brands. Actual cream products could be consumed, depending on the amount.

Whipped non-dairy topping gives a festive touch to foods. It can be an addition to or a replacement for creamer in coffee. Place it on top of pie, fruit, cake, or flavored gelatin dessert. Eat it frozen as a substitute for ice cream. Layer it with fresh or frozen berries, canned fruit, or canned fruit pie filling to make a parfait. Recipes abound with many combining whipped topping with canned fruits, flavored gelatin dessert mix, or pudding mix. Check out www.kraftfoods.com/coolwhip/ and www.cooks.com (enter cool whip or cool whip Jell-O in search box). Whipped cream is another choice, as 2 tablespoons have 52 calories, 6 mg sodium, 11 mg potassium, 10 mg calcium, and 9 mg phosphorus.

com/coolwhip/ and www.cooks.com (enter cool whip or cool whip Jell-O in search box). Whipped cream is another choice, as 2 tablespoons have 52 calories, 6 mg sodium, 11 mg potassium, 10 mg calcium, and 9 mg phosphorus.

Stirring and sprinkling white or brown sugar into or onto foods can yield extra calories. Add liberally to hot beverages such as tea or coffee, lemonade, limeade, hot or cold cereal, or fresh fruits such as grapefruit or berries. Glaze carrots by mixing cooked carrots with melted margarine and brown sugar. Combine with cinnamon to make "cinnamon sugar" for sprinkling on buttered toast. Dust powdered sugar on top of French toast or waffles.

Liquid sweeteners include honey and corn, maple, or flavored gourmet syrups. Add honey to hot beverages, such as tea or cider, or spread it on English muffins. Combine honey with mustard to glaze meats or spread on sandwiches. Honey and maple syrup go well with apples or pears for desserts such as baked apples, homemade applesauce, or glazed apple slices; and hot cereals can be sweetened with them. Glaze carrots or candy sweet potatoes with honey or maple or corn syrup. Stir honey or syrup into melted margarine and pour

over waffles, pancakes, or French toast. Try gourmet flavored syrups in coffee or mix with seltzer to make an "Italian soda".

Jams, jellies, marmalade, and preserves come in a multitude of flavors to provide variety to meals and snacks. Explore uses other than spreading on bread and toast. Serve as a condiment such as mint jelly with lamb or red currant jelly with veal or pork. Stir orange marmalade and margarine into hot cooked carrots to glaze them. Melt jam or jelly with spices, such as plum jam with ginger or apple jelly with cinnamon, to glaze meat or poultry. Strawberry, raspberry, or pineapple preserves can top plain cake. For a quick "trifle" dessert break ladyfingers into pieces and layer in a serving dish with preserves, drained canned fruit, and whipped topping.

The next column will review calorie dense foods as well as ways to increase protein intake. Combating food boredom hopefully will enhance intake when appetites are poor.

Editor's note: All websites were accessed February 1, 2005.

Strawberry Parfait: Mix $\frac{1}{4}$ of 8-oz package cream cheese, softened, with 2 TBSP strawberry jam. Gently stir in $\frac{1}{4}$ cup Cool Whip whipped topping. Put $\frac{1}{4}$ cup strawberries into each of two parfait glasses. Top with cream cheese mixture. Per serving: 193 Calories, 2.5 gm protein, 20 gm carbohydrates, 2.5 gm fat, 33 mg Ca, 43 mg Phos, 91 mg Na, 113 mg K

Cool Whip Frosting: Mix 1 (4 serving) box instant vanilla pudding with 1 8-oz tub Cool Whip. For a tropical version add 1 (20-oz) can crushed pineapple in its own juice. Spread on pound cake or gold cake.

Frozen Cool Whip Dessert: Mix one large tub Cool Whip with one small package pistachio instant pudding. Drain one (16-oz) can fruit cocktail; stir into pudding mixture. Pour into square pan and freeze. Set out 15 minutes prior to serving.

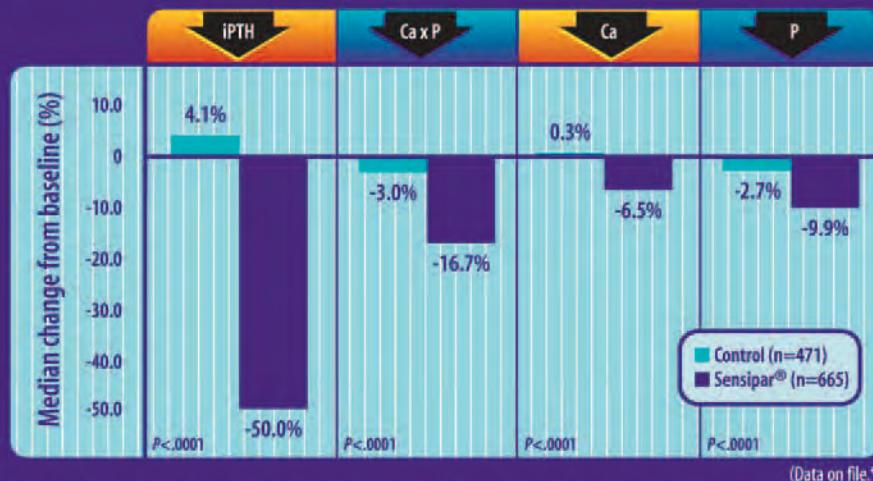
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Sensipar® is BOUND to change
the way you treat secondary HPT

Only Sensipar® targets the calcium-sensing receptor to reduce PTH while simultaneously lowering Ca x P, Ca, and P¹⁻³



(Data on file.)

Results from three 6-month, multicenter, randomized, double-blind, placebo-controlled clinical studies conducted in 1136 CKD patients with secondary HPT on dialysis. 30 mg to 180 mg of Sensipar® or placebo was administered once daily, either alone or in combination with vitamin D sterols and phosphate binders, to achieve a mean iPTH ≤250 pg/mL. Pooled median baseline iPTH concentrations were 596 pg/mL and 564 pg/mL for the Sensipar® and control groups, respectively.

- Sensipar® enables significantly more patients to achieve the 4 key NKF-K/DOQI™ secondary HPT goals, independent of vitamin D^{5-7*}
- Sensipar® is safe and well tolerated in a broad range of secondary HPT patients on dialysis⁸

FIRST-IN-CLASS
Sensipar®
(cinacalcet HCl) Tablets
30mg·60mg·90mg

*NKF-K/DOQI™ Guidelines for Bone Metabolism and Disease in Chronic Kidney Disease (Stage 5).
K/DOQI is a trademark of the National Kidney Foundation, Inc.

Sensipar® is indicated for the treatment of secondary hyperparathyroidism (HPT) in patients with chronic kidney disease on dialysis. Sensipar® lowers serum calcium. Significant reductions in calcium may lower the threshold for seizures. Secondary HPT patients, particularly those with a history of a seizure disorder, should be carefully monitored for the occurrence of low serum calcium or symptoms of hypocalcemia. The most commonly reported side effects were nausea and vomiting.

Please see adjacent brief summary of prescribing information.

References: 1. Block GA, Martin KJ, de Francisco ALM, et al. Cinacalcet for secondary hyperparathyroidism in patients receiving hemodialysis. *N Engl J Med*. 2004;350:1516-1525. 2. Nemeth EF, Heaton WH, Miller M, et al. Pharmacodynamics of the type II calcimimetic compound cinacalcet HCl. *J Pharmacol Exp Ther*. 2004;308:627-635. 3. Curhan G. Fooling the parathyroid gland—will there be health benefits? *N Engl J Med*. 2004;350:1565-1567. 4. Data on file. Amgen Inc, Thousand Oaks, Calif. 5. Goodman WG, de Francisco ALM, Moe SM, et al. Cinacalcet HCl (Sensipar™) is an effective treatment for secondary hyperparathyroidism (HPT) in CKD patients on dialysis. *J Am Soc Nephrol*. 2004;15:280A. Abstract F-P0984. 6. Moe SM, Coburn JW, Quaries LD, et al. Achievement of proposed NKF-K/DOQI bone metabolism and disease targets: treatment with cinacalcet HCl in dialysis patients with uncontrolled secondary hyperparathyroidism (HPT). *J Am Soc Nephrol*. 2003;14:48A. Abstract SU-FC217. 7. Sensipar® (cinacalcet HCl) package insert. Thousand Oaks, Calif.: Amgen Inc; 2004. 8. Coyne DW, Stegman MH, Azad H, et al. Cinacalcet HCl controls secondary hyperparathyroidism regardless of gender, race, age, and geography in patients with chronic kidney disease receiving dialysis. *J Am Soc Nephrol*. 2003;14:46A. Abstract SA-P0754 and poster.

Brief Summary

See package insert for full prescribing information

SENSIPAR® (cinacalcet HCl) Tablets

INDICATIONS AND USAGE

Sensipar® is indicated for the treatment of secondary hyperparathyroidism in patients with Chronic Kidney Disease on dialysis.

CONTRAINDICATIONS

Sensipar® is contraindicated in patients with hypersensitivity to any component(s) of this product.

WARNINGS

Seizures: In three clinical studies of CKD patients on dialysis, 5% of the patients in both the Sensipar® and placebo groups reported a history of seizure disorder at baseline. During the trials, seizures (primarily generalized or tonic-clonic) were observed in 1.4% (9/656) of Sensipar®-treated patients and 0.4% (2/470) of placebo-treated patients. Five of the nine Sensipar®-treated patients had a history of a seizure disorder and two were receiving anti-seizure medication at the time of their seizure. Both placebo-treated patients had a history of seizure disorder and were receiving anti-seizure medication at the time of their seizure. While the basis for the reported difference in seizure rate is not clear, the threshold for seizures is lowered by significant reductions in serum calcium levels. Therefore, serum calcium levels should be closely monitored in patients receiving Sensipar®, particularly in patients with a history of a seizure disorder (see PRECAUTIONS, Hypocalcemia).

PRECAUTIONS

General

Hypocalcemia: Sensipar® lowers serum calcium, and therefore patients should be carefully monitored for the occurrence of hypocalcemia. Potential manifestations of hypocalcemia include paresthesias, myalgias, cramping, tetany, and convulsions. Sensipar® treatment should not be initiated if serum calcium is less than the lower limit of the normal range (8.4 mg/dL). Serum calcium should be measured within 1 week after initiation or dose adjustment of Sensipar®. Once the maintenance dose has been established, serum calcium should be measured approximately monthly (see DOSAGE AND ADMINISTRATION). If serum calcium falls below 8.4 mg/dL but remains above 7.5 mg/dL, or if symptoms of hypocalcemia occur, calcium-containing phosphate binders and/or vitamin D sterols can be used to raise serum calcium. If serum calcium falls below 7.5 mg/dL, or if symptoms of hypocalcemia persist and the dose of vitamin D cannot be increased, withhold administration of Sensipar® until serum calcium levels reach 8.0 mg/dL, and/or symptoms of hypocalcemia have resolved. Treatment should be re-initiated using the next lowest dose of Sensipar® (see DOSAGE AND ADMINISTRATION). In the 26-week studies of patients with CKD on dialysis, 66% of patients receiving Sensipar® compared with 25% of patients receiving placebo developed at least one serum calcium value < 8.4 mg/dL. Less than 1% of patients in each group permanently discontinued study drug due to hypocalcemia. In CKD patients with secondary HPT not on dialysis, the long-term safety and efficacy of Sensipar® have not been established. Exploratory investigation indicates that CKD patients not on dialysis have an increased risk for hypocalcemia compared to CKD patients on dialysis, which may be due to lower baseline calcium levels. In a small, short-term study, in which the median dose of cinacalcet was 30 mg at the completion of the study, 74% of cinacalcet treated patients experienced at least one serum calcium value < 8.4 mg/dL. **Adynamic Bone Disease:** Adynamic bone disease may develop if iPTH levels are suppressed below 100 pg/mL when assessed using the standard Nichols IRMA. One clinical study evaluated bone histomorphometry in patients treated with Sensipar® for one year. Three patients with mild hyperparathyroid bone disease at the beginning of the study developed adynamic bone disease during treatment with Sensipar®. Two of these patients had iPTH levels below 100 pg/mL at multiple time points during the study. In the three 6-month, phase 3 studies conducted in CKD patients on dialysis, 11% of patients treated with Sensipar® had mean iPTH values below 100 pg/mL during the efficacy-assessment phase. If iPTH levels decrease below the NKF-K/DOQI recommended target range (150-300 pg/mL)¹ in patients treated with Sensipar®, the dose of Sensipar® and/or vitamin D sterols should be reduced or therapy discontinued. **Hepatic Insufficiency:** Cinacalcet exposure as assessed by AUC_{0-inf} in patients with moderate and severe hepatic impairment (as indicated by the Child-Pugh method) were 2.4 and 4.2 times higher, respectively, than that in normals. Patients with moderate and severe hepatic impairment should be monitored throughout treatment with Sensipar® (see CLINICAL PHARMACOLOGY, Pharmacokinetics and DOSAGE AND ADMINISTRATION). **Information for Patients:** It is recommended that Sensipar® be taken with food or shortly after a meal. Tablets should be taken whole and should not be divided. **Laboratory Tests: Patients with CKD on Dialysis with Secondary Hyperparathyroidism:** Serum calcium and serum phosphorus should be measured within 1 week and iPTH should be measured 1 to 4 weeks after initiation or dose adjustment of Sensipar®. Once the maintenance dose has been established, serum calcium and serum phosphorus should be measured approximately monthly, and PTH every 1 to 3 months (see DOSAGE AND ADMINISTRATION). All iPTH measurements during the Sensipar® trials were obtained using the Nichols IRMA. In patients with end-stage renal disease, testosterone levels are often below the normal range. In a placebo-controlled trial in patients with CKD on dialysis, there were reductions in total and free testosterone in male patients following six months of treatment with Sensipar®. Levels of total testosterone decreased by a median of 15.8% in the Sensipar®-treated patients and by 0.6% in the placebo-treated patients. Levels of free testosterone decreased by a median of 31.3% in the Sensipar®-treated patients and by 16.3% in the placebo-treated patients. The clinical significance of these reductions in serum testosterone is unknown. **Drug Interactions and/or Drug/Laboratory Test Interactions:** See CLINICAL PHARMACOLOGY, Pharmacokinetics and Drug Interactions. Effect of Sensipar® on other drugs: Drugs metabolized by cytochrome P450 2D6 (CYP2D6): Sensipar® is a strong in vitro inhibitor of CYP2D6. Therefore, dose adjustments of concomitant medications that are predominantly metabolized by CYP2D6 and have a narrow therapeutic index (e.g., flecaïnide, vinblastine, thioridazine and most tricyclic antidepressants) may be required. Amitriptyline: Concurrent administration of 25 mg or 100 mg cinacalcet with 50 mg amitriptyline increased amitriptyline exposure and nortriptyline (active metabolite) exposure by approximately 20% in CYP2D6 extensive metabolizers. Effect of other drugs on Sensipar®: Sensipar® is metabolized by multiple cytochrome P450 enzymes, primarily CYP3A4, CYP2D6, and CYP1A2. Ketoconazole: Sensipar® is metabolized in part by CYP3A4. Co-administration of ketoconazole, a strong inhibitor of CYP3A4, increased cinacalcet exposure following a single 90 mg dose of Sensipar® by 2.3 fold. Dose adjustment of Sensipar® may be required and PTH and serum calcium concentrations should be closely monitored if a patient initiates or discontinues therapy with a strong CYP3A4 inhibitor (e.g., ketoconazole, erythromycin, itraconazole; see DOSAGE AND ADMINISTRATION). **Carcinogenesis, Mutagenesis, and Impairment of Fertility** **Carcinogenicity:** Standard lifetime dietary carcinogenicity bioassays were conducted in mice and rats. Mice were given dietary doses of 15, 50, 125 mg/kg/day in males and 30, 70, 200 mg/kg/day in females (exposures up to 2 times those resulting with a human oral dose of 180 mg/day based on AUC comparison). Rats were given dietary doses of 5, 15, 35 mg/kg/day in males and 5, 20, 35 mg/kg/day in females (exposures up to 2 times those resulting with a human oral dose of 180 mg/day based on AUC comparison). No increased incidence of tumors was observed following treatment with cinacalcet. **Mutagenicity:** Cinacalcet was not genotoxic in the Ames bacterial mutagenicity assay or in the Chinese Hamster Ovary (CHO) cell HGPRT forward mutation assay and CHO cell chromosomal aberration assay, with and without metabolic activation or in the in vivo mouse micronucleus assay. **Impairment of fertility:** Female rats were given oral gavage doses of 5, 25, 75 mg/kg/day beginning 2 weeks before mating and continuing through gestation day 7. Male rats were given oral doses 4 weeks prior to mating, during mating (3 weeks) and 2 weeks post-mating. No effects were observed in male or female fertility at 5 and 25 mg/kg/day (exposures up to 3 times those resulting with a human oral dose of 180 mg/day based on AUC comparison). At 75 mg/kg/day, there were slight adverse effects (slight decreases in body weight and food consumption) in males and females. **Pregnancy Category C:** In pregnant female rats given oral gavage doses of 2, 25, 50 mg/kg/day during gestation no teratogenicity was observed at doses up to 50 mg/kg/day (exposure 4 times those resulting with a human oral dose of 180 mg/day based on AUC comparison). Decreased fetal body weights were observed at all doses (less than 1 to 4 times a human oral dose of 180 mg/day based on AUC comparison) in conjunction with maternal toxicity (decreased food consumption and body weight gain). In pregnant female rabbits given oral

gavage doses of 2, 12, 25 mg/kg/day during gestation no adverse fetal effects were observed (exposures less than with a human oral dose of 180 mg/day based on AUC comparisons). Reductions in maternal food consumption and body weight gain were seen at doses of 12 and 25 mg/kg/day. In pregnant rats given oral gavage doses of 5, 15, 25 mg/kg/day during gestation through lactation no adverse fetal or pup (post-weaning) effects were observed at 5 mg/kg/day (exposures less than with a human therapeutic dose of 180 mg/day based on AUC comparisons). Higher doses of 15 and 25 mg/kg/day (exposures 2-3 times a human oral dose of 180 mg/day based on AUC comparisons) were accompanied by maternal signs of hypocalcemia (periparturient mortality and early postnatal pup loss), and reductions in postnatal maternal and pup body-weight gain. Sensipar® has been shown to cross the placental barrier in rabbits. There are no adequate and well-controlled studies in pregnant women. Sensipar® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Lactating Women:** Studies in rats have shown that Sensipar® is excreted in the milk with a high milk-to-plasma ratio. It is not known whether this drug is excreted in human milk and because many drugs are excreted in human milk and because of the potential for clinically significant adverse reactions in infants from Sensipar®, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the lactating woman. **Pediatric Use:** The safety and efficacy of Sensipar® in pediatric patients have not been established. **Geriatric Use:** Of the 1136 patients enrolled in the Sensipar® phase 3 clinical program, 26% were ≥ 65 years old, and 9% were ≥ 75 years old. No differences in the safety and efficacy of Sensipar® were observed in patients greater or less than 65 years of age (see DOSAGE AND ADMINISTRATION, Geriatric Patients).

ADVERSE EVENTS

Secondary Hyperparathyroidism in Patients with Chronic Kidney Disease on Dialysis: In 3 double-blind placebo-controlled clinical trials, 1126 CKD patients on dialysis received study drug (656 Sensipar®, 470 placebo) for up to 6 months. The most frequently reported adverse events (incidence of at least 5% in the Sensipar® group and greater than placebo) are provided in Table 1. The most frequently reported events in the Sensipar® group were nausea and vomiting.

Table 1. Adverse Event Incidence (> 5%) in Patients On Dialysis

Event*	Placebo (n = 470) (%)	Sensipar® (n = 656) (%)
Nausea	19	31
Vomiting	15	27
Diarrhea	20	21
Myalgia	14	15
Dizziness	8	10
Hypertension	5	7
Asthenia	4	7
Anorexia	4	6
Pain Chest, Non-Cardiac	4	6
Access Infection	4	5

* Included are events that were reported at a greater incidence in the Sensipar® group than in the placebo group.

The incidence of serious adverse events (29% vs. 31%) was similar in the Sensipar® and placebo groups, respectively. **12-Month Experience with Sensipar®:** Two hundred and sixty-six patients from 2 phase 3 studies continued to receive Sensipar® or placebo treatment in a 6-month double-blind extension study (12-month total treatment duration). The incidence and nature of adverse events in this study were similar in the two treatment groups, and comparable to those observed in the phase 3 studies. **Parathyroid Carcinoma:** The most frequent adverse events in this patient group were nausea and vomiting. **Laboratory Values:** Serum calcium levels should be closely monitored in patients receiving Sensipar® (see PRECAUTIONS and DOSAGE AND ADMINISTRATION).

OVERDOSAGE

Doses titrated up to 300 mg once daily have been safely administered to patients on dialysis. Overdosage of Sensipar® may lead to hypocalcemia. In the event of overdosage, patients should be monitored for signs and symptoms of hypocalcemia and appropriate measures taken to correct serum calcium levels (see PRECAUTIONS). Since Sensipar® is highly protein bound, hemodialysis is not an effective treatment for overdosage of Sensipar®.

DOSAGE AND ADMINISTRATION

Sensipar® tablets should be taken with food and should not be divided. Sensipar® should be taken with food or shortly after a meal. Dosage must be individualized. **Secondary Hyperparathyroidism in Patients with Chronic Kidney Disease on Dialysis:** The recommended starting oral dose of Sensipar® is 30 mg once daily. Serum calcium and serum phosphorus should be measured within 1 week and iPTH should be measured 1 to 4 weeks after initiation or dose adjustment of Sensipar®. Sensipar® should be titrated no more frequently than every 2 to 4 weeks through sequential doses of 60, 90, 120, and 180 mg once daily to target iPTH consistent with the NKF-K/DOQI recommendation for CKD patients on dialysis of 150-300 pg/mL. Sensipar® can be used alone or in combination with vitamin D sterols and/or phosphate binders. During dose titration, serum calcium levels should be monitored frequently and if levels decrease below the normal range, appropriate steps should be taken to increase serum calcium levels, such as by providing supplemental calcium, initiating or increasing the dose of calcium-based phosphate binder, initiating or increasing the dose of vitamin D sterols, or temporarily withholding treatment with Sensipar® (see PRECAUTIONS). **Special Populations: Geriatric patients:** Age does not alter the pharmacokinetics of Sensipar®; no dosage adjustment is required for geriatric patients. Patients with renal impairment: Renal impairment does not alter the pharmacokinetics of Sensipar®; no dosage adjustment is necessary for renal impairment. **Patients with hepatic impairment:** Cinacalcet exposures, as assessed by AUC_{0-inf}, in patients with moderate and severe hepatic impairment (as indicated by the Child-Pugh method) were 2.4 and 4.2 times higher, respectively, than in normals. In patients with moderate and severe hepatic impairment, PTH and serum calcium concentrations should be closely monitored throughout treatment with Sensipar® (see CLINICAL PHARMACOLOGY, Pharmacokinetics and PRECAUTIONS). **Drug Interactions:** Sensipar® is metabolized in part by the enzyme CYP3A4. Co-administration of ketoconazole, a strong inhibitor of CYP3A4, caused an approximate 2-fold increase in cinacalcet exposure. Dose adjustment of Sensipar® may be required and PTH and serum calcium concentrations should be closely monitored if a patient initiates or discontinues therapy with a strong CYP3A4 inhibitor (e.g., ketoconazole, erythromycin, itraconazole; see CLINICAL PHARMACOLOGY, Pharmacokinetics and PRECAUTIONS).

Storage: Store at 25°C (77°F); excursions permitted to 15-30°C (59-86°F). [See USP controlled room temperature]. **Rx Only:** This product, or its use, may be covered by one or more US Patents including US Patent Nos. 6313146, 6211244, 6031003 and 6011068, in addition to others, including patents pending.

References: 1. National Kidney Foundation: K/DOQI clinical practice guidelines: bone metabolism and disease in chronic kidney disease. American Journal of Kidney Disease 42:S1-S201, 2003

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Technical Column

What's in the Water??? Part II - Aluminum

By Russell Dimmitt Russell is associate vice president for Renal Care Group's Technical Services. He may be contacted at (615) 345-5520 or rdimmitt@renalcaregroup.com.

In part one of the series "What's in the Water," the effects of chlorine and chloramines on the hemodialysis patient were discussed. Water in its very nature is an aggressive solution. Positively charged water molecules are attracted to everything with which they come in contact (both in and out of the dialysis facility). Water will collect chemical elements from plumbing, holding tanks, hot water heaters and other devices used to transport it from one point to another. Specific elements outlined in the Association for the Advancement of Medical Instrumentation (AAMI) Contaminant Panel have known adverse affects on hemodialysis patients. These contaminants can be categorized into three areas: microorganisms (bacteria), organic contaminants (pesticides and herbicides) and inorganic contaminants (chlorine, salts, sediments and heavy metals). Although dialysis water treatment systems are designed to remove these contaminants, some components have been known to leach contaminants back into the purified water supply.

The average person may drink 10 to 14 liters of water per week. The average dialysis patient is exposed to about 450 liters of water per week as dialysate and, indirectly, during dialyzer reprocessing (an average of 35 Liters will be used for dialyzer reprocessing). Therefore, contaminants such as aluminum, fluoride, free chlorine, and chloramine, (inorganic contaminants and heavy metals) commonly used in municipal water treatment, are quite hazardous in the hemodialysis setting.

Aluminum, an abundant metal in the environment, may occur naturally in a local water supply, or municipal water plants may add it (as alum) to increase water clarity by removing algae, sediment, and silt. The Safe Water Drinking Act amended by Congress in 1996, outlines specific procedures used by the municipal water plant for the use and monitoring of alum. However, at a pH range of 6.4 to 6.5, the minimum amount of soluble aluminum was about 30 µg/L, and the addition of fluoride at a level of 1 mg/L was found to increase the amount of soluble aluminum by a factor of 10.

The use of aluminum-based coagulants for the removal of particulate, colloidal, and dissolved substances in municipal

water usually results in an increase in the amount of aluminum in the finished water, with a portion of the coagulant remaining as residual aluminum (1). However, treatment can also decrease the total aluminum content. For example, use of poly-aluminum chloride as the coagulant lowered the mean concentration of aluminum in raw waters from 960 µg/L to a mean value of 120 µg/L in finished water (2). Generally, a concentration between 1 mg/L and 5 mg/L is desired with addition of an aluminum salt during water treatment (3). The final concentration of aluminum in the municipal treated water depends on pH, temperature of the water during treatment, the type of organic and inorganic molecules in the raw water, and treatment conditions (e.g., the amount of coagulant employed) and therefore varies from one plant to another (1).

Many water suppliers add fluorides for the prevention of dental caries (4). In natural water, the most likely soluble forms of fluorine are the free anion, the undissociated hydrofluoric acid, and complexes with aluminum, iron, and boron. In treated water, fluorides exist as less physiologically active fluoroaluminates.

Continued on page 22

MANY THANKS

Thank you to the following peer reviewers for this issue:

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RPG Chair Message

By Cathi J. Martin, RD, CSR, LDN

Cathi is a regional dietitian with Renal Care Group in Nashville, Tenn. She can be reached at cjmartin@renalcaregroup.com.

I would like to start by thanking Anne Ishmael, MS, RD for her contributions to the Renal Practice Group over that past year and a half. Anne recently resigned as chair of RPG, and I want to wish her good luck in her future endeavors.

As incoming chair, I thought I would start by telling you a little about myself. I am originally from Alabama and have worked in renal for the past 12 years. I have lived in Nashville for the past 5 years with my son, Garrett who is 14 years old, and we recently moved into a new home. I am

passionate about football and golf. I have held national offices in both the RPG and the Council of Renal Nutrition (CRN) over the past 10 years, and I am looking forward to leading RPG into the future. I am grateful for your trust and your support, and I will work hard to keep RPG strong.

I hope each of you have seen the new third edition of the Clinical Guide for Chronic Kidney Disease. It is an awesome publication that I'm sure you will find useful in your practice. We were very fortunate to have both of the editors of this book, Karen Wiesen, MS, RD and Laura Byham-Gray, PhD, RD, CNSD speak at FNCE in Anaheim. Over 500 dietitians attended the session!

I would also like to welcome Deborah Brommage, MS, RD, who is starting her term as chair of CRN. RPG is looking forward to continuing our strong alliance with CRN and collaborating on new and exciting projects. Be sure and mark your calendars for the upcoming National Kidney Foundation's Clinical Meetings in Washington, DC, May 4-8, 2005.

My focus is on members. We are working to continually update and improve the lending libraries. Our goal is to obtain all resources and texts recommended for the CSR exam. I would like to hear from you if you have ideas how RPG could better serve the members! Please feel free to contact me by email.

Technical Column

continued from page 21

For individuals with normal kidney function, only small amounts of aluminum are absorbed from the diet - the kidneys excrete the excess. In dialysis patients, who lack kidney function, exposure to large amounts of aluminum compounds can cause aluminum to build up in the body. High levels of aluminum over time can cause progressive neurological damage and encephalopathy (degeneration of brain function) that can be fatal. The contaminants can build up in the brain tissue of dialysis patients, causing confusion, short term memory problems, personality changes, speech problems, muscle spasms, hallucinations, seizures, and intellectual impairment. These symptoms may be referred to as dialysis dementia. Prolonged exposures to high levels of aluminum have also been associated with bone disease, with symptoms of bone pain, muscle weakness, and possible fractures. Sometimes these symptoms are referred to as aluminum related bone disease.

The water purification equipment installed at dialysis facilities enable us to meet

standards published by the AAMI and the Food and Drug Administration (FDA) for dialysis water (Aluminum 0.01 mg/L and Fluoride 0.2 mg/L). Although this equipment includes ion exchange softening, carbon adsorption and reverse osmosis, the capacity of such equipment may be overwhelmed by large concentrations of chemicals in the municipal water. It is also important to note that dialysis water treatment systems are built, sized and installed based on a specific measurement in time. Once the initial contaminant testing has been completed, AAMI recommends repeat testing every 12 months where reverse-osmosis or deionization is the primary choice for water treatment (5). As changes occur to the raw water, municipalities adjust the chemical additives. These adjustments can be as frequent as weekly.

With the association of aluminum, fluoride and pH being so intertwined, a safety concern for patients creates a need for dialysis centers and municipal water treatment plants to keep in constant contact. Discussions between parties should be an open line of communication to forewarn of events and water contaminant

level adjustments. Truly knowing "What's in the Water" will prepare dietitians to work through emergency situations.

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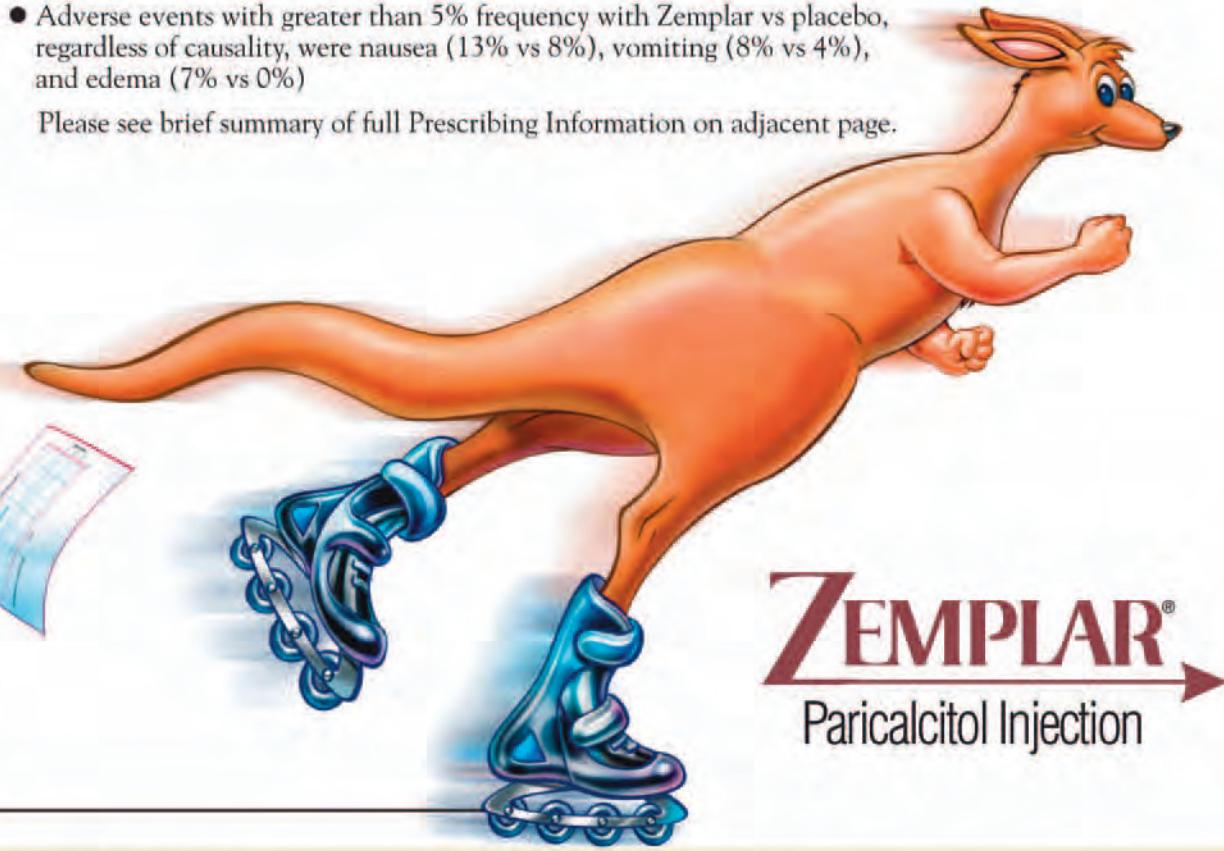
There is more to know about Zemplar...

- Clinically studied in over 700 patients¹⁻⁶
- PTH outcomes: proven to safely and rapidly reduce PTH levels with no significant difference in the incidence of hypercalcemia or hyperphosphatemia when compared to placebo²
- Zemplar is indicated for both the treatment and prevention of secondary hyperparathyroidism associated with chronic renal failure

Important Safety Considerations

- Zemplar is contraindicated in patients with vitamin D toxicity, hypercalcemia, or hypersensitivity to product ingredients
- Administration may place patients at risk for hypercalcemia, elevated Ca × P product, and metastatic calcification
- Adverse events with greater than 5% frequency with Zemplar vs placebo, regardless of causality, were nausea (13% vs 8%), vomiting (8% vs 4%), and edema (7% vs 0%)

Please see brief summary of full Prescribing Information on adjacent page.



ZEMPLAR®
Paricalcitol Injection

 Abbott Laboratories
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REFERENCES: 1. Clinical data on file, 2003. 2. Martin KJ, et al. *J Am Soc Nephrol*. 1998;9:1427-1432. 3. Martin KJ, et al. *Am J Kidney Dis*. 1998;32:s61-s66. 4. Lindberg J, *Clin Nephrol*. 2001;56(4):315-23. 5. Martin KJ, et al. *Am J Kidney Dis*. 2001;38(5):s57-s63. 6. Sprague SM, et al. *Kidney Int*. 2003;63:1483-1490.

BRIEF SUMMARY
CONSULT PACKAGE INSERT FOR FULL PRESCRIBING INFORMATION

Zemplar®

(paricalcitol injection, USP)

Fliptop Vial

Rx only

INDICATIONS AND USAGE

Zemplar® is indicated for the prevention and treatment of secondary hyperparathyroidism associated with chronic renal failure. Studies in patients with chronic renal failure show that Zemplar® suppresses PTH levels with no significant difference in the incidence of hypercalcemia or hyperphosphatemia when compared to placebo. However, the serum phosphorus, calcium and calcium x phosphorus product (Ca x P) may increase when Zemplar® is administered.

CONTRAINDICATIONS

Zemplar® should not be given to patients with evidence of vitamin D toxicity, hypercalcemia, or hypersensitivity to any ingredient in this product (see **PRECAUTIONS, General**).

WARNINGS

Acute overdose of Zemplar® may cause hypercalcemia, and require emergency attention. During dose adjustment, serum calcium and phosphorus levels should be monitored closely (e.g., twice weekly). If clinically significant hypercalcemia develops, the dose should be reduced or interrupted. Chronic administration of Zemplar® may place patients at risk for hypercalcemia, elevated Ca x P product, and metastatic calcification. Signs and symptoms of vitamin D intoxication associated with hypercalcemia include:

Early

Weakness, headache, somnolence, nausea, vomiting, dry mouth, constipation, muscle pain, bone pain, and metallic taste.

Late

Anorexia, weight loss, conjunctivitis (calcific), pancreatitis, photophobia, rhinorrhea, pruritus, hyperthermia, decreased libido, elevated BUN, hypercholesterolemia, elevated AST and ALT, ectopic calcification, hypertension, cardiac arrhythmias, somnolence, death, and rarely, overt psychosis.

Treatment of patients with clinically significant hypercalcemia consists of immediate dose reduction or interruption of Zemplar® therapy and includes a low calcium diet, withdrawal of calcium supplements, patient mobilization, attention to fluid and electrolyte imbalances, assessment of electrocardiographic abnormalities (critical in patients receiving digitalis), hemodialysis or peritoneal dialysis against a calcium-free dialysate, as warranted. Serum calcium levels should be monitored frequently until normocalcemia ensues.

Phosphate or vitamin D-related compounds should not be taken concomitantly with Zemplar®.

PRECAUTIONS

General

Digitalis toxicity is potentiated by hypercalcemia of any cause, so caution should be applied when digitalis compounds are prescribed concomitantly with Zemplar®. Adynamic bone lesions may develop if PTH levels are suppressed to abnormal levels.

Information for the Patient

The patient should be instructed that, to ensure effectiveness of Zemplar® therapy, it is important to adhere to a dietary regimen of calcium supplementation and phosphorus restriction. Appropriate types of phosphate-binding compounds may be needed to control serum phosphorus levels in patients with chronic renal failure (CRF), but excessive use of aluminum containing compounds should be avoided. Patients should also be carefully informed about the symptoms of elevated calcium.

Essential Laboratory Tests

During the initial phase of medication, serum calcium and phosphorus should be determined frequently (e.g., twice weekly). Once dosage has been established, serum calcium and phosphorus should be measured at least monthly. Measurements of serum or plasma PTH are recommended every 3 months. An intact PTH (iPTH) assay is recommended for reliable detection of biologically active PTH in patients with CRF. During dose adjustment of Zemplar®, laboratory tests may be required more frequently.

Drug Interactions

Specific interaction studies were not performed. Digitalis toxicity is potentiated by hypercalcemia of any cause, so caution should be applied when digitalis compounds are prescribed concomitantly with Zemplar®.

Carcinogenesis, Mutagenesis, Impairment of Fertility

In a 104-week carcinogenicity study in CD-1 mice, an increased incidence of uterine leiomyoma and leiomyosarcoma was observed at subcutaneous doses of 1 to 10 mcg/kg (< 1 to 3 times the maximum recommended human weekly dose of 0.72 mcg/kg, based on body surface area, mg/m²). The incidence rate of uterine leiomyoma was significantly different than the control group at the highest dose of 10 mcg/kg.

In a 104-week carcinogenicity study of rats, there was an increased incidence of benign adrenal pheochromocytoma at subcutaneous doses of 0.15 to 1.5 mcg/kg (≤ 1 times the maximum recommended human weekly dose of 0.72 mcg/kg, based on body surface area, mg/m²). The increased incidence of pheochromocytomas in rats may be related to the alteration of calcium homeostasis by paricalcitol. In carcinogenicity studies in rats and mice, paricalcitol did not affect the incidences of tumors apart from benign rodent-specific lesions related to the effects of chronic hypercalcemia.

Paricalcitol did not exhibit genetic toxicity *in vitro* with or without metabolic activation in the microbial mutagenesis assay (Ames Assay), mouse lymphoma mutagenesis assay (L5178Y), or a human lymphocyte cell chromosomal aberration assay. There was also no evidence of genetic toxicity in an *in vivo* mouse micronucleus assay. Zemplar® had no effect on fertility (male or female) in rats at intravenous doses up to 20 mcg/kg/dose [equivalent to 13 times the highest recommended human dose (0.24 mcg/kg) based on surface area, mg/m²].

Pregnancy

Pregnancy Category C.

Paricalcitol has been shown to cause minimal decreases in fetal viability (5%) when administered daily to rabbits at a dose 0.5 times the 0.24 mcg/kg human dose (based on surface area, mg/m²) and when administered to rats at a dose 2 times the 0.24 mcg/kg human dose (based on plasma levels of exposure). At the highest dose tested (20 mcg/kg 3 times per week in rats, 13 times the 0.24 mcg/kg human dose based on surface area), there was a significant increase of the mortality of newborn rats

at doses that were maternally toxic (hypercalcemia). No other effects on offspring development were observed. Paricalcitol was not teratogenic at the doses tested.

There are no adequate and well-controlled studies in pregnant women. Zemplar® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nursing Mothers

It is not known whether paricalcitol is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Zemplar® is administered to a nursing woman.

Pediatric Use

The safety and effectiveness of Zemplar® were examined in a 12-week randomized, double-blind, placebo-controlled study of 29 pediatric patients, aged 15-19 years, with end-stage renal disease on hemodialysis and nearly all had received some form of vitamin D prior to the study. Seventy-six percent of the patients were male, 52% were Caucasian and 45% were African-American. The initial dose of Zemplar® was 0.04 mcg/kg 3 times per week, based on baseline iPTH level of less than 500 pg/mL, or 0.08 mcg/kg 3 times a week based on baseline iPTH level of ≥ 500 pg/mL, respectively. The dose of Zemplar® was adjusted in 0.04 mcg/kg increments based on the levels of serum iPTH, calcium, and Ca x P. The mean baseline levels of iPTH were 841 pg/mL for the 15 Zemplar®-treated patients and 740 pg/mL for the 14 placebo-treated subjects. The mean dose of Zemplar® administered was 4.6 mcg (range: 0.8 mcg – 9.5 mcg). Ten of the 15 (67%) Zemplar®-treated patients and 2 of the 14 (14%) placebo-treated patients completed the trial. Ten of the placebo patients (71%) were discontinued due to excessive elevations in iPTH levels as defined by 2 consecutive iPTH levels > 700 pg/mL and greater than baseline after 4 weeks of treatment.

In the primary efficacy analysis, 9 of 15 (60%) subjects in the Zemplar® group had 2 consecutive 30% decreases from baseline iPTH compared with 3 of 14 (21%) patients in the placebo group (95% CI for the difference between groups -1%, 63%). Twenty-three percent of Zemplar® vs. 31% of placebo patients had at least one serum calcium level > 10.3 mg/dL, and 40/5 vs. 14% of Zemplar® vs. placebo subjects had at least one Ca x P ion product > 72 (mg/dL)². The overall percentage of serum calcium measurements > 10.3 mg/dL was 7% in the Zemplar® group and 75 in the placebo group; the overall percentage of patients with Ca x P product > 72 (mg/dL)² was 8% in the Zemplar® group and 7% in the placebo group. No subjects in either the Zemplar® group or placebo group developed hypercalcemia (defined as at least one calcium value > 11.2 mg/dL) during the study.

Geriatric Use

Of the 40 patients receiving Zemplar® in the three phase 3 placebo-controlled CRF studies, 10 patients were 65 years or over. In these studies, no overall differences in efficacy or safety were observed between patients 65 years or older and younger patients.

ADVERSE REACTIONS

Zemplar® has been evaluated for safety in clinical studies in 454 CRF patients. In four, placebo-controlled, double-blind, multicenter studies, discontinuation of therapy due to any adverse event occurred in 6.5% of 62 patients treated with Zemplar® (dosage titrated as tolerated) and 2.0% of 51 patients treated with placebo for 1 to 3 months. Adverse events occurring with greater frequency in the Zemplar® group at a frequency of 2% or greater, regardless of causality, are presented in the following table:

Adverse Event Incidence Rates For All Treated Patients In All Placebo-Controlled Studies

Adverse Event	Zemplar® (n=62) %	Placebo (n=51) %
Overall	71	78
Body as a Whole		
Chills	5	0
Feeling unwell	3	0
Fever	5	2
Flu	5	4
Sepsis	5	2
Cardiovascular		
Palpitation	3	0
Digestive System		
Dry mouth	3	2
Gastrointestinal bleeding	5	2
Nausea	13	8
Vomiting	8	4
Metabolic and Nutritional Disorders		
Edema	7	0
Nervous System		
Light-headedness	5	2
Respiratory System		
Pneumonia	5	0

A patient who reported the same medical term more than once was counted only once for that medical term.

Safety parameters (changes in mean Ca, P, Ca x P) in an open-label safety study up to 13 months in duration support the long-term safety of Zemplar® in this patient population.

Adverse events during post-marketing experience: Taste perversion, such as metallic taste, and allergic reactions, such as rash, urticaria and pruritis rarely have been reported.

OVERDOSAGE

Overdosage of Zemplar® may lead to hypercalcemia (see **WARNINGS**).

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CRN Chair Message

By Deborah Brommage, MS, RD, CSR, CDN Deborah is chair of the Council on Renal Nutrition (CRN) of National Kidney Foundation (NKF) and is administrative dietitian at Winthrop-University Hospital Dialysis Center in Mineola, Long Island, N.Y. She can be reached at dbrommage@winthrop.org

I am proud to begin my term as CRN chairperson and honored to be a member of the NKF Board of Directors. My role on the Board is to be a voice of the professional councils, as well as for clinical issues that may arise.

As for my background, I earned my graduate degree in nutrition from Case Western Reserve University in Cleveland, Ohio. I have been a registered dietitian for 25 years and a renal dietitian for the past 14 years. I joined CRN in 1991 and attended many NKF Annual and Clinical Meetings. For the past four years, I have served on the CRN Executive Committee as the Region I alternate representative and Region I representative. I also served as the chair of the Research Grant Committee for the past 3 years. I am pleased to say that there are several exciting grant projects currently in progress. These projects will provide renal dietitians with pertinent clinical information to improve outcomes for patients with chronic kidney disease.

Another project I spearheaded was the CRN Research Grant Bulletin Board. The idea and support for this endeavor came from Judy Beto, RD, PhD. Dr. Beto's passion for research and her desire to get renal dietitians involved in research are evident throughout this project. If you are interested in doing research, be sure to take advantage of this CRN membership benefit, which can be found on the NKF-CRN website.

As I look to the future and reflect on CRN's objectives, I am enthusiastic about our 5-year goals, which I will share with you.

1. Promote and encourage quality nutrition care for all patients with CKD.
2. Support the profession of the renal dietitian and promote professional education.
3. Develop and promote patient and public education.
4. Stimulate, support, encourage and disseminate nutrition-related research.
5. Impact regulatory and legislative issues.
6. Maintain and increase Council membership, and
7. Maintain fiscal accountability within the NKF structure to support CRN's goals.

CRN has several programs and projects currently underway to support these goals:

First, I am excited about our upcoming milestone anniversary. This year CRN will commemorate its 30th year as a professional council of the NKF. At the 2005 NKF Clinical Meetings in Washington, DC, CRN members will celebrate the past three decades of achievements at a special anniversary luncheon celebration. In addition to the outstanding educational sessions, NKF will organize a legislative workshop and trip to Capital Hill for professional council members.

The patient and public education committee continues to update and create new fact sheets and brochures. These materials and the revised cookbook list can be found on the NKF-CRN website.

The professional education committee is organizing an author's bureau for experienced and new authors who are interested in writing for publication. CRN will collaborate with the ADA-RPG once again on a joint project that will benefit the membership of both groups.

The Renalink continues to have informative and inspiring articles. Updates on NKF activities, as well as local events, are included in this multidisciplinary newsletter.

The Journal of Renal Nutrition (JREN) continues to be a shared journal with the CRN and the International Society for Renal Nutrition and Metabolism. The JREN is recognized internationally as THE renal nutrition journal for renal dietitians, physicians and scientists.

The membership committee successfully completed the affiliation process last summer. CRN is 1533 members strong. With so many benefits and the opportunity for nation-wide networking, membership in CRN, as well as ADA-RPG, are assets to renal dietitians. I am an ADA-RPG member and believe membership in both groups is extremely valuable to my career. Let's keep the membership numbers of both organizations growing by encouraging fellow renal dietitians to join.

I look forward to another productive and fulfilling year for CRN, as well as joint activities with the ADA-RPG. Cathi Martin is an outstanding leader, and I know that Cathi and I will work well together to maintain the strong relationship between CRN and the ADA-RPG.

Rehab Corner

Encouragement – Creating Windows of Opportunity

By Stephanie McIntyre, RD. Stephanie is patient rehab director for Renal Care Group, Inc. and a renal dietitian at Renal Care Group-Phoenix. She may be contacted at smcintyre@renalcaregroup.com.

Encouragement of the “five E’s” of Rehab involves creating windows of opportunity. Of the “five E’s” (Encouragement, Education, Exercise, Employment, and Evaluation), encouragement is blended into the others because there are encouraging aspects of each “E” to consider when working with dialysis patients.

To effectively encourage patients to obtain the highest quality of life and functional ability, dietitians must understand what motivates and drives patients to live. Two methods of determining patients’ motivators (or encouragement factors) are questionnaires and conversations. Engaging patients in conversation regarding personal interests such as hobbies, social, and/or spiritual pursuits enables dietitians to customize nutritional advice. Interacting with social workers may be beneficial in obtaining patient history and background information to formulate successful teaching strategies.

Dietitians play an important role in creating for patients an environment for success. Taking the time to listen, while reacting positively to information offered by patients, opens doors for ongoing dialogue. Patients have numerous struggles, some of them every day. Dietitians must continually encourage them, show passion for their well-being through involvement in nutrition education and rehab, and let them know about available support systems. Those are the dietitians’ roles in Encouragement.

So, what motivates a person to live life to the fullest with kidney disease? The answer(s) will be different for each patient. The following questions are just some suggestions to help dietitians understand the motivator(s) to better encourage patients:

Encouragement:

Encourage patient involvement with friends, family, religious institutions, hobbies, and other activities. Remaining grounded in lifelong relationships may assist patients in realizing that many aspects of “life before dialysis” have remained constant. For example:

“What do you look forward to or enjoy doing each day?”

“How was your weekend? Did you do anything different or fun?”

Education:

Encourage patients to continue exploring the relationship between nutrition and disease through educational games, activities, or reading. Keep nutrition messages fun and simple. Explore alternative avenues of learning to determine which teaching method works best. For example:

“Do you feel it is easier to learn information by listening, viewing visual aids (pictures, handouts, etc), or participating in activities and games?”

Exercise:

Reinforce the importance of continuing current physical activities or starting new ones.

“Do you exercise on a regular basis? If so, what type of exercise and how often?”

“Would you like information on exercise?”

“Do you believe you can exercise now that you are on dialysis?”

Employment:

Encourage patients to seek job training or re-entry into the workforce, should they desire employment. Encourage them to take charge of their circumstances.

“How do you spend your time or what do you do when you are not at dialysis?”

“Were you working before you started dialysis?”

“Are you interested in keeping your job or starting a new job?”

“Have you ever volunteered before?”

“What barriers prevent you from taking care of yourself?”

Evaluation:

In order to move along the rehabilitation continuum, patients need to be encouraged to revisit past successes and setbacks.

“Do you track your weights, labs or blood pressure? How do you use this information?”

“Do you set goals, work to reach them, and then set new goals?”

Make the effort to include the “five E’s” of rehab in daily conversations and formal assessments with patients. Rehab provides a simple way to demonstrate caring about patients as people, and not just whether or not they ate the right foods or their “numbers” look good. Dietitians may establish caring connections with patients by individualizing nutrition therapy and encouraging patients in all of the “five E’s” of rehab.

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RPG Mission: The RPG is the advocate of the nutrition profession serving the public through the promotion of optimal renal nutrition, health and well-being.

RPG Vision: RPG members will be leaders in providing scientifically sound renal nutrition care and education for patients, the profession and the public.

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