



Impact of Metabolic Acidosis on Clinical Outcomes in Patients with Chronic Kidney Disease

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@fuse.net.*

Renal dietitians professionals routinely evaluate a range of laboratory values to monitor the status of patients with chronic kidney disease (CKD). These include serum albumin, one of a panel of indicators of nutritional status, and serum calcium- phosphorus, which provides information on bone metabolism and disease (1,2).

The National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-K/DOQI) Clinical Practice Guidelines on Nutrition also recommend the monthly evaluation of sodium bicarbonate, a measure of hydrogen ion concentration in the blood (1). Low serum bicarbonate indicates metabolic acidosis and has been linked with adverse clinical outcomes, including negative nitrogen and total body protein balance, worsening secondary hyperparathyroidism and dissolution of bone (3). When metabolic acidosis is corrected, however, protein degradation decreases in patients undergoing maintenance dialysis therapy, and bone histology improves (2,4,5).

This column will review the underlying causes of metabolic acidosis in patients with CKD, summarize its potential adverse effects and discuss treatment recommendations.

Causes of metabolic acidosis in CKD

The human body produces approximately 70 mmol of hydrogen ions daily and maintaining an appropriate acid-base balance depends on equivalent net acid excretion (6). Dietary factors impacting acid-base balance include the protein, chloride, phosphorus, sodium, potassium, calcium and magnesium content of foods; differing absorption rates of these nutrients across the intestine; metabolic generation of sulfate from sulfur-containing amino acids and degree of phosphate dissociation (7).

Changes in the pH of the extracellular fluid (ECF) are prevented by the carbonic acid-bicarbonate buffer system (see Figure 1). When hydrogen ions (H^+) enter the ECF, they interact with bicarbonate ions (HCO_3^-) forming carbonic acid (6).

Healthy kidneys support this buffer system by secreting hydrogen ions into the renal tubular fluid and reabsorbing bicarbonate ions. However, as glomerular filtration rate (GFR) declines in patients with CKD, bicarbonate ions are lost from the proximal tubule and acidosis begins to develop. Increasing severity of CKD is marked by failure to excrete inorganic and organic acids. A large proportion of patients with GFR below 30 mL/min/1.73m² (Stage 4

CKD) have acidosis, which progresses to affect most patients undergoing maintenance dialysis therapy (2).

Potential adverse effects of metabolic acidosis in patients with CKD

Studies in animals and humans indicate that CKD increases protein catabolism (8). When body composition and energy expenditure were compared in patients with CKD (mean GFR 23.9 ± 2.6 mL/min/1.73m²) with normal controls matched for age, gender, height and weight, lean body mass and basal energy expenditure was significantly lower in the patients with CKD (9). Since CKD patients were also more acidotic than the control group, acidosis may have contributed to protein catabolism (9,10).

For patients with CKD undergoing maintenance dialysis therapy, continuous ambulatory peritoneal dialysis (CAPD) may offer an advantage over hemodialysis (HD) by providing a continuous supply of buffer. However, in a cross-sectional study examining the relationship between acid-base balance and nutritional status in patients undergoing CAPD, almost 13% had metabolic acidosis (11). When a composite nutritional index (CNI) was

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Figure 1. Response of the carbonic acid-bicarbonate buffer system to hydrogen ions.

Bicarbonate reserve:



Extracellular fluid (ECF):

From the Editor's Desk

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After reading their works for years, I finally met some of my heroines at FNCE. I was delighted to put faces with the names of renal champions I have respected throughout my career. Prior to the conference, the word "networking" always held a negative tone in my mind, similar to "schmoozing," but meeting people with similar professional passions was very inspiring and gave me a new perspective of the concept. Therefore, if you feel stuck in your career, and want to "change your major," I encourage you to attend a professional meeting to boost your enthusiasm.

As RPG members, we have access to stipend awards to attend continuing education functions, which, like conferences, can be good enthusiasm boosters. These awards enable a few dietitians to attend chronic kidney disease-related meetings. Please review the enclosed award application and apply so that you may fulfill some of your own growth and development needs. This issue of the Renal Nutrition Forum contains several summaries from dietitians who received awards in the previous year and are sharing their newly gained knowledge with the rest of us.

If professional meetings don't fit into your busy schedule or into your budget, try reading a new book. Cynthia Stafford reviews an excellent book, *Motivational Interviewing: Preparing People for Change*. Sometimes people realize their dietary failures for the first time when interviewed by dietitians. This realization motivates some people to make changes, but it paralyzes others. The way in which we question people can be a powerful encourager or discourager.

Our feature article, by Philippa Norton Feiertag, clarifies acidosis - a topic that can be daunting to both rookie and veteran renal dietitians. The complementary patient education handout on acid balance may help patients understand why we ask them to take additional medication. The handout may not help the medicine go down any easier, but hopefully patients will at least take their pills after learning that acidosis is a systemic problem with serious consequences.

If you find the handout does not effectively address your patient population and you want to develop your own, check out Stephanie McIntyre's article on assessment of readability. After introducing us to the 5 E's of renal rehabilitation in her last column, she now takes an in-depth look at education (one of the E's) by focusing on the readability of patient education materials. Stephanie shares practical tips for evaluating readability using word processing programs.

Speaking of acid, Sharon Schatz completes her two-part series on citrus, highlighting limes and lemons. She informs me that 95% of our country's lemon crop is grown in California and Arizona - a reassuring fact given the destructive hurricanes in Florida last season. Her article includes some excellent resources for citrus-based recipes.

We have a new author who will update us on the technicalities of dialysis. Russell Dimmitt is the associate vice president for Renal Care Group's Technical Services. Russell will enlighten us on non-nutritional, "behind the scenes" aspects of dialysis that may affect patients' nutritional responses to treatment.

I hope that the presidential election will find you already in the mood to cast your vote. This year, members will vote online for RPG positions. If you desire a paper ballot, contact Andy Kamm at akamm@eatright.org or call 1(800) 877-1600, ext. 4815. The online voting deadline is February 25, 2005. If requested from ADA, paper ballots must be postmarked or faxed by February 20, 2005. Our Nominating Committee chair, Susan Knapp, will be happy to answer questions about the election process. She may be contacted at sknapp@davita.com. Your opinion shapes the future direction of the renal practice group, so please make your views known today.

Sarah Carter

Impact of Metabolic Acidosis ...

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computed by grading these patients for clinical, biochemical and anthropometric parameters, mean CNI score was significantly lower in acidotic patients than in patients with normal acid-base balance.

Metabolic acidosis seems to increase muscle protein breakdown by stimulating an energy-dependent proteolytic pathway (12,13). Chronic metabolic acidosis also contributes to derangements in growth hormone sensitivity and thyroid hormone secretion (14). These changes negatively impact protein metabolism and play a significant role in the growth retardation seen in children with CKD (1,14).

Another effect of chronic metabolic acidosis is altered composition of bone tissue. Reduced synthesis of 1,25-dihydroxyvitamin D₃ by the proximal kidney tubule in CKD is exacerbated by metabolic acidosis, thereby decreasing calcium absorption from the diet (2). In addition, compromised acid-base balance induces bone dissolution by stimulating bone resorption, inhibiting bone formation and increasing levels of parathyroid hormone (15,16). Thus, metabolic acidosis contributes to osteodystrophy and predisposes patients with CKD to bone fractures.

Following renal transplantation, metabolic acidosis may persist, and buffering of excess hydrogen ions by skeletal elements can lead to abnormalities in calcium-phosphorus balance, disorders of bone metabolism and post-transplant osteoporosis (2).

Recent preliminary studies suggest that metabolic acidosis also plays a part in the hypertriglyceridemia seen in CKD, and that normalization of acid-base balance in these patients may result in a significant decrease in serum triglyceride levels (3,17). The underlying mechanism may involve 1,25-dihydroxyvitamin D₃ (18,19).

Clearly, metabolic acidosis in patients with CKD contributes to a wide range of adverse clinical outcomes, and these are summarized in Table 1.

When metabolic acidosis was corrected in nondialyzed elderly patients (ages 73 ± 6

years) with CKD, mean albumin increased significantly from 33.1 ± 2.1 g/L to 37.0 ± 2.5 g/L (20). Normalized protein catabolic rate (nPCR) decreased significantly in these patients, indicating reduced protein breakdown. Patients undergoing maintenance HD also show significantly decreased nPCR when their serum bicarbonate levels improve (21). Other studies on patients with CKD undergoing maintenance dialysis therapy have shown decreased protein breakdown and improved bone histology when metabolic acidosis is treated (2,4,5). The ability to alleviate adverse outcomes justifies an aggressive approach to the correction of metabolic acidosis.

Treatment recommendations for metabolic acidosis in CKD

The NKF-K/DOQI Clinical Practice Guidelines for Nutrition in Chronic Renal Failure recommend the measurement of serum bicarbonate once monthly in maintenance dialysis patients (1). These guidelines also recommend that pre-dialysis or stable serum bicarbonate levels should be at least 22 mmol/L in both adult and pediatric patients.

Normalization of low serum bicarbonate levels can be achieved in 2 ways. Increasing bicarbonate concentration in hemodialysate above 38 mmol/L is safe, effective and well tolerated (1,21,22). In patients undergoing

peritoneal dialysis, serum bicarbonate levels may be raised by providing either higher dialysate bicarbonate or lactate levels (1).

Serum bicarbonate levels can also be increased by providing an oral dose of sodium bicarbonate (1,20). Sodium bicarbonate oral supplementation for adults with CKD usually comprises approximately 2-4 g daily. In children receiving maintenance dialysis therapy, use of high sodium bicarbonate concentrations in dialysate and oral administration of sodium bicarbonate should be individualized to maintain a steady serum bicarbonate level (1).

Summary

The renal dietetics professional can play an important part in managing metabolic acidosis in patients with CKD. Comparing the patient's serum bicarbonate level with the target range, recommending appropriate corrective therapies where indicated, and monitoring patient compliance with prescribed oral bicarbonate supplements are all within the renal dietitian's scope of practice and may alleviate the adverse effects of metabolic acidosis in this population.

References

1. National Kidney Foundation Kidney Disease Outcomes Quality Initiative

Continued on page 4

Table 1. Potential adverse effects of metabolic acidosis in patients with chronic kidney disease (CKD)

- Increased protein catabolism (8)
- Decreased composite nutritional index (CNI) score in patients on peritoneal dialysis (11)
- Growth retardation in children (1,14)
- Abnormalities in calcium and phosphorus metabolism (2,15,16)
- Worsening secondary hyperparathyroidism (3)
- Renal osteodystrophy (15,16)
- Post-transplant osteoporosis (2)
- Exacerbation of hypertriglyceridemia (3,17)

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Cast Your Vote!

This year RPG DPG will be conducting its election of officers online.
Please exercise your right to vote to select your future RPG DPG leaders.

The online polls will open Jan. 15, 2005 and will close Feb. 25, 2005.

Visit www.renalnutrition.org to view candidate bios and to cast your vote online.

Paper ballots are available upon request by contacting Andy Kamm at akamm@eatright.org or 800/877-1600 ext. 4815

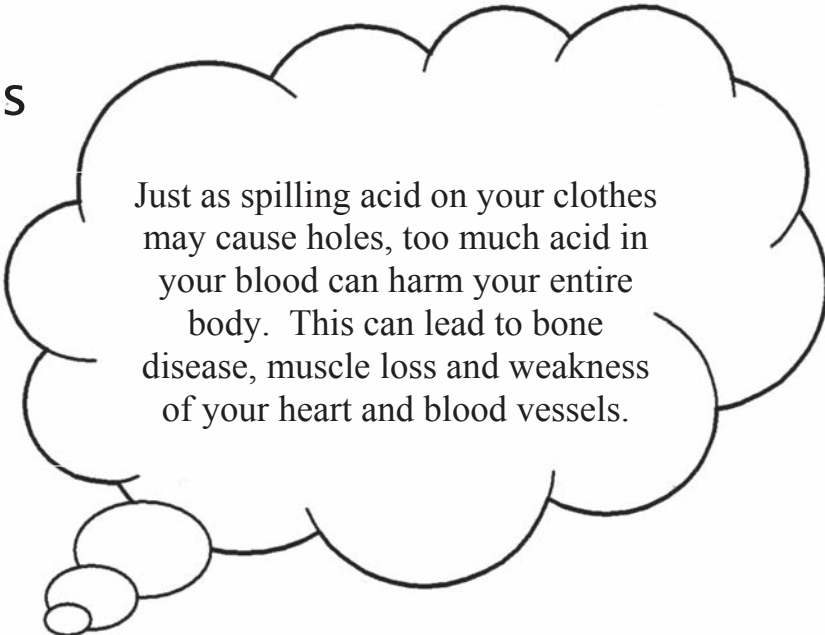
Paper ballots must be postmarked by or faxed by Feb. 20, 2005.

Your vote is appreciated!



Acid Balance

Your blood contains too much acid.



Just as spilling acid on your clothes may cause holes, too much acid in your blood can harm your entire body. This can lead to bone disease, muscle loss and weakness of your heart and blood vessels.



Healthy kidneys and lungs help control the amount of acid in the blood.
In kidney disease, this process is disturbed and acid increases.
An increase in acid can also result from severe diarrhea,
poor blood sugar control and some medications.

The amount of acid in your blood decreases after dialysis and after taking sodium bicarbonate pills prescribed by your physician.

Come to all of your dialysis treatments and take your sodium bicarbonate pills as prescribed!

Kidney Friendly Food Facts

Citrus - Section II

By Sharon Schatz, MS, RD, CSR, CDE

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This column will try to add some summer sunshine to gray winter days as the discussion of citrus is continued. Lemons and limes pack a potent punch to any food or beverage without adding significant potassium or sodium. The two most common types of lemons are Eureka - obtainable all year, and Lisbon - with winter availability. The Meyer lemon is actually a hybrid, probably of a lemon with a mandarin. When choosing lemons, select bright-yellow, thin-skinned ones, and avoid those that are green. Extreme hardness indicates that lemons are old. Those with a smooth skin are juicier. Lemons can be kept refrigerated for two or three weeks.

The lemon is probably one of the most versatile fruits, although it is one of the few that typically is not eaten as is. Every part of the lemon from the juice to the zest can be used in cooking, and its flavor imbues a multitude of cuisines. There are many uses for lemon wedges other than flavoring tea. Lemon wedges provide a splash of flavor to salads, vegetables, meat, poultry, and seafood. Add thinly sliced lemons when stewing fruit to cut the sweetness. Lemon zest can provide more dimension to baked goods or French toast.

Lemon juice is a boon to the "renal diet" as it can compensate for the lack of salt when cooking. It can be fresh squeezed, concentrated, bottled, frozen, or dehydrated and powdered. (Lemon juice powder is available from Great American Spice Company, <http://www.americanspice.com> and Rocky Mountain Spice Company, <http://www.myspicer.com>).

Room temperature lemons yield more juice than those that are refrigerated. To obtain more juice you can put the lemon in boiling water or warm in the microwave for five to ten seconds, but be careful not

to overheat. You can also try rolling the lemon in the palm of your hand or on the countertop to make the juice more extractable. If just a few drops of juice are needed, pierce the skin with a toothpick and squeeze out what you need. One medium lemon provides approximately 3 tablespoons juice and 1 tablespoon grated zest while a large lemon yields ¼ cup lemon juice.

Lemon juice is used to make salad dressings, marinades, and sauces for desserts, vegetables, fish, or poultry. Do not let chicken, fish, or meat marinate too long if the base is lemon juice, as it will start "cooking" the flesh. Baked goods such as cake, cookies, muffins, tarts, and pies feature a slew of uses for lemon, and lemon is found in desserts such as puddings, sorbets, and sherbets. Lemon butter is an easy way to add calories when needed and goes well with seafood or vegetables such as asparagus and green beans.

Lemon juice is often used in beverages such as the summertime favorite, lemonade. Lemonade can be mixed with other fruits or juices for new flavor treats such as blending it with fresh or frozen

strawberries or raspberries or adding it to grape juice. Ice cubes made from lemonade can be added to beverages or used in lieu of popsicles to help quench thirst. Lemonade concentrate is a recipe ingredient for salad dressing, sauces, chicken, and baked goods. It may be preferable for dialysis patients to use homemade lemonade or that diluted from frozen concentrate, as commercially prepared products might have additives contributing potassium or sodium.

Lime is less commonly used in the United States although it is a popular ingredient in the cooking of Mexico and Latin America, Southeast Asia, India, Africa, and the Caribbean. The sour or acid types of limes are more available than the sweet ones. Varieties of the large Tahiti type limes include the Persian (called Tahiti in California) and the seedless Bearss, grown in California. The most desirable Persians are green in color and heavy for their size. The Mexican Group is smaller and thinner-skinned with a light lemon-yellow color, and it includes the Key lime of Florida, known as Mexican in the Southwest, Dominican when imported from the Dominican Republic, or West Indian when

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Lemon and Lime Products		
Item	Portion	K+ (mg)
Lemon juice, bottled, unsweetened	1 fl oz	31
Lemon juice, fresh	1 fl oz	38
Lemon juice, packet	1 each	5
Lemon juice, yield per fruit	1 each	58
Lemon peel, fresh	1 tsp	3
Lemon sections, peeled, resh	½ c	146
Lemon with peel, no seeds, raw	1 whole	157
Lemonade (pink) frozen concentrate	1 fl oz	24
Lemonade (pink) prepared from frozen concentrate with water	½ c	19
Lemonade (white) frozen concentrate	1 fl oz	24
Lemonade (white) prepared from frozen concentrate with water	½ c	25
Lime juice, bottled, unsweetened	1 fl oz	23
Lime juice, fresh	1 fl oz	34
Lime juice, yield per fruit	1 each	41
Lime, raw	1 medium	75
Limeade frozen concentrate	1 fl oz	16
Limeade prepared from frozen concentrate with water	½ c	11

Source: ESHA Food Processor, version 8.3

Book Review

Motivational Interviewing, Preparing People for Change

By Cynthia Stafford, RD, CSR, LD
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People with chronic kidney disease (CKD) come from all geographic areas and represent all levels of education, as well as diverse ethnic and socioeconomic groups. They require varying degrees of nutrition education in a variety of settings. Counseling patients on the renal diet is often challenging. A lack of understanding and knowledge can be major factors that contribute to anxiety and poor adjustment to dialysis and to the diet often seen in CKD patients. Decisions regarding compliance with the diet and dialysis/medication regimen are determined in large part by interaction with treatment providers and systems. Using effective and considerate counseling skills can improve adherence with nutrition recommendations. Incorporating motivational interviewing into everyday practice will assist clinicians in optimizing counseling techniques to enhance learning of the recommended renal diet. There are extensive references addressing motivational interviewing, many of which are specific to addiction. Several references exist on chronic diseases, such as diabetes or hypertension, and motivational interviewing. This article is a brief review of a book entitled *Motivational Interviewing, Second Edition: Preparing People for Change*, by William R. Miller and Stephen Rollnick (1). This is a “must-read” for renal dietitians.

While this book is a lengthy 438 pages, it is well worth your time. As renal dietitians, we can improve the quality of life for CKD patients by gaining a better understanding of motivational interviewing and techniques to enhance our counseling skills. According to Miller and Rollnick, motivational interviewing is defined as an effective evidence-based approach to overcome ambivalence that keeps many people from making desired changes in their lives, even after seeking or being referred to professional treatment. This book is intended to assist counselors who

wish to encourage patients to rely on their own resources for behavior change. There are four parts to the book, I. Context, II. Practice, III. Learning Motivational Interviewing, and IV. Applications of Motivational Interviewing. This article will review each part briefly.

I. Context

What factors facilitate behavior change? One factor that frequently makes a difference is the professional with whom the patient interacts. Some clinicians feel that a direct and confrontational tactic is the best method. However, Miller and Rollnick suggest just the opposite. According to them, humiliation, shame and guilt are not the primary forces that lead to behavior change. (Reality check for most of us, “Why did you drink that much fluid?” Sound familiar?) Instead, positive behavior change is more likely to occur when people find a connection with something of value when in an empowering atmosphere. This makes it easier for them to explore their present behavior in relation to what is valued or desired in the future.

II. Practice

There are two fantastic quotes at the beginning of this section, “What people really need is a good listening to,” Mary Lou Casey, and “A fool takes no pleasure in understanding, but only in expressing personal opinion,” Proverbs 18:2. It is important to understand the patient’s point of view. Oftentimes, asking the patient to rate the issue on a scale from 0 to 10 will provide some insight of how important the issue is to the individual. As renal dietitians we often feel it is our duty to give advice, however we may gain more insight into the issue simply by listening to our patients.

Setting an agenda is an important initial step. Basically, what will you talk about? If the patient is referred to a renal dietitian for specific counseling, at least one topic of conversation has been identified. However, even in such cases, that topic may not be the only or first subject matter to be discussed. An opening question might be, “As you know, there are many things we

could talk about regarding the renal diet, but what are some things you would like to discuss?”

Miller and Rollnick suggest there are five methods of motivational interviewing that can be used at the first patient-counselor meeting. Four methods include open-ended questions, affirming, reflecting, and summarizing (OARS). The fifth method involves eliciting “change talk”. Open-ended questions allow the patient to do most of the talking. Frequently, these types of questions do not result in brief answers. Try to avoid asking three open-ended questions in a row. Ask the open-ended question, setting the topic for discussion, then follow with reflective listening. Reflective listening involves listening, then rephrasing the patient’s answers in your own words. Affirming the patient during the conversation is another way of building rapport. Compliments or statements of appreciation can be used to affirm the patient’s point of view. For example, “I appreciate that you took a big step in meeting with me today.” Also, “That’s a great question” or “Thank you for talking with me today.” Summary statements link together and reinforce topics that have been discussed. In giving the summary, you decide what to include and emphasize. Finally, according to Miller and Rollnick, eliciting a discussion about change involves “recognizing the disadvantages of the status quo, recognizing the advantages of change, expressing optimism about change, and expressing intention to change.”

III. Learning Motivational Interviewing

How do we improve our counseling skills and learn to incorporate motivational interviewing into everyday practice? First, we should put more emphasis on learning the patient’s needs rather than focusing so much on teaching. Miller and Rollnick offer a few very important tips:

1. Talk less than your patient does
2. Offer a few reflections for every question that you ask
3. Use open-ended questions, for exam-

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Book Review

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- ple, "What do you know about high potassium foods?"
4. Listen empathetically and try reflective listening, for example, "Let me see if I understand you,"
 5. Keep it simple
 6. Pay attention to your patients and be open to the fact that what they say and how they say it is largely a response to your own counseling skills

Frequently disengagement and resistance will result from telling patients what, why, and how they need to change. Facilitating behavioral change requires the use of new approaches to old problems while incorporating personally relevant solutions from patients into the discussion. Being told what to do usually is not persuasive!

IV. Applications of Motivational Interviewing

Chapters 15 through 25 discuss a variety of practical applications of motivational interviewing written by leading motivational interviewing practitioners other than Miller and Rollnick. Chapter 17, *Motivational Interviewing in Medical and Public Health Settings* written by Ken Resnicow and colleagues, is a great review of motivational interviewing in relation to diet and physical change. Changing diet behavior patterns typically involves modification rather than elimination. Although generally not considered addictive behaviors according to Resnicow, giving up certain foods can be perceived as a sacrifice, and such changes can manifest a similar response as a withdrawal from an addiction. Renal dietitians may benefit from these expert explanations on applying

motivational interviewing.

In summary, this is a great core text for counseling and psychotherapy for motivational interviewing. It is important to note that there are at least 15 studies funded by the U.S. National Institutes of Health to test motivational interviewing as intervention for health behavior change. Results from these studies will ultimately help clinicians learn more about this intriguing technique to enhance learning that results in improved adherence. In the meantime, this book will serve as an excellent comprehensive starting point. Two thumbs up!

Reference

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Kidney Friendly Food Facts

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imported from any of the West Indies. Buy limes that are firm with uniformly colored skin and avoid those that have brown or white spots, which indicate age or mold. Limes perish faster than lemons, and limes will keep in the refrigerator for up to two weeks.

Limes have uses similar to lemons, but the flavor is sharper and more acidic. One medium lime yields approximately 2 tablespoons juice. Lime juice is less

commercially available than lemon juice. Bottled products include generic lime juice, Key lime juice, and Rose's lime juice that is sweetened. Try adding a few drops of Rose's lime juice to seltzer, club soda, cranberry juice, or even lemonade for a refreshing beverage. Frozen limeade concentrate is another option.

$\frac{3}{4}$ cup ordinary (Persian) lime juice =
 $\frac{2}{3}$ cup Key lime juice = 1 cup lemon juice

Lemon, lime, and lemon-lime marmalades can turn ordinary toast into a treat. The marmalade can also be used in marinades

for poultry or fish. If these are not readily available in the local market, they can be found at British specialty food stores that sell on-line.

For lemon and lime recipes, check these web sites:

<http://www.sunkist.com/recipesearch/>
<http://www.florida-juice.com/recipes.html>
<http://www.keylimejuice.com/recipes.htm>
http://www.realemon.net/recipes_with_zing.html

<http://www.foodnetwork.com>
(Websites accessed October 18, 2004).

A Special Tribute to Julie Geraci, MEd, RD, LD

A colleague, friend, wife, mom, daughter we will always remember you. Julie was a person that was committed to her family and her profession. We will all feel the void of her absence and remember her dedication in all she did personally and professionally. She was part of the Renal Practice Group for about a year and a half as the Area 1 Coordinator and Reimbursement Chair. She was eager to become involved in our professional organization and had the desire to make a difference in her chosen profession of renal nutrition. She made a difference by her willingness to become involved and stretching her boundaries. The RPG Executive Committee and Board members thank her for her contributions. To honor her memory, as well as her commitment to RPG, the Executive Committee voted to make a memorial donation in her name to the ADA Foundation Scholarship Fund. We will miss you and remember you always!

Hope is the thing with feathers, That perches in the soul, And sings the tune without the words, And never stops at all. – Emily Dickinson

Technical Column

What's in the Water?

Chloramine and Chloramines - Part I

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.*

Early one Sunday morning, I found myself looking into a glass of water. With the sun shining through a window and reflecting off the particles suspended in this clear solution (or so I thought), I began to think about the actual contents. At our dialysis facilities, the same water (well not exactly the same) with the same contents flows through a maze of equipment designed to take out the very things our community water treatment plants add and monitor. Municipal plants receive water from many sources including lakes, rivers, mountain runoff and wells. Leaving the municipal plant and traveling for miles in underground pipes, water continues to attract chemicals. Other chemicals may be added for the public's benefit, e.g. fluoride, calcium, chlorine, and alum, but can be fatal for hemodialysis patients. For this very reason, we go to great lengths in the removal and purification process known as water treatment for hemodialysis.

Hemodialysis patients are exposed to 450 liters of water weekly. The water treatment experts in dialysis facilities must ensure that the city water used for dialysate does not have contaminants that can harm patients. Some contaminants can kill patients with exposure; others can cause increased infection/inflammation and drive the albumins lower, which can contribute to morbidity and mortality.

Water in its very nature is an aggressive solution. Positively charged water molecules are attracted to everything with which they come in contact. Water will collect chemical elements from plumbing, holding tanks, hot water heaters and other devices we use to transport it from one point to another. Specific elements outlined in 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 all types of contaminants are tested at one time or another, total chlorine must be tested before each patient shift.

Chlorine added at municipal water plants for the control of bacterial growth comes in many forms. An increasing number of municipal suppliers now use chloramines (referred to as "combined chlorine"), rather than the traditional chlorine (referred to as "free chlorine"). The sum of free chlorine and combined chlorine is "total chlorine". We remove both chlorine and chloramines from water with activated carbon tanks in the "water treatment room" at each facility. Chlorine is typically measured manually before each HD shift by the trained water technician with kits utilizing a chemical known as "DPD" (N,N-diethylo-phenylenediamine). These kits contain one reagent to measure total chlorine and a second to measure free chlorine (Cl). Combined chlorine (chloramines NHCl_2) is calculated as the difference between total chlorine (HOCl) and free chlorine. Patient safety considerations require that all of the chlorine measured as total chlorine is assumed to be in the form of chloramines, and the maximum patient exposure limit for chloramine is 0.1 mg/L.

Chloramine is a powerful oxidant, which denatures hemoglobin by direct oxidation, and can be fatal. Exposure to chloramine

in the hemodialysis setting has been associated with hemolysis, hemolytic anemia and methemoglobinemia, a condition on which hemoglobin is unable to carry oxygen. Therefore, as part of the daily water treatment system checklist, water technicians are asked to test for chlorine at the site of the water loop after the water has passed through the carbon tanks. By testing at this location, we are ensuring that chlorine does not make its way to the reverse osmosis unit and into the treated water circuit.

Although the risk of contamination is low, insufficient carbon filtration, and/or inadequate total chlorine testing measures can leave a facility wide-open for problems. The Center for Disease Control reports that 113 patients were exposed to chlorine / chloramines during 1991. Of these patients, 41 required transfusions and a widespread decrease in hematocrits from an average of 26% to an average of 22% were all attributed to chloramines-induced hemolysis (1). Today, chlorine / chloramines are being used in very creative ways to control bacteria in the municipal water systems and be an increasing concern for technology. To paraphrase Paul Harvey, "Later, for the rest of the story."

Reference

1. Tipple MA, Shusterman N, Bland LA, McCarthy MA, Fayero MS, Arduino MJ, Reid MH, Jarvis WR. Illness in hemodialysis patients after exposure to chloramines contaminated dialysate. *ASAIO Trans.* 1991;37:588-91.

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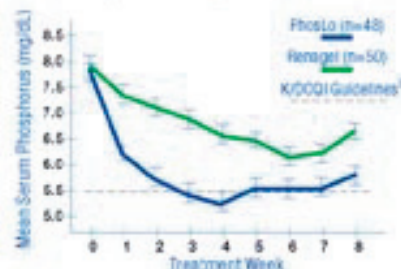
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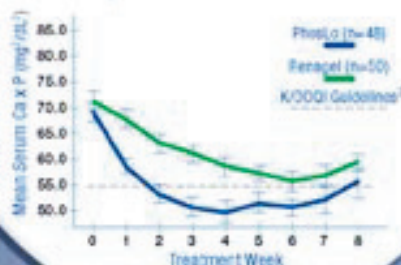
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BRIEF SUMMARY OF PRESCRIBING INFORMATION

CONTRAINDICATIONS: Patients with hypercalcemia. **INDICATIONS AND USAGE:** For the control of hyperphosphatemia in end stage renal failure. **WARNINGS:** Patients with end stage renal failure may develop hypercalcemia when given calcium with meals. No other calcium supplements should be given concurrently with PhosLo. Progressive hypercalcemia due to overdose of PhosLo may be severe as to require emergency measures. Chronic hypercalcemia may lead to vascular calcification, and other soft-tissue calcification. The serum calcium level should be monitored twice weekly during the early dose adjustment period. The serum calcium times phosphate (Ca x P) product should not be allowed to exceed 66. Radiographic evaluation of suspect anatomical region may be helpful in early detection of soft tissue calcification. **PRECAUTIONS:** Excessive dosage induces hypercalcemia; therefore, early in the treatment during dosage adjustment serum calcium should be determined twice weekly. Should hypercalcemia develop, the dosage should be reduced or the treatment discontinued immediately depending on the severity of hypercalcemia. Do not give to patients on digoxin, because hypercalcemia may precipitate cardiac arrhythmias. Always start PhosLo at low dose and do not increase without careful monitoring of serum calcium. An estimate of daily calcium intake should be made initially and the intake adjusted as needed. Serum phosphorus should also be determined periodically. **Information for the Patient:** Inform the patient about: 1) compliance with dosage; 2) adherence to diet instructions and avoidance of nonprescription antacids; and 3) symptoms of hypercalcemia. **Drug Interactions:** PhosLo may decrease the bioavailability of tetracyclines. **Carcinogenesis, Mutagenesis, Impairment of Fertility:** Long term animal studies have not been performed. **Pregnancy:** Testosterone Effects: Category C. Animal reproduction studies have not been conducted. It is not known whether PhosLo can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Give to a pregnant woman only if clearly needed. **Pediatric Use:** Safety and effectiveness in pediatric patients have not been established. **Geriatric Use:** Of the total number of subjects in clinical studies of PhosLo (n = 91), 25 percent were 65 and over, while 7 percent were 75 and over. No overall differences in safety or effectiveness were observed between these subjects and younger subjects, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out. **ADVERSE REACTIONS:** In clinical studies, patients have occasionally experienced nausea during PhosLo therapy. Hypercalcemia may occur during treatment with PhosLo. Mild hypercalcemia (Ca²10.5 mg/dL) may be asymptomatic or manifest itself as constipation, anorexia, nausea and vomiting. More severe hypercalcemia (Ca²12 mg/dL) is associated with confusion, delirium, stupor and coma. Mild hypercalcemia is easily controlled by reducing the PhosLo dose or temporarily discontinuing therapy. Severe hypercalcemia can be treated by acute hemodialysis and discontinuing PhosLo therapy. Decreasing dialysate calcium concentration could reduce the incidence and severity of PhosLo induced hypercalcemia. The long term effect of PhosLo on the progression of vascular or soft tissue calcification has not been determined. Isolated cases of pruritus have been reported which may represent allergic reactions. **OVERDOSAGE:** Administration of PhosLo in excess of appropriate daily dosage can cause severe hypercalcemia (see **ADVERSE REACTIONS**).

REFERENCE: 1. Cunibi WY, Hodgins RE, McDowell LL, et al. Treatment of hyperphosphatemia in hemodialysis patients: The Calcium Acetate Renal Evaluation (CARE Study). In press.
2. K/DOQI guidelines (in press).

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Where Do Your RPG Dollars Go?

Please review our RPG Budget Report through the end of the fiscal year (May 31, 2004).

Member Services include:

- Forum: 4 issues a year
- 2 CPEU credits
- New Member Packets
- Limited stipends for education
- Area Coordinators:
 - Membership
 - Lending Library
- Website: www.renalnutrition.org
- Legislative and reimbursement news
- Awards and Scholarships
- FNCE Speaker Sponsorship
- Publications available for purchase:
 - Clinical Guide
 - National Renal Diet
 - Simplified Renal Instruction

Administrative Expenses include:

- Conduct business for members
- Teleconference calls
- Strategic plan development
- Printing, copying, mailing
- Educational projects
- FNCE
 - Display at DPG Showcase
 - Business Meeting
 - Speaker
 - Tuition assistance

RPG 2004-2005 Budget Report

	YTD Actual 2003-2004 (ended 5/31/04)	Budgeted 2003-2004
REVENUE:		
Membership Dues	\$53,450.00	\$39,000.00
Publication Sales	15.00	50.00
Merchandise Sales	274.00	0.00
Royalty	9,637.00	7,500.00
Subscription Incomes	175.00	35.00
Advertisement	23,114.00	10,000.00
Grants/Contracts	1,250.00	0.00
Investment Income	4,733.00	2,500.00
Miscellaneous Receipts	50.00	0.00
Total	\$92,724.00	\$59,085.00

	YTD Actual 2003-2004	YTD Budgeted 2003-2004
EXPENSES:		
2101 Administration	\$5,437.00	\$12,700.00
2102 Newsletters	42,842.00	25,875.00
2103 Ed. Projects	527.00	3,820.00
2104 Cyberspace/Internet	0.00	2,750.00
2105 Awards/Honorariums	2,889.00	11,400.00
2106 FNCE	9,332.00	10,160.00
Total	\$61,027.00	\$66,705.00

Total Current Assets (5/31/04)	\$136,591.00
Total Liabilities (5/31/04)	41,916.00
Total Net Assets (5/31/04)	94,675.00
Prior Year YTD	64,009.00

ADA-RPG Stipend Application

The ADA-RPG financially supports continuing education in the area of renal nutrition for RPG members. **Applicant must be a member of ADA-RPG for a minimum of 1 year.** Before submitting this application, please read the policy and procedures that are attached.

Please print or type application.

Applicant's Name: _____

ADA Registration #: _____ RPG Member? Y N Since: _____

Phone Number: _____
DAYTIME EVENING

Email address: _____

Mailing Address: _____

Program Title: _____

Program Date(s): _____

Is the program approved for ADA credits? _____ If so, how many? _____

How do you plan to travel to program? _____

Registration Fee for program: _____ Amount of \$ applied for from RPG _____

Do you have financial assistance from place of employment or others? _____

Have you applied for or accepted stipend funds from any other professional group for this same meeting? Y N If so, which group? _____

Briefly describe your objectives for the meeting _____

Do you have a paper to present? _____ if so, what is the topic _____

Mail to: MaryJo Dahms, RD, LD, CD
DaVita Inc.
2785 White Bear Ave., Suite 201
Maplewood, MN 55109
651-777-8839

American Dietetic Association Renal Practice Group Stipends *for* Professional Education

Policy

The ADA-Renal Practice Group supports continuing education in the area of renal nutrition for RPG members only. Thus, the RPG will allocate funds on a yearly basis to assist members wishing to attend conferences of professional interest. The Executive Board will determine the amount of available funds yearly. The application and procedure will be printed in the RPG newsletter, Renal Nutrition Forum, and be posted on the RPG website. Copies can also be obtained by contacting the Awards Chairperson.

1. The applicant must be a member of the ADA-RPG for at least one year.
2. A copy of the program must accompany the application.
3. The program must deal primarily with issues concerning the patient with ESRD or treatment of ESRD.
4. National ADA/CRN meetings will qualify. International meetings will be considered.
5. Applications may be made retrospectively if applicants desire.
6. One stipend per person per two-year cycle is allowed.
7. Persons presenting original research or review papers may receive priority consideration.
8. Signed stipend contract must be returned to the Awards chairperson prior to meeting.
9. To allow equitable access to stipend funds for all RPG members, applications will only be accepted exclusively to this group. RPG reserves the right to deny stipend funds to members who have accepted stipends from other professional groups (i.e. NKF-CRN) for the same professional meeting. RPG also reserves the right to deny stipend funds.
10. Applicants that have been approved for stipends and then choose to not attend the conference will not be allowed to apply for future stipends if this occurs two or more times.

Procedure

1. Applicants will be awarded on a first come, first served basis and the RPG will review all applications.
2. ADA-RPG will award stipends up to \$3,000.00 per year, with a cap of \$500.00 per stipend per budget (membership) year.
3. Funds will be provided retrospectively
4. Applicant will send application and a copy of the program to the Awards Chairperson.
5. The Awards Chairperson will notify the applicant of approval.
6. The applicant will return the signed contract to the Awards chairperson prior to meeting.
7. The applicant will summarize the assigned presentation(s) from the meeting and send the summary to the Award Chairperson and Renal Forum editor no more than two weeks after the meeting. See general style guidelines for writing summary. **ALL REPORTS MUST BE SENT VIA EMAIL OR ON DISC.**
8. The applicant will also send verification of meeting attendance and completed expense report with original receipts to Awards Chairperson. (If travel is via airplane-include boarding passes). We are unable to reimburse expenditures without original proof of payment.
9. Awards Chairperson will forward expense report to the treasurer once the presentation(s) summary is received from applicant.
10. The treasurer will send monies to applicant after all information is received. **RECEIPT OF MONEY BY THE APPLICANT MAY TAKE 1-3 months after submission of report.**

Updated 9/04

An electron micrograph showing a cross-section of an artery. The central lumen is a large, clear, light-blue area. The surrounding arterial wall is composed of various layers, including a prominent red-stained layer. Dark, irregular, and dense regions within the arterial wall represent medial calcifications. A label with an arrow points to one of these calcified areas.

The risks of secondary HPT go much deeper than bone

Medial calcifications

Arterial cross section as seen through electron microscopy

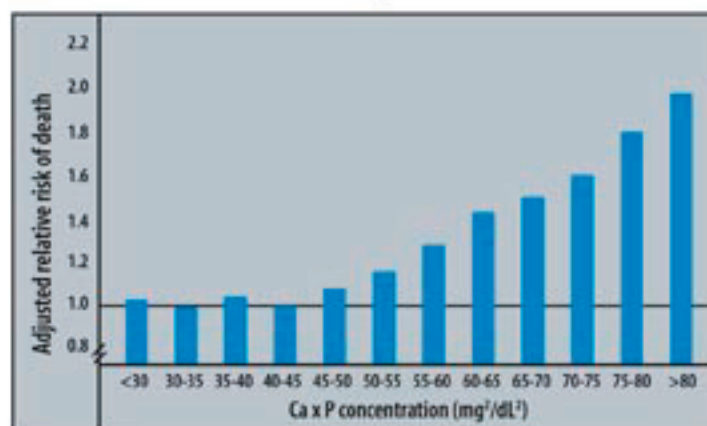
Failure to achieve NKF-K/DOQI™ bone metabolism goals* increases the risk of patient mortality^{1,3}

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

References: 1. Block GA, Klassen PS, Lazarus JM, Ofsthun R, Lowrie TG, Chertow GM. Mineral metabolism, mortality, and morbidity in maintenance hemodialysis. *J Am Soc Nephrol*. 2004;15:2208-2218. 2. Block GA, Hubert-Schwarz TE, Levin WK, Port FK. Association of serum phosphorus and calcium x phosphate product with mortality risk in chronic hemodialysis patients: a national study. *Am J Kidney Dis*. 1998;31:607-617. 3. Garrah SK, Stock AG, Levin WK, Hubert-Schwarz TE, Port FK. Association of elevated serum P₀, Ca x P₀ product, and parathyroid hormone with cardiac mortality risk in chronic hemodialysis patients. *J Am Soc Nephrol*. 2007;18:2111-2118. 4. National Kidney Foundation. K/DOQI Clinical Practice Guidelines for Bone Metabolism and Disease in Chronic Kidney Disease. *Am J Kidney Dis*. 2003;42(suppl 3):S1-S201. 5. Kim J, Pisoni RL, Sarver M, Satajathum S, Klassen R, Young TW. Achievement of proposed NKF-K/DOQI bone metabolism and disease guidelines: results from the dialysis outcomes and practice patterns study (DOPPS). *J Am Soc Nephrol*. 2003;14:268A-270A. Abstract F-PO442. 6. Data on File. Amgen Inc, Thousand Oaks, Calif.

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

MAKING SECONDARY HPT A PRIMARY FOCUS.

AMGEN™

RPG Chair Message

By Anne Ishmael, MS, RD, LD Anne is a renal dietitian for Gambro Healthcare, San Jacinto in Houston, Texas and can be reached at auto63347@hushmail.com.

At the 2004 FNCE, RPG's priority presentation, "Intensive Care to Outpatient Care: Survival Skills for Renal Practice" exceeded its stated objectives. Audio CDs are available for purchase from ADA's bookstore. Our speakers were Laura Byham-Gray, PhD, CNSD and Karen Wiesen, MS, RD, LD, who were the editors for the latest handbook, *A Clinical Guide to Nutrition Care in Kidney Disease*. Both editors signed copies of the book during the RPG General Membership Breakfast. This joint publication of both RPG and the Council on Renal Nutrition of the National Kidney Foundation (NKF) was released at FNCE. It is an excellent resource for dietitians preparing for the Board Certified Specialist in Renal Nutrition (CSR) examination and a valuable reference for practicing dietitians who care for patients with chronic kidney disease.

Amgen generously sponsored this year's RPG membership breakfast meeting. Lily Kaye, B.S., B.Ed., Pharm.D, BCPS, CDE,

delivered Amgen's feature presentation, "Targeting Secondary HPT Clinical Consequences, New Therapeutic Goals, and the Role of Sensipar (cinacalcet HCl)."

An award was presented to Jennifer Smothers for serving as RPG Chair for 2003 - 2004. Lois Hill provided a legislative update, and Clara Batty encouraged RPG members to run for an office with ADA. Another activity at the membership breakfast was taste-testing Pro-Stat, a ready to consume, liquid protein supplement, providing 15 grams of protein in 30 mL. Mary Ellen Smith, RD, from Pro-Stat, provided information about the product and forms to request samples. For more information on Pro-Stat, visit the website: <http://www.pro-stat.info/index.htm> (Accessed October 11, 2004).

The Executive Board approved the use of online voting for RPG's elected positions. Online voting will start with our 2005 elections. The board has made a three-year commitment to American Dietetic Association Foundation (ADAF) to provide a total of \$2,100 to fund research opportunities.

Legislative opportunities abound on local, state and national levels. Congratulations to the dietitians in Missouri who now have a mandatory licensed practice act after ten years of legislative initiatives. The kidney community has been asked to speak up for the ESRD Modernization Act of 2004 (Senate Bill 2614) in Congress. You can develop or sharpen your advocacy skills by attending ADA Public Policy Workshop March 1-3, 2005, at the Capital Hilton in Washington, D.C. and/or NKF's 2005 Spring Clinical Meeting May 4-8, 2005, in Washington D.C. A pre-conference, legislative workshop will be offered at the NKF Spring Clinical Meeting. Any day can be an "ESRD Day" in your facility - where you invite a legislator in to expand their awareness of the unique needs of the patients with chronic kidney disease. Contact Karen Bassinger at kbase1@comcast.net or your area coordinator if you want to be involved with legislative issues.

Sincerely,

Anne Ishmael, MS, RD, LD

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 thwnd 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!

CRN Chair Message

By Susan M. Reams, RD, CSR, LD

Susan is chair of the Council on Renal Nutrition (CRN) of National Kidney Foundation (NKF) and is chief clinical dietitian at Mercy Medical Center in Des Moines, Iowa. She can be reached at sreamswdm@prodigy.net

Aim High

Dear RPG and allied team members,

As I reflect back on my three-year term as the CRN Chairperson, I am secure in knowing that I aimed high with my endeavors. I feel that I have been able to hurdle over many obstacles and have accomplished a list of numerous "to do's." My involvement with CRN has been the most rewarding experience that I will forever cherish and be grateful for.

Being able to represent and lead the CRN membership through a wide variety of networking activities and patient and professional projects has provided me with the strength and fortitude to pursue and be selected for a new directorship role at my place of employment. These CRN activities have gifted me to lead with my heart and not just my mind. I was given the opportunity to work alongside many wonderful individuals, including the RPG Board and many of your members.

Together, CRN has accomplished many great things, and some of them jointly with the RPG, which I will now take this opportunity to highlight.

- 1) The completion and publication of the 3rd Edition of the *CRN Pocket Guide*.
- 2) The expansion and improvement of the Annual Spring NKF- Clinical Meetings, including the superior CRN program.
- 3) Initiating a joint CRN-Executive Committee and RPG-Board networking breakfast at NKF Clinical Meetings.
- 4) Rekindling the CRN-RPG liaison and returning the CRN Chairperson Message to the *Renal Nutrition Forum*.

5) Working with the RPG to collaborate with Centers for Medicare & Medicaid Services (CMS) in developing a National Renal Dietitian survey, thus changing the components of the CMS 2728 Form to reflect the importance of renal nutrition and its impact on the CKD patient population.

6) The development and implementation of the CRN Research Bulletin Board Website.

7) Collaboration with the RPG in the development and publication of the "Renal Dietitian's Standards for Clinical Practice."

8) Working side by side with the RPG to write and publish the third edition of *A Clinical Guide to Nutrition Care in Kidney Disease*.

9) Development of the Strategies II-Advanced Course to debut at NKF's Clinical Meetings 2005 in Washington, D.C.

10) The joint venture of the *Journal of Renal Nutrition* (JREN) with the International Society of Renal Nutrition and Metabolism (ISRN&M)

When I was "placed" into my role as Chairperson in the Fall of 2001, one of my main goals was to restore the integrity and mission of this volunteer organization and to bring it back to the forefront of the NKF organization. I believe this has been accomplished because I had the support and confidence from my CRN team members and from all of you to fulfill my passion and dreams.

I realize that I set the bar very high for myself and for all of you as well. It is important to believe in yourself, and in what you are capable of doing. Do not be afraid to expand your horizons, venture "outside" of your safety zone or your "box," but do so in a manageable manner so you can provide quality work, not just quantity. Remember to seek out the acknowledgment you deserve because you are the CKD expert in nutrition.

Another goal that I had was to provide an effective template of professionalism by mentoring those who touched my life. Again, you need to seek out quality, not perfection, thus allowing yourself to have reachable goals. Have the courage of conviction to do your best and achieve your desired outcomes because the payback will be ten-fold in building up your self-esteem.

So, in closing, I want to sincerely thank the CRN Executive Committee, the CRN membership, the NKF Staff, the RPG Board and its membership, my colleagues, my family, my friends and my religious faith for the undying support you have given me over these past 3-plus years.

I will always have "renal" in my blood, and my heart will always remain as an expert in renal nutrition. It has been my honor to serve all of you in this position. Please remember to remain strong and steadfast, because you, too, CAN "aim high!"

With my Utmost Best!

Susan M. Reams, RD, CSR, LD
CRN Chairperson
2001-2004



Look Who's Running for Office

RPG members are on
the ADA ballot!

Jessie Pavlinac, MS, RD, CSR, LD
for Speaker-Elect of the House
of Delegates

Jenny Smothers, RD, LD for
Professional Issues Delegate for
Clinical Nutrition

Rehab Corner

The Second “E” from the Five “E’s” of Renal Rehabilitation: Education

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.

Part I — Readability

This column was adapted from an article in the Nephrology Nursing Journal July-August 2004 by Michael D. Aldridge, MSN, RN, CCRN.

Do you create your own education materials? Do you use education materials from a variety of resources? Well, if you answered “yes” to either of these questions, please read further if you want to make sure that you are not wasting your time on materials that are not usable. How could your materials not be usable if you are already using them? Simple – what reading level are your materials? Are they written at the 5th-6th grade level? If your answer is no, then the majority of your patients cannot use your materials. What a waste of time – literally.

What is readability?

Readability is simply defined as “characteristics of written material that make that material ‘easy’ or ‘difficult’ to read.” There are some simple strategies you can do when writing and checking that your materials are written at the 5th-6th grade level. When creating your own materials, there are two aspects,

design and writing, which will simplify the readability level. Design refers to the visual elements of the material. The goal is to create something that is visually appealing, uncluttered, and easy to follow.

Examples of design include:

- using a font easy to read such as Arial
- using 14-point font
- Lists are bulleted so they are easy to follow
- Keep a lot of white space on the page

Writing refers to words that make up the text, as well as sentence structure and the style in which the text is written.

Examples of writing include:

- Write in an active voice “you” and not use “I” or “the patient”
- No more than 10-15 words per sentence
- Use numerals (1, 2) instead of numbers spelled out
- Decrease the number of words that contain more than 3 syllables

How can you check for readability?

Most word-processing programs can produce readability information. You can usually find it by searching for “readability” in the Help menu. If you have developed your education material(s) in Microsoft Word, here are some simple steps you can follow:

1. Click on “tools” “options” “spelling and grammar”
2. Select the “show readability statistics” box
3. Click “okay”
4. When you are finished with your document go to “tools” and select “spelling and grammar.” The program will complete its spelling and grammar checks, and then present the readability statistics for your document.

Now, your education materials will be at the appropriate reading level. Not only are they readable, they are useable. This creates the opportunity for your patient to understand and adapt the information in your materials. Readability does not equal understanding; it simply creates opportunity for understanding.

How does readability relate to rehabilitation?

Education is one of the “5 E’s” of renal rehabilitation. Any means of improving education improves rehabilitation efforts. Regardless of the education topic, whether or not it’s specifically on rehab, nutrition, etc, we are striving to improve our patients’ quality of life. To obtain more information on ways to improve readability of education materials, please read: Aldridge, MD. Writing and Designing Readable Patient Education Materials. *Nephrology Nursing Journal*. 2004;31:373-377.

MANY THANKS

Thank you to the following peer reviewers for this issue:

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Lori Smuckler
Martha Wilkins
Laura Yates

Stipend Report

Diagnostic Nutrition Residency: An Opportunity For Advanced Practice

By Maureen P. McCarthy, MPH, RD, CSR, LD Maureen is a renal dietitian at Pacific Northwest Renal Services and a transplant dietitian at Oregon Health and Sciences University in Portland, Ore. She may be reached at mmccarthy@renalcaregroup.com.

In June 2004, dietitians who had completed the first-ever session of the Diagnostic Nutrition Residency (DNR) at the Veterans Affairs Medical Center (VAMC) in Phoenix, AZ, presented talks on aspects of Nutrition Diagnosis that had inspired them during the 12-month program. Topics ranged from specific components of the Nutrition Physical Exam (NPE)—the mouth and the nails were featured; to biotin status in uremia and the nutrikinetics of chronic kidney disease; to the serious work of clarifying concepts at the center of clinical challenges, such as mechanical intolerance of gastric feedings in critically ill patients.

To provide some background, the Nutritional Injury-Specific Diagnostic Nutrition Residency (NI-S DNR) is a 12-month program. Students meet five times for 2-3 days each over the course of 12 months at the Carl T. Hayden VAMC in Phoenix. Eligible dietitians must be: 1) registered dietitians; 2) in positions with direct patient care currently and for at least 3 years previously; 3) part of an interdisciplinary team; 4) able to attend four 3-day didactic sessions and a 2-day culminating conference; 5) able to provide written support from their facility; and 6) willing to find support for travel, lodging and meals for these meetings. There are no additional fees. Upon successful completion of the course, students are Certified Nutrition Injury Specialists (CNIS). Faculty include Diane Parrington, PhD, RD, CNSD, VAMC-Phoenix; Carrie Jo Braden, PhD, RN, FAAN, University of Texas Health Science Center-San Antonio; John Costantino, DO, VAMC-Phoenix; and Mary Ann Kight, PhD, RD. The CNIS certificate bears the seal of the Department of Veterans Affairs. The first and future classes of residents will be breaking new ground to demonstrate and convince health care leaders of the certification's value.

The biggest attraction of the residency is the opportunity to observe and practice the NPE with experts such as Kight, Parrington and Costantino and with in-patients identified by staff dietitians at the VAMC-Phoenix. Faculty lead residents through physical exams of selected patients in their hospital rooms. Eventually, the students demonstrate techniques of the nutrition physical exam and discuss their findings at bedside and in detailed discussions in the classroom. Most importantly, the techniques of the NPE are applied in the work setting between DNR sessions.

During the year, there is a significant focus on concept clarification to allow practitioners to develop theories related to problems encountered in clinical settings. In the 2003-2004 residency, one 3-day session was completely devoted to this material. Students brought concepts from their clinical practice settings, such as:

- mechanical intolerance of gastric feedings in critically ill patients (Kim Kilde, RD, CNSD, VAMC-Phoenix)
- micronutrient supplementation in long-term care (Kathleen Williams, RD, LD, Northern Arizona VA Health Care System)
- nutritional dysadaptation/injury states (Marianna Gammon, MS, RD, CDE, El Dorado Hospital, Tucson)

Each student researched literature related to her/his selected concept and prepared an extensive paper to develop and analyze the concept. This exercise included identifying and exploring personal and professional values that would have an impact on how the practitioner approached the concept. This is the kind of work that will guide dietitian-led, evidence-based advances in clinical practice with understanding of practitioner issues, such as workplace resources and scope of practice concerns.

Those of us in renal nutrition are fortunate to have the work of Mary Pat Kelly, MS, RD, as a model of nutrition diagnostics in our specialty area (1). Two renal dietitians participated in the DNR during its first year: Joy Lutz-Mizar, RD; and Maureen

McCarthy, MPH, RD, CSR. Lutz-Mizar, who practices in the Los Angeles area, has a longstanding interest in biotin nutrition in the ESRD population. She presented some of her clinical observations, including a case study of biotin in the treatment of uremic neurological disorders. This author spoke about the prekinetic phase of nutrikinetics in uremia. Nutrikinetics describes the fate of nutrients in the body over time, in particular the processes of prekinetics, absorption, distribution, metabolism and excretion (see Table 1). As dietitians, we should understand and be able to describe these processes in detail as an essential step in developing and justifying medical nutrition therapy.

Aguilera and his colleagues in Spain have described disordered eating behaviors in uremic patients (2). They used the model of appetite regulation described by Schwartz, et.al. and reported how it is altered in uremia (3). For example, since leptin is partially cleared by the kidney, levels increase during chronic kidney disease (CKD), stages 3 to 5 (2). This creates a feeling of satiety, leading to lower intake of calories and protein (4). Numerous other changes in uremia result in the anorexia we see in CKD patients. High levels of tryptophan are seen and, since tryptophan is a precursor of serotonin, this creates high serotonin levels in the brain, further reducing appetite. Increased cytokine levels, characteristic in CKD, are associated with anorexia and malnutrition; they also cause increased leptin production, creating a sense of satiety. Elevated tumor necrosis factor (TNF) reduces GI motility and promotes acidosis. These and other alterations in CKD and end-stage renal disease (ESRD) interfere with normal appetites, compromising nutrient intake (2).

It is ironic that often the best antidote for on-the-job fatigue is continuing education, an effort to learn new skills or to advance and perfect existing skills. Though this brought more time burdens to complete coursework while meeting the needs of a full caseload, it was very inspiring. In my

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brought more time burdens to complete coursework while meeting the needs of a full caseload, it was very inspiring. In my practice, I am using a modified nutrition physical exam technique in pre-kidney transplant nutrition assessments, as well as with my adult hemodialysis patients at Pacific Northwest Renal Services of Renal Care Group of the NW. At Oregon Health and Science University, led by Jessie Pavlinac, MS, RD, CSR, LD, we will begin training clinical dietitians in the nutrition physical exam. Finally, I can hardly wait to tease out the details of the other four phases of nutrikinetics in CKD!

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Table 1. Definitions for Nutrikinetics

- **P**rekinetics – before the absorption of nutrients (5)
- **A**bsorption – the taking in of food; the process of absorbing or being absorbed (6)
- **D**istribution – movement of nutrients, or products of absorption, throughout the body (5)
- **M**etabolism – sum of chemical and physical changes in food after ingestion; the chemical changes in living cells by which energy is provided for vital processes and activities and new material is assimilated (6)
- **E**xcretion – process that eliminates undigested residue of food and waste products of metabolism (6)

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For information about the Nutrition Diagnostic Residency, contact Diane Parrington, PhD, RD, at diane.parrington@med.va.gov. Applications for the 2005-2006 class will be sent out electronically in January 2005.

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Stipend Report

Cardiovascular Disease Risk Factors in Chronic Kidney Disease from National Kidney Foundation's Clinical Meetings 2004

By Alison J. Rigby, PhD, MPH, RD, CSR

Alison is a researcher at Stanford University, teaches nutrition/dietetics classes at San Francisco State University, and practices in renal nutrition.

This article is a review of the National Kidney Foundation (NKF) Kidney Disease Outcomes Quality Initiative (K/DOQI) focus on cardiovascular disease risk factors in chronic kidney disease (CKD). It summarizes some of the clinical practice guidelines for hypertension and provides an update on dyslipidemia management, as presented by Dr. Gerald B. Appel, Dr. Michael V. Rocco, Dr. Lawrence G. Hunsicker and Dr. Domenic A. Sica, during the NKF Clinical Meetings in Chicago, Illinois 2004.

The symposium provided highlights of the hypertension and dyslipidemia guidelines and a summary of some expert perspectives on the utility of implementing the guidelines for kidney patients that are at increased risk of cardiovascular disease (CVD).

CVD is the leading cause of mortality in CKD patients and data from the United States Renal Data System show that patients with CKD, but not yet on dialysis, have an increased incidence (9%) of cardiovascular (CV) events over patients without CKD. The Heart Outcomes Prevention Evaluation (HOPE) trial found CKD to be an independent predictor of CV events, with 22% of patients with serum creatinine 1.4-2.3mg/dL experiencing CV death, myocardial infarction (MI), or stroke over the 4 years studied, as opposed to 15% in those patients without CKD.

Hypertension is present in 70% of the 5.6 million persons in the US with renal insufficiency. The presence of CKD in hypertensive patients increases CV events and mortality. The control of systolic hypertension has been associated with decreased CVD mortality in many recent studies. Patients with stages 4 and 5 CKD commonly have dyslipidemia and insulin resistance. It appears that tight control of blood pressure and plasma lipids is warranted. A blood pressure goal of

130/80mm Hg is appropriate for all stages of CKD. Patients should be taught to measure and record blood pressure, whenever possible.

Antihypertensive drug therapy should be used in CKD to lower blood pressure, reduce the rate of CVD in patients with or without hypertension and to slow the progression of kidney disease in patients with or without hypertension. Angiotensin-converting-enzyme inhibitors (ACE-I) or angiotensin-receptor blockers (ARBs) are the preferred agents in diabetic kidney disease and non-diabetic kidney disease with proteinuria (spot urine total protein-to-creatinine ratio $\geq 200\text{mg/g}$). Recent trials have demonstrated a kidney protective effect with the use of these agents blocking the renin-angiotensin-aldosterone system (RAAS). Concern over the cardiac and renal safety of calcium channel blockers (CCBs) has been expressed recently from some large clinical trials. In most cases no beneficial or adverse effects were found from using these agents.

Therapeutic lifestyle changes (TLC) as utilized in CVD risk reduction should be recommended as part of the treatment regimen. These include weight loss if appropriate, daily moderate intensity exercise, smoking cessation, and moderate alcohol intake. Sodium intake of less than 2.4g/day (100 mmol/day) should be recommended in patients with CKD and hypertension. Most classes of antihypertensive agents result in sodium retention, as compensation for lower blood pressure. This may substantially blunt the anti-hypertensive effect. In patients with high sodium intakes, adequate diuresis is important to restore the responsiveness to RAAS blockers. Diuretics should be used in most patients to assist in treating hypertension related to fluid overload. Patients should be monitored for hypotension, decreased glomerular filtration rate (GFR) and serum potassium levels.

According to the K/DOQI guidelines, all adults and adolescents with CKD should be evaluated for dyslipidemia. The evaluation

should include a complete fasting lipid profile with total-cholesterol (total-C), low-density lipoprotein-cholesterol (LDL-C), high-density lipoprotein-cholesterol (HDL-C) and triglycerides (TG). Compared to the Adult Treatment Panel III of the National Cholesterol Education Program guidelines, CKD needs to be considered in the highest risk category, and the evaluation for dyslipidemia should occur at presentation, versus every 5 years. For adults and adolescents with Stage 5 CKD, fasting lipid profiles should be evaluated initially, at 2-3 months after a status change or other condition known to cause dyslipidemia, and annually.

Drug therapy (mainly statins and fibrates) should be used for high LDL-C and high TG after first emphasizing TLC. For adults with Stage 5 CKD who have fasting TG $\geq 500\text{mg/dL}$ ($\geq 5.65\text{mmol/L}$) that cannot be corrected by removing any underlying cause, treatment with TLC and a TG-lowering agent should be considered. For adults with stage 5 CKD and LDL-C $\geq 100\text{mg/dL}$ ($\geq 2.59\text{mmol/L}$), TLC and drug therapy should be considered to reduce LDL-C to $<100\text{mg/dL}$. For adults with stage 5 CKD and LDL-C $<100\text{mg/dL}$, fasting TG $\geq 200\text{mg/dL}$ ($\geq 2.26\text{mmol/L}$) and non HDL-C (total-C minus HDL-C) $\geq 130\text{mg/dL}$ ($\geq 3.36\text{mmol/L}$), treatment should be considered to reduce non-HDL-C to $<130\text{mg/dL}$.

The K/DOQI advocates TLC for adults with CKD, which includes consultation with a dietitian with expertise in CKD. The proposed diet should outline a reduction in saturated fat (saturated fat $<7\%$ of total calories) and an increase in monounsaturated fat up to 20% of total calories (total fat: 25-35% of total calories). Components of the diet that reduce dyslipidemia should be emphasized, including 20-30g fiber/day (5-10g/day of viscous (soluble) fiber) and the use of plant stanols/sterols of 2g/day. "Total calories" should be reinforced to attain or maintain

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standard National Health and Nutrition Examination Survey (NHANES) body weight and a body mass index (BMI) 25-28 kg/m².

Physical activity goals include moderate daily lifestyle activities, using a pedometer to attain/maintain 10,000 steps per day, with regular daily motion and distance (within each person's ability) being emphasized. Moderate planned physical activity should be incorporated three to four times per week, with 20-30 minute periods of activity. A five minute warm-up and cool-down should be included, plus some resistance training to emphasize lean muscle mass and reduce excess body fat.

The greatest increase in CKD is occurring in older patients at risk for CVD. It is evident that renal dietitians have an important role in the referral of patients for the measurement of "traditional" CVD risk factors and for the aggressive nutrition and life-style management of the high risk CKD patient.

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Stipend Report

Nutrition Across the Continuum of Care

By Paula Rhoades, PhD, RD, LDN
Paula is a renal dietitian at Dialysis Clinic Incorporated in Shreveport, La. She may be contacted at paularhoades@netzero.net

Judith A. Beto, PhD, RD, FADA, presented her PAGE classification system for kidney disease management at the National Kidney Foundation (NKF) Clinical Meetings in Chicago in April 2004 (CM.04). The PAGE system divides patients into Pediatric, Adults, Geriatric, and End of Life subgroups.

Dr. Beto identified key areas of focus and goal-setting for persons with chronic kidney disease (CKD) stages 1 to 4, end stage renal disease (ESRD), or CKD, stage 5 requiring renal transplantation, and transplant. (see Table 1). Within each of these three stages of care, the key focus and long term goal are identified on the grid (see Table 1). For example, the key focus of chronic kidney disease for pediatric patients is growth and development and the long term goal is delay of progression of kidney disease. In contrast, the key focus of patients at end of life (at any age) is quality of life and recognition of advance directives.

Dr. Beto suggested that the entire health care team use the PAGE system as a training tool for patient care conferences and quality improvement meetings. Then all members are on the "same page" regarding

the nutritional priorities for specific patients. Priorities are the "differences between where you are and where you want to be." Patient care priorities vary by the position of the patient on the grid and his or her co-existing specific conditions. With a starting place identified, each team member can tailor care for that patient.

After outlining the PAGE system, Dr. Beto described how to apply it. She challenged dietitians to set one goal for each patient for the next three months. As an example, the key focus of adults at the ESRD stage of PAGE is maintaining health. Dr. Beto encouraged dietitians to address fad diets with their patients undergoing renal dialysis. She cited high protein-low glycemic response diets, calcium-fortified foods, plant sterols, and viscous fiber as issues of interest to these patients. She emphasized the need to be specific with patients about how to do things, such as weighing food or matching phosphorus binders with particular portions of foods.

To move toward helping patients meet their goals dietitians will need to keep abreast of latest developments in health care. In PAGE, for example, transplant patients' key focus is graft survival, so monitoring vitamin supplementation research will be necessary. Dr. Beto referred participants to her article with Dr. Bansal in the March 2004 issue of *The Journal of the*

American Dietetic Association (1). The article summarized National Kidney Foundation Kidney Dialysis Outcome Quality Initiatives (K/DOQI) clinical practice guidelines for nutritional care in CKD. The current recommendations for the dietary parameters of protein/energy, sodium/fluid, potassium, phosphorus/calcium and vitamins were given.

Other recent developments in health care may require dietitians to refresh their skills. Kinetic modeling and hospitalization risk indexing, for example, can contribute to a higher level of patient care. If dietitians need assistance or feedback on a proposed project, Dr. Beto suggested creating a "virtual advisory board" by sending questions to colleagues and experts in the field and soliciting their input.

Dr. Beto emphasized the need to instruct patients' families as well as patients on renal diet restrictions. The goal is to focus nutrition care on the priorities a given patient subgroup.

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Table 1 Beto's PAGE classification system for CKD Management (2)

	Pediatrics	Adults	Geriatric	End of Life
Age (years)	<18	18-64	65+	Any age
CKD				
Key focus	Growth Development	Maintain or promote health	Maintain or promote health	Quality of life Recognition of advance directives
Prevention goal	Retard/delay progression	Promote health	Minimize aging effects	Retard/delay progression
ESRD				
Key focus	Growth Development	Maintain or promote health	Maintain or promote health	Recognition of advance directives
Long term goal	Transplant	Transplant or effective dialysis	Effective dialysis Transplant?	Quality of life with or without dialysis
TRANSPLANT				
Key focus	Growth Development Graft survival	Graft survival	Graft survival	N/A
Long term goal	Control of weight, hypertension	Control of weight, hypertension, dyslipidemia	Control of weight, hypertension, dyslipidemia	N/A
Used with permission by Judy Beto, PhD, RD				

Stipend Report

Incorporating Everyday Exercise Into Your Patients' Lifestyle

By Susan Tweeddale, RD, LD Susan is the clinical dietitian at Fort Smith Regional Dialysis Center in Arkansas and Poteau Dialysis Center in Oklahoma. She can be reached at susancroot@usa.net

Problems I have encountered in my dialysis units have not changed much over time. The majority of patients are type 2 diabetics, hypertensive, or both. Most patients start dialysis discouraged, depressed, and out of shape – living with the consequences of smoking, making unwise food choices, a sedentary lifestyle and being non-adherent with prescribed dietary and medication regimens. For years I have informed patients about how kidney disease alters their body's needs, taught them what those needs are and encouraged them to make choices that would give them a better quality of life. Some choose to be empowered. For many others, non-adherence leads to potassium and phosphorus levels remaining outside recommended boundaries, to low albumin, and to excessive fluid gains, all of which lead to a myriad of preventable problems.

A counselor once said to me "it is unfair to expect different results by doing the same thing." For years I have done the same thing with similar results. Knowledge was often not being translated into action. How to make patients WANT to make changes? Sheila Gaffney PTMS, Vanderbilt University, speaking at the National Kidney Foundation (NKF) meeting in Chicago in May, redirected my attention. Exercise is a great motivator. The more people do, the better they feel. Exercise can help patients translate knowledge into action – to make long-term lifestyle changes that would improve their quality of life, no matter their stage of kidney disease.

A brief outline of the Vanderbilt plan Sheila helped develop follows:

"Incorporating Everyday Exercise Into Your Patients' Lifestyle"

Benefits of Exercise:

Improves:

- Quality of life

- Strength and Endurance (leading to increased mobility)
- Balance (preventing falls)
- Hematocrit

Lowers:

- Cholesterol
- Blood Pressure
- Blood Sugar
- Promotes weight loss
- Adds social interaction

Before starting an exercise program, the facility staff should:

- Find out patient goals in order to "hook" them into exercise.
- Educate caregivers to encourage patients to exercise. Exercise will improve functional status, decrease hospital stays, and increase days at the dialysis center, making life easier for the caregiver.
- Get a buy-in from the staff. For example, nurses and technicians get points for patients who exercise. Points are cumulative. The person with the highest number of points gets sent to the convention of their choice or gets a financial payoff at the end of the year as a bonus.
- Get a physician's order – the number one motivator for staff. This could be done as a "unique order" so that it must be addressed daily or charted as not completed. For example, "Patient is able to participate in exercise program while on dialysis." Medicare may pay for physical therapy with a doctor's order.

Before starting an exercise program, the patient must have:

- Adequate dialysis
- Stable blood pressure
- Stable blood sugar
- Freedom from infection
- Freedom from illness

Develop an exercise plan, choosing all three types of exercise with the most time spent on cardiovascular:

Types of Exercise:

- Flexibility: will help joints, making

- bending and stooping easier and may decrease falls, decreasing fractures
- Strength: will increase muscle strength. Cardiovascular: make circulation, lung and heart work more efficiently.
- Frequency/Intensity/Duration (goals vary with the individual):
- Frequency: Flexibility daily; Strengthening every-other-day; Cardiovascular starting slowly, 3-4 times weekly.
- Intensity: Start slowly and progress gradually.
- Duration: Start short, increase slowly, thirty minutes or longer continuous movement is recommended.
- Measure progress – keep records.

Cautions:

- Exercise outside in moderate temperatures only.
- Do not exercise if febrile.
- Do not exercise if dialysis treatment is missed.
- Exercise should not cause pain; stiffness and soreness is okay, incapacity is not.

Key points to Exercise Success:

- Keep it positive.
- Keep it simple.
- Start slowly, add exercises over 2-3 weeks.
- Make it fun, mix it up.

Exercise off Dialysis (examples)

- Aquatics: good for non-swimmers and helps joint problems.
- Walking: start 5 minutes out, 5 minutes back; slowly with a partner; increase time slowly before increasing speed.
- Recreational team sports.
- Cycling.
- Freewheeling: start with "no tension" for 5 minutes and work up.
- Strength training: use equipment, soup cans (14½ oz), beanbags or weights (1#-5#), or Thera-bands to start.
- Climbing up stairs
- Raking
- Sweeping
- Park farthest away in the parking lot
- Exercise during dialysis

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Patients should exercise during the first two hours of treatment.

- Do not exercise dialysis arm.
- Be seated or reclining, according to tolerance.
- Start with no or low weights and build gradually.
- Do not exercise if low or high blood pressure or blood sugar, fever, cold or cardiac symptoms.

Exercise options on treatment

- Stretching: start with Thera-bands tied to chair, for upper extremities mainly.
- Weights: cuff or arm weights available. If hypotensive, recline to do exercises; put on arm or ankle.
- Cycles: 1 bike/10 patients; Champ Cycle \$500 each; may use cuff weights with cycling.

Exercise offers hope. It can improve depression, making change (i.e., adherence with renal diet, fluid restriction and medications) more "doable." Exercise may be done off or on treatment. Done on treatment, exercise is time well spent – supervised, safe, and free. We are planning to start an exercise program in our clinics. Donated funds will be used to purchase exercise equipment and a video camera for patient education. Valuable starter information and resources were gleaned from Ms. Gaffney's talk at the NKF meeting in May. Three principles from Sheila worth remembering:

- "Incorporate exercise into your own life first."
- "G.O.Y.D." – Get Off Your Duff!
- "Any exercise is better than no exercise."

RESOURCES FOR THE PROGRAM

- Amgen Renal Advances; Telephone 800-468-7777 (call for free copy):

- Exercise: A Guide For People On Dialysis by Patricia Painter, PhD, developed by Life Options Rehabilitation Advisory Council.
- Feeling Better With Exercise: A Video Guide For People On Dialysis.
- Champ Cycles: www.championchair.com (accessed October 13, 2004)
- Sheila Gaffney PTMS, Vanderbilt University; Telephone 615-343-1161; e-mail: sheila.gaffney@vanderbilt.edu
- National Kidney Foundation; Telephone 800-622-9010 (call for free brochure); "Staying Fit With Kidney Disease"
- Thera-bands: system of progressive resistance; Telephone 423-238-7800 – call for information.

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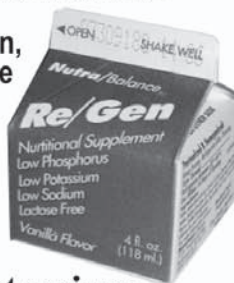
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