RENAL NUTRITION FORUM
A Publication of the Renal Dietitians Dietetic Practice Group
www.renalnutrition.org
VOLUME 26 NUMBER 2 ■ SPRING 2007

Renal Dietitians

A Dietetic Practice Group of American Dietetic Association

Feature Article:

An In-Depth Review of the Use of IV Vitamin D Analogs and Parathyroidectomy in the Management of Secondary Hyperparathyroidism to Treat Calcific Uremic Arteriolopathy in Dialysis Patients.

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Nothing compares with calciphylaxis, or the more clinically appropriate term - Calcific Uremic Arteriolopathy (CUA), as a condition and complication both intriguing and poorly understood in chronic kidney disease. Although it is a relatively rare condition, the related morbidity and mortality rate remains high due to the lack of knowledge related to the pathogenesis of this condtion.

Calciphylaxis or Calcific Uremic Arteriolopathy

Calciphylaxis is an uncommon condition that affects around 1-4% of End Stage Renal Disease patients. It is a vasculopathy occuring primarily in patients with chronic kidney disease. It causes a spectrum of end-organ damage due to ischemia. Sometimes this ischemia can be so severe that it causes infarction to the downstream tissues. The most common and most noticeable cases occur in skin and subcutaneous tissues. The risk of infection increases when the ischemia leads to subcutaneous nodules of infarction and necrotizing skin ulcers that heal poorly. The risk is especially high in regions that posses thicker subcutaneous adipose tissue, such as the breast, abdomen, and thighs. It is a painful condition that develops rapidly and usually leads to ischemic skin necrosis, non-healing ulcers and gangrene that may lead to amputation. Sepsis is the major cause of death; it occurs in approximately 60% of patients who suffer from this condition. Calciphylaxis is usually more prominent in females. The approximate female-to-male ratio is 3:1. It is observed to occur more frequently in Caucasians. It has been reported in individuals ranging from 6 months old to 83 years old. A mean patient age of 48 years was calculated from a large series of patients. It has been observed that younger patients who have received a longer duration of renal replacement therapy, such as dialysis, have a higher chance of developing this condition (1-3).

Vascular calcification was first reported in association with uremia by Bryant and White in 1898 (3). However, uremia, vascular calcification, and skin necrosis were rarely seen. It was not until 1962 that CUA was first properly defined and coined by Selye and colleagues as a “condition of hypersensitivity in which-especially after a sensitization by a specific calcifying factor (e.g. vitamin D compounds, parathyroid hormones)-topical treatment with certain challengers (e.g. egg white, egg yolk, metallic salts) causes an acute local calcinosis followed by inflammation and sclerosis” (4). Selye

In This Issue:

From the Editor's Desk

Renal Nutrition Forum is published quarterly (winter, spring, summer, fall) as a publication of the Renal Dietitians Dietetic Practice Group of the American Dietetic Association.

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

Future Deadlines:
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Remember to update your profile electronically in the 'members only' section of ADA's website. You will need your registration number and web password. Keeping ADA informed of your name and contact information will help avoid delayed issues of your Renal Nutrition Forum.

I find the following quote a source of inspiration and a reminder to follow my dreams!

"We should show life neither as it is nor as it should be, but as we see it in our dreams." Chehkov

It doesn't matter what you do or how you do it but most accomplished business leaders, athletes or even artists have a vision or dream of their ultimate goal or goals. In order to accomplish a goal whether in business, art or athletics it is necessary to have a vision. Athletics provides the most literal example of mind over matter and what it means to envision and dream of your eventual success. The Olympics is the ultimate test of an athlete's mental and physical prowess.

"I dream my paintings and then I paint my dreams."
Van Gogh

We are reminded of many instances of individuals overcoming incredible hardships or barriers to achieve their goals. One of the cornerstones of a successful business leader or athlete is being able to envision success every minute of the day and in everything they do!

It is easy to relate and identify with the trials and challenges of individuals that pursue the Olympic dream of winning a gold medal. The following are examples of two Olympics athletes that followed their respective dreams and realized them too! The personal determination, dedication and perseverance of these individuals can be translated into any aspect of our work or personal lives.

Wilma Rudolph and Billy Mills are two athletes that overcame insurmountable odds to achieve their ultimate goal of winning an Olympic gold medal.

Did you know that Wilma Rudolph was one of 22 children? She was born premature and experienced many childhood ailments including polio! She was not expected to walk normally again let alone run and win gold medals! Thanks to the perseverance and determination of her mother, Wilma was nursed back to health and by the time she was a teenager she was finally able to walk normally. In the 1960 Rome Olympics Wilma became the first American woman to win 3 gold medals in the Olympics. She won the 100-meter dash, the 200-meter dash, and ran the anchor on the 400-meter relay team. Wilma overcame both physical and societal barriers in winning her gold medals at the Olympics.

Did you know that Billy Mills dreamed of qualifying and winning a gold medal in the Olympics? He planned and designed every aspect of his training so that it was broken down into intervals that would result in running significantly faster than he had ever run in his life! Billy Mills was a virtual unknown in the final of the 10,000 meter race in the 1964 Toyko Olympics. He is the only American male to ever win a gold medal in the 10,000 meter race. His come from behind win in the last 100 meters of the race was heralded as one of the greatest upsets in Olympic history! Billy Mills set a new Olympic record and ran nearly a minute faster than his lifetime best time. He never let himself doubt that he could make his dream become reality. The 1984 movie "Running Brave" was based on his victory.

Many of the qualities of business leaders and athletes overlap especially the importance of having a dream or creating a vision of success! One of the cornerstones of any leadership philosophy or achieving a goal in general is envisioning success and dreaming big.

In this issue, I am excited to be able to offer 2 CPE articles for our members. My goal has been to provide our members

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Editor's Letter.....

with at least one CPE article per issue and now we have two in one issue! It is a first and we hope that you continue to find this a valuable membership benefit. To date, the Renal Nutrition Forum has provided 4 CPE articles this membership year. The CUA article (approved for 2 CPE units) is an excellent article written by an author new to our publication, Wai Yin Ho. *The CPE anwer sheet and self mailer insert for this CUA article can be accessed via www.renalnutrition.org.* Philippa Norton-Feiertag provides us with continued cutting edge information on relevant topics such as Leptin and Nutritional Status in Patients with CKD. This article is the second CPE article and approved for 1.5 CPE units. I am excited to welcome Stephanie McIntyre back with her Rehab column. She will begin a regular column for the RPG website on Rehab and relevant topics. You will also find the travel log from Lois Hill detailing her exciting People to People International trip to China to be extremely interesting and informative. And finally you will be interested in reading the article about The ADA Scope of Dietetics Practice Framework.

"One of the cornerstones of any leadership philosophy or achieving a goal in general is envisioning success and dreaming big."

On another note, I hope that everyone has had the opportunity to visit the newly redesigned website at www.renalnutrition.org. I am thankful for the efforts of our webmaster Teresa Pangan, Webnoxious owner and web developer. She has provided great ideas, valuable insight, and has been a fantastic person to work with in the ongoing process to redesign the RPG website.

Thank you to the following Clinical Peer Review Members for this issue: Maria Karalis, Lynn Munson, Susan Salmi, and Mary Sundell. Additional thanks is extended to RPG Board Members Sharon Griff and Pat Weber and ADA Practice Team Manager and Director respectively, Susan Dupraw and Diane Juskelis for proof copy review of the fall, winter and current issue. Please remember to forward your ideas and suggestions for topics and articles to me. I would love to hear from you! Happy Spring and remember to follow your dreams! ◆

constructed an experimental model and was able to precipitate systemic calcification, somewhat analogous to this syndrome, in nephrectomized rats. It was speculated that a mechanism occurred in uremic humans. They developed a two-step process to generate this condition in rats. The first stage was called sensitization. They sensitized rats with dehydrotachysterol, ergocalciferol, or parathyroid hormone. This was then followed by a challenging stage. Substances used to challenge these rats included intravenous iron, intraperitoneal injections of iron, or intraperitoneal administration of egg albumin. These agents generally induced an inflammatory reaction that later on resulted in calcification. This two-step process was thought to replicate the steps of this visceral organ calcification (5, 6). Since the tissue calcification described by Selye and the clinical syndrome known as calciphylaxis is not an IgE-mediated process, the term "calciphylaxis" hence is considered inaccurate. Given the arteriole involvement in this condition, it is suggested that "calcific uremic arteriolopathy" (CUA) is a more appropriate term for this condition.

Secondary Hyperparathyrodism and Vitamin D Analog Therapy

Secondary hyperparathyrodism (SHPT), usually develops in chronic kidney disease patients as one of the many consequences of renal insufficiency. Although the pathogenesis of CUA is still elusive, SHPT is thought to be closely associated with it. This article will focus on reviewing this particular risk factor. In studies by Selye, rodents were treated with parathyroid hormone used as a "sensitizing" agent. In many reported cases of CUA, serum parathyroid hormone (PTH) values are elevated above acceptable thresholds for end stage renal disease (ESRD) patients (1, 2, 4). One study conducted by Wilmer and colleagues assessed 21 patients with CUA and found their mean serum intact PTH level was 440 +/- 535 pg/dl (7). It remains unknown whether PTH is directly accountable for CUA by causing vascular injury but the role of PTH in the shift of calcium and phosphorus homeostasis has been speculated as a potential cause.

Vitamin D Analog therapy is commonly used in hemodialysis to treat SHPT. In Seyle's model, vitamin D is one of the sensitizers found to stimulate the CUA process. Jono and colleagues suggested that 1,25-dihydroxyvitamin D3 may negatively affect the vascular smooth cell phenotype and cause medial wall calcification (9). In the past vitamin D analog therapy was often one of the first therapies to be eliminated in the treatment of CUA. In contrast to Seyle's model and Jono's theory, recent studies have demonstrated that vitamin D analogs modulate vascular proliferation and upregulate the protective factors of osteopontin and matrix gla protein, and downregulates inflammatory factors, which in turn inhibits vascular calcification (10). Some studies show that lowering serum parathyroid hormone levels and correcting SHPT may help heal ulcerations and alleviate the pain associated with CUA (4, 9, 10). The development of less calcemic forms of vitamin D analogs have reduced the associated risk of induced elevated serum calcium. More recent studies have proposed the use of paricalcitriol or the calcimimetic - cinacalcet in the treatment of CUA as another viable therapy option instead of the traditional surgical parathyroidectomy (11).

Formulating the Clinical Question

In outpatient dialysis clinics settings, dietitians are often assigned the role as the bone mineral managers. A protocol is used as a guideline to adjust patients' phosphate binder and intravenous vitamin D analog therapy. Since CUA is a rare condition, its treatment plan usually is not included within the protocol guidelines. There are no uniform treatment approaches to this condition. Unfortunately regardless of the intervention strategy, outcomes remain poor and mortality rates remain elevated. The goal of this review is to utilize the evidence based medicine approach in searching for the optimal treatment plan of CUA. Despite an array of available treatment options, this article will focus on whether correcting SHPT by parathyroidectomy and the utilization of vitamin D analog therapy helps improve CUA survival rate in dialysis patients. The clinical question, "Does correcting secondary hyperparathyroidism by parathyroidectomy or using an IV vitamin D analog therapy help improve the survival rate in dialysis patients who suffer from calcific uremic arteriolopathy?" is formulated.

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CUA Literature Matrix

Investigators	Year	Class	Sample Demographics	Treatment of CUA	Mention of Vit D Analog	Outcomes	Comments
Yeh[24]	2006	D	1 case: 42yof w/ SHPT, CUA at bilateral lower legs	Total parathyroidectomy (PTX) w/ autotransplantation of parathyroid tissue to the L forearm	Y	Pain improved, CUA healed, Ca/PO4/PTH level imprv post-op. But SHPT recurred 15 mos post-op	PTX is useful mgm't for CUA, but regular f/u of PTH level & imaging studies of possibly residual parathyroid tissues is important.
Don[10]	2003	D	2 cases: Case 1: • 56yoaaf • Proximal CUA • Ca wnl, PO4: 7.5, Alb: 3.2, iPTH: 1044 Case 2: • 51yowf • Distal CUA • Ca wnl, PO4: 11, Alb: 3.4, iPTH: 247	Combo tx strategy: • Change PO4 binder to non-Ca based • ↑HD tx freq from 3x/wk to 5x/wk • ↑Ca conc in dialysate from 2.5 to 1 mEq/l • Vit D analog (paricalcitol)was used in 1 case w/ iPTH >1000 pg/ml, no Vit D usage in another w/ iPTH 247	Y	Both CUA was resolved in ~6 months.	Since combination tx is used, it's difficult to isolate a single strategy that contributes to the outcome.
Wilmer[1]	2002	R			Y	Role of Vit D to the development of CUA remains controversial. But overuse of Vit D analog may result in adverse effect.	PTX promotes wound healing & short term mortality but long-term benefits are largely unknown.
Russell[23]	2001	D	One case: 73yowm HDx3yr	D/C Ca base PO4 binder, switched from Calcitriol to paricalcitol, incr HD time to 6x/wk	Y. Con't on Vit D but changed from Calcitriol to paricalcitol.	Significant healing of the lesions, near-total healing in 1 yr.	

CUA Literature Matrix

Investigators	Year	Class	Sample Demographics	Treatment of CUA	Mention of Vit D Analog	Outcomes	Comments
Kang[16]	2000	D	16 cases (14f, 2m; age 39-70).	PTX & other conventional tx.	Y	Median survival t: PTX grp:14.1mo, nonPTex grp: 6.1mo.	PTX cannot be recommended routinely in all patients, unless severe hyperparathyroidism mandates intervention.
Duffy[20]	2006	D	15 cases w/ proximal & distal CUA: 6 underwent PTX, either subtotal or total, 9 meds controlled	Subtotal & Total PTX	N	Median survival: 39 mos in PTX group vs. 3 mos in meds group	Pts w/ CUA from SHPT should be referred promptly for PTX to promote short-term wound healing & long term survival.
Nunley[3]	2006	R	Narrative Review	PTX, along w/ other tx options, are reviewed	N		PTX may show therapeutic benefit to some but not all. Only a few studies are able to show a decrease in mortality rate in pt undergone PTX.
Ghacha[18]	2006	D	1 case 40yom, CUA @ upper & lower limbs	PTX	N	CUA @ upper limbs healed completely, those in lower limbs showed marked improvement	Response to any therapeutic option is never assured.
Bardsley[19]	2005	D	3 cases: 2 68yof, 1 62yof All with calf CUA All have SHPT	Subtotal PTX	N	2 survived & CUA healed in 6 & 10wks, 1 died post-op day 7.	Option of PTX as tx of CUA should be considered

CUA Literature Matrix

Investigators	Year	Class	Sample Demographics	Treatment of CUA	Mention of Vit D Analog	Outcomes	Comments
Wang[9]	2004	D & R	1 case: 30yof	Medical PTX, & low Ca dialysate bath	N	CUA healed in 2 mos	Medical PTX and low Ca dialysate is recommended to treat early CUA.
Arch-Ferrer[2]	2003	D	35 pts identified at the author's institute. Mean age: 54+/-15yr, 57%aa, 74%f.	PTX	N	Better survival rate in PTX group (80 mo vs 35 mo)	PTX may provide pain relief & ulcer healing, but not all surgical pts survive the dz.
Oh[21]	1999	D	5 cases: age from 40-54yo; 4f, 1m;4 white, 1 hispanic; 3 proximal, 2 distal CUA	PTX Non-PTX group: no details on meds tx besides wound care, surgical debridement, & narcotics for pain	N	Survival rate: PTX group: 1 mo & 3 mo; non-PTX group: 4mo, 6mo, still alive	Benefits of PTX is inconclusive. The rarity of the dz makes it difficult to study tx in any prospective fashion.
Coates[15]	1998	D	16 cases (13f, 3m; age 35-78). 6 w/ SHPT.	PTX	N	Survival: 1/5 in PTX group (ulcer free for 4 yrs), 1/11 in non-PTX group (ulcer free for 18 months).	The study emphasized the dismal prognosis and current lack of effective tx for this condition.
TÖRÖK[22]	1995	D	1 case: 44yof, Ca wnl, PO4 slightly ↑, iPTH↑↑, distal CUA	PTX	N	Ulcers healed after PTX but remission of CUA 2 yr after PTX.	Prognosis, along w/ understanding of etiology & pathogenesis of CUA, remain poor.
Hafner[14]	1995	R	Literature review of 104 cases	PTX	N	Survival: 38/58 w/ PTX vs 13/37 w/o PTX	Only a randomized control prospective trial trial can establish the value of PTX in CUA
Khafif[4]	1990	R	Narrative Review	PTX along w/ other tx options, are reviewed	N		PTX is highly recommended for pt w/ CUA who has SHPT

Searching for the Evidence

A literature search was performed utilizing the 4S approach according to Haynes and colleagues (13). At the top of this hierarchy is System. The Clinical Evidence and National Guideline Clearinghouse database was searched. One result from the National Kidney Foundation's Kidney Dialysis Outcome Quality Initiative (K/DOQI) guideline was generated from the National Guideline Clearinghouse database. However the focus of this result is on vascular calcification instead of the more specific CUA that was being searched. The next ranks of hierarchy consist of Synopses and Syntheses. EBM Reviews, ACP Journal Club, Cochrane, and DARE under OVID were searched. No systematic review pertaining to this clinical question was available. The last step in the 4S approach is Studies. OVID Medline, CINHAL, and the PubMed database was searched. Sixteen articles pertaining to the clinical question were generated under the Medline database. However these were primarily review articles and case studies. High quality primary research studies are lacking. Results from CINHAL are mostly diagnoses articles pertaining more to nursing professionals. One hundred and sixty two results were generated under PubMed. However PubMed was difficult to shift through and most of the findings were irrelevant to the clinical question. The following keywords were used throughout the searching process: calciphylaxis, calcific uremic arteriopathy, nephrocalcinosis, systematic calcinosis, metastatic calcification, cutaneous necrosis, uremic gangrene syndrome, ischemic tissue necrosis; vitamin D, calcitriol, paracalcitol, and doxercalciferol.

All primary research studies located pertaining to this clinical questions are case reports. The total number of cases in each study ranges from one to sixteen. The quality of these studies ranges from neutral to negative or poor due to study design, sample sizes, and lack of statistically significance. The review articles are mostly narrative reviews with only one systematic review located.

Literature Review

Treatment with Parathyroidectomy

Some earlier studies warranted parathyroidectomy as the essential treatment in CUA. Khafif and colleagues concluded in his review article that "It is strongly urged that any time cutaneous calciphylaxis is noted in a patient with chronic renal failure, or pulmonary calcification is identified in a patient with hyperparathyroidism, a total parathyroidectomy be carried out with autotransplantation of one gland in the forearm." (14). The rationale behind this conclusion is to eliminate the sensitizer and the challenger in the suggested inflammation process, a theory developed by Seyle and colleagues.

However, recently published studies do not show a definite correlation between correcting SHPT and CUA as earlier studies did. Although some studies show improvement in survival rate after parathyroidectomy, improvement in survival is not statistically significant. Survival improvement is limited since prognosis of this condition is poor. Recent studies indicate that the overall survival rate for CUA is approximately 1 to 5 years or 45% and 35% respectively (3). Furthermore, a series of interventions, including wound management and change in medications were usually adopted simultaneously as part of the treatment package. Therefore it is challenging to isolate any single treatment plan and its contributions to the improvement in survival rate.

In a systematic review by Hafner and colleagues, a total of 95 cases were reviewed, 58 of these underwent parathyroidectomy after CUA diagnosis. Two thirds of this group (38 out of 58) survived compared with one third (13 of 37) of the patients who did not undergo parathyroidectomy (p=0.007, n=95). Distal CUA was indicated to have a higher survival rate than its proximal counterpart (40 of 53 versus 11 of 42) (15). Limitations of the Hafner review included that an array of treatment options were adopted in the subjects, and there was no control of the auxiliary treatment options since it was a retrospective review. Hence the improvement in survival rate in the parathyroidectomy group may not be fully credited to parathyroidectomy alone.

Case studies conducted by Arch-Ferrer, Coates, Kang, Duffy, and their colleagues all show improvement in short term survival after parathyroidectomy (2,16,17,21). In the study by Arch-Ferrer, 35 patients were identified at the author's institution from 1993 to 2001. Seventy four

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percent were female. Sixty six percent of this group underwent surgical parathyroidectomy to varying extents. They showed improvement in serum calcium, phosphate, and PTH values (P<0.5) post surgery and had a longer median overall survival (80 months) than non-surgical patients (35 months) (2).

Coates and colleagues investigated 16 cases that involved 13 females and 3 males, from 35 to 78 years of age, who were diagnosed with CUA from 1985 to 1996 (16). All of the patients had an elevated calcium and phosphate product in the past and all had elevated PTH either at presentation or in the past. However, in some cases, skin lesions developed with normal calcium phosphate product and PTH level when CUA was diagnosed. Five patients underwent parathyroidectomy as part of the treatment plan of CUA, 3 other patients underwent parathyroidectomy to correct SHPT prior to development of CUA. Only 2 patients survived with slow healing of the lesions - one from the surgical group and one from the non-surgical group. The one who underwent parathyroidectomy, despite recurrence of ulceration, remained ulcer-free for 4 years, versus 18 months in the one who did not undergo parathyroidectomy.

In Kang's retrospective case studies, 7 out of a total of 16 patients underwent parathyroidectomy to treat SHPT (17). Only 1 patient survived out of this group. The overall median survival for all patients was 9.4 months. The surviving patient is alive 53 months after diagnosis. The median survival for surgical patients (14.8 months) from the time of diagnosis was favorable but not statistically different from the median survival in nonsurgical patients (6.3 months; P=0.22). Calcium, phosphorus, and PTH levels in the surgical group before parathyroidectomy are significantly higher than the non-surgical group. It is well established that elevated phosphorus and calcium contributes to increased morbidity and mortality (18). This may play a role in the statistical insignificance of survival rate between the surgical and non-surgical groups.

Some smaller case studies also demonstrate similar results as above. Lesions were healed in 6 weeks to 2 years after parathyroidectomy (9,19,20). In a study by Wang, medical parathyroidectomy was used instead of its traditional surgical counterpart. The patient in this study was treated with three injections of local alcohol into the parathyroid glands for medical parathyroidectomy, accompanied with low calcium dialysate treatment during dialysis. Wound pain and skin ulceration associated with CUA improved significantly 2 weeks later (9).

Duffy and colleagues conducted a study to investigate the long-term outcomes in CUA patients who underwent parathyroidectomy (21). Fifteen patients were identified. Nine were treated with medical therapy (bisphosphonates and phosphate binders), whereas 6 underwent parathyroidectomy. Among the 6 surgical patients, 4 underwent subtotal parathyroidectomy, and 2 underwent total parathyroidectomy. After a 80-month follow-up period, the surgical patients had a longer median survival (39 months), compared with the medical group (3 months).

While the above studies show beneficial effects of parathyroidectomy on CUA outcome and survival rate, some other studies suggest otherwise. Five cases were discussed by Oh and colleagues (22). Four of the five patients had SHPT and only 2 underwent parathyroidectomy. One refused the surgery and the other one did not need one by the time CUA was diagnosed due to normal PTH level. The survival time after CUA diagnosis of the surgical group was 1 month and 3 months respectively, compared to 4 months, 6 months, and still alive at the non-surgical group.

Findings in the case study by Torok showed that although ulcers of the study subject were healed and she sustained a 2-year symptom-free period after parathyroidectomy, the cutaneous lesions of the lower extremities reappeared, with superficial skin involvement that progressed to deep necrotic lesions extending down to the muscular fascia (23). She was diagnosed with tertiary hyperparathyroidism. Since residual parathyroid gland was unable to locate, another parathyroidectomy was not an option. This time both systemic and local treatment failed to arrest the slow progression of the ulcerative cutaneous lesions.

Treatment with Vitamin D Analog Therapy

Only 2 case series mention vitamin D analog therapy in the treatment of CUA. However neither could isolate

the beneficial effects of vitamin D therapy alone to CUA. In a case presented by Russell, the treatment package entailed switching phosphate binder to a calcium-free one (Sevelamer hydrochloride (Renagel®)), increasing duration of dialysis treatment, and replacing a more calcemic vitamin D analog calcitriol (Calcijex ®) with the active vitamin D3 analog paricalcitol (Zemplar ®) (24). Vitamin D therapy was slowly weaned afterwards. Although serum intact PTH trended up subsequently to above normal limit after discontinuing paricalcitol, the patient's phosphorus and calcium level improved to normal levels gradually, and significant healing of the lesions was noted at 8 months following diagnosis, with near-total healing by 12 months.

Treatment with Combination Therapies

A combination of therapies was employed to correct CUA in two cases discussed by Don and Chin (11). Both cases had similar demographic background. Case 1 was diagnosed with proximal CUA while case 2 was diagnosed with distal CUA. The PTH level in case 1 was greatly elevated but was normal in case 2. A combination of treatment utilized was similar to the one mentioned above by Russell. Although PTH in case 2 subsequently trended up to above normal, only case 1 was given vitamin D therapy. Paricalcitol was used in this case. CUA was resolved in both cases in 6 and 7 months respectively.

Yeh and colleagues described a case with a 42-year-old female CUA patient who underwent total parathyroidectomy with autotransplantation of the parathyroid tissue to the left forearm (25). The patient was treated with a phosphate binder and vitamin D3 continuously. The pain and wound area improved following surgery in combination with skin grafts and hyperbaric oxygen therapy. Serum PTH level improved significantly post operation. However, SHPT recurred 13 months after surgery.

Due to the lack of studies that focus on the use of vitamin D therapy alone as a treatment option for CUA, a direct association of the beneficial effects of vitamin D in treating CUA could not be made. However, as illustrated in the previous sections of this article, the correction of serum calcium and phosphorus levels significantly improve CUA outcomes. Therefore, the use of vitamin D, especially the less calcemic option, paricacitol, to aide in the correction of SHPT, in combination with other treatment options, seems to be a more conservative approach.

Other Speculated Causes of CUA

Although the pathogenesis of CUA is still elusive and only a few studies are able to suggest a mechanism that may lead to the development of CUA, several reports indicate some speculated risk factors for the syndrome. These include obesity, elevated serum phosphorus and calcium level, the use of Warfarin, protein C and protein S deficiency, vitamin K deficiency, malnutrition, rapid weight loss, and lack of natural calcification inhibitors, such as matrix GLA protein(1, 26). Since the goal of this article is to focus on SHPT and CUA, details of these potential causes are not further elaborated on in this article. These are deduced causes based on retrospective case studies. A complete explanation of why CUA develops in some patients but not others with similar risk factors still remains intangible.

Other Speculated Causes & Risk Factors of CUA:

- Caucasian race
- Females
- DM
- HIV+
- Obesity
- Malnutrition
- Elevated serum Ca & PO4
- Secondary Hyperparathyroidism
- Usage of Warfarin
- Protein C and/or Protein S deficiency
- Vitamin K deficiency
- Inflammation
- Lack of Calcification Inhibitors (i.e. matrix GLA protein, osteopontin, fetuin-alpha2)

Additional Treatment Options for CUA

Treatment of CUA is mainly supportive. Early detection of the condition allows the avoidance or removal of potential sensitizers and challengers. Normalization of serum calcium and phophorus levels through the prescribed nutrition plan and medications is crucial. Aggressive wound care with careful debridment,

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hyperbaric oxygen therapy and prednisone is commonly adopted. Some studies demonstrate promising results following the use of sodium thiosulfate. The use of antibiotics to control infection and narcotics to control pain is also widely reported as part of the supportive treatment of CUA (1, 22, 27).

Treatment Options for CUA:

Supportive:	Wound Healing (Hyperbaric O2, Debridment)
Medical:	Phosphate binder (non-Ca based) Antibiotics for infection Steroids Necrotics for pain control IV Sodium Thiosulfate IV vitamin D analog therapy
Surgical:	Parathyroidectomy

Conclusion

Understanding of the pathogenesis and cause of the CUA process is not easy. Most suggested theories are hypothetical at best, based on single retrospective case reports. No single theory is sufficient to explain all cases. The failure to understand the inherent and underlying pathophysiologic factors of this disease entity has led to the current suboptimal treatment and a poor long-term prognosis. Few researchers will argue with the importance of local wound care, but treatment for SHPT remains controversial in treatment of CUA. Parathyroidectomy may result in pain relief and ulcer healing. However, not all surgical patients survive their disease. Direct association of the usage of vitamin D therapy alone in CUA is weak but the efficacy in the usage of vitamin D therapy in treating SHPT is undeniable. The evidence answering this clinical question is weak and is mostly due to the lack of a specific study, poor study design, and small sample sizes of the studies.

A common denominator of the conclusion of the articles reviewed thus far is the quest for a prospective, randomized controlled trial to further study the pathogenesis and hence the best treatment of CUA.

Implications for Clinical Practice

More high quality research is definitely warranted in the pathogenesis and treatment strategy of CUA. As an aside, it may be interesting to investigate whether C-reactive proteins have any correlation with CUA.

Until strong evidence in this area arises, practitioners need to treat CUA based on their best clinical judgment according to their past experience and on a case by case basis. Elimination of speculated risk factors one at a time may be the best treatment approach currently due to the lack of a conclusive understanding of the syndrome.

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Leptin and Nutritional Status in Patients with CKD

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The prevalence of protein-energy malnutrition (PEM) in patients with chronic kidney disease (CKD) is well documented and is a strong predictor of morbidity and mortality (1-3). Barriers to maintaining adequate nutritional status include decreased appetite, reduced palatability of foods, accumulation of uremic toxins, co-morbid illnesses and inflammatory conditions (1, 4-6). Rates of malnutrition remain high in this population despite interventions to increase calorie and protein intake including oral nutrition supplements, amino acid-enriched peritoneal dialysis solutions, total parenteral nutrition (TPN) and tube feedings (3).

Findings from several studies indicate that elevated serum levels of cytokines in patients with CKD may have a negative impact on appetite, food intake and nutritional status (2,7,8). Leptin, a member of the interleukin (IL)-6 family of cytokines, increases significantly in some patients with CKD and has been linked to changes in nutrition intake and body composition in this population (8,9,10).

Considerable research efforts have been made to determine the role of leptin in malnutrition associated with CKD and to develop effective interventions for improving nutritional status. This article will review recent studies on change in leptin levels in kidney disease, the relationship between serum leptin and markers of nutritional status in patients with CKD, and therapeutic strategies for improving patient outcomes.

Change in leptin levels in kidney disease

Leptin is a 16-kDa protein secreted by adipose tissue into the bloodstream and plays an important role in body weight regulation through its effects on the centers of hunger, energy expenditure and body temperature in the hypothalamus (11). Normal serum leptin levels are 1.0 - 35.3 and 3.6 - 72.4 ng/mL in males and females, respectively (12).

In a cross-sectional study of 233 men and women ages 23 to 75 years with intact renal function, subjects were divided into five categories of body mass index (BMI) from normal weight (BMI <25 kg/m^2) to severely obese (BMI ≥40 kg/m^2) (13). Serum leptin level was directly associated with BMI and waist circumference, and there was a linear increase in mean leptin level across the five categories of BMI. Serum leptin levels were significantly higher in women, regardless of BMI and waist circumference. Findings from this study suggest that in the non-renal population, serum leptin levels are correlated with body fat mass and women have higher leptin levels than men.

In patients with diabetes or excess body weight, the appearance of >30 mg albumin/day in the urine, referred to as microalbuminuria, is an early indicator of kidney disease (14,15). If microalbuminuria is untreated, macroalbuminuria (albumin excretion ≥300 mg/day) may develop, followed by a decrease in glomerular filtration rate (GFR). In a study designed to determine whether serum leptin levels were elevated in patients with type 2 diabetes and microalbuminuria or macroalbuminuria, 60 subjects were assigned to two study groups (15). One group contained 10 patients with type 2 diabetes and macroalbuminuria, 10 patients with type 2 diabetes and normoalbuminuria, and 10 healthy controls. The second group contained 10 patients with type 2 diabetes and microalbuminuria, 10 patients with type 2 diabetes and normoalbuminuria, and 10 healthy controls. Subgroups within both study groups were matched for sex and body fatness. In the first group, macroalbuminuric patients had higher leptin levels (11.90±2.98 ng/mL) than normoalbuminuric patients (4.13±0.92 ng/mL) and healthy controls (4.78±1.37 ng/mL). In the second group, microalbuminuric patients had higher leptin levels (21.16±5.80 ng/mL) than normoalbuminuric patients (8.74±1.89 ng/mL) and healthy controls (10.06±3.00 ng/

mL). After adjusting for body fatness, serum leptin levels and creatinine clearance were inversely correlated in both groups.

In a more recent study, presence of microalbuminuria and serum leptin levels were determined in 29 males (mean age 37.7±9.3 years) with abdominal obesity but without disturbances of carbohydrate metabolism or CKD (16). Microalbuminuria was detected in 62% of study participants. As rates of albumin excretion increased, serum leptin levels rose. Although serum creatinine levels were within normal limits, renal filtration function was impaired in obese patients with microalbuminuria.

The results of these studies indicate that serum leptin levels are elevated in type 2 diabetic patients with microalbuminuria and macroalbuminuria, and in obese patients with microalbuminuria. These findings suggest that leptin metabolism begins to change in the early stages of kidney disease.

Several studies have investigated leptin levels in patients with CKD. In a study of 219 patients with various degrees of renal failure, serum leptin levels were negatively correlated with GFR (17). In a small study of 36 patients with CKD Stage 5, leptin levels corrected for BMI were four times higher than in healthy controls (18). Other studies have shown significantly higher leptin levels in patients undergoing peritoneal dialysis (PD) than in patients on maintenance hemodialysis (HD) or in uremic patients on conservative management, and marked increases in serum leptin levels within three months of initiation of PD therapy (19,20). Thus, findings from these studies indicate that clearance of leptin from the blood decreases as kidney failure progresses, resulting in high serum leptin levels known as hyperleptinemia.

Leptin levels and markers of nutritional status in patients with chronic kidney disease (CKD)

Reduced renal clearance of leptin in CKD leads to elevated serum leptin, which has been identified as a potential cause of anorexia and poor nutritional status in this population (8-10). Serum leptin concentration was significantly related to BMI and skinfold thickness in an elderly polypathological population (21) and a number of studies have investigated the relationship between serum leptin levels and markers of nutritional status in patients with CKD.

In one study, serum leptin was measured by radioimmunoassay and body composition was determined by dual-energy X-ray absorptiometry (DEXA) in 23 undialyzed patients with CKD, 24 PD patients and 22 HD patients (10). Dietary intake was monitored using 3-day diet diaries. All subjects were Caucasian and free from diabetes, and 24 people with intact renal function served as controls. Leptin relative to total fat mass was significantly higher in patients than in controls, particularly in patients undergoing maintenance dialysis. One-third of the dialysis patients were consuming less than prescribed amounts of calories (30-35 kcal/ kg ideal body weight [IBW]) and protein (1.1-1.3 g/kg IBW for PD patients and 1.1-1.2 g/kg IBW for HD patients). Dialysis patients with the highest leptin to fat mass ratio had the lowest daily protein intake and significantly less lean tissue mass than other patients and controls. This data suggests an association between increased leptin levels, low protein intake and loss of lean tissue in patients undergoing maintenance dialysis therapy.

In another study of nutritional status in nondiabetic patients undergoing maintenance dialysis therapy, BMI, fat mass, lean body mass, serum albumin, leptin and total protein were determined in 32 patients undergoing continuous ambulatory peritoneal dialysis (CAPD) and 152 HD patients (22). While no significant difference was found between CAPD and HD patients with respect to serum leptin levels, female patients in both groups had significantly higher leptin levels than males. Serum leptin levels in both male and female CAPD and HD patients showed significant positive correlation with age, fat mass, BMI and triceps skinfold thickness. No correlation was found between serum leptin levels and lean body mass, serum albumin or total protein in this study.

Other studies have focused on the impact of serum leptin on body composition in HD patients. When serum leptin levels were measured in 103 HD patients and 167 age- and gender matched healthy controls, HD patients had significantly higher leptin levels and significantly lower fat mass and lean mass than controls (23). In both HD patients and controls, leptin levels were significantly higher

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in females than in males and correlated positively with percent body fat. After assigning all subjects to one of six categories based on percent body fat and comparing leptin levels in HD patients and controls in each category, leptin was significantly higher in HD patients than controls only in percent body fat categories of 30 or greater.

In an investigation of the association between weight loss and leptin levels in a population of HD patients, serum leptin, BMI and body fat mass were compared in 181 patients undergoing HD and 185 healthy controls (24). Findings from this study revealed no significant difference in leptin levels between HD patients and controls but BMI in HD patients was significantly lower than BMI in controls. In the HD patients, serum leptin to fat mass ratio showed a significant inverse correlation with duration of HD and a high ratio of leptin to fat mass was associated with weight loss during a 17-month follow-up period.

While there appears to be a close relationship between serum leptin levels and body fat mass in maintenance dialysis patients, the association between leptin levels and symptoms of anorexia in this population is less well defined. In a prospective study directed to determine whether hyperleptinemia was associated with anorexia in maintenance HD, 49 HD patients were categorized as anorexic or non-anorexic on the basis of responses to a questionnaire discriminating for the presence of anorexia-related symptoms (25). When compared with 24 healthy control subjects, HD patients had significantly higher serum leptin levels and serum leptin to BMI ratio was significantly higher in HD patients than in controls. Although calorie and protein intake, serum albumin and mid-arm muscle circumference (MAMC) were significantly lower in anorexic than in non-anorexic patients, serum leptin levels and leptin to BMI ratios were similar in both categories of HD patient.

A cross-sectional study of 49 CAPD patients and 27 healthy controls examined serum leptin levels, body composition and dietary intake (26). Again, serum leptin was significantly higher in dialysis patients than in controls, and patients exhibited a greater increase in serum leptin for any given increase in BMI. However, no significant correlation was found between serum leptin concentration and dietary intake of calories or protein, or serum levels of albumin and prealbumin.

Collectively, these studies indicate a significant relationship between serum leptin levels, BMI and fat mass in patients undergoing maintenance dialysis therapy. Nevertheless, etiology of anorexia in this population appears to be more complex and few studies suggest a causal relationship between increased serum leptin levels and development of anorexia. Uremic toxins, inflammation and changes in amino acid profile, as well as imbalances in leptin, ghrelin and neuropepetide Y levels, are all implicated in anorexia in patients with CKD (27,28).

Therapeutic strategies for modulating serum leptin levels in CKD

Leptin levels appear to be improperly regulated in patients with CKD and may impair nutritional status in this population. Administration of anabolic agents including recombinant human growth hormone (rhGH) to patients with CKD has been linked with an increase in dietary protein intake and lean body mass, and several small studies have explored the effects of these agents on leptin regulation in CKD (29,30). Insulin-like growth factor (IGF) is associated with decreased serum leptin levels in CKD patients, while a combination of rhGH and IGF increased serum leptin levels in eight well nourished maintenance HD patients (31,32). Malnourished HD patients treated with rhGH showed increased serum leptin levels only in the presence of high insulin levels accompanying the administration of intradialytic parenteral nutrition (IDPN) (33).

Use of dialysis solutions enriched with amino acids has resulted in increased IGF levels and improved serum albumin in malnourished CAPD patients (3). When the impact of an amino acid-based dialysis solution on leptin levels was evaluated in nine stable CAPD patients, hyperleptinemia was transiently lower after three months (34). Total body mass, BMI, serum albumin and total protein all increased significantly during treatment with the amino acid-based dialysis solution but incidence of anorexia and daily energy and protein intake showed no significant changes.

A recent study of 39 malnourished HD patients assessed the effect of high-calorie supplementation on serum leptin

levels (35). Twelve patients received an additional 475 kcal and 16 grams of protein daily and 27 patients received an additional 67 kcal and 16 grams of protein daily for 12 weeks. Sixteen age- and sex-matched well nourished patients not given nutritional supplementation served as controls. Patients receiving high-calorie supplementation showed significant increases in body fat mass and serum leptin levels. Findings from a study designed to evaluate response of a small group of hypoalbuminemic dialysis patients to the appetite stimulant megestrol acetate included progressive increase in serum leptin levels, improved appetite and increase in body weight, BMI, TSF and serum albumin (36).

These more recent studies indicate that increased serum leptin levels in maintenance dialysis patients may parallel an improvement in nutrition intake and markers of nutritional status, including body weight and serum albumin. However, leptin is likely only one of many factors in the development of malnutrition during CKD. Increased understanding of other mechanisms regulating appetite and food intake may lead to new therapies for improving nutritional status in patients with CKD.

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Sounds crazy, but yes the dietitian plays an important role in a patient's employment potential. This by no means implies that the dietitian takes over the social workers job. There are many ways that the dietitian can assist patients with potential employment opportunities. Ask questions about current and former employment activities and how they expect dialysis to impact their future. Try to dig as deep as possible; this is an important quality of life issue that may provide the "hooks" to make connections with the patients. It is important to inquire if the patient has already met with their social worker and shared information that they discussed with you. Either way, the dietitian serves as an educator, and source of encouragement and reinforcement for employment opportunities. Among the 32% of patients ages 18-55 who started dialysis in 2002- the most recent year for data – just 23% had full- or part-time jobs.(1-2) In comparison, 64% of American in the same age group are working.[2] The employment rate for CKD patients is low, however there is evidence to suggest that more people could be working. The Life Options study by Curtin et al reported that 21% of unemployed working-age dialysis patients said they were both able and willing to work.[3] Dialysis clinics can benefit when patients work considering that 72% of full-time working patients keep their employer group health plans (EGHPs).(1-2) On average, EGHPs pay three times as much as Medicare for dialysis – a difference to the clinic of more than $36,000 per year, per working, insured patient for dialysis alone.(1-2)

What is Employment?

Now employment is more than just paid part- and full-time work. Life Options, creator of the 5 E's (Encouragement, Education, Exercise, Employment and Evaluation) of renal rehabilitation, expanded employment to include not only paid employment, but also other important activities such as going to school and/or job training, volunteering and hobbies. All of these important activities of employment play a role in a patient's quality of life. Unfortunately the studies on kidney disease and employment focus on paid employment and not the other activities. It would be very interesting if future studies would include all employment activities since we do have large number of patients who are > 65 years old. However, studies discussed here focused on paid employment.

Nutrition link to better employment outcomes?

A study from Denmark found correlations between the SF-36 physical scores and age and between Physical Function and hemoglobin and albumin levels during a 3-month period.(4) The SF-36 is a self-rated quality of life questionnaire that consists of eight different dimensions of health: Physical Function, Role-Physical, Bodily Pain, General Health, Vitality, Social Function, Role-Emotional, and Mental Health. The SF-36 was used prior to the availability of the KD-QOL that is the kidney disease specific quality of life questionnaire in this study.

One of the most common complaints by dialysis patients is fatigue. It has been shown that the fatigue experienced by dialysis patients is not a result of anemia, but the lack of physical activity.(5) Although this study by Brunier and Graydon only contained 43 patients, their findings have been validated by other studies that have shown that exercise training in hemodialysis patients can enhance physical activity, physical fitness, behavioral change, psychological status, work capacity and health-related quality of life.(6-9) Serum albumin levels have been shown to be closely linked with rates of morbidity and mortality in hemodialysis patients.(10-13) Increases in albumin levels have been reported in studies by Cheema et al and Frey et al with exercise. (13,14) There is also a relationship between albumin levels and peak VO_2 that reinforces the predictive value of low albumin levels in ESRD with respect to performance status as well as mortality.(15) An employment study by Blake et al found poor physical function physical predicted unemployment,

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however no correlations with hemoglobin or albumin.(16) So the potential is there to improve patient's employment potential by including physical activity and encouraging good food choices and overall nutrition education, however more studies regarding nutrition and *all* employment activities, as defined by Life Options, need to be done.

So what exactly is the RDs role with Employment?

Encouragement and Education. Nutrition has numerous links to physical activity (and essentially employment depending on the physical demands of the different activities). During the initial visit make a point of asking each patient about their employment activities. Ask questions such as: Do you currently work? What was your career? Are you retired, if so what activities do you want to be involved in? Do you have any hobbies? Do you want to continue or start any new employment activities? They need to hear from more team members than just the social worker that employment activities are important and possible. Depending on the responses by the patient, ask more questions or encourage activities they report they like or participate in currently. Employment may provide important cues to help the dietitian find more ways to connect with the patient. Being able to connect with the patients will allow for more education opportunities and may improve the patient's willingness to make positive behavior changes. The dietitian is able to help the patient to understand the connection between good nutrition and being able to do the activities they enjoy and that are important to him/her. The ultimate goal as practitioners is to reinforce another important link - between nutrition and quality of life.

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Scope of Dietetics Practice

The ADA Scope of Dietetics Practice Framework (SODPF) Subcommittee under the guidance of Sally Cohenour, Chair, has written the following article about SODPF.

Do you want to E X P A N D your practice to include a new skill? Do you want to change your specialty area? ADA has a tool to help you!

Have you wanted answers to scope of dietetics practice questions? Questions such as:

- Do you need clarification about whether a new RD is qualified to write TPN orders?
- Do you want to add bedside dysphasia screening to your scope of practice?
- Do you want to change from one dietetics specialty area to another?
- Does a physician question validity of RD documentation in the medical record?
- How can an RD request privileges to write orders for nutrition-related laboratory tests? For tube feedings?

ADA's Scope of Dietetics Practice Framework (SODPF) resources and decision analysis tool can help you to expand your ***individual*** scope of practice with confidence.

Did you know that everyone has an individual scope of practice, much like a unique fingerprint?

Each RD's and DTR's individual scope of practice varies by his/her: education; training; credentials; level of experience, skill and proficiency; area of expertise; licensure or certification laws; applicable state and federal laws and regulations; job description; facility/ employer policies and procedures; and third party payer requirements. As you can see, no two practitioners will have the same scope of practice. Since one answer does not fit all, ADA has developed SODPF resources and a decision tool. All together, these materials assist members in assessing competency, supporting expansion or advancement of practice, defining individual scope of practice, and answering other questions.

Utilization of the Framework:

- Promotes safe practice
- Contributes to career development

What is the SODPF?

ADA's SODPF is an umbrella for the resources needed to determine individual scope of practice. The Framework includes an algorithm (Decision Analysis Tool) and suggested resources. All of these resources are located for members on ADA's website (www.eatright.org) via the Practice Page.

To use the SODPF web page,

- Review the Overview and Framework diagram
- Gather supporting documents (ADA documents are found on this page)
- Complete the Decision Analysis Tool
- Refer to any pertinent definitions in the Definitions of Terms (Section 4B).
- Review the Frequently Asked Questions & Answers, such as, the reasonable and prudent test (Appendix D)
- Use the Decision Tree in conjunction with the Decision Analysis Tool or the Tool by itself
- Check the case studies (Appendix E & F) for examples of the process used to find answers to specific questions

What's next?

Continual changes and developments in healthcare knowledge, medical technology, and federal or state laws necessitate that ADA continue to equip its members with current tools to operate. To this end, ADA regularly reviews and updates the Framework's Definition of Terns and other decision making tools and resources. The SODPF Website contains the most current information. Watch for future Framework articles in this newsletter—up next: Utilizing standardized terms to describe your practice (ADA Definition of Terms-Section 4B of the SODPF).

The SODPF was developed by the ADA Practice Definitions Task Force with input from the House of Delegates, the Commission on Dietetic Registration, and the Board of Directors. It was approved and published in 2005. Article submitted by Sally Cohenour, MS, RD, Chair SODPF Sub-Committee of the Quality Management Committee and by Julie Meddles, RD, LD and Jackie Boucher, MS, RD, LD, CDE, members of the SODPF Sub-Committee.

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Renal Dietitian Travels To People's Republic Of China...

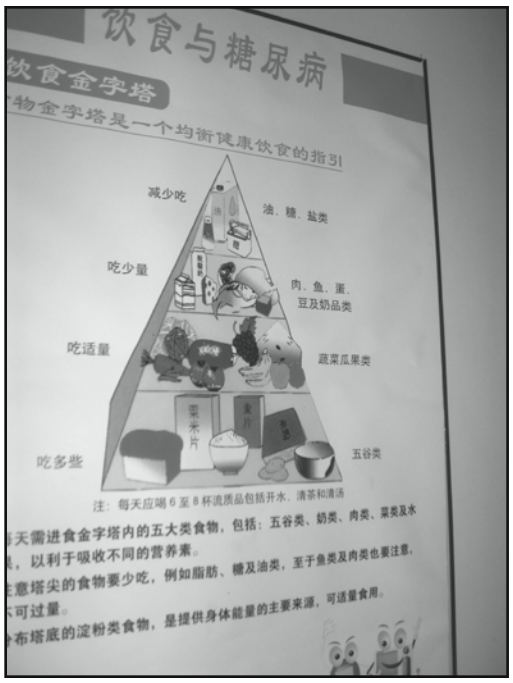
...As a Member of a People to People International Tour

Notes from a travel journal on a People to People International (PTPI) Tour

By Lois Hill, MS, RD, CSR

Lois is a renal consultant and owner of Nutrition Solutions. She can be contacted via email: LJBHill@aol.com or phone: 859-259-0740.

The purpose of PTPI is to enhance international understanding and friendship through educational, cultural and humanitarian activities involving the exchange of ideas and experiences directly among peoples of different countries and diverse cultures. Tolerance and understanding are central themes. PTPI was founded by President Dwight D. Eisenhower in 1956. PTPI believes that individuals can often be more effective than governments in promoting partnerships with different cultures and world peace. The group also believes that all will benefit from sharing different approaches to solving common problems. And finally PTPI believes if people can better understand other cultures, they are more tolerant and accepting of the differences.



On October 8, 2006, 58 dietitians along with 16 friends and family traveled from the US to Hong Kong. This delegation was a People to People International Tour led by the past American Dietetic Association President, Rebecca Reeves, Dr.PH, RD. There were five renal dietitians traveling as part of the professional delegation. China is the third largest country in terms of area in the world. In addition, China has one of the world's largest populations with a population of 1.3 billion people. The reigning government is the Communist Party of China. In 1966 the Cultural Revolution took place followed by the "opening up" policy in 1978. In other words, China "opened up" to the world. Over the last thirty years, China has become more economically developed which has had an impact on the nutritional status of the Chinese people and culture. China's economic development has supported an evolution from a traditional Chinese lifestyle to a modernized lifestyle. In this article, highlights of the cities visited, their culture and the professional exchanges will be reviewed.

Beijing was our first stop. The professional members of the group met with the Chinese Nutrition Society which is a national scientific social group consisting of nutrition professionals. It is a unit of the China Association for Science and Technology and a country member of the International Union of Nutrition Sciences. The professional program in Beijing focused on the prevalence and incidence of nutrition and diet related diseases including their impact on the health and well-being of the Chinese people in urban and rural areas. The program also focused on understanding how nutrition messages regarding disease prevention and health promotion are created and disseminated by the Chinese Ministry of Health to the Chinese public. Public nutrition education is done via posters. There are limited TV ads because they are so expensive. Lastly this program focused on the education and roles of nutrition professionals in both Western and traditional health care. Chinese nutrition professionals do not have the credentialing standards that we have in the US. Currently 20% of the Chinese people have hypertension. Vitamin A deficiency is estimated at 29% in Chinese cities and 49.5% in rural areas. There is a 6% diabetes

Answers for CPE test (Leptin...): 1:A, 2:D, 3:B, 4:D, 5:C, 6: A, 7:C, 8:D, 9:A, 10:C

incidence rate in the cities. Type 2 diabetes contributed to the Chinese diabetes population being second in the world in 2003. Overweight defined as Body Mass Index (BMI) of 24 – 27.9 has increased by 40%. While obesity defined as a BMI of 28 or greater has almost doubled. Physical activity in the cities' according to data show 75% do not exercise, 15% participate in regular exercise and 10% indicate a "sometimes" exercise pattern. Increased calorie and increased fat intake was reported in a 10 year survey which included 24 hour recalls for 3 day periods. The typical Chinese diet consists of approximately 12% protein, 59% carbohydrate, 30% fat (35% in the cities).

Next our delegation met at the International Life Sciences Institute Focal Point (ILSI FP) in China. The Institute was founded in 1993 as part of the Chinese Center for Disease Control and Prevention (China CDC), which was known as the Chinese Academy of Preventive Medicine before 2002. ILSI FP promotes the promotion and scientific information exchange between Chinese and global academic communities in the fields of food safety and nutrition. Our program at the ILSI FP focused on the issue of childhood obesity and how it is being addressed in China. The BMI levels for overweight and obesity are lower for the Chinese people. The acceptable BMI range in China is 18.5 – 23.9. As expected, as the BMI increases the rate of chronic diseases also increases. Just as in the US, China attributes childhood obesity problems very specifically to the consumption of fast foods such as "McDonalds and Kentucky Fried Chicken". We also heard about the commonality of micronutrient deficiencies in China and discussion on how to prevent these deficiencies. Since 1993, salt has been iodized with a reduction in iodine deficiency from 25% to 5% of the population. The most common deficiency is iron deficiency with 20 – 30% of women in their child- bearing years having iron deficiency related to plant based diets. Iron fortified soy sauce is one iron fortified food commonly used by adults. Our program also focused on how the Chinese traditional diet based on ancient tradition has changed in the last 30 to 40 years. Thirty years ago there were starving children in China as many of us American children were told at the dinner table. Chinese children are now 3.4% taller than in 1992. Today traditional herbs and spices are less commonly used. We had the opportunity to visit a Chinese Medicine market with a great array of herbs and spices from ginseng to saffron.

We visited Beijing Normal University and met with representatives from the Student's Catering service and the Beijing Normal University Kindergarten. The Student Catering Services also served the Student's Family Restaurant, a Cake House and food bars which serve students for their birthdays and holiday parties. The professional program focused on the daily diet of college students, how to improve the nutrition standards of the college students, food and nutrition needs of Chinese kindergarten students, and finally our professional exchange focused on the cultural/ regional exploration of Chinese food, food preparation, eating habits, and traditions. The average daily protein intake is approximately 67 grams and the number of obese children has increased. Our speakers reported that nutrition education is suboptimal. So the government has established nutrition education centers for high school and elementary students. The following three stages of eating were identified for students: "eat enough, enjoy good food, and eat healthy". Nutrition goals were to eat less fat, sugar and salt. The schools have implemented a program called the "Happy 10 Program" which is ten minutes of exercise during the school day.

A highlight of Beijing was a walking tour of the Forbidden City also known as the Imperial Palace. The construction of the Forbidden City is comparable to the Egyptian pyramids and to the Great Wall of China. We ended our Beijing tour with a tour of Tiananmen Square. Watch for the 2008 Olympics coming to Beijing. And finally our Beijing visit was made complete by seeing and walking atop the Great Wall of China.

Regarding the cuisine, on two occasions we were served french fries as a hospitality gesture from our Chinese hosts. This was also a reflection of how the Chinese diet has become westernized. Our trip was complete with authentic Peking duck. Round table meal service served family style was our typical meal service.

Xi'an is the home of the Terra Cotta Warriors. Discovered in 1914 by a group of peasants digging a well,

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these life size warriors are over 2000 years old. So far an estimated 8,000 guards have been identified. This is truly a wonder of the world.

The Xi'an professional program included a visit to the Nutrition and Food Hygiene Subject, School of Public Health. This professional program focused on the nutrition education of the Chinese public and health care professionals, research in sports nutrition, and maternal nutrition, folic acid fortification of grains and breastfeeding.

We were treated to a tour of a bakery, Maky Food Corporation, a private enterprise. This tour focused on nutrition research on food production, the diet culture in different regions of China, and the economics of food and nutrition delivery. We were welcomed to the bakery with a sign that read "Welcome Nutriologists" which epitomizes the lack of awareness about dietitians and their roles in China.

Kunming - A personal highlight of this trip was a tour of the First Affiliated Hospital of Kunming Medical College. The Kunming Hospital has the first research unit combining Western Medicine and traditional Chinese Medicine The hospital has 1775 beds with an occupancy rate of 104 – 113% and a staff of 2623. The hospital is staffed by 5 clinical dietitians. The physicians and nurses provide diabetes education. In all of China, there are only 4000 dietitians for 1.3 billion people! China's medical system is similar to Canada's which is a socialized system.

A Chinese renal transplant nurse stated the nephrologists restrict protein level for kidney disease and pre-transplant to 0.6 - 0.8 grams/ kilogram. The prescribed dialysis nutrition plan was described as 1 gram of protein/ kilogram, 3 – 5 grams of sodium with a fluid restriction. Citrus fruits are restricted to limit potassium. The clinical dietitians "help the physicians and nurses guide patients with diabetes and kidney disease". The role of dietitians in China is in the infancy stage. Training programs are just beginning. Dietitians provide diets and nutrition education. Patients usually do not receive diet education for their disease(s). A physician or nurse may call a dietitian for assistance with diet education. Unfortunately, we did not get to observe dialysis. The first dialysis unit in China was opened in 1994.

The typical protocol for kidney transplant patients immediately post transplant is to restrict sodium, potassium and protein. After approximately two weeks post transplant, a "normal diet" is prescribed. In 2003 there were 16,043 kidney transplants performed in the US according to the National Kidney and Urologic Disease Information Clearinghouse as compared with 5,500 kidney transplants performed in China in 2006. Discussion of reports of tourists traveling to China to obtain and pay for kidney transplants with organs from Chinese prisoners was not addressed during our meetings.

Traveling to China as a delegate with the People to People International Tour for Dietitians and Nutritionists was a highlight of both my professional and personal life. The delegation exchanged professional information on many nutrition related issues including renal nutrition. As China continues to progress and develop economically, it will be most interesting to watch the impact on the lifestyle and the health of its people. With the increase of obesity, Type 2 diabetes, and hypertension, it is predicted that chronic kidney disease will increase. Just as in the United States, it is also predicted that nutrition will play a critical role in the treatment and management of chronic kidney disease.

For more information about PTPI please access their web site at http://www.ptpi.org/programs/travel.jsp or contact the organization via phone at 877.787.2000 ◆

Renal Dietitians Chair Message

Patricia Weber, MS, RD, CSR, CDE

Diseases caused by overeating are cured by fasting; those caused by starvation are cured by feeding. Diseases caused by exertion are cured by rest; those caused by indolence are cured by exertion. To put it briefly; the physician should treat disease by the principle of opposition to the cause of the disease according to its form, its seasonal and age incidence. -Hippocrates, The Nature of Man, 9

Hippocrates didn't spend all his time swearing oaths, but his "common sense" nutrition advice seems rather simplistic for the Father of Medicine. We dietitians are often asked to keep it simple and keep it practical. That is a great challenge, but it is one of the reasons that the latest KDOQI guidelines on Diabetic Kidney Disease once again emphasize that patients *need* the services of competent, experienced renal dietitians. Renal Dietitians (RPG) has a number of selfless volunteers who work to provide our members with practical tools, through meetings, publications available from ADA, the website, **www.renalnutrition.org**, and the *Renal Nutrition Forum*. I would like to take this opportunity to thank our Executive Committee for their leadership this year. Past-chair Cathi Martin offered stability and served as a liaison to the National Kidney Foundation. Incoming Chair Lois Hill has been a great resource with her wealth of experience in the ADA and Commission on Dietetic Registration. Secretary Jane Louis has a special interest in legislation and advocacy, and has kept important issues at the forefront of our thoughts. Treasurer Pam Kent has kept us fiscally accountable, and been a source of wise counsel. Kathy Madigan and the Nominating Committee, rounded out with Joanne Cooke and Paula Frost, tackled the tough job of recruiting nominees for office, with creativity and freshness.

We hope that you have noticed the efforts of the hardworking Media Team to provide fresh content for the Forum, and an exciting new and useful website. Members of the team are Sharon Griff, Managing Editor, Cathy Goeddeke-Merickel, Editor and Website Editor, Lesley Wujastyk, Assistant Editor and Marianne Hutton, Advertising Editor and liaison to industry.
The Membership Chair, Connie Cranford, was the important first contact for nearly 400 new members this year. Rounding out those who work "in the trenches" are our Area Coordinators: Chhaya Patel, Outcomes Chair, Mary Jo Dahms, Awards and Scholarship Chair, Patricia Williams, Education Chair, who with her team planned an excellent member benefit in the workshop designed to help members prepare for board-certification in Renal Nutrition (CSR), Jennie House and Sandra Oliverio, Lending Librarians, Karen Basinger, Legislative/Reimbursement Chair, and Patricia Barba, Historian.

Last but not least, I would like to thank our Professional Issues Delegate, Mary Russell, for representing us, and our Practice Team Manager, Susan DuPraw. Susan has a global perspective, and a keen ability to quickly analyze the potential effects of a decision. She keeps us on the straight and narrow path!

Many of the RDs who are in the RPG are also active in the NKF Council on Renal Nutrition (CRN). There is a strong sense of volunteerism that transcends organizational boundaries, and enables us to work cooperatively on issues about which we are passionate. I now pass the baton to Lois Hill, who will help us rise to more challenges and celebrate more victories along with our sister organization, the CRN. Thank *you* for your membership in the RPG. We welcome your active participation. ◆

FNCE 2007: September 29-October 2, 2007: Philadelphia, PA

The Renal Dietitians (RPG) and the Medical Nutrition Practice Group (MNPG) will be sponsoring the following FNCE presentation:

The Nutritional and Inflammatory Evaluation in Dialysis Patients (NIED Study): What You Need to Know

Presented by Kamyar Kalantar-Zadeh, MD, PhD, MPH and Sara Coleman, RD, CSR, CDE

This presentation is scheduled for Sunday, Sept. 30 from 1:30 to 3PM

CRN Chairperson Message

Maria Karalis, MBA, RD, LDN

"In support of NKF-CRN's Mission and Vision, I am particularly interested in, the future role of renal dietitians and providing the direction and support necessary for our CRN members to address the breadth and depth of our standards of practice. We need to be innovative, visible and highly proactive to influence regulatory and/or legislative issues impacting our profession. I will commit to bring forward issues that will impact our future and promote the development of programs that will enable us to succeed in research, education and practice. It is also important to continue our collaboration with the ADA-RPG to further strengthen our voice. My leadership style is inclusive, honest, focused, and strategic. It involves open communication and knowledge based decision-making. I feel these attributes are necessary in setting a clear direction and fostering an environment where all constituencies succeed, including the CKD patient".

This was my statement of goals exactly as shown on the ballot for CRN Chair-Elect in the fall of 2005. In keeping with the theme of a "fearless mission" proposed by our Past CRN Chair and fearless leader, Deborah Brommage, I humbly accept the mission of leading this highly successful organization. I have this statement of goals posted on my bulletin board in my office and refer to it often. It provides much needed focus in making decisions when I can't see the forest from the trees.

I look forward to continued partnership with the ADA-RPG leadership. Both the RPG and CRN have similar visions and missions and it will be important for our profession as well as the patients we serve, to further strengthen this partnership.

The CRN Executive Committee of previous years should be commended for their many accomplishments in exceeding CRN's five –year goals. My charge in the next two years will be to accelerate the momentum set in motion by previous leaders and to re-examine our five-year goals. The following goals will be re-evaluated in 2008:

- Promote and encourage quality nutrition care of all patients with CKD;
- Support the profession of the renal dietitian and promote professional education;
- Develop and promote patient and public education;
- Stimulate, support, encourage and disseminate nutrition-related research, and
- Impact regulatory and legislative issues.

I'd like to encourage you to re-examine these goals with the Executive Committee. This is your organization – let your voice be heard. Send an email with your ideas or thoughts to your Region Representative or to me at mariakaralis@yahoo.com.

Finally, I'd like to thank the following outgoing individuals who have dedicated many hours of their time to volunteer for CRN: Paula Frost, RD, CSR, LD, Associate Chair; Linda Gross, MS, RD, LDN Region II Representative; Louise Clemment, MS, RD, CSR, LD Region IV Representative; Elizabeth Strickland, MS, RD, LD Region IV Alt-Representative and Janelle Gonyea, RD, LD, CM Program Chair.

I welcome and look forward to working with our newly elected members: Associate Chairperson Cathi J. Martin, RD, CSR; Secretary/Treasurer Maureen P. McCarthy, MPH, RD, CSR, LD; Region II Representative Jane H. Greene, RD, CSR, LDN; Region II Alternate Representative Kay G Norris, RD, CSR, LD; Region IV Representative Mary J. Rockwell, RD, CSR, LD and Region IV Alternate Representative: Laurel W. Valentino, RD, LDN. ◆

Visit the Renal Dietitians DPG Online!

www.renalnutrition.org

Our redesigned website includes many more resources just for you, our members! You can view pictures of RPG leaders and read their bios, or take a look at the member's only area to access patient education materials and numerous other resources. Remember to use your last name (as listed with ADA) and ADA number (no zeros at the beginning) to gain access to the website.

2006-2007 RPG Executive Committee

Mission: Renal dietitians dietetic practice group is leading the future of dietetics by promoting and supporting ADA members working in nephrology practice.
Vision: RPG members are a valued source of expertise in nephrology nutrition.

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RNF Guidelines For Authors

Article Length: Article length is determined by the Editor for each specific issue. The feature article and abstract is approximately 3000 words (not including tables/graphs). Other articles are usually 1000-1500 words; member highlights and reports are approximately 400-500 words.
Text format: Times New Roman font, 12 point, double space
Tables/Illustrations: Tables should be self explanatory. All diagrams, charts and figures should be camera-ready. Each should be accompanied by a title and brief caption that clearly explains the table, chart, diagram, figure, illustration, etc.
References: References should be cited in the text in consecutive order parenthetically. At the end of the text, each reference should be listed in order of citation. The format should be the same as the *Journal of the American Dietetic Association*.
Reference citiation examples:
Article in periodical:
Knowler WC, Barrett-Connor E, Fowler SE, et. al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Eng J Med*. 2002;346:393-403.
Book:
Institute of Medicine. Dietary Reference Intakes: Applications for Dietary Assessment.
Washington, D.C.: National Academy Press; 2001.
Chapter in book:
Walsh J. Which insulin to use and how to start. In: Using Insulin. San Diego, Calif.: Torry Pines Press; 2003.
Web Site:
Medscape drug info. Available at www.medscape.com/druginfo. Accessed Feb. 3, 2004.

Author Information: List author with first name, middle initial (if any), last name, professional suffix and affiliation (all in italics) below the title of the article. Also include the primary author's complete contact information including affiliation, phone, fax and email address.
Submissions: All submissions for publication should be submitted to the editor as an email attachment (either an MS word file or text file). A new feature on the RPG Website will be to post the lead articles from the Renal Nutrition Forum on the Members Only Section of the RPG website (password protected). Thus, please include a brief abstract (for the website) along with your article submission.

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