The Renal Pharmacist

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View from the Chair...

Hello RPN members,

With the outbreak of SARS, the last few months have been challenging for the city of Toronto and to Health Care Professionals in particular. Many of us have seen many changes implemented in our hospitals and some of these changes may be here to stay. It was with great disappointment that the RPN executive decided to cancel our spring educational meeting because of the SARS outbreak. I know many of us were looking forward to hearing Dr. George Bailie speak on Dosing of Antibiotics in Automated Peritoneal Dialysis.

On a brighter note, Dr. Bailie has kindly agreed to come to Toronto in September to give his presentation. Much of the research published on the pharmacokinetics of medications in automated peritoneal dialysis has been published by Dr. Bailie and his colleagues and he is an expert on many other areas of nephrology. I hope many of you will be able to attend what is sure to be a very informative presentation. It is important in these difficult and uncertain times that we do not lose momentum and continue to move forward to fulfill our goals. RPN members can keep the lines of communication open through emails, conference calls and of course, our award winning website (**www.renalpharmacists.net**) and hopefully, we will be meeting again soon.

The executive is currently planning our involvement in the Canadian Association of Nephrology Nurses and Technologists (CANNT) conference, scheduled this fall in Vancouver. This is the second CANNT conference in which we will participate and it marks the RPN's fourth national conference. Participation in such conferences continues to increase our national exposure, provide an opportunity for members to meet with nephrology pharmacists from across the country and also to discuss and disseminate the latest clinical research.

Have an enjoyable summer!
Lori MacCallum, *Chair, Renal Pharmacists Network*

RPN Executive Positions Call for Nominations!

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IN THIS ISSUE ...

Impact of SARS on the Renal Pharmacy Team

(A view from York Central Hospital – Closed due to SARS from March 29 – April 18, 2003)

Submitted by Brenda Bruinooge and Lisa Sever, York Region Dialysis Program, Richmond Hill, ON

We wanted to see how the SARS closure and quarantine impacted our practice with our dialysis patients.

1. Eprex dispensing – as our outpatients came to the hospital routinely to pick up their Eprex for home use, we had to set up alternative arrangements with the Nephrologists' outside offices to take on this role or meet patients outside of the hospital.
2. Patient assessments – All outpatient assessments for PD and renal insufficiency were put on hold as clinics were cancelled, but HD patients were still available so more followups were done. No HD patient transfers or new starts happened during the closure.
3. Dispensing of medications to the floors and dialysis units – all medications were sent up in brown paper bags. All returned medications were thrown away.
4. Decreased inpatient admissions resulted in us cleaning up the office!

con't on p2

Medications in Renal Transplantation

Submitted by Salma Bhaloo, St. Michael's Hospital, Toronto, ON

Medications are an important part of post-transplant life. Typically, most patients are maintained on 3 immunosuppressive agents to prevent allograft rejection. The most common regimen is CsA or FK506 + MMF + prednisone. Variations can be made to this regimen based on certain patient factors. The recipient's risk for rejection is assessed by the Panel Reactive Antibody test and / or by HLA (genetic) matching against the donor. If a patient is deemed to be at high risk for rejection, additional immuno-suppression might be used; for example, the patient might receive induction therapy with an anti-lymphoctye product such as Thymoglobulin®. Conversely, a patient who is assessed to have a low risk for rejection may be maintained on only a two-drug regimen. At our centre, some low-risk patients are offered a steroid-minimizing regimen to limit the detrimental effects of long-term prednisone. This could include patients at high risk for post-transplant diabetes mellitus, or patients with advanced osteoporosis. In order to provide more protection against early rejection, the patient receives additional induction with basiliximab (Simulect®).

One current trend in renal transplantation relates to the minimization of nephrotoxicity by limiting the exposure to CsA and FK506. The dose of these agents could be kept very low or the agent can be eliminated completely. In such cases, we can substitute with an alternative non-nephrotoxic agent such as Sirolimus (Rapamune®).

After the transplant, patients may also need to start or resume additional medications to treat or prevent other co-morbidities. Some of these include anti-hypertensives, anti-hyperlipidemics, antibiotics, anti-virals, antacids, iron supplements, stool softeners, anti-osteoporosis agents, etc.

The pharmacist is an important member of the transplant team. Patients benefit tremendously from the monitoring and teaching they receive from the pharmacist. In the pre-transplant settings (e.g. pre-dialysis units, dialysis units), pharmacists can help the patient understand how their medication regimens might change post-transplantation, and what they might expect in terms of side effects and special monitoring needs. By educating the patient upfront, we can help improve the life of our patients as they enter a new phase of life. Common immunosuppressives used in renal transplantation:

- Cyclosporine (Neoral®, CsA)
- Tacrolimus (Prograf®, FK, FK506)
- Mycophenolate Mofetil (Cellcept®, MMF)
- Azathioprine (Imuran®, AZA)
- Sirolimus (Rapamycin, Rapamune®)
- Basiliximab (Simulect®)
- Daclizumab (Zenapax®)
- Thymoglobulin® (Thymo)
- Orthoclone OKT3® (Muromonab-CD3)

Impact of SARS

con't from p1

5. All off-site nursing home HD patients were admitted as a precaution to avoid infecting other nursing home patients – this gave us a good chance to review their medications and outcomes.
6. No childcare for some of our staff as the onsite childcare unit was closed too, and they had no backup plan.
7. General anxiety about catching SARS amongst staff and HD patients who had to return to the hospital environment three times a week.
8. Concern for fellow staff as some of the dialysis RN's and SPD had become hospitalized for SARS.
9. We were quarantined at home for 10 days and had time away from family and friends.
10. No volunteers were available at the hospital, so we had to take care of any "stat" deliveries ourselves.
11. As health-care workers, we felt ostracized when we were in the community. The general public made the association that all health-care workers were infected.

As we continue to fight against SARS, more new standards of care will emerge. Currently there are still more questions than answers. Hopefully with more research and experience the hospital will be a relatively "safe" environment in which to be.

RPN EXECUTIVE POSITIONS AVAILABLE

RPN still needs volunteers for the Secretary/Treasurer and Vice-Chair positions. If you can spare a few hours a month to devote to your renal profession, contact Lori MacCallum using the information on the front of the newsletter. If you are interested in assisting the RPN in any other way, please feel free to contact any member of the Executive. As many of the communications are done by teleconference and/or email, these positions are open to any renal pharmacist in Canada.

Vice Chair This one year term involves assisting the Chair in carrying out his/her responsibilities. The Vice Chair assumes the role of the Chair in his/her absence. He/she implements new projects as identified and assumes the role of the Chair in the subsequent year.

Secretary / Treasurer This one year term involves setting agendas for meetings, taking minutes of general and committee meetings and ensuring minutes and agendas are mailed in a timely manner. The Secretary/Treasurer ensures the membership list is updated. He/she also maintains financial year-end reports with the Chair or Vice Chair or Past Chair.

Pneumococcal and Influenza Vaccination in Hemodialysis Patients

Nancy Fu, B.Sc.Pharm.[1], Robert Dinglasan B.Sc.Pharm.[1] and Bruce Lange, Pharm.D.[1,2]

Introduction

Pneumococcus and influenza are common pathogens[1]. Hemodialysis patients are in a patient group at high risk of morbidity and mortality when infected by these organisms[2]. This and the substantial healthcare resources utilized to treat pneumococcal infections or influenza make preventative measures such as vaccination attractive. Vaccinations have been recommended by many authorities as a key strategy to reduce serious infections, antibiotic use, antibiotic resistance and overall cost of treatment in high risk patient groups[3].

Yet anecdotal reports suggest that despite the proven benefit and availability, many hemodialysis patients at our institution do not receive pneumococcal vaccine (PV) or influenza vaccine (FV).

The objective of the current investigation is to determine hemodialysis patient's recollection of vaccine administration and awareness of these vaccines availability and potential benefit.

Methods

From March 10th to March 28th thirty-seven patients (approximately 25 % of hemodialysis patients) at Royal Columbian Hospital, New Westminster, BC, were randomly chosen to answer a set of questions (Table 1.) regarding their knowledge of the potential benefit and availability of PV for renal patients and whether they could recall ever receiving PV. Patients were also asked if they received a FV in the past year. Hemodialysis patient kardexes were also reviewed for documentation of PV or FV administration.

Results

Patient demographics are described in Table 2. Most patients (84%) spoke English as a first language. Average time on dialysis was almost 2 years (22.4 months).

Based on patient self-report, only 14/37 (38%) hemodialysis patients surveyed reported that they had received PV. 24 patients (65%) stated that they had no knowledge that PV was recommended and available free of charge to renal patients. However, of these patients, 4 stated that they had received PV in the past . Of the 13 patients who knew the vaccine was available for renal patients, 10 /13 (77%) patients reported receiving PV.

Self-report of FV was higher: 21/37 (57%) reported receiving FV.

None of the patient kardexes contained documentation of FV or PV.

Discussion

There is clearly a lack of knowledge of the benefit and availability of PV and FV in the hemodialysis patients sampled at RCH. If the recall of vaccinations by patients surveyed accurately reflects the true incidence of vaccination, this group of patients is greatly under-immunized against these two potentially serious and preventable infectious diseases. It is beyond the scope of the current investigation to comment on factors such as age, sex or ethnicity on vaccination rates, although this may be an area requiring more study. To improve vaccination rates and vaccine documentation in this patient group, it would appear advisable to vaccinate patients with PV and FV in the hemodialysis unit, unless there was clear confirmation of vaccination at other sites (e.g. family doctor's office, public health clinic or community pharmacy clinic).

References

1. Mandel et al. Ed. Principles and Practice of Infectious Disease. 2001
2. BC Center for Disease Control. Vancouver. Jan 2001
3. Health Organization. Dept of Communicable Disease Surveillance and Response. Global Strategy for Containment of Antimicrobial Resistance. 2001

Footnotes:

1. University of BC, Faculty of Pharmaceutical Sciences. At the time of this study, Ms Fu and Mr. Dinglasan were fourth year pharmacy students.
2. Royal Columbian Hospital, Dept. of Pharmacy, New Westminster B.C. and clinical instructor, University of BC, Faculty of Pharmaceutical Sciences.

Table 1.

Hemodialysis patient questionnaire.

1. Introduction to patient as a pharmacy student on rotation in the kidney dialysis unit at RCH
2. Ask permission to ask questions regarding their immunization status.
3. Explain the purpose of the survey (to update patient information in order to optimize their health) and explain the current recommendations for patients with kidney disease to receive pneumococcal vaccines every 5 years and influenza vaccines yearly.
4. Have you ever received a pneumococcal vaccine ?
   If yes go to question 6.
   If no go to question 5.
5. Did you know that as of January 2001, the BC Ministry of Health made the pneumococcal vaccine available at no charge to persons with certain disease states including chronic renal disease?
6. Have you received a "Flu" vaccine in the past year?
   If yes go to question 8
   If no go to question 7
7. Is there any reason for not getting the "flu" vaccine? (e.g. allergy to eggs or preservative)

All patients were advised to see their doctor or local public health unit to obtain the vaccines if they wished to receive them.

Table 2.

Patient demographics

Male (%)	20 (54)
Mean age in years (range)	69 (43 – 87)
Ethnicity (%)	
Caucasian	22 (59)
East Indian	7 (19)
Asian	7 (19)
First Nations	1 (3)
English speaking (%)	31 (84)
Mean months on Dialysis (range)	22.4 (1-72)

Results of Hospital Survey of Enoxaparin Dosing for ESRD Patients

Submitted by Reshma Rathod, Lakeridge Health Corporation, Whitby, ON

An email survey for enoxaparin dosing in patients with renal insufficiency was sent to all members of the RPN in May 2003. Members from 16 institutions across the country responded. The results are presented below:

INSTITUTION	DOSING OF ENOXAPARIN IN PATIENTS WITH RENAL INSUFFICIENCY (Creatinine clearance less than 30ml/min)
Credit Valley Hospital, ON	No LMWH used in patients with CrCl <30ml/min
Trillium Health Centre, ON	Avoid use of LMWH in patients with CrCl <30ml/min
St. Michael's Hospital, ON	Avoid use of LMWH for CrCl <30ml/min If a LMWH is used, recommend dosing at 50% of the usual dose.
Toronto East General, ON	Enoxaparin used at a reduce interval (q24h)
University Health Network, ON	All patients with CrCl <30ml/min have Anti-Xa levels ordered and dosing interval of enoxaparin may be extended to q24h depending on Anti-Xa level.
Sunnybrook Health Sciences Centre, ON	Avoid using LMWH in patients with CrCl <30ml/min
William Osler Health Centre, ON Brampton Memorial Hospital Campus, ON	Do not use enoxaparin for patients with renal insufficiency
Grand River Hospital, ON	Enoxaparin is used at 1mg/kg sc once daily for treatment
Cite de la Sante de Laval, QC	Enoxaparin is used at 75% of the dose for CrCl <10ml/min and Anti-Xa levels are monitored.
University of Alberta Hospitals, AB	Enoxaparin 0.65mg/kg sc BID for CrCl <30ml/min. Lovenox 0.85mg/kg sc bid for CrCl 30-60ml/min
Jubilee Hospital , British Columbia, BC	LMWH of choice is nadroparin. For CrCl 20-30ml/min dose is reduced by 50% for treatment of DVT/PE. For Acute Coronary Syndrome, the interval is reduced to q24h. For CrCl <20ml/min UFH is recommended
Hôpital Dr Georges Dumont, NB	Avoid use of LMWH for CrCl <30ml/min. If enoxaparin is used, treatment dose is adjusted to 0.64mg/kg q12h and Anti-Xa levels are monitored.
Vancouver General Hospital, BC	Avoid use of LMWH for CrCl <30ml/min
Royal Columbian Hospital, BC	Avoid use of LMWH in patients with CrCl <30ml/min If enoxaparin is used recommend 1.5mg/kg sc q24h for CrCl >10-15ml/min. Avoid in patients with CrCl <10ml/min

The manufacturer for Lovenox® (Aventis) has released guidelines for enoxaparin dosing in renal patients as of March 2003. They are as follows:

For prophylaxis in conjunction with hip and knee orthopaedic surgery, the recommended dosage is 30mg sc once daily.
For prophylaxis in conjunction with abdominal or colorectal surgery, or for prophylaxis in medical patients at risk of deep vein thrombosis, the recommended dosage is 20mg once daily.
For treatment of deep vein thrombosis with or without pulmonary embolism a dosage of either 0.75mg/kg or 1mg/kg once daily is recommended.
For treatment of unstable angina and NQWMI the recommended dosage is 1mg/kg sc once daily.

Pertinent references that may be of interest are:

Collet JP et. al. Enoxaparin in unstable angina patients who would have been excluded from randomized pivotal trials. JACC 41(1): 8-14; 2003 Jan 1.

Kalus JS, Spencer AP. Enoxaparin should be used cautiously in patients with end-stage renal disease. Pharmacotherapy 2001; 21(8): 1015-1016.

Duplaga BA, Rivers CW et al. Dosing and monitoring of low molecular weight heparins in special population. Pharmacotherapy 2001; 218-34.

Brophy DF, Wazny LD et al. The pharmacokinetics of subcutaneous enoxaparin in end-stage renal disease. Pharmacotherapy 2001; 21(2): 169-74.

ARTICLES OF INTEREST

Please refer to the website ***www.renalpharmacists.net*** *for a more complete list and links to the abstracts.*

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Bastani B, Jain A, Pandurangan G. **Incidence of side-effects associated with high-dose ferric gluconate in patients with severe chronic renal failure.** Nephrology *(Mar)* 8:8-10, 2003.

Vaughn W. Folkert, Beckie Michael, Rajiv Agarwal, Daniel W. Coyne, Naomi Dahl, Pamela Myirski, David G. Warnock, Ferrlecit® Publication Committee. **Chronic use of sodium ferric gluconate complex in hemodialysis patients: Safety of higher-dose (250 mg) administration.** Am J Kidney Dis *(Mar)* 41:651-657, 2003.

Macdougall IC, Matcham J, Gray SJ. **Correction of anaemia with darbepoetin alfa in patients with chronic kidney disease receiving dialysis.** Nephrol Dial Transplant *(Mar)* 18:576-581, 2003.

Sadek T, Mazouz H, Bahloul H, Oprisiu R, El Esper N, et al. **Sevelamer hydrochloride with or without alphacalcidol or higher dialysate calcium vs calcium carbonate in dialysis patients: an open-label, randomized study.** Nephrol Dial Transplant *(Mar)* 18:582-589, 2003.

Baker RJ, Senior H, Clemenger M, Brown EA. **Empirical aminoglycosides for peritonitis do not affect residual renal function.** Am J Kidney Dis *(Mar)* 41:670-675, 2003

Adeel Ansari, Stephen Thomas, David Goldsmith. **Assessing glycemic control in patients with diabetes and end-stage renal failure.** Am J Kidney Dis *(Mar)* 41:523-531, 2003.

UPCOMING EDUCATIONAL EVENT OF THE RENAL PHARMACISTS NETWORK

September 4, 2003

Holiday Inn Yorkdale

(Dufferin St. & 401)

Our speaker will be

Dr. George Bailie

who will talk about

Dosing of Antibiotics in Automated PD.

Visit

www.renalpharmacists.net

for information

and to register.

Congratulations are extended to Sean Albanese and his wife Heather on the birth of their daughter Carolyn. She was born on January 29, 2003. Sean, who works at Thunder Bay Regional Health Centre has fallen head over heels for the new girl in his life. We wish you all the best.

Three times' a charm for Lisa Sever and her husband Manfred. A timely arrival of Timothy, 9lbs, on April 15th, 2003 (1 week after Lisa's SARS quarantine had finished!) Big brothers Alexander and Nicholas are excited. Lisa who works at York Central Hospital, Richmond Hill, ON is enjoying her new little one (he's a good sleeper!) and will be taking advantage of the one year maternity leave. ***Congratulations.***

MEMBER PROFILE

Lori MacCallum

Lori has been serving as the Chair for the Renal Pharmacists Network since September 2002. She brings to this position a wealth of knowledge, networking skills and education. Lori studied Biology for 2 years before completing her BSc in Pharmacy from Dalhousie in 1994. She later completed the Pharm D. program from the University of Toronto in 2000.

Lori, a well-rounded pharmacist, has worked in a Community setting (Lawtons Drugs in Nova Scotia), long-term care setting as a Clinical Consultant, followed by her current role at St. Michael's Hospital . She is a Clinical Pharmacy Specialist in the Diabetes Comprehensive Care Program working with home dialysis (PD and HD), progressive renal disease and transplant patients.

She is a renowned speaker having presented at the PPC's, Annual General Meeting (CSHP) and CANNT to name a few. She is affiliated with the University of Toronto: Pharm D. program, Bachelor of Science in Pharmacy Progarm and the Acute Care Nurse Practitioner Program.

She serves as a preceptor to Pharm D. Students.

Lori's biggest challenge in working with renal patients is the vast number of patients. When asked about the most rewarding part she replied "I love working in ambulatory care and having the opportunity to really get to know my patients. Some patients have been with me since I started at St. Michael's Hospital 3 years ago. I enjoy working together with patients to determine the best way to incorporate their medication regimens into their daily lifestyle. Being a part of a multidisciplinary team also brings me great satisfaction!"

Her other interests include running. Lori ran her first marathon last September and is training for another one. She has already run 5 half marathons. Wow! She also enjoys biking, reading and relaxing with friends.

Lori has brought a great deal of insight to the RPN. She is extremely level headed and open to new ideas and ways of thinking. We thank you Lori for all of your efforts and time devoted to improving communications and information dissemination amongst renal pharmacists nationally.

CLASSIFIEDS

WANTED RPN e-mail group list – If you have never received an e-mail from Lisa Sever, then you are not on the RPN e-mail list. Please e-mail me your address if you wish to be included. The group e-mail is used for surveys, drug information questions, product news, newsletter submissions, etc. Drop an e-mail to L.Sever@aci.on.ca.

NOTICE - ADDRESS / INFO CHANGES

Please forward any address/phone number changes to Andrea Fox at foxa@smh.toronto.on.ca. We are constantly updating our membership mailing list. Thank you!

A Great Big THANK YOU!

To all of those who contributed and to ORTHO BIOTECH for printing and distributing the newsletter.

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UPCOMING CONFERENCES

CANNT 2003 (October 30 - November 2, 2003)

This year CANNT (Canadian Association of Nephrology Nurses and Technicians) in association with RPN will host their annual conference in Vancouver from Friday October 31 - Sunday November 2/03. On Thursday October 30, there will be a half-day pre-conference workshop dealing with nephrology patient assessment skills. Over the next 3 days, several dynamic renal pharmacists from across Canada will be speaking on the following topics:

- Hemodialysis Catheter Maintenance (Lavern Vercaigne, Winnipeg)
- Diabetes and Renal Disease: Factors Beyond Glycemic Control (Mary Anne Hopkins, Ottawa)
- Glycemic Control in Patients with CKD (Piera Calissi, Saskatoon)
- Role of ACEI plus ARB in predialysis (Jennifer Dykeman, Saint John)
- Immunosuppression in transplantation: Current and Future Trends (Nilufar Partovi, Vancouver)
- Calcium and Phosphorus Disruption in CKD (Lori McCallum, Toronto)
- Management of hypocalcemia post-parathyroidectomy: Case Study (Brenda Bruinooge, Toronto)

As well, there will be several poster presentations from the Pharmacy group (both platform and poster format). A variety of talks from other allied health professionals, including physicians and nurses, will ensure further insight into dealing with the renal patient. This conference should prove both informative and fun for all who attend.

For further information, please access the CANNT website at www.CANNT2003.ca or contact
Karen Shalansky, Pharm.D. (kshalans@vanhosp.bc.ca)
or Joanne Jung (jjung@providencehealth.bc.ca)

SEPTEMBER 19 - 20, 2003

Prevention in Renal Disease

The Divisions of Nephrology at the University Health Network, St. Michael's Hospital and Sunnybrook and Women's College Health Sciences Centre, are hosting the 2nd Annual Conference in Prevention in Renal Disease. All conference sessions will be held at the newly renovated Courtyard Marriott Hotel (475 Yonge Street, Toronto, ON, M4Y 1X7, Canada; 416-924-0611), located in the heart of Toronto.

The conference objectives include:

- To review recent advances in the prevention of established renal disease
- To relate recent advances to current nephrology practice
- To review methods of disseminating new knowledge and of influencing non-nephrologists to adopt new preventive strategies
- To discuss directions for further research into the prevention of renal disease progression and the prevention of de novo renal disease

Doctors and Professionals with an interest in diabetes, hypertension and renal disease will gain new perspectives on renal disease.

For more information visit www.nephroprevention.com

Deadline for submissions
for the next Newsletter is September 10, 2003
or call Reshma Rathod, Communications Co-ordinator,
using the contact information on the front of this newsletter.

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Treating Hypertension in CKD: Interpreting ALLHAT

Background

The goals of antihypertensive therapy in patients with chronic kidney disease (CKD) are to lower blood pressure, slow the progression of kidney disease and to reduce the risk of cardiovascular disease (CVD).

Many studies demonstrate that antihypertensive regimens including an ACE inhibitor or ARB, usually in combination with a diuretic, are more effective in slowing progression of CKD than other antihypertensive regimens.

The ALLHAT Study (JAMA. 2002;288:2981-2997)

The Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) did not confirm these earlier studies.

ALLHAT, a randomized controlled trial, compared calcium channel blockers and ACE inhibitors to thiazide-type diuretics to reduce risk of CVD. ALLHAT concluded that thiazide-type diuretics are superior in preventing one of more major forms of CVD and are less expensive. ALLHAT Investigators recommend that diuretics should be preferred for first step antihypertensive therapy.

National Kidney Foundation and American Society of Nephrology Note Limitations in Applying ALLHAT to Patients with Chronic Kidney Disease

- ALLHAT's enrolled study population was selected for higher risk of additional CVD events than kidney failure.
- ACE inhibitors were given without diuretics.
- Proteinuria was not measured.

National Kidney Foundation's and American Society of Nephrology's Recommendations on Treating Hypertension in Chronic Kidney Disease

- The goals of antihypertensive therapy in CKD are to lower blood pressure, slow the progression of kidney disease and reduce the risk of CVD.
- Patients with CKD should be considered in the highest risk group for implementation of recommendations for antihypertensive therapy to reduce CVD risk.
- ALLHAT findings do not invalidate results of prior studies showing beneficial effects of inhibition of the renin-angiotensin system in slowing progression of kidney disease.
- ACE inhibitors and/or ARBs remain "preferred agents" for treatment of hypertension in most patients with diabetic kidney disease and non-diabetic kidney diseases with proteinuria.
- Target blood pressure for patients with CKD should be <130/80 mm Hg.
- Most patients with CKD require more than one antihypertensive agent for blood pressure control.
- Most patients with CKD should receive ACE inhibitors and/or ARBs in combination with diuretics.
- Many patients with advanced CKD require a loop diuretic rather than a thiazide diuretic.
- This regimen is effective in lowering blood pressure, slowing progression of kidney disease and reducing the risk of CVD.
- If there is a conflict between the goals of slowing progression of CKD and CVD risk reduction, individual decision-making is recommended, based on risk stratification.