CANNT JOURNAL
JOURNAL ACITN

Volume 19, Issue 3 July–September 2009

IN THIS ISSUE:

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2. National Kidney Foundation. K/DOQI Clinical Practice Guidelines for Bone Metabolism and Disease in Chronic Kidney Disease. *Am J Kidney Dis.* 2003;**42**(Suppl 3):S1-S201.
3. Renagel® Product Monograph, Genzyme Canada; 2006.

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JULY–SEPTEMBER 2009 ■ VOLUME NINETEEN ■ ISSUE THREE

CANNT JOURNAL
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The CANNT Journal
is the official publication of the Canadian Association of Nephrology Nurses and Technologists, 336 Yonge St., Ste. 322, Barrie, ON, L4N 4C8, telephone: (705) 720-2819, fax: (705) 720-1451, e-mail: cannt@cannt.ca. Published quarterly, the journal is received by all members of CANNT. Subscriptions are: Canada $50.00 (plus GST), US. $60.00, Outside N. America $85.00. Back issues, when available, are $7.50 (+GST) per issue and are available from the editor. Opinions expressed by writers in the CANNT Journal are not necessarily those held by the editor or CANNT. Contrasting views by our readership and membership are welcome. All letters, comments and articles are to be sent to the CANNT office, 336 Yonge St., Ste. 322, Barrie, ON L4N 4C8. Toll-free: 1-877-720-2819
Website: www.cannt.ca

• **Deadlines for submission to the CANNT Journal are:**
January–March – January 15, for publication March 15;
April–June – April 15, for publication June 15;
July–September – July 15, for publication September 15;
October–December – October 15, for publication December 15.
The CANNT Journal is indexed in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the International Nursing Index (INI), MEDLINE, EBSCO, ProQuest and Thomson Gale.
ISSN 1498-5136

The CANNT Journal is produced by Pappin Communications, The Victoria Centre, 84 Isabella St., Pembroke, Ontario K8A 5S5.

Letter from the Editor: Gillian Brunier

Cardiac devices and more!

For those of us who work with patients on dialysis, technology is a part of our everyday working experience. While we received formal inservices on new hemodialysis machines, we don't always have a full understanding of other new technologies in areas not directly related to kidney disease. Many of our patients with kidney disease also have major health problems affecting other areas of their bodies, especially their hearts. Therefore, it is with great pleasure that we bring you a review of a relatively new technological device for patients with heart disease.

We would guess that many **CANNT Journal** readers have recently encountered more patients with heart disease in their practice who have implantable cardioverter defibrillators (ICDs) and wondered: "What exactly are these devices?" Suzette Turner, Nurse Practitioner in the Arrhythmia Clinic at Sunnybrook Health Sciences Centre in Toronto, with her colleagues, has written an excellent continuing education (CE) article entitled "Prevention of death in chronic kidney disease: The role of implantable cardioverter defibrillators" to help us gain a basic understanding of ICDs and some of the common complications associated with them.

The second feature article is entitled "Reduced drug costs from switching hemodialysis patients from epoetin alfa in multidose vials to pre-filled syringes." This research article was written by Lori Wazny, Colette Raymond and their pharmacist colleagues in the Manitoba Renal Program. The researchers believe that through their retrospective analysis, they were able to demonstrate considerable cost savings to their renal program. In this era of fiscal restraint, it is always useful to be able to show cost savings from a change in practice.

On another important note, the Canadian Nurses Association (CNA) has been offering Canadian Nurses certification exams in specialty areas since 1992. By April 2009, there were 15,500 nurses certified in Canada and by 2010, certification will be offered in 19 specialties/areas of nursing practice. Nephrology nurses have always been proud to be part of this certification process, and on page 10, Colleen Wile, from the **CANNT Journal** editorial board, brings us an update on how we are doing. Also, on page 44, Patricia Loughren of Georgian College, Barrie, Ontario, on behalf of the Dialysis Technical Certification Team, brings us an update on certification for Canadian Technologists. CANNT encourages all Canadian Nephrology Nurses and Technologists to be involved with these two programs.

Finally, as the CANNT National Symposium (October 15–18, St. John, New Brunswick) draws closer, we are proud to publish all the winning abstracts on pages 11 to 28. We also encourage all of you who had your abstracts accepted for either an oral presentation or a poster, to consider turning your presentation into an article for the **CANNT Journal** so that you can share with all of us the advancements in your programs across the country. If you submit a journal article—based on your upcoming CANNT 2009 conference presentation—before the deadline of **October 1, 2009**, you will be eligible to win CANNT's prestigious **Manuscript Award** and prize money of $500 cash. If you have questions on how to turn your presentation into an article, please don't hesitate to contact me via e-mail: **gillianbrunier@sympatico.ca**

Please send all submissions, questions or comments to:

Gillian Brunier, Editor, CANNT Journal
Fax: (416) 495-0513
e-mail: **gillianbrunier@sympatico.ca**

Les dispositifs cardiaques et plus!

Pour ceux et celles d'entre nous qui travaillent auprès de patients en dialyse, la technologie fait partie de notre expérience de travail quotidienne. Bien que nous recevons des formations structurées en milieu de travail sur les nouveaux appareils d'hémodialyse, nous n'avons pas toujours une pleine compréhension des autres nouvelles technologies dans des domaines qui ne se sont pas nécessairement reliés à la maladie du rein. Bon nombre de patients en dialyse présentent également d'autres maladies majeures concomitantes touchant d'autres parties de leur corps, notamment le cœur. Par conséquent, c'est avec le plus grand plaisir que nous vous présentons une revue d'un dispositif technologique relativement nouveau spécialement conçu à l'intention des patients atteints de cardiopathie.

Nous avons idée que beaucoup de lecteurs du **Journal de l'ACITN** ont récemment croisé dans leur pratique un plus grand nombre de patients atteints de cardiopathie qui avaient un défibrillateur cardioverteur implantable (DCI) et se sont demandé : « À quoi sert exactement ce dispositif? » Suzette Turner, infirmière praticienne à la Clinique d'arythmie du Sunnybrook Health Sciences Center de Toronto, a rédigé en collaboration avec ses collègues un excellent article de formation professionnelle continue intitulé *« Prevention of death in chronic kidney disease: The role of implantable cardioverter defibrillators »* [Prévention de la mortalité dans la maladie rénale chronique : Le rôle des défibrillateurs cardioverteurs implantables] afin de nous aider à acquérir les connaissances de base entourant les DCI et certaines des complications courantes qui leur sont associées.

Le second article est intitulé *« Reduced drug costs from switching hemodialysis patients from epoetin alfa in multi-dose vials to pre-filled syringes »* [Réduction des coûts des médicaments en faisant passer les patients en hémodialyse qui utilisent des flacons multidoses d'érythropoïétine (EPO) recombinante humaine (epoetin alfa) à des seringues préremplies]. Cet article de recherche a été corédigé par Lori Wazny, Colette Raymond et leurs collègues en pharmacie du *Manitoba Renal Program*. Dans le cadre d'une analyse rétrospective, les chercheurs ont été en mesure de démontrer des économies de coûts importantes dans leur programme de néphrologie. En cette période de compression budgétaire, c'est toujours utile de pouvoir justifier des économies de coûts grâce à un changement dans la pratique.

Par ailleurs, et tout aussi important, l'Association des infirmières et infirmiers du Canada (AIIC) offre des examens d'agrément aux infirmières du Canada depuis 1992. En avril 2009, il y avait 15 500 infirmières agréées au Canada et d'ici 2010, l'agrément sera offert dans 19 secteurs de spécialité ou domaines de la pratique infirmière. Les infirmières en néphrologie ont toujours été fières de prendre part à ce processus d'agrément. En page 10, Colleen Wile, du Comité de rédaction du **Journal de l'ACITN,** nous présente une mise à jour sur nos progrès. Également en page 44, Patricia Loughren du *Georgian College,* à Barrie, en Ontario, au nom de l'équipe d'agrément des technologues en dialyse, nous livre un compte rendu sur l'évolution de l'agrément pour les technologues canadiens. L'ACITN encourage infirmières et technologues en néphrologie au Canada à participer à ces deux programmes.

Enfin, comme le Congrès national de l'ACITN (du 15 au 18 octobre, à Saint John, au Nouveau-Brunswick) approche à grands pas, nous sommes fières de publier tous les résumés qui ont été retenus aux pages 11 à 28. Nous invitons également toutes les personnes dont les résumés ont été acceptés pour une communication orale ou une affiche scientifique de prendre en considération notre suggestion de transformer leur présentation en un article pour le Journal de l'ACITN. Vous pourriez ainsi partager avec nous tous les progrès accomplis dans vos programmes respectifs d'un bout à l'autre du pays. Si vous soumettez un article pour le Journal—issu de la présentation que vous donnerez au Congrès de l'ACITN de 2009—avant la date limite **du 1er octobre 2009,** vous serez admissible au prestigieux **Prix d'excellence du manuscrit de 2009 de l'ACITN,** accompagné d'une récompense de 500 $. Si vous avez des questions sur la manière de transformer votre présentation en article, n'hésitez pas à communiquer avec moi par courriel à : **gillianbrunier@sympatico.ca**.

Le Journal ACITN
est la publication officielle de l'Association canadienne des infirmiers/infirmières et technologues en néphrologie, a/s 336 Yonge St., Ste. 322, Barrie, ON, L4N 4C8, téléphone : (705) 720-2819, télécopieur : (705) 720-1451, Courriel : cannt@cannt.ca. Publié quatre fois par année, ce journal est envoyé à tous les membres de l'Association. L'abonnement annuel est: Canada, 50 $ (+TPS), E.-U., 60 $, hors du Canada et E.-U., 85 $. Les publications antérieures, lorsque disponsibles, coûtent 7,50 $ (+TPS) chacune. Les opinions émises par les auteurs dans ce journal ne sont pas nécessairement partagées par l'Association ni par le rédacteur en chef. Nous invitons les lecteurs à nous faire part de leurs opinions. Toute correspondance devra être envoyée à l'ACITN, 336 Yonge St., Ste. 322, Barrie, ON L4N 4C8.
Site web : **www.cannt.ca**

• **Voici les échéanciers à rencontrer pour soumettre des articles/nouvelles au journal :**
Janvier–mars – le 15 janvier,
pour publication le 15 mars
Avril–juin – le 15 avril,
pour publication le 15 juin
Juillet–septembre – le 15 juillet,
pour publication le 15 septembre
Octobre–décembre – le 15 octobre,
pour publication le 15 décembre
Le journal CANNT est maintenant répertorié dans le "Cumulative Index to Nursing and Allied Health Literature (CINAHL)", "International Nursing Index" (INI), "MEDLINE", "EBSCO", "ProQuest", et "Thomson Gale".
ISSN 1498-5136

Le journal CANNT est préparé par Pappin Communications, The Victoria Centre, 84 rue Isabella, Pembroke, Ontario K8A 5S5.

Message from the President

Come join us in Saint John!

October 15–18! Remember those dates! CANNT is in Saint John, New Brunswick, and we would love you to join us. The conference committee has been hard at work to make this a wonderful experience. I think of the conference experiences I have had over the past years and CANNT always comes first to my mind. International conferences are wonderful opportunities, but nothing is as good as going to a conference in Canada. The topics are relevant to my health care system and scope of practice but just as outstanding as the topics and posters are the people who I get to see. I get to reconnect with people with whom I have crossed paths in nephrology nursing over the years. I may only see them once a year at the CANNT conference, but there is always a hug, a smile or a wave.

The CANNT conference gives me an opportunity to evaluate myself and the care that I deliver. I am exposed to new treatment options and shown new ways of approaching the age-old problems of our patients. If I don't come away with a litany of new skills, I at least come away with the knowledge that I am on track. Sometimes, the affirmation that I am up to date and practising quality care is enough to give me a boost to keep me going until next year when I get to evaluate myself all over again. CANNT strives to provide the best in education for all of the members of the renal multidisciplinary team and, thus, sets a standard of care and practice for renal professionals.

This year, the CANNT conference is hosting some fabulous sessions on everything from vascular access, transplant, end-of-life care, nurses as teachers, BP monitoring, technical information, home therapies and burnout, all the way to infection control. There are two sessions that I think speak especially well in helping to promote a high standard of renal care in Canada. Rick Luscombe, our CANNT President-Elect, is presenting once again a session on assisting nephrology nurses to prepare for the Canadian Nurses Association (CNA) examination. This session will help nurses become familiar with strategies for study, sample exam questions and navigate the exam process. The session will also be provided in French this year. If you will be writing your CNA certification in nephrology, this is a session you will not want to miss.

Another session that I think speaks to CANNT's ongoing commitment to nephrology professionalism is "Abstracts and presentations and manuscripts: Oh my!" given by Alison Thomas, our Past-President. The **CANNT Journal** exists and is held in high regard due to the quality of manuscripts that are written and submitted by committed nephrology staff and the dedication of our editorial staff. This session will help you navigate the process of writing and submitting an abstract, presentation and manuscript. Believe me—writing an article for the journal is not the daunting process many fear. It's even better when a group presents/writes together. The help from the editorial staff makes it a good experience, and then there is the feeling of accomplishment when you see the cover of the **CANNT Journal** with your name as author.

So bring your energy, your vision and your sense of fun, come join us in Saint John!

Jan Baker, RN, BN, CNeph(C)
CANNT President

Soyez des nôtres à Saint Jean!

Du 15 au 18 octobre—inscrivez ces dates à votre agenda. Les membres de l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN) se réuniront à Saint Jean, au Nouveau-Brunswick, pendant ces quelques jours. Et, nous aimerions que vous soyez des nôtres! Le Comité organisateur travaille sans relâche pour faire de ce congrès une expérience merveilleuse. En repensant aux expériences de congrès que j'ai vécues ces dernières années, celles de l'ACITN me viennent toujours à l'esprit en premier. Les congrès internationaux sont certes des occasions extraordinaires, mais rien n'équivaut à un congrès au Canada. Les sujets sont pertinents à notre système de santé et à notre champ d'activité, mais avant tout, les congressistes sont tout aussi exceptionnels que les sujets et les affiches scientifiques qui y sont présentés. J'ai la chance de renouer avec les personnes que j'ai croisées au fil des années dans le cadre de ma pratique infirmière en néphrologie. Il m'arrive de ne les revoir qu'une seule fois par année au Congrès de l'ACTIN, mais nous échangeons toujours une étreinte, un sourire ou un signe de la main.

Le Congrès de l'ACITN me donne l'occasion de m'évaluer et d'évaluer aussi les soins que je donne. Je suis exposée à de nouvelles options de traitement et je découvre de nouvelles façons d'aborder les problèmes liés au vieillissement de notre population de patients. Si je ne pars pas avec toute une panoplie de nouvelles habiletés, je repars au moins avec la certitude que je suis sur la bonne voie. Parfois, le simple fait de savoir que je suis à jour et que je fournis des soins de qualité est suffisant pour me donner un nouvel élan jusqu'à l'année suivante lorsque j'aurai à nouveau la chance de m'autoévaluer. L'ACITN cherche à donner le meilleur en éducation à tous les membres de l'équipe multidisciplinaire en néphrologie et, par conséquent, elle établit une norme de soins et de pratique pour les professionnels de la santé œuvrant en néphrologie.

Cette année, le Congrès de l'ACITN présente de fabuleux ateliers sur divers sujets, des accès vasculaires, à la transplantation, aux soins en fin de vie, aux infirmières enseignantes, à la surveillance de la TA, à l'information technologique, aux thérapies à domicile, à l'épuisement professionnel en passant par la prévention et le contrôle des infections. Selon moi, deux ateliers permettent de promouvoir une norme élevée de soins infirmiers en néphrologie au Canada. Rick Luscombe, président élu de l'ACITN, animera de nouveau l'atelier destiné aux infirmières en néphrologie qui préparent leur examen d'agrément de l'Association des infirmières et infirmiers du Canada (AIIC). Cet atelier consiste à aider les infirmières à se familiariser avec des stratégies d'étude et des exemples de question et à explorer le processus d'agrément. L'atelier sera également offert en français, cette année. Si vous êtes inscrites à l'examen d'agrément en néphrologie de l'AIIC, c'est un atelier que vous ne voudrez pas manquer.

Un autre atelier auquel je pense et qui porte sur l'engagement continu de l'ACITN envers le professionnalisme en néphrologie s'intitule « *Abstracts and Presentations and Manuscripts: Oh my!* » [Résumés, présentations et articles : Oh là là!], par Alison Thomas, présidente sortante. Le **Journal de l'ACITN** existe et est tenu en haute estime en raison de la qualité des articles de fond, qui sont rédigés et soumis par un personnel engagé en néphrologie, et du professionnalisme de notre équipe dévouée à la rédaction. Cet atelier vous aidera à comprendre le processus de rédaction et de soumission d'un résumé, d'une présentation et d'un article. Croyez-moi—écrire un article pour le journal n'est pas aussi décourageant que cela en a l'air. C'est même mieux lorsqu'un groupe présente ou rédige ensemble un article. L'équipe éditoriale vous apportera son soutien pour vous faire vivre une expérience enrichissante. Vous éprouverez un fort sentiment d'accomplissement lorsque vous lirez votre nom, comme auteur, à la une du **Journal de l'ACITN**.

Faites-nous donc profiter de votre énergie, de votre vision et de votre joie de vivre et soyez des nôtres à Saint Jean!

Jan Baker, inf., B.Sc.Inf., CNéph(C)
Présidente, ACITN

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NOTICE BOARD

- Ottawa Supper Clubs–Contact Janet Graham, Nephrology Unit, Ottawa Hospital, jgraham@ottawahospital.on.ca
- **August 28–30, 2009.** The 3rd North American Chapter Meeting of the International Society for Peritoneal Dialysis (ISPD), The Westin Bayshore, Vancouver, B.C. Website: www.ispd.org
- **September 2–October 16, 2009.** Registration time for the Nephrology Certification Exam. Contact Canadian Nurses Association Certification Program, e-mail: certification@cna-aiic.ca. Website: www.cna-aiic.ca. Toll-free phone number: 1-800-450-5206
- **September 5–8, 2009.** 38th European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA) International Conference, Hamburg, Germany. Website: www.edtnaerca.org
- **September 16, 2009.** Nephrology Healthcare Professionals Day.
- **October 15, 2009.** Kidney Foundation of Canada. Deadline for Allied Health Research Grants. Contact: Coordinator, Research Grants and Awards, e-mail: research@kidney.ca. Website: www.kidney.ca
- **October 15–18, 2009.** CANNT 41st National Symposium. Saint John Trade & Convention Centre, Saint John, New Brunswick. Conference Planner: Heather Reid: e-mail: hreid@innovcc.ca. Website: www.cannt.ca
- **March 7–9, 2010.** 30th Annual Dialysis Conference. Seattle, Washington. Website: www.som.missouri.edu/Dialysis
- **March 11, 2010.** World Kidney Day. A joint initiative of the International Society of Nephrology and the International Federation of Kidney Foundations. Website: www.worldkidneyday.org
- **March 15, 2010.** Kidney Foundation of Canada. Deadline for Allied Health Fellowships and Scholarships. Contact: Coordinator, Research Grants and Awards, (800) 361-7494, ext. 232, e-mail: research@kidney.ca. Website: www.kidney.ca
- **April 17, 2010.** Exam date for CNeph(C) certification exam. Contact Canadian Nurses Association Certification Program, e-mail: certification@cna-aiic.ca. Website: www.cna-aiic.ca Toll-free phone number: 1-800-450-5206
- **May 2–5, 2010.** The American Nephrology Nurses Association (ANNA) 41st National Symposium, Grand Hyatt San Antonio and Henry B. Gonzalez Convention Center in San Antonio, Texas. Website: www.annanurse.org

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Update on certification in nephrology

By Colleen Wile, RN, CNeph(C), Clinical Nurse Educator, Community Dialysis, Halifax, N.S.

The Canadian Nurses Association (CNA) is committed to nursing excellence and continuing competence. Annually, CNA offers a certification program for registered nurses to obtain a specialty certification. This certification program is important to nurses, the nursing profession, employers and the general public. Specialty certification is a voluntary process reserved for nurses who meet rigorous practice, continuous learning and testing requirements. Registered nurses commit to a national standard of professional competence that demonstrates a comprehensive understanding of their specialty and a commitment to continuing competence by obtaining and maintaining their national certification.

CNA reports the total number of registered nurses in Canada certified in all specialties, in 2008, rose to 15,225. This represents a growth of 4.8% over the previous year (see Figure One). The number of registered nurses becoming certified in nephrology rose to 1,080 active certifications in 2008 (see Table One).

In April 2009, more than 1,980 registered nurses wrote CNA certification exams in 18 nursing specialties, raising the total number to 15,500 certified in Canada.

CANNT would like to congratulate all candidates who successfully obtained their certification in 2009, and also congratulate those who recertified this past year. By maintaining certification, nephrology nurses continue to demonstrate their commitment to the specialty of nephrology nursing.

For those registered nurses returning to school, many universities across Canada now offer credit towards the baccalaureate nursing degree for those nurses who are certified in one of the 18 specialties offered by CNA.

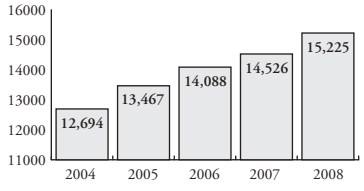

Figure One. Number of RNs with valid CNA certification by year (all specialties), 2004–2008
Source: Canadian Nurses Association, Department of Regulatory Policy

Certification application forms and recertification application forms are available from the CNA website http://getcertified.cna-aiic.ca. Completed applications will be accepted between September 1 and October 16, 2009, at the CNA office. The exam date for 2010 will be April 17, 2010.

CNA offers three resources to assist those candidates who are planning to write for their certification:

1. A list of mentors can be found below or on the CNA website
2. A prep guide will be sent to you once your completed application is accepted
3. A resource document called "Build on what you know: A study group manual for nurses preparing for CNA certification exams." This document can be found on the website at http://getcertified.cna-aiic.ca.

Financial assistance may be available to nurses to assist with covering the cost for certification:

1. Most hospitals or provincial licensing bodies offer financial assistance to help with the cost of writing the exam.
2. The Canadian Nurses Foundation also offers financial awards to two nurses in each specialty area to cover the certification fees.
3. CANNT also offers the ISPD bursary to assist with the cost of certification or recertification.

Applications for the Canadian Nurses Foundation award can be found at: http://cnf-fiic.ca/Scholarships/Certification/tabid/76/language/en-US/Default.aspx. Application for the CANNT ISPD bursary can be found at: http://www.cannt.ca/en/resources/cannt_awards_bursaries__grants/bursaries.html

For more information on nephrology certification, visit the CNA website at: http://getcertified.cna-aiic.ca

Mentors

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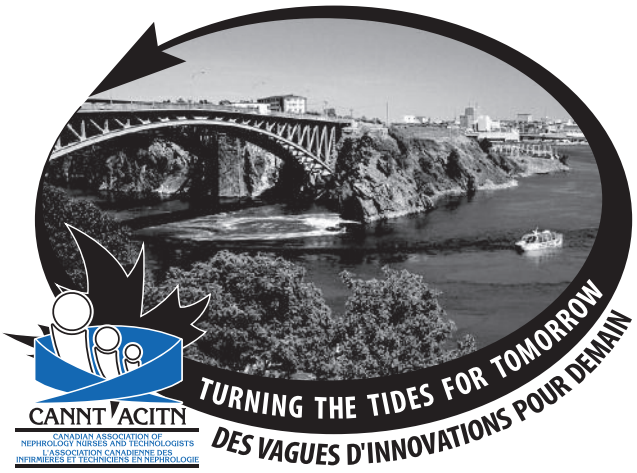
Table One. Number of RNs with valid CNA certification by year and specialty, 2004–2008

Specialty area	2004	2005	2006	2007	2008
Cardiovascular	546	660	713	722	774
Community Health	N/A	N/A	148	216	338
Critical Care	1,235	1,263	1,223	1,166	1,190
Critical Care Pediatrics	46	61	94	104	100
Emergency	1,305	1,353	1,307	1,323	1,345
Gastroenterology	87	147	171	205	235
Gerontology	1,628	1,822	1,937	1,988	2,104
Hospice Palliative Care	491	756	916	1,103	1,247
Nephrology	**921**	**963**	**1,019**	**1,052**	**1,080**
Neuroscience	192	207	223	237	258
Occupational Health	988	952	926	908	888
Oncology	1,137	1,231	1,332	1,323	1,360
Orthopedics	N/A	N/A	73	125	153
Perinatal	578	619	621	642	665
Perioperative	1,777	1,672	1,585	1,552	1,566
Psychiatric/Mental Health	1,763	1,761	1,729	1,734	1,750
Rehabilitation	N/A	N/A	71	121	172
Total	**12,694**	**13,467**	**14,088**	**14,526**	**15,225**

Source: Canadian Nurses Association, Department of Regulatory Policy



CANNT 2009

Saint John Trade & Convention Centre, Saint John, New Brunswick

October 15–18, 2009

TURNING THE TIDES FOR TOMORROW

This conference, **CANNT 2009,** promises to be a stimulating forum where nephrology professionals… nurses, technologists, administrators, researchers and pharmacists… will be able to learn, share, network, discuss and socialize together.

Experience all that **CANNT 2009** has to offer…

- Share in the messages of top-rated professional speakers…
- Choose from more than 40 concurrent sessions suited to all interests… topics range from nutrition, transplantation, end-of-life issues, pediatrics, infection control and much, much more...
- Peruse 27 poster presentations with contributing authors from one coast of Canada to the other—you'll be delighted in the diversity of nephrology topics being profiled this year!
- Interact with our corporate partners as they display their latest products and services, and share their expertise with delegates. With ample opportunities to network with corporate representatives, delegates should come prepared with questions and issues.
- Immerse yourself in this year's conference theme. Our social activities and the scientific program will inspire, educate, rejuvenate and motivate you for the everyday challenges of your professional and personal lives.

Register today! **CANNT 2009** information is available as follows:
1) printed brochure available by calling: (519) 652-0364 (Innovative Conferences & Communications)
2) downloadable brochure on-line at **www.cannt.ca**
3) program, abstracts, on-line registration and secure payment on-line at **www.cannt.ca**

We're excited to welcome Canadian nephrology professionals to New Brunswick — to experience CANNT 2009.

Abstracts

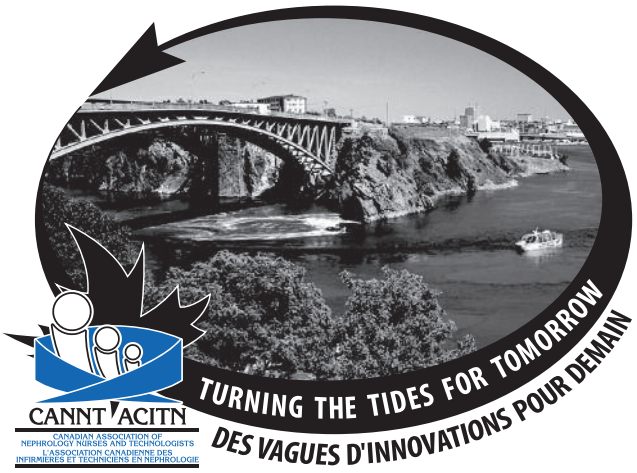
Some of the key strategic goals of CANNT are to disseminate educational materials to CANNT members, profile scientific research, and provide opportunities for nephrology colleagues to network.

CANNT's national conference, **CANNT 2009,** provides an excellent venue for accomplishing these goals of CANNT. However, only a portion of CANNT members are able to attend the national conference annually. Cognizant of this, CANNT is pleased to be publishing the abstracts to be presented in both oral and poster format at this year's annual conference in this issue of the **CANNT Journal.**

The following abstracts celebrate the diversity of nephrology topics being investigated and discussed across Canada. It is our hope that CANNT members interested in pursuing a profiled topic will contact our national office at 705-720-2819 or 1-877-720-2819 or **cannt@cannt.ca** to receive information regarding how to contact the author about the work.

We hope you will carefully review these abstracts!

Gillian Brunier
Editor, CANNT Journal



Conférence nationale annuelle de l'ACITN de 2009

Saint John Trade & Convention Centre, Saint John, Nouveau-Brunswick

October 15–18, 2009

DES VAGUES D'INNOVATIONS POUR DEMAIN

La **Conférence nationale annuelle de l'ACITN de 2009** promet d'être un forum stimulant où les professionnels de la néphrologie—infirmières, technologues, gestionnaires, chercheurs et pharmaciens—se donnent rendez-vous pour approfondir leurs connaissances, échanger leurs idées et opinions, réseauter, discuter et nouer des relations.

Venez vivre l'expérience de la **Conférence nationale annuelle de l'ACITN de 2009…**

- Venez écouter nos conférenciers-invités, tous experts dans leur domaine.
- Choisissez parmi plus de 40 ateliers simultanés ceux qui répondent le plus à vos champs d'intérêt. Les sujets abordés vont de la nutrition, à la maîtrise de l'infection, en passant par la transplantation, les questions liées à la fin de la vie et les enjeux d'ordre pédiatrique. Et, beaucoup plus encore!
- Consultez 27 d'affiches scientifiques auxquelles ont participé des auteurs d'un bout à l'autre du Canada—vous serez enchantés par la diversité des thèmes qui sont présentés cette année sur la néphrologie!
- Venez rencontrer nos partenaires commerciaux. Ils vous feront part de leurs plus récents produits et services et partageront avec vous leur expertise. Comme nous vous offrons maintes occasions de réseauter avec les représentants de l'industrie, nous vous conseillons de préparer les questions ou sujets de discussion que vous aimeriez aborder avec eux.
- Laissez-vous imprégner du thème de la Conférence de cette année. Les activités sociales prévues et le programme visent notamment à vous inspirer, à parfaire vos connaissances, à vous régénérer et à vous motiver afin de relever les défis quotidiens qui jalonnent votre vie professionnelle, mais aussi votre vie personnelle.

Inscrivez-vous maintenant! Pour de plus amples renseignements sur la **Conférence nationale annuelle de l'ACITN de 2009,** veuillez consulter les sources d'information suivantes :

1) brochure imprimée en appelant au 519-652-0364 (Innovative Conferences & Communications)
2) brochure en ligne à **www.cannt.ca**
3) programme et actes de la conférence, inscription et paiement sécurisé en ligne à **www.cannt.ca**

C'est donc un rendez-vous à Nouveau-Brunswick pour tous les professionnels canadiens de la néphrologie—venez vivre l'expérience de la **Conférence nationale annuelle de l'ACITN de 2009.**

Résumés

Conformément à certains de ses objectifs stratégiques clés, l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN/CANNT) doit diffuser des outils éducationnels à ses membres, médiatiser la recherche scientifique et offrir des occasions de réseautage aux collègues de la néphrologie.

Le Congrès annuel de l'ACITN/CANNT de 2009 offre un excellent cadre pour l'atteinte de ces objectifs. Toutefois, nous sommes conscients qu'une seule portion des membres de l'ACITN/CANNT peut y assister. Pour remédier à cela, nous avons le plaisir de vous annoncer que nous publierons les textes complets des communications et des affiches scientifiques du Congrès de 2009.

Les résumés suivants célèbrent la diversité des sujets en néphrologie qui font l'objet d'études et de discussions au Canada. Les membres de l'ACITN/CANNT qui désirent approfondir un sujet en particulier, abordé pendant le Congrès, peuvent communiquer avec le bureau de l'ACITN/CANNT, par téléphone au 705-720-2819 ou au 1-877-720-2819 ou par courriel à **cannt@cannt.ca**, afin d'obtenir la marche à suivre pour joindre le ou les auteurs.

Je vous souhaite une bonne lecture attentive de ces résumés!

Gillian Brunier
Rédactrice en chef, Journal de l'ACITN/CANNT

The effects of buttonhole needling in a hemodialysis unit: The patient and staff experience — A summary

Valerie Ludlow, RN, MN, CNeph(C), St John's, NL

A progressive cohort research study was initiated in four hemodialysis (HD) units in Newfoundland to assess the effects of needling arteriovenous fistulas (AVF) using the buttonhole (BH) technique, primarily from the viewpoint of the patients and the staff. At the end of the study, it was noted that cannulation pain was statistically reduced and vessel pressures and hemostasis times were decreased slightly or stayed the same. As well, staff and patients had a high level of confidence in the nurses' abilities to use the BH technique effectively. However, the frequency of access infections increased, requiring care protocols to be re-examined. In terms of cost, the need for additional supplies should be weighed against the reduction in frequency of procedures and complications resulting from fistula damage. Positive responses were obtained from both the staff and patients on the benefits derived from the BH cannulation technique. However, the most important consequence of this study might be the opportunity for both staff and patients to participate in a research project that encouraged them to have input into the HD care provided.

A toolkit to inform Aboriginal people with chronic kidney disease receiving or about to receive hemodialysis

Barbara L. Patterson, RN, PhD, Lee Ann Sock, BSN, and Denis LeBlanc, MSW PhD(c), Fredericton, NB

Purpose of study: The research was intended to determine the nature, structure, content, and preferred mode of delivery of a toolkit designed for Aboriginal people who are required to undergo dialysis in an urban dialysis unit that will assist them to be sufficiently informed about the dialysis experience and the available resources/supports to meet their need for an integrated and culturally relevant plan of care.

Methods: The research had a community-based research (CBR) approach. A team of three academic and eight community researchers (from Elsipogtog First Nation) met over two years to discuss the research, share experiences, and design the toolkit. Data collection also included individual interviews with people on dialysis, family members and Elders, and an examination of relevant literature and teaching tools.

Results: The project resulted in a prototype of the toolkit that can be used online or as a hard copy. It consists of DVDs of videotaped interviews with various stakeholders, a manual that links the content of the DVDs to various aspects of the dialysis experience, and a calendar/diary.

Conclusions: Because the toolkit has been designed in partnership with Aboriginal people, it reflects Aboriginal traditions and the experiences of many Aboriginal people with chronic kidney disease.

Implications for nephrology care: The toolkit will inform health care providers of culturally relevant means of providing nephrology care to Aboriginal people receiving dialysis. It will also assist Aboriginal people with chronic kidney disease and their families to better prepare for dialysis and to understand what resources/services are available to them.

Improving renal end-of-life care

Karen Mahoney, MSN, and Lee Beliveau, RN, New Westminster, BC

As renal care has expanded to an older patient group with extensive co-morbid diseases, we have recognized the need to provide good palliative and end-of-life (EOL) care alongside traditional restorative renal services. Patients and their families need support with EOL transitions, and programs are paying more attention to this important part of the experience of living with kidney disease.

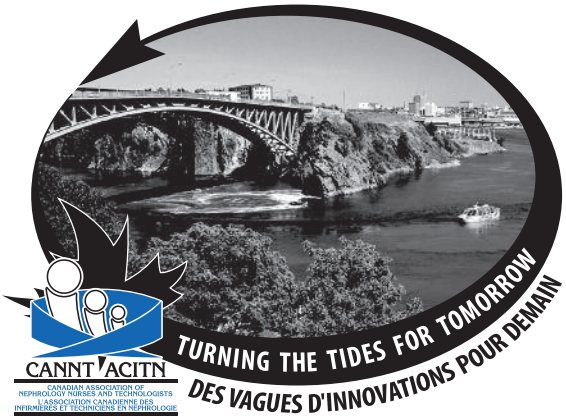
The Fraser Health Renal Program realized we could do a better job caring for our patients nearing EOL. An ongoing focus on Advance Care Planning (ACP) and a high percentage of hospital deaths sparked a debate on how best to streamline our EOL processes. After a year spent exploring resources and barriers to care, we implemented a pilot project aimed at eliminating gaps in EOL care, beginning with ACP conversations through to hospice palliative care referrals and bereavement support. This presentation will outline our key learnings about:

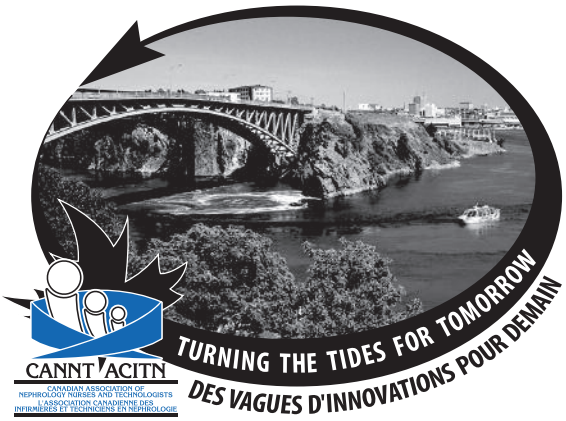
- Embedding Advance Care Planning conversations into everyday renal care
- Identifying patients approaching end of life
- Pain and symptom support guidelines
- Collaborating with hospice palliative care teams
- Supporting the primary renal care team
- Bereavement support

Home hemodialysis patients' perception and experiences of a needle-free access device

Stella Fung, RN, BHSc(N), CNeph(C), Rose Faratro, RN, BHSc(N), CNeph(C), Celine D'gama, RN, BHSc(N), CNeph(C), Elizabeth Wong, RN, BSc(N), CNeph(C), Cynthia Bhola, MSc(N), CNeph(C), and Bonnie Houghton, RN CNeph(C), Toronto, ON

Background: Nocturnal home hemodialysis provides enhanced uremic clearance and is associated with physiological improvements. However, the potential complications of





hemodialysis access (e.g., air embolism and line separation) exist at the home setting. To date, there is a paucity of research done to enhance safety for home hemodialysis.

Methods: A prospective cohort study (n = 24) was performed. All patients were instructed to use the TEGO® device as per protocol after two weeks of standard therapy. All subjects were surveyed to ascertain their perceptions and levels of anxiety regarding potential line complications at baseline and serially for a year using a standardized questionnaire.

Results: Of the 24 patients who were instructed to use the TEGO® connectors, three patients did not comply with the regular use of such a device. All patients achieved nocturnal home hemodialysis without blood access complications. At baseline, 50% of our cohort was deeply concerned about potential central venous line complication. Fifty-eight per cent stated that they were concerned about line disconnection during the hemodialysis procedure. The use of TEGO® connectors was associated with a reduction of the anxiety level (from 58% to 33%, $p<0.05$). Clinically significant central venous line complications remained rare. The present study was not powered to determine the potential impact of needle-free connection on line sepsis or thrombosis.

Conclusions: The use of needle-free connectors is associated with a reduction of home hemodialysis patients' anxiety level. The true benefit of such a device requires further prospective controlled studies.

The 20% connection: How hemodialysis and renal disease impacts neurological events

Charlotte McCallum, RN(EC)-Adult MN/ACNP, CNCC(C), and Margaret Leonard, RN, London, ON

It's no secret uremic patients are at increased risk of cardiovascular events. Incidence of atherosclerotic cardiovascular accidents in predialysis and hemodialysis patients is three times greater than the general population (Jungers et al., 1999). Cerebrovascular events are not excluded from the long list of increased incidence for patients on hemodialysis. Naganuma et al. (2005) measured the prevalence of silent cerebral infarctions in a hemodialysis population to be almost 50%. Although there are similar risk factors to the general population, some unique laboratory abnormalities are related to increased risk of silent cerebral vascular accidents in persons treated chronically with hemodialysis (Fukunaga et al., 2008). Utilizing a combined didactic review of the literature and case study format, this presentation describes the etiology of various neurological events at increased risk for persons on hemodialysis. Participants will increase their knowledge of cerebrovascular events, increase their neurological assessment skills, and have an improved understanding of the treatment recommendations for their patients.

Raising the bar in vascular access outcomes: A provincial approach

Rick Luscombe, RN, BSN, CNeph(C), Gayle Kroetsch, RN, CNeph(C), and Janet Williams, BSN, MBA, Vancouver, BC

Monitoring and documenting vascular access outcomes has always been a challenge for dialysis programs. In British Columbia, the Provincial Vascular Access Services Team (PVAST) utilized targets from the Kidney Dialysis Outcomes Quality Indicators (KDOQI) and Canadian Society of Nephrologists (CSN) guidelines to develop B.C.-specific targets. B.C.-specific targets are for a 50% incidence and 80% prevalence rate for fistulas/grafts and for infection rates less than .01 infection episodes per patient year for fistulas, 0.1 for grafts and 0.5 for catheters.

In B.C., PVAST has taken a provincial approach to meeting these targets. An important first step was the development of semi-annual reports that provide incidence, prevalence and infection rates at provincial and health authority levels. These reports are utilized by PVAST and health authority renal teams to identify quality improvement initiatives and to monitor the impact of these initiatives on vascular access outcomes. Work continues on identifying and resolving barriers and in creating forums for interdisciplinary dialogue (e.g., province-wide vascular access rounds and vascular access presentations at the annual provincial nephrology days). This presentation will focus on the process of developing the reports and will highlight some of the resulting initiatives, which are aimed at improving vascular access in B.C.

Home blood pressure monitoring for management of nephrology outpatients with masked hypertension: A successful story

Thuy Pham, RN, MN, Lyne Cloutier, RN, PhD, and Sheldon Tobe, MD, Toronto, ON

Masked hypertension has captured great attention in the literature, as a phenomenon with clinical significance in recent years. This phenomenon is defined as a condition in which patients with hypertension have elevated blood pressure (BP) during their daily lives, but not while they are in the medical environment. Patients with masked hypertension have a risk of cardiovascular events greater than those with normal BP and a similar risk to those with uncontrolled BP. The national and international guidelines now recommend home BP measurement as a method for detecting and monitoring masked hypertension. The purpose of this presentation is to discuss the case of a patient with chronic kidney disease and masked hyperten-

sion whose BP was successfully controlled using home BP monitoring. Literature on masked hypertension will be reviewed. The latest Canadian Hypertension Education Program guidelines on the recommended best practice methods for developing and implementing a home BP monitoring program for nursing management of nephrology outpatients with masked hypertension or suspected masked hypertension will be provided.

Maintaining a nocturnal hemodialysis program: Five years on in Southern Alberta

Owen Gaskill, MSc, Maria-Teresa Ala, BN, RN, and Bonnie Couture, RN, CNeph(C), Calgary, AB

The Southern Alberta Renal Program's Home/Nocturnal Hemodialysis Unit, established in 2004, provides training for independent hemodialysis and supports ~50 patients, most of whom dialyze nocturnally. The unit at present has a training capacity of ~30 patients per year. By 2007, yearly training numbers had decreased, training failures had increased and patient support became inconsistent. We present our program's historical training data and describe steps taken to increase training capacity and rates, reduce training failure rates and re-establish consistency of patient support. Steps include adopting new promotional material and promotional strategies, instituting a standardized patient assessment model, shifting training methods and materials, and creating a more coherent patient support strategy. Results have been positive, but patient recruitment remains a challenge.

Création d'un service mobile |d'hémodialyse dans un centre ultra spécialisé en cardiologie

Sylvie Bastien, Coordonatrice en gestion du personnel infirmier, Sylvie Lévesque, Infirmière chef d'équipe en hémodialyse à l'ICM, Marie-Ève Cotton, Infirmière en hémodialyse à l'ICM, Geneviève Riendeau, Infirmière en hémodialyse à l'ICM, et Émilie Laflamme, Infirmière en hémodialyse à l'ICM, Montréal, QC

L'Institut de Cardiologie de Montréal (ICM) est un centre ultra spécialisé en cardiologie. Sa clientèle de plus en plus âgée et atteinte de co-morbidités nécessite souvent des soins en néphrologie. En constante augmentation, ces besoins sont couverts par l'équipe de néphrologues de l'Hôpital Maisonneuve-Rosemont (HMR) qui agit en tant que consultants à l'ICM. La direction des soins infirmiers, en partenariat avec l'équipe du centre de dialyse de HMR, a mis en place un projet novateur afin d'offrir à cette clientèle le service de dialyse durant leur séjour hospitalier, par la création d'un service mobile d'hémodialyse. Les infirmières de ce service, équipe volante priorité hémodialyse, se déplacent d'une unité à l'autre avec tout l'équipement nécessaire pour le traitement au chevet du patient. Elles ont acquis une expertise et font faire preuve d'une grande capacité d'adaptation pour faire face à toutes les situations qu'exige ce type de patients en phase aigue. Grâce à cette équipe d'infirmières, la qualité de soins s'en est vue améliorée : le service est offert au bon moment, dans le confort du client et en toute sécurité.

Tracking infection control statistics as a quality outcome indicator for tunnelled dialysis catheters

Paulina Gonzales, RN, BScN, CNeph(C), Bharat Nathoo, MD, FRCP(C), Barb Gray, RN, MScN, CNeph(C), Janett Black, RN, BScN, Kimmy Lau, RN, MN, CNeph(C), Johanne Denis, RN, BScN, CNeph(C), and Kathy Lynch, RN, CNeph(C), Toronto, ON

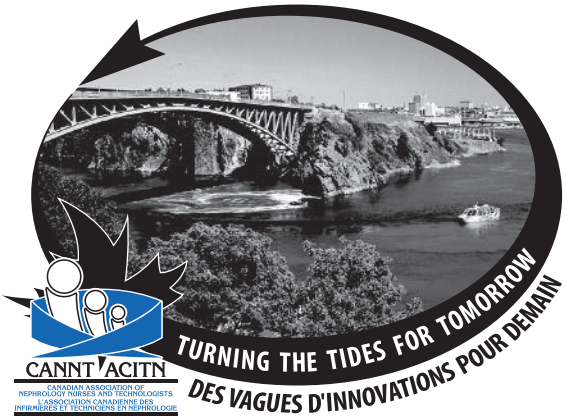
Most end stage renal disease (ESRD) patients are immunocompromised and present with a myriad of co-morbidities upon initiation of hemodialysis as a treatment modality. The purpose of this article is to evaluate the causes of a sudden increase in tunneled dialysis catheter (TDC) infections in a local hemodialysis unit and the processes that were implemented by the multidisciplinary team to halt its spread.

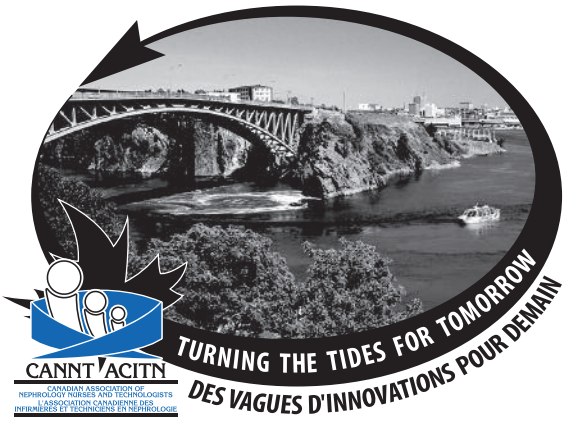
Infection continues to be the most serious complication in the use of TDCs, with increasing morbidity and mortality rates primarily from catheter-related bacteremia (CRB) (Beathard & Urbanes, 2008). Prevention of CRB in dialysis patients should be the aim of every facility. However, once the bacteriemia occurs, prompt diagnosis and treatment is essential.

The mobilization of the multidisciplinary team to assess the sudden increase is key to positive outcomes for evaluation and correction of factors identified. To achieve this goal, the local hospital hemodialysis leadership team developed and utilized several tracking tools to identify the source(s) of the infections, the causative organisms and treatments, and assessed other multifactorial events that could affect the outcomes.

A comprehensive review of the unit's policy and procedure pertaining to central venous catheter care was also undertaken and assessed for its alignment with the Kidney Disease Outcomes Quality Indicator (KDOQI) guidelines and current nephrology best practices. Hand hygiene review was also an essential component of the process.

With timely and aggressive interventions by the dialysis team at this local hospital, the number of infections was substantially reduced by 57%.





Some things are meant to fall, but dialysis patients are not one of them. Action today for a better tomorrow: Implementing a fall prevention program

Monique Moore, RN, CNeph(C), Kathaleen Bijman, RN, BScN, CNeph(C), and Martine Quinn, RN, Cornwall, ON

Statistics Canada identified seniors aged 65 and over are at greater risk of falling. Though there are multiple factors that can precipitate a fall, a person with multifaceted health conditions increases the probability. The majority of hemodialysis patients are not only in this age category, they also have the additional physiological complexities that are secondary to chronic renal failure. Hence, this augments the likelihood for dialysis patients to fall and an increased vulnerability to injury. Considering the above, a fall prevention program is imperative. This presentation will demonstrate how the health and safety committees from the Eastern Ontario Dialysis Clinic and the Ottawa Carleton Dialysis Clinic created their fall prevention program. To implement this plan of action, an education session was created for our staff to increase their understanding regarding the necessity of a fall prevention program.

Included in this presentation are the researched data regarding falls and the various fall risk assessment tools considered. The evidence-based tool that was adapted to accommodate our units' needs will be explained, including the knowledge on how and when to use the fall risk tool. Patient-focused educational handouts will be discussed.

With the application of the fall risk tool and the identification of those at higher probability of a fall, we anticipate a better tomorrow for our dialysis patients… on their two feet, that is.

Developing a peritoneal dialysis patient assessment tool

Karen Forsberg, RN, Janice James, RN, CNeph(C), Heather Bilan, RN, Heather Zadorozniak, RN, BSN, CNeph(C), Anne Stendhal, RN, BSN, CNeph(C), and Linda Turnbull, RN, BN, CNeph(C), Kelowna, BC

Utilizing a self-managed approach to align identified individual patient medical, physical and social challenges with unique learning needs is critical to ensure successful outcomes for patients and families seeking home therapies such as peritoneal dialysis (PD).

Purpose: To develop and implement a PD patient assessment tool that supports positive outcomes for all potential PD patients regardless of medical, physical and social limitations. The creation of this tool will assist in the identification of potential barriers or challenges for patients desiring PD as a home therapy, thus ensuring that patients training/education is matched with individual needs.

Description: A cross-hospital/-provincial team of health care professionals from three PD programs in Alberta and B.C. formed to develop and implement an assessment tool for patients who have shown an interest in performing PD. The tool focuses on medical, physical and social parameters from a self-management perspective. Questions were formulated to identify patients who show evidence of low, moderate, or high ability to successfully self-manage PD in the home environment. The tool was piloted at three hospitals commencing April 1, 2009.

Evaluation: Initial six-month outcomes post-assessment tool implementation will be presented reflecting: ease of use, impact on length of time on therapy and patient satisfaction.

Implications for practice: The early identification of potential barriers or challenges permits the opportunity for PD programs to align clinical and educational support utilizing a self-managed approach to ensure successful outcomes for patients desiring PD.

An innovative approach to hemodialysis electronic bedside charting

Judy Chaperon, RN, CNeph(C), Mary Katherine Coady, RN, CNeph(C), Jocelyne Rowlands, RN, Alec Dorion, and Pierre Gratton, Sudbury, ON

Chronic conventional hemodialysis treatments typically generate 156 records per patient annually. This represents significant nursing workload, medical record storage and data retrieval challenges. As a regional nephrology program supporting six remote satellites, we sought a method to electronically connect the programs' records into one system.

After purchasing a nephrology software program, we standardized on one hemodialysis machine for the program. We adapted the dialysis machine to support a laptop computer to enable bedside electronic charting. Nurses review the dialysis care plan at the bedside, acknowledge all checks and blood pressures, which flow automatically into the medical record and access the hospital's main information system for other functions, such as a workload measurement.

Our experience thus far indicates that nursing staff initially requires more time to perform charting functions. After a short training program, many staff see the benefits in the speed of data retrieval and time saved recording. The results are safe patient monitoring, reduced chances of transcription errors, and adherence to the standards of charting practice for our province's regulatory nursing college. We also found it essential to have dedicated "champion" nursing staff to train and support the users. Our next steps will be to roll this out to our six satellites.

Important implications for nephrology programs include cost savings in medical records storage, patient safety, and immediate data retrieval for patient care when patients "fall back" from a satellite, and a robust electronic database for Continuous Quality Improvement (CQI) functions.

Effect of burnout on health and retention outcomes in nephrology nursing

Lori Harwood, RN, MSc, CNeph(C), Barbara Wilson, RN, MScN, CNeph(C), and Jane Ridley, RN(EC), MScN, CNeph(C), London, ON

Occupational burnout among nurses is an area of interest given the current nursing shortage. Burnout can have serious implications on productivity, nurses' health, service usage and health care costs. Nephrology nurses, like nurses in other areas, are not immune to the effects of work-related stress. The purpose of this study was to examine the effect of burnout on nurses' mental and physical health outcomes and the effect on retention. A randomly selected sample of 129 Canadian nurses completed a survey consisting of the Maslach Burnout Inventory and the Pressure Management Indicator. Nurses in the sample were also asked questions related to retention in their current positions. Multivariate analysis was used to examine the predictors of and associations with mental health, physical health and retention. Results demonstrated that almost 40% of mental health symptoms experienced by nephrology nurses could be explained by burnout (emotional exhaustion and cynicism) and 27.5% of physical symptoms could be explained by emotional exhaustion and cynicism after controlling for age and years of nephrology nursing experience. Twenty-three per cent of the sample had plans to leave their current position. Retention was significantly associated with burnout, and mental and physical symptoms. The results confirm that burnout is an issue amongst nephrology nurses. Organizational strategies aimed at reducing perceptions of burnout would be an important consideration, as a means to keep nurses working to their fullest potential.

Protect yourself, protect others: A closer look at infection control practices in a hemodialysis unit

Fran Boone, RN, Betty Herman, RN, Barbara Smith, RN, and Carrie Armstrong, RN, BScN, London, ON

The need for infection control in hospitals has been the subject of much discussion in the media and is a concern for all health care staff given high rates of hospital-acquired infections. This project highlights a "late career initiative" quality improvement project undertaken by three experienced hemodialysis nurses with the goal to increasing education and awareness around proper hand washing and infection control practices in a busy in-centre hemodialysis unit. The late career initiative is sponsored by the Ministry of Health and Long Term Care for Ontario and has been in place for several years. The project was carried out over one month and, during that time, a number of key initiatives were undertaken including:

1. Education for nurses around hand washing using the "4 Moments of Hand Hygiene" program.
2. A workplace "walk-about" inspection by members of the hospital infection control team.
3. A review of unit-based policies and procedures around infection control practices.
4. An education display that included eye-catching posters on infection control.
5. A video entitled "Who moved my cheese!"

Results of the infection control audit indicated that several projects need to be completed to improve our work environment. In the short term, nurses in our hemodialysis unit have a greater awareness of proper hand hygiene, and the need to be aware of the clean versus dirty mix in the patient's environment. In the long term, our renal program will be initiating an infection control committee that will address key issues on a regular basis.

Transcultural barriers to Type 2 diabetic treatment regimes

Pauline Atkins, RN, MScN, FNP, Scarborough, ON

Purpose: The purpose of this research study was to do an in-depth literature review of West Indian Canadians diagnosed with Type 2 diabetes, using Parse's and Leininger's theoretical framework, to investigate the barriers to their treatment regime, and develop an educational pamphlet addressing their needs.

Incidence:

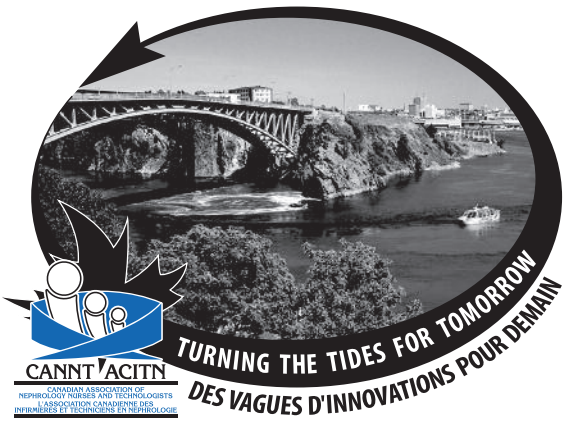
- 2,006,000 Canadians with diabetes (6.2%). This is expected to increase by 2030 to 3,543,000.
- Prevalence will increase with those who are 65 and older.
- Similar trends are seen in the West Indian Islands:
  - Jamaica population: 2,780,132. Of these, 81,000 have diabetes (3%).
  - Trinidad and Tobago population: 1,056,608. Of these, 60,000 are diabetic (4.5%).

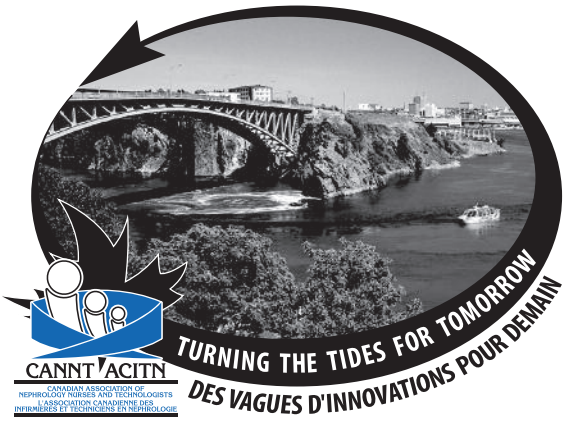
Method:

- Conducted an in-depth literature review on Type 2 diabetes.
- Identified barriers to their treatment regime: diet, exercise, education and spirituality.
- Obtained letter of approval from IRB.
- Developed an educational pamphlet addressing the specific needs of West Indian Canadians with Type 2 diabetes.
- Evaluated the pamphlet with nurse practitioner, diabetic educator and nephrologist using an evaluation tool, which consisted of six "yes" and "no" questions with two open-ended questions.

Results: For the six "yes" and "no" questions, all the experts thought that the pamphlet identified the target population clearly and that its readability was appropriate.

Two of the content experts thought more information was needed on diabetes and the role of the health care provider needed to be clearly identified in relation to follow-up care.





Discussion: Information from the pamphlet can be given to West Indian Canadians with Type 2 diabetes by health care practitioners, with the intent patients will be motivated to seek information that is relevant to them.

Conclusion: Health professionals who understand the culture and health practices of West Indian Canadians need to focus on what is important for the patient, and how addressing these needs might lead to fewer health-related complications and adherence to diabetic treatment regime.

Turning the tides for tomorrow through implementation of an innovative chronic disease prevention and management project

Linda Kloosterman, RN, BScN, CNeph(C), Andrea Ravestein, RN, CNeph(C), Emily Harrison, RN, BHScN, CNeph(C), Ethel Doyle, RN, BScN, CNeph(C), MHSM, and Barb Bunker, RN, MN, CNeph(C), Toronto, ON

Nephrology patients have multiple co-morbid conditions requiring frequent intervention and support from within the health care system. Literature shows how chronic disease prevention and management (CDPM) strategies have been adopted within the primary health care sector. However, few address implementation strategies of CDPM within an acute care environment to support the care and management of individuals living with chronic kidney disease (CKD).

Lakeridge Health Regional Nephrology System (RNS), in partnership with Baxter Canada, is transforming how renal health care is delivered through the development and implementation of a Renal Chronic Disease Prevention and Management program. Using the Ontario provincial CDPM model of care, this program focuses on improving renal care coordination and co-morbid management to prevent and/or delay onset to dialysis, improving QOL for renal patients throughout their lifespan, increasing efficiencies and reducing health care costs.

Concrete examples of project initiatives to date include:

- Quarterly data capture, analysis, reporting and quality improvement based on evidence-based guidelines using Plan Do Study Act cycles
- Risk stratification process implemented
- Self-management philosophy including self-management support workshops and coaching for staff, patient education materials and community self-management programs for patients
- Seamless care coordination, communication and integration through development of patient care pathways, team meetings, IT improvements and staff workshops
- KDQOL survey and patient satisfaction surveys to focus QI activities on patient-centred care.

Artificial homeostasis: The delicate balance of acid and base

Charlotte McCallum, RN(EC), MN/ACNP, CNCC(C), Margaret Leonard, RN, and Sue Molloy, RN, London, ON

The mysterious world of blood gas analysis is rarely discussed amongst nursing circles, yet it plays a vital role in the differential diagnosis for medical treatment recommendations. Utilizing a case-based format, several cases are presented including common and unique situations to explain how the body attempts to maintain homeostasis, and outlining treatment objectives with dialysis. Biochemistry and physiology related to normal acid base balance and how it is altered by azotemia are reviewed. The purpose of this presentation is to provide novice to expert registered nurses with a better understanding of how azotemia alters normal electrolyte balance, thereby providing background information necessary to understand the impact of acute and chronic renal failure, dialysis bath requirements, and hemodialysis treatment at the molecular level. Although the focus is on chronic dialysis dependent cases, two unique cases of acute onset of metabolic acidosis requiring dialysis are presented. On conclusion, participants will be able to analyze laboratory data to identify metabolic versus respiratory acidosis including compensatory mechanisms, and troubleshoot potential causes of anion gap disturbances in metabolic acidosis states.

Partnering with patients to improve peritonitis rates

Sharon White, RN, BScN, MBA, London, ON

The London Health Sciences Centre (LHSC) Peritoneal Dialysis (PD) Program is an active PD program caring for approximately 120 patients. The program strives for optimal patient outcomes and, in doing so, regularly analyzes infection rates.

In 2003, the LHSC peritonitis infection rate was 1:56 patient months. Peritonitis rates remained acceptable in 2004 (1:41) and 2005 (1:57). In 2006, the PD team became concerned when the peritonitis rate deteriorated to 1:31 patient months, with a further decline to 1:27 patient months in 2007. The PD team needed to respond to the downward trend.

Embracing the philosophy of chronic disease management, which emphasizes partnership with patients, the team implemented multiple changes. The changes included adding a patient questionnaire, changing the process to assess the cause of each peritonitis, developing a poster and patient handout to increase patient awareness of how to prevent peritonitis, informing patients of the project targets and process, a patient education day focused on prevention of infection and increased home visits. All of these changes will be shared during this presentation and contributed to an improved peritonitis rate of 1:47 patient months.

MRSA myths and realities: One hemodialysis unit's practice

Kim Hurley, BN, RN, CNeph(C), Saint John, NB

In Canada and throughout the world, the incidence and prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA), as both a nosocomial and, more recently, a community-associated pathogen, has increased each year. MRSA infection among dialysis patients is higher than in any other patient group and 100 times higher than in the general population. Our immune-compromised dialysis patients are a primary host for "super bugs" vancomycin-resistant enterococci (VRE) and MRSA. Subsequently, caring for dialysis patients infected with MRSA/VRE has been challenging for nephrology nurses. Overcrowded dialysis units, limited number of isolation rooms, increased incidence of infection and use of antibiotics have contributed to the growth in both MRSA/VRE infections and colonization.

The purpose of this presentation is to review the myths and realities of MRSA and to describe the Saint John Regional Hospital Hemodialysis Unit's multidisciplinary and systematic approach to MRSA/VRE surveillance, transmission precautions, hand hygiene, environmental services and decolonization procedures. Successful decolonization of our hemodialysis patients has reduced medical complications, relieved the stigma associated with living with MRSA/VRE and improved both patient outcomes and quality of life. Take control of your unit and don't let these "super bugs" take a bite out of you.

Role of the licensed practical nurse (LPN) in the Alberta hemodialysis unit

Susan Moore, LPN, and Beverley Preston, LPN, Calgary, AB

The purpose of this presentation is to give insight to other hemodialysis units how the role of the LPN has increased in scope over the past two years within the Southern Alberta Renal Program (SARP).

The College of Licensed Practical Nurses of Alberta has four areas of specialized practice: renal dialysis, advanced orthopedics, operating room and immunization. The renal dialysis LPN holds an active practice permit (which specifies area of specialized practice) and completes advanced training approved by council.

An overview of the Alberta LPN current educational requirement will be provided. The LPN graduate program is two years in length. The SARP LPN hemodialysis orientation involves two weeks of classroom instruction, two weeks of practical experience with a clinical nurse educator and two to three weeks working with a preceptor. The preceptor is usually an LPN. Education also consists of completing an immunization course, intramuscular/id course, IV direct medication administration, Cathflo® administration, continuous workshops and educational days. We also have a written exam with an 80% pass mark.

The main objective of the presentation is to clarify key responsibilities of the dialysis LPN, which are assessment, planning, implementation, evaluation and professional development. Specific examples will be given for the above objectives.

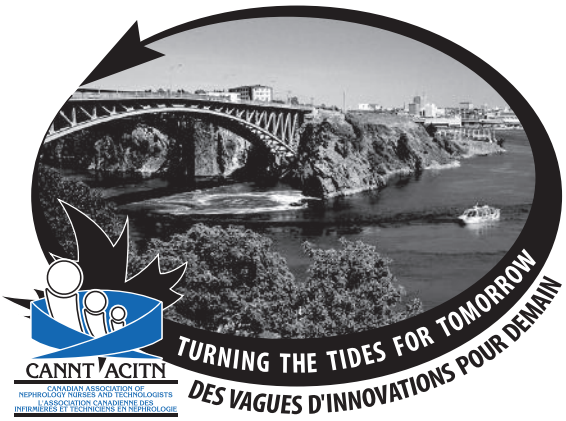
We will provide information to the attendees where the LPN is employed, i.e., hospitals, acute dialysis settings and in community satellite units.

This presentation will show that by expanding the LPN to full scope of practice, you can optimize the patient care, allowing best patient care by utilization of nursing resources. There is better operational efficiency, increased patient safety procedural continuity, overall satisfaction with care and facilitation of recruitment and retention of LPNs. The utilization of LPNs is an effective tool in the health care system.

Shower and no dressing technique for tunneled central venous catheters

Julie Ann Lawrence-Murphy, RN(EC), Nurse Practitioner, MScN, CNeph(C), Alexandra Hooton, RN, Andrea Pember, RN, and Christine St. Roch, RN, London, ON

We undertook a pilot implementation of a "shower and no dressing technique". Our Vascular Access Best Practice Group at London Health Sciences Centre (LHSC) learned of an innovative technique where hemodialysis patients were taught to shower with tunneled central-venous accesses. A literature review showed abundant information comparing infection rates between different dressings. However, there is a paucity of information detailing the effects of "no dressing" for tunneled central lines. In addition, registered nurses often report patients arriving with wet and non-intact dressings due to showering. As a result of nurses' observation, available data on central line care and reports of showering improving quality of life, the "shower and no dressing technique" has been introduced to five patients at LHSC. Convenience sampling began in August 2008, with five patients participating. Inclusion criteria included: catheter in situ at least six months, no history of catheter-related bacteremia, ability to perform the proposed technique, and low contamination risk in the patient's work or home setting. Patients who had medications instilled in the catheter limbs (other than Citrate) were excluded. After 23 patient-months, there have been no catheter-related infections, nor exit-site concerns. Water testing from participant homes was performed to identify vectors of pathogen transmission. These results have compelled our leadership teams to facilitate the implementation of a larger Continuous Quality Improvement endeavour. This initiative will compare the "shower and no dressing technique" to the current standard of care. Data collection will be expanded to include infection rates, exit-site characteristics, quality of life, and cost comparisons.



Thank you very much… What did she say?

Cindi Wheeler, RN, BN, CNeph(C), and Debra Grant, RN, BScN, CNeph(C), Toronto, ON

Have you ever attended a presentation that you felt contained ideas that were useful and innovative, only to leave and not be able to recall what was mentioned or know how to put those ideas into practice once you returned to your unit? Your time is valuable and to spend an hour or more in an information session and not be able to use the information is a waste of your time. Using adult learning principles in teaching promotes motivation, reinforcement, retention and, most importantly, transference of what was taught.

How a patient is taught is as important as the content. The "how" is what will allow that patient to leave the health care setting and be able to incorporate those teachings into everyday living. Collaboration between the health care provider and the patient is pivotal and supports patient independence and motivation to make sustainable changes to their health.

The purpose of this session is to provide you with practical ways of incorporating principles of adult learning and self-management techniques into your teaching, whether you teach patients, staff or fellow colleagues. This interactive session may leave you motivated to try a new approach to teaching, and your patient motivated to learn. It may also enable you to create the outcome you want: being an effective instructor, identifying and decreasing the barriers to optimal learning, improving retention and, as a result of teaching, your patient will use the information as taught, in their own setting.

Evaluating inadequate fluid removal: A nursing algorithm

Gillian Brunier, RN(EC), MScN, CNeph(C), Shirley Drayton, RN, BA, and Anne Knoll, RN, CNeph(C), Toronto, ON

Managing the fluid volume for patients on peritoneal dialysis (PD) has become critical since volume overload may result in hypertension and, eventually, ischemic heart disease. Cardiovascular disease is now the leading cause of death for patients on dialysis. Symptoms of volume overload include: hypertension, increased jugular venous pressure, crackles at the bases of both lungs, and pitting edema of both legs and ankles. To manage fluid volume, the primary targets of care for patients on PD are regulating fluid balance (which includes both restriction of water and salt intake) and optimizing the PD prescription, as well as blood pressure control.

The home dialysis nurse needs to understand how best to assess and eliminate possible causes of volume overload and the difficulties PD patients face in doing so. To this end, a nursing algorithm was developed at our centre to illustrate the multiple difficulties encountered in the removal of fluid and how best to resolve them. This presentation will review all aspects of the nursing algorithm and then demonstrate through the use of four case studies some unusual signs and symptoms of patients with difficulty in fluid removal, their assessment, interventions and outcomes. Identification of membrane failure is the final step in the algorithm. Newer thoughts on preserving peritoneal membrane integrity through decreased use of hypertonic PD solutions will be incorporated in this presentation. Use of the algorithm should help home dialysis nurses maintain better volume control for their patients and increase their patients' long-term survival.

Hemodialysis patients' perception of risk for foot problems and their foot care practices

Melvin John Yumang, BSc, MSc(A) in Nursing, Lindsay Hammond, BSc, MSc(A) in Nursing, Nancy Filteau, N MSc(A) in Nursing, and Margaret Purden, N PhD, Montreal, QC

Background: End stage renal disease (ESRD) patients are prone to foot problems due to vascular complications and multiple comorbidities. However, less is known about this issue from the patient's perspective. Research to date estimates a four-fold prevalence of foot problems in ESRD patients over those without ESRD.

Purpose: This study explored hemodialysis patients' perception of risk for foot problems and their foot care practices.

Methods: A qualitative descriptive design, using purposive sampling of nine men and women. Two hemodialysis units from a large university-affiliated hospital centre in Quebec were used.

Results: Three major themes emerged: (1) *Foot problems are not a serious complication;* (2) *I am protected from developing foot problems;* and (3) *Taking care of my feet.* Patients, including those currently suffering from a foot problem, lacked knowledge of their actual risk for foot problems. All participants engaged in some form of foot care, such as the use of a footbath. Several individuals described behaviours that could compromise foot health.

Conclusions: Participants demonstrated a low perception of risk for foot problems and exhibited a surprising lack of concern for the development of a foot problem. This is troublesome, given the heightened risk for foot problems latent in this population.

Implications for nephrology care: The findings suggest that it is worthwhile for nurses to elicit patients' actual foot care practices both to validate those that are appropriate and to address those that are unsafe.

Evaluation to a better dialysis: A look at online clearance data of patients with central venous catheters: Reversed or not reversed? That is the question!

Susan Bonnetta, RN, CNeph(C), Dianne Kimball, RN, and Darlene Young, RN, CNeph(C), Lindsay, ON

Purpose: To compare the effect of reversing the lines of central venous catheters on the online clearance data (OLCD).

Method: Volume, time, plasma sodium, blood volume processed, monthly blood work Kt/V, delivered Kt/V single pool, delivered Kt/V equation, Kecn, blood flow rates, dialysate flow rate, use of Cathflo® will be collected on a data collection sheet over four months on all patients in our unit with a central venous line.

Results: Data will be analyzed to determine whether reversing the lines and achieving comparable blood flow rates has an impact on OLCD for the individual patients where applicable, and the group as a whole.

Conclusions: The quality of dialysis and catheter function should not only be evaluated on achieving a blood pump speed of greater than or equal to 300 ml/min.

Implications for nephrology care: Current practice in our unit is to maximize blood flow to at least 300 ml/min and, if this cannot be achieved, lines are run reversed. With the advent of new technology, we have a lot of data available that go uncollected and not analyzed. Each unit needs to continue to look at the quality of dialysis we are providing to our patients by utilizing the information available to assess our practice.

Examining the relationship between the use of sugarless candy and thirst in hemodialysis outpatients: The sugarless candy study

Hong Gao, RN, BSN, CNeph(C), Patricia Watts, RN, and Alison Thomas, RN(EC), MN, CNeph(C), Toronto, ON

Thirst is a frequent and distressing symptom experienced by hemodialysis patients. Limiting fluid intake to prevent volume overload may contribute to the sensation of thirst and, thereby, lead to a desire to drink to alleviate that thirst. Strategies such as sucking on hard candy, eating ice chips and chewing gum have been tried in an effort to alleviate thirst and avoid excess fluid ingestion. The purpose of this study is to evaluate the impact of sugarless candy on perceptions of thirst in a population of hemodialysis patients.

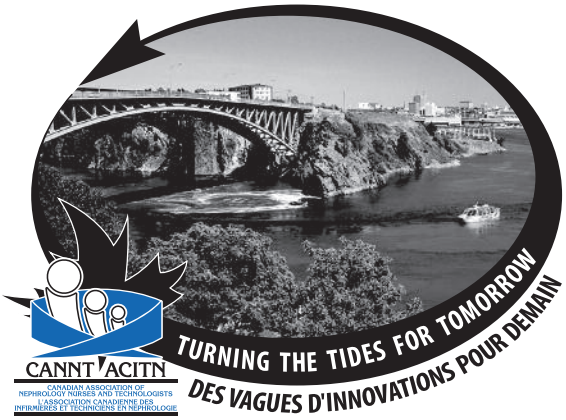
A prospective, non-randomized study design will be used to study 20 to 25 thrice weekly hemodialysis patients who meet the inclusion criteria in the hemodialysis unit at St. Michael's hospital for a one-week period. All patients will be provided with and instructed to suck on sugarless candy when they feel thirsty. Data will be collected at enrolment and at two time points during the study. Perception of thirst intensity will be measured on a Visual Analogue Scale (VAS) and interdialytic weight gain (IDWG) will be documented. Descriptive statistics will be used to characterize the study population and summarize continuous variables. Differences in thirst and weight groups will be measured using ANOVA. This study will determine if the application of a simple strategy to help manage thirst in the hemodialysis patient population is of value, based on study findings.

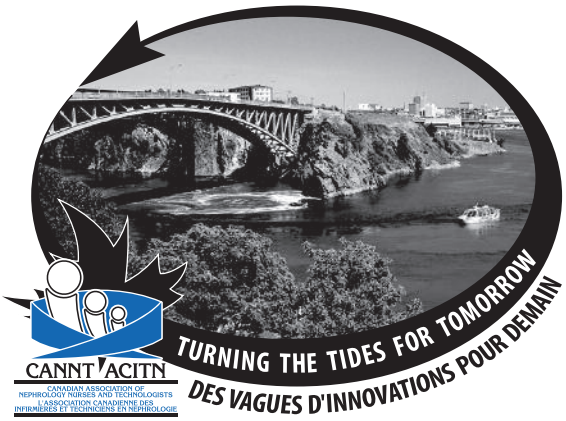
Smoothing the transition into hemodialysis at Lakeridge Health

Colleen Holstein, RN, Sandy McGarry, RN, Andrea Ravestein, RN, CNeph(C), Elizabeth Whistle, RN, and Marlyn Young, RN, Oshawa, ON

The idea of starting hemodialysis can be a very overwhelming experience, especially when one feels unwell. Nurses often get caught up in the routines of the unit, taking for granted the small things, such as how to manage the remote control on the television in the dialysis unit. But, for a patient coming to the unit for the first time, this small task can be an important yet stressful one. The nurses at Lakeridge Health recognized that patients transitioning into hemodialysis were overwhelmed with the new surroundings and the information provided to them. They thought the idea of a dialysis initiation checklist would be helpful in both streamlining the information given, as well as providing the appropriate information at the appropriate time. The checklist is helpful to the nurse, as it provides the nurse with a step-by-step teaching tool ensuring a complete orientation to the unit and the process of hemodialysis for the patients and their families. It also allows nurses to review new information over several treatments in order to prevent information overload.

After four to six weeks on dialysis, once the patient has settled in, an updated checklist is initiated, giving the nurse and patient the opportunity to discuss more detailed information such as their understanding of their own renal failure, vascular access, diet, medications, transplant options and travelling opportunities. The utilization of these two checklists promotes two-way communication, which will turn the tides towards an enhanced nurse-patient relationship providing an open and comfortable environment for the patient.





Vascular Access Interest Group: The who, what, where and when

Suzanne Seiler, RN, and Kari Matos, RN, London, ON

The vascular access nurse case manager at London Health Sciences Centre (LHSC) developed a vascular access interest group four years ago. This committee continues to be a dynamic group that works together to identify and address vascular access issues.

The committee includes RNs from three in-centre and four satellite dialysis units, the CKD clinic, and the daily/nocturnal dialysis unit, as well as the renal educator, research, nurse practitioners and vascular access nurse case managers. The group meets every other month for two hours, and rotates our meetings between the three city hospitals.

Some of the projects undertaken include: vascular access worksheet, checklist for troubleshooting poor-performing catheters, fistula letter for patients, and various pamphlets for patients. The group also created single-needle policy, a tPA policy, and self-cannulator guidelines. We have had many presentations and discussions on a variety of topics. The group has also contributed to an annual vascular access workshop/conference day for the staff. At present, we are working on a minimal distance of needles study, shower technique protocol, hand washing for patients in the dialysis unit, and safety needle trials.

We are very proud of the achievements this group has accomplished and hope to carry on in the future with more, new exciting projects.

Picture archive communication system (PACS) and vascular access

Audrey Miller, RN, BScN, CNeph(C), and Verna Bloom, RN, BScN, Saskatoon, SK

Vascular access has long been known as the Achilles heel of hemodialysis. New technology, combined with existing technology, has allowed our hemodialysis program to support staff in our home unit and satellite units across the province. MIQS is a provincial computer program providing transfer of patient information to whatever dialysis facility requires it. Recently, we have implemented the capture of a single image from a diagnostic imaging procedure that would best provide caregivers with the information required to assist in needling the AV access. The image is attached to the procedure report in MIQS. The image can then be viewed remotely. The image is selected by the dialysis access clinician, and a group e-mail can be sent to notify staff of the image. Areas of stenoses, stent placement, pseudoaneurysms, and tortuous vessels are visualized, allowing a greater understanding of access problems. This simple tool provides an excellent opportunity for discussion and education, when the dialysis access clinician and staff member(s) can simultaneously view the same image and discuss it via telephone.

Complications in buttonhole cannulation technique

Lori Mehew, RN, CNeph(C), Oshawa, ON

Purpose: Evaluation of three fistula infections using buttonhole cannulation technique and the development of guidelines to reduce the number of in-centre fistula infections and define some indications and contraindications for buttonhole technique.

An investigation of three in-centre fistula infections within a three-month time span, resulting in urgent surgical consultation for ligation of the infected AVF. Individual case reviews were performed to evaluate common themes and determine possible sources for the infections.

This is a retrospective investigation of three infected fistulae. All three cases resulted in the loss of the arterial venous fistula by means of surgical ligation for removal of the infected vessel, as well as insertion of a central venous access device (CVAD) in order to continue and maintain conventional dialysis treatments.

KDOQI best practice guidelines for vascular access indicate infections in fistulae rates should not exceed the standard of one infection q 100 years. Three infections in three months indicated major concern for the patients and the nurses.

Considerations for improved and enhanced education sessions would be required and implemented. Evaluations were performed in the following areas: unit audits, multicentre audits, consultation with VA surgeon, nephrologists and infection control team.

A review of the current practice trends within the GTA was initiated and the data were reviewed. The program's current policies and procedures were reviewed and an addendum to the current practice resulted following a detailed analysis.

Catheter tip design: A question of functionality

Rick Luscombe, RN, BSN, CNeph(C), Vancouver, BC

Maintaining vascular access and providing patients with optimal dialysis is a challenge for every dialysis program. Fistulae are the access of first choice but, for various reasons, catheters must be used. Approximately one-third of all hemodialysis patients require long-term hemodialysis catheters. Every hemodialysis nurse has experienced problematic catheters. Historically, chronic catheters have had problems with infections and decreased flows due to thrombus formation, requiring the use of antithrombogenic agents. This

disruption of flow requires nursing time and effort, often resulting in inadequate dialysis for the patient, thus rescheduling patients for further dialysis. This places additional stresses on an already overloaded system and compromises patient's health.

The in-centre hemodialysis unit at St. Paul's Hospital in Vancouver, B.C., from July 31, 2008, to January 27, 2009, underwent a catheter trial. The purpose was to choose a new catheter for the program. A result of the trial was a comparison of three different catheter tips, (staggered, split and symmetrical). Functionality of the three catheter tip designs was measured by alteplase usage and measuring recirculation via ultrasound dilution. This presentation captures these results.

A comparative cost analysis: How nurses can cut costs without cutting quality

Joyce Hunter, RN, and Amy Chan, RN, Toronto, ON

Our hemodialysis program provides hemodialysis therapy to approximately 206 outpatients per week. Currently, 122 patients dialyze via central venous catheters (CVCs). Evidence-based and safe practices are essential in maintaining low infection rates in the CVC population of patients who are at high risk of infectious complications and may have the same CVC for several years with no other access option due to vascular exhaustion. Our hemodialysis CVC dressing protocol had been unchanged for more than 20 years. However, with the development of new products for CVC care, it was decided to review current practice. A key motivator in changing the protocol was to reduce workload and cost while maintaining or improving current infection rates (0.11/1000 patient days). A new dressing protocol was then drafted utilizing products that are currently available in the hospital. The new protocol was then phased into practice in September 2008. A comparative cost analysis was carried out at three months post-initiation of the new protocol, which reflected an $11,329 cost savings per annum on dressing supplies while maintaining our low infection rate. In addition, a minor change in the amount of heparin infused during dialysis was initiated with a projected cost savings of $28,615 per annum. A quarterly cost analysis and collection of CVC infection rate will occur to determine real values as opposed to projected values to establish the success of the new hemodialysis CVC dressing change protocol.

A three-step approach to CVC conversion of prevalent in-centre hemodialysis patients

Patty Quinan, RN, Murray Berall, MD, FRCP, and David Mendolssohn, MD, FRCP, Toronto, ON

Purpose: Conversion of patients with central venous catheters (CVC) to alternate access is problematic. In October 2006, all prevalent in-centre hemodialysis patients with CVC (n=108, 38%) were reviewed to determine suitability for arterio-venous access creation. We describe a three-step process to convert suitable patients to arterio-venous fistulae (AVF) or arterio-venous graft (AVG).

Method: Eligibility included patients with a CVC on dialysis more than 90 days with suitable anatomy. In step one, patients were assessed to determine suitability. In step two, suitable patients were scheduled to see the vascular surgeon. In step three, patients who refused AV access creation were asked to sign a waiver.

Results: In step one, 37/102 (36%) patients did not have suitable vessels and 65/102 (64%) patients were deemed suitable. In step two, 53 patients were deemed suitable and 28/53 patients refused conversion. In step three, patients were asked to sign the waiver.

Twenty-five of fifty-three (47%) patients are currently in the conversion process (16 converted, four awaiting maturation, three awaiting surgery and two primary failures). Results are to March, 31, 2009.

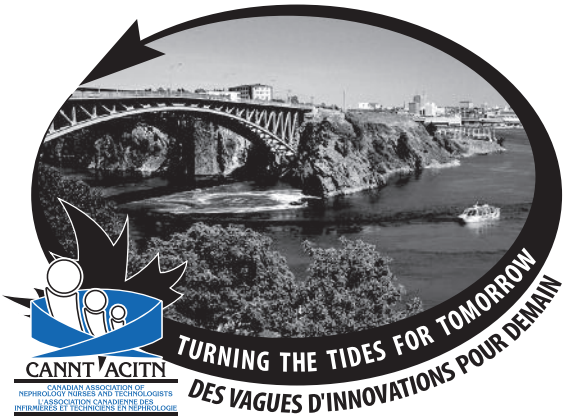
Conclusion: Conversion of patients with CVC to better forms of access is challenging. Our three-step approach was partially successful, but more research into surmounting the psychosocial aspects of resistance to conversion is required. The waiver did not prove to be effective in converting patients, but may be helpful for medico-legal reasons.

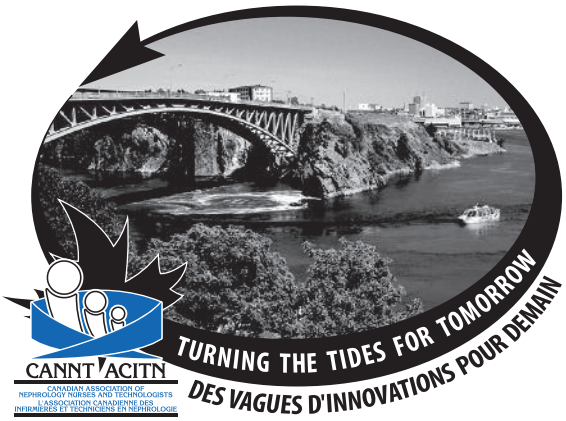
Better vascular access is a "big bang for the buck" item for improved patient survival and should be considered after every access failure.

Home hemodialysis patient stories show program success

Susan Haskett, RN, CNeph(C), Katy Burke, RN, Evangeline Cazebon, RN, Jennifer Di Castri, RN, Bonnie Harper, RN, Wendy Hennings, RN, Laurie Ledger, RN (Manager Representative), Angela Robinson, RN, Pauline Sheppard, RN, Vanessa Shortis, RN, Bev Sondrup, RN, Sarah Thomas, RN, Dr. Mike Copeland, and Donna Murphy-Blake (PRA Coordinator), Kelowna, BC

In British Columbia, there are an estimated 145,000 people who suffer from kidney disease. With the need for dialysis services growing at a rate approaching five per cent per year, the B.C. Provincial Renal Agency, in partnership with five regional health authorities, has developed a uniquely designed innovative program that offers independent dialysis including home-based treatments or treatments within existing facilities for patients to successfully manage their own care. A survey of needs was sent to each health authority. From the needs survey,





barriers were identified such as geography, differing approaches and philosophies to the idea of independent dialysis, as well as issues related to different machines, training techniques and knowledge base.

This Innovative Approach Management to Home Dialysis (IAMHD) is the only program in North America to be implemented on a province-wide basis. Internationally, this program was non-selective, and has been successful in training patients that others may have deemed as having been inappropriate or too sick to do it on their own. We have had the opportunity to watch our clients adapt to their illness and overcome barriers in their environment. These remarkable success stories have given us a glimpse into the human's ability to adjust. *"This program is a Godsend blessing for us." Louis, home nocturnal dialysis patient.*

Thinking outside of the box

Lisa Harley, RN, BScN, CNeph(C), Toronto, ON

Francesca is a woman with Down's syndrome who was found suddenly to have renal failure. She speaks very little and dislikes anyone invading her personal space. The following describes the unconventional process of her treatment.

In discussion with the family, hemodialysis was initiated. However, she required full sedation before and during all treatments, as well as physical restraints on occasion.

After a family meeting, the decision was made to change to peritoneal dialysis (PD). Thus, a PD catheter with an interscapular exit site was inserted. She was then treated with cycler PD. Because she tended to walk away while still connected to the cycler, she was converted to continuous ambulatory peritoneal dialysis (CAPD). The original plan was to have her mother learn the procedures. However, despite training, she felt she would not be able to cope with Francesca's ongoing agitation during CAPD exchanges. Several prescriptions were considered until negotiations were made to have three exchanges per day done by visiting nurses. It was acknowledged that although this would probably not be optimal dialysis, the primary goal was to have her at home without chemical sedation. Additionally, CAPD TID might eventually allow Francesca to return to her day program, which she seemed to value.

Eight weeks post-discharge, her outcomes are not measured according to our usual parameters. Francesca has not yet returned to her day program, but she is enjoying other previous comforts such as food and cartoons. We have learned so much from her.

The peritoneal dialysis home visit pilot project at St. Paul's Hospital

Michele Trask, RN, BSN, MIPH, and Jennifer Chow, RN, BScN, CNeph(C), Vancouver, BC

Transitioning to a lifestyle of daily peritoneal dialysis (PD) can be a stressful experience for patients and families. Currently, no process is in place in the PD program at St. Paul's Hospital for home visits (HV) for review of information taught during training. The goal of the HV project is to enhance support for patients and families by identifying the needs of our patients. Through a referral process by the nephrologist, nurse or social worker and at the patient's request, HVs are made to patients who live within a 25 km radius from the hospital. Criteria for home visits include patients who have completed their dialysis training and/or admitted to the hospital for PD-related complications. Patients having difficulty coping with dialysis at home were also visited.

Results are measured primarily using patient surveys. Their self-confidence ratings revealed that patients appreciate the opportunity to review information such as hand washing techniques, choosing solutions, and recognizing symptoms for peritonitis/exit site infections. Also, types of phone calls from patients have been recorded to evaluate the learning needs of patients. Findings reveal that more recording of phone calls is required to demonstrate variation in the type of calls received from patients. This could assist in assessing the benefits of home visits. As a result of the HV project, our multidisciplinary team has recognized the importance of continuity of care for our patients. The decision was made to continue the home visits and incorporate them into our program during the dialysis training process.

When your training falls on "deaf ears"… Strategies for teaching and managing peritoneal dialysis for patients with hearing impairments

Julie Shaw, RN, and Debra Grant, RN, BN, CNeph(C), Mississauga, ON

Effective communication is key to the successful training of peritoneal dialysis (PD) patients. Unique learning needs can often present challenges that require innovative approaches.

Recently, our usual repertoire of training strategies proved inadequate for the new challenge ahead—how to successfully train a hearing impaired patient? The basic elements of communication were missing… this patient did not read lips and his first language was "sign language." To our surprise, this proved comparable to having English as a second language. We needed some help!

We contacted the Canadian Hearing Society (CHS), which became an invaluable resource and partner in our teaching/learning experience to meet our patient's needs. Extensive use of an interpreter from CHS and repetition were incorporated into our training "toolbox." Other key strategies included staged teaching, a primary focus on visual training aids and emphasis on return demonstrations to assess the

effectiveness of our training. The patient's subsequent safe transition to automated PD was facilitated through the adaptation of the alarm system to incorporate a visual alert. Ongoing communication was optimized through interpreters (sign language) at clinic visits, use of the Bell call relay system and e-mail.

Our approach proved successful for both the patient and for us, as a medical team. The patient is enjoying a full life on peritoneal dialysis. He has regained his independence and freedom to travel.

Partners in peritoneal dialysis

Janice Verch-Whittington, RN, BScN, Kim Watkins, RN, BScN, CNeph(C), Francine Poirier, RN, CNeph(C), Monique Benard, RN, CNeph(C), and Donna Leafloor, RN, BScN, MHSM, Ottawa, ON

Purpose of project: To enhance the existing partnership between the Renfrew Victoria Hospital's PD program and the Ottawa Hospital's Home Dialysis program and improve the efficiency of the services being provided. To also continue to provide PD services to support the Renfrew County patients in their own community.

Description: In 2005, the Renfrew Victoria Hospital and the Ottawa Hospital partnered to start a PD program in Renfrew to improve the accessibility of PD to Renfrew County's CKD population. Four years later, the partnership continues. The most recent tool we have added is telemedicine. The Renfrew Victoria Hospital's PD team and the Ottawa Hospital's Home Dialysis team come together to conduct a joint PD clinic by telemedicine. Patients from both programs living in Renfrew County come to the Renfrew Victoria Hospital once every six weeks for a PD clinic that includes the Ottawa Hospital's Home Dialysis team by telemedicine.

Outcomes:

- Increased convenience for patients with decreased travel without compromising care.
- Ongoing mentoring and support available for the Renfrew Victoria Hospital's PD program.
- Enhanced communication between the two PD programs.

Implications for nephrology practice: With strong partnerships, it is possible to start and grow a PD program while ensuring positive patient outcomes.

Home visit safety for the home dialysis nurse

Dana Vae Ross, RN, CNeph(C), and Donna Leafloor, RN, BScN, MHSM, Ottawa, ON

As a home dialysis nurse, are you always aware of what to expect when you visit a patient's home? Do you have a systematic method of identifying potential risk? Do you have a well-developed process to minimize risk during travel and home visits? The answer to these questions is often NO. Consequently, the nurses of The Ottawa Hospital Home Dialysis Unit decided to develop a safety policy for travel and home visiting.

Although nurses generally develop a good sense of their patients' personalities and their home situations during training, we are not always prepared for the situations we find when we visit their homes. According to the literature, precautions related to personal safety during a home visit are often an overlooked aspect of occupational safety. There are several precautions, with many aspects to be considered. These include: safety of geographical risks related to location and condition of the home, patient/family behaviours, history of violence, travel/auto safety, communication capability, and the nurse's actions when in the home. We have developed a policy and tools to promote safety during travel and home visiting, including a risk assessment questionnaire, home visit itinerary and a procedure for a safe home visit and to identify follow-up required when risks are identified.

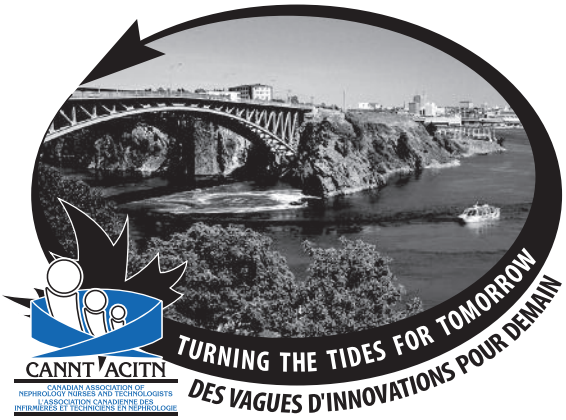
Home visits are a vital part of the care nurses provide for home dialysis patients. By identifying risks and demonstrating how to safely conduct home visits, we believe our policies and procedures will help make nurses feel more safe and comfortable in their home visits.

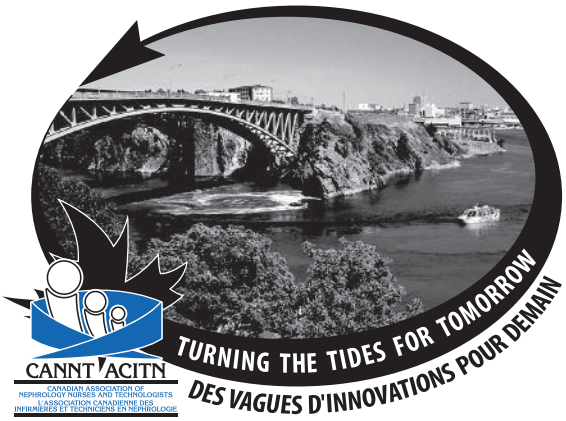
Home dialysis: An option for everyone

Dennis Smith, RN(EC), BScN, MN, Sharon White, RN, BScN, MBA, and Lori Harwood, RN, MSc, CNeph(C), London, ON

As the population with stage five chronic kidney disease grows, the associated costs of providing in-centre dialysis care continue to increase. Given the high costs of these therapies, home dialysis modalities should be an option for all end stage renal disease (ESRD) patients. Unfortunately, these dialysis modalities are underutilized. Although age and serious comorbidities limit many patients from taking responsibility for their dialysis treatments, it is generally felt that more patients could benefit from the independence of home dialysis. Our nephrology team has identified important prerequisites to choosing home therapy. These include patient motivation, economy/budget, dedicated community resources, treatment quality, and the attitude of nephrology team members.

A small qualitative research study was conducted on 10 home dialysis patients (five home hemodialysis and five peritoneal dialysis) in an attempt to identify barriers and facilitators to successful home dialysis therapy: What influenced their





decision in favour of home dialysis? What resources do they require to continue to successfully dialyze at home? And, what can health care professionals do to promote more people choosing home dialysis?

The results revealed that successful home dialysis patients require(d) a significant amount of support in their home, mainly from their immediate family, a prompt supportive network from the renal team, early identification and education surrounding home dialysis options, and a peer support group to discuss home options with all patients with advanced kidney disease.

Care paths for home renal replacement therapies

Renata Marco, RN, and Susan Porteous, RN, CNeph(C), Hamilton, ON

Increasing the use of peritoneal dialysis (PD) in Ontario, while addressing the increasing growth of end stage renal disease, better meeting the needs of the elderly population, removing the barriers to cost effective care, and promoting a consistent, standardized delivery of PD services throughout Ontario is the primary focus of the Provincial PD Initiative.

The PD Joint Initiative Implementation Steering Committee was formed at St. Joseph's Healthcare, Hamilton, Ontario, with professional members representing a multidisciplinary cross-section involved in the kidney/urinary program. The goal of this committee was to develop strategies to meet the Provincial PD Initiative targets.

Care paths were developed, and modality education information was revised in order to promote home therapies, PD first, as the choice for renal replacement therapy (other than renal transplantation). Collaboration within the various disciplines was imperative to ensure and facilitate the success of the steering committee's objectives.

Quarterly data collection enabled ongoing review of the progress of the initiative.

It is not an easy decision for clients to make when choosing a renal replacement therapy for their chronic kidney disease. By providing standardized, consistent information and care paths promoting home therapies, the kidney/urinary program at St. Joseph's Healthcare will strive to meet the Provincial PD Initiative targets.

Advance care planning (ACP) for the chronic kidney disease client

Susan Porteous, RN, CNeph(C), and Renata Marco, RN, Hamilton, ON

What is advance care planning? Why is it important to have an advance care plan?

ACP is a process whereby a mentally competent (capable) adult participates in a plan directed at making personal health decisions in the event that he or she becomes legally incompetent (incapable) to personally direct his or her own health care.

Health care professionals must commit to making advance care planning routine in their delivery of care. Clients are not always aware of their options. Issues related to death and dying are often avoided until late into the illness. Clients must be prepared for their death. They need to have ACP information early in their illness before the initiation of dialysis.

By developing a standardized ACP in the kidney and urinary program, clients are able to make choices regarding their end-of-life care. Educating health care professionals is essential in ensuring that all clients have access to the information through discussion, reading materials, and follow-up with their caregivers.

Many clients would like to talk about end-of-life care and have their wishes and plans for the future heard. We must support ACP in order to make a difference in our clients' quality of life.

Research dissemination to clinical practice: Hepatitis B vaccination program at the progressive renal insufficiency clinic

Kimmy Lau, RN, MN, CNeph(C), Richmond Hill, ON

Dialysis patients are at high risks of hepatitis virus infection due to various factors such as malnutrition, uremia, and a generalized immunosuppressive state. A Hepatitis B vaccination program has been practised for all dialysis patients over a period of time. It is always a challenge in the dialysis population because of a relative low seroconversion rate. Several studies have shown that patients respond better to Hepatitis B vaccination if it is administered at an earlier stage of kidney failure. With the commitment to high-quality care, the Progressive Renal Insufficiency (PRI) Clinic has assumed the financial challenges by paying for the hepatitis vaccines.

A Hepatitis B vaccination project was initiated in September 2007 for patients with an estimated glomerular filtration rate (eGFR) less than 25ml/min. A chart review at the hemodialysis unit was conducted to compare results with patients who received the vaccination after the initiation of dialysis at the same period of time. More than 80% of the patients at the PRI clinic were seroconverted (defined as anti-HBs titer is over 100iu). In conclusion, the high seroconversion rate, by Hepatitis B vaccination prior to initiation of dialysis, has reduced the risk of hepatitis virus infection. The known Hepatitis B status prior to entry to hemodialysis unit, thereby, provides a proactive care plan to patients. The expenses for Hepatitis B vaccination at the PRI clinic are significant. However, it is cost effective for the dialysis program in the long term. Most of all, high-quality care for our dialysis population is maintained.

Delaying renal replacement therapy: Is dialysis destiny? Evidence from the Regina Qu'Appelle Health Region (RQHR) chronic renal insufficiency (CRI) program population

Nicole Aitken, BA(Hon), Chris Horton, RN, CNeph(C), Debbie Norton, RN, BEd, MSc, Cathy Nadiger, RN, BSN, CNeph(C), and Elan Paluck, PhD, Regina, SK

Background: A growing prevalence of end stage renal disease (ESRD) in Canada has resulted in a surge of patients requiring dialysis. The overall goal of the RQHR CRI program is to delay and/or prevent the need for renal replacement therapy and to better prepare patients and their families to make treatment choices when kidney failure is imminent. The purpose of this study was to examine the extent to which the progression of chronic kidney disease (CKD) is delayed in patients referred to the CRI program.

Methods: A retrospective analysis of data maintained by the CRI program, Medical Information Quality System (MIQS), and Enovation® databases was undertaken. The delayed progression of CKD was the study's primary outcome and was measured by patients' change in glomerular filtration rate (GFR). *"Change in GFR"* was defined as the GFR at the patient's initial CRI appointment minus their most recent value as of December 31, 2004. GFR was calculated using the Modification of Diet in Renal Disease (MDRD) formula. *Change in GFR* was compared to an expected rate of decline of 7.56 ml/min/yr, which is cited as the average decline in GFR experienced by CKD patients referred for specialist care.

Results: Complete data were available for 302 of the 402 CRI patients. Of this group, most (n=165/302) were classified at their first CRI visit as being in the latter stages of CKD (i.e., Stage 4/5; creatinine clearance < 30 ml/min/1.73 m^2).

The overall median *change in GFR* for the study group was 1.6 ml/min (interquartile range = -6.9 to 11.8) reflecting that more than half of CRI patients (n=141) experienced an increase in GFR. Of the CRI patients experiencing a decline in GFR greater than the expected rate of decline (n=86/302), the highest proportion of decline (n=21/23) occurred in patients in the early stages of CKD (i.e., Stage 1/2). The majority (68%) of patients in stage 4/5 demonstrated an improvement in GFR since their first visit to the CRI program. Analysis of variance revealed that patients' initial stage of CKD, when they joined the program, had a significant effect on the median *change in GFR* ($F_{(2,299)}$ = 103.97, p<0.001). Tukey and LSD post-hoc tests showed all of the median *changes in GFR* between those in Stages 1/2, 3, and 4/5 to be significant (p<0.001).

Conclusion: As the prevalence of ESRD continues to grow, programs and interventions that prevent or delay the need for renal replacement therapy are needed. Previous research has demonstrated that interventions delaying the expected rate of kidney decline by as little as 10% per year have significant cumulative cost savings for the health system. This study demonstrated that overall, the CRI program has delayed the progression of renal disease in 47% of their patients by substantially more than 10%. Cumulative cost savings to the RQHR are likely to be substantial.

Turning the tides to a successful transplant work-up

Eleanor Topolie, RN, and Kristina Giddings, RN, BHScN, Oshawa, ON

For registered nurses within a hemodialysis unit, promoting self-managed care is an absolute priority. Renal transplant work-up is no exception. Lakeridge Health is affiliated with two regional transplant centres offering cadaveric, live and paired exchange, as an alternative modality. This process successfully encourages patients to self-manage their transplant work-up, and maintains excellent team-to-team communication.

Once a patient has chosen a transplant centre, they sign a release of information. The nephrologist will be asked to sign a consult note. Our hemodialysis centre utilizes a developed set of standard orders, which reflect the required tests for the transplant centres. The nurse then organizes patient information and communicates with central bookings to schedule the necessary tests. The hemodialysis nurses obtain all required blood work.

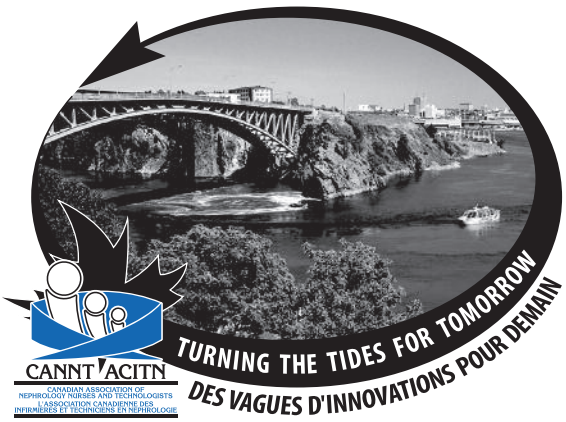
Patients are encouraged to self-manage their transplant process by keeping scheduled appointments, organizing family doctor appointments and communicating with the nurses, if there are any concerns with the work-up process. The nurses designed a "fridge reminder" for the patient to keep track of their appointments. This tool displays the appointment date, special instructions and direction to appropriate departments.

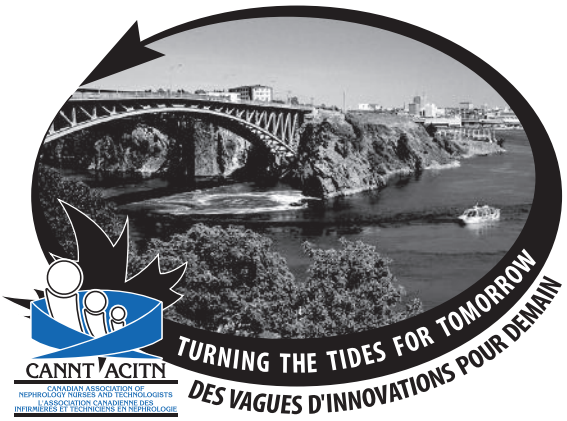
The patient care facilitator tracks the transplant work-up test results. Once all results are available, the transplant work-up package is faxed to the centre of choice. Further investigation may be required after the transplant team evaluates test results. The transplant centre notifies the hemodialysis unit with scheduled patient meetings. Ongoing communication is maintained until a successful transplant has been achieved.

Credit Valley Hospital renal program patient flow pattern

Susan Pattison, RN, BA, CNeph(C), and Dianne Moseley, RN, BAS, CNeph(C), Mississauga, ON

This poster will demonstrate the flow and coordination between the various programs and multidisciplinary teams within the renal service at the Credit Valley Hospital. These programs include nephropathy, kidney care centre, post transplant, PD and hemodialysis.





Being a regional program, we also provide service for other hospitals and nephrologists in the Region of Peel. The poster will demonstrate the accessibility to these programs at all levels of care and give a brief description of the staffing, care and services provided within these programs. "How do we do it?"

Advanced care planning: Completing the circle of life

Dennis Smith, RN(EC), BScN, MN, Jane Ridley, RN(EC), MScN, CNeph(C), and Marlene Rees-Newton, MSW, RSW, London, ON

Advanced care planning (ACP) is a process that allows individuals to plan their future health care. This process includes an improved understanding, reflection and discussion that focus on an individual's health, culture, relationships, goals, and values.

Health care providers (HCP) routinely lack the confidence and preparation to engage in end-of-life discussions with their patients. Unfortunately, such discussions often occur when patients become ill. HCPs then attempt to discuss end-of-life therapies, such as code status, without engaging in the full ACP process.

Individuals living with end stage renal disease require comprehensive ACP due to their medical complexities. It is important to identify the power of attorney (POA) for personal care and obtain a decision on code status. However, comprehensive ACP extends beyond POA and code status. It requires a cultural shift among health care providers. This involves actively engaging patients and their families in discussions that explore the ethical, psychosocial, and spiritual values that impact their decisions about dialysis (initiation, withholding, or withdrawal), quality of life, and when to allow natural death (AND).

Our regional renal program has deemed ACP crucial to the needs of those living with end stage renal disease. Our goal is to develop and implement an organized, consistent approach to ACP that reflects and documents patients' core values, beliefs and decisions. We hope this will reduce the need for crisis intervention and improve our patients' quality of life when it is needed most.

Medication reconciliation: Improving patient safety

Michelle Masson, RN, Margaret Van Puymbroeck, RN, Gail Barbour, RN, CNeph(C), and Dennis Smith, RN(EC), BScN, MN, London, ON

Hemodialysis patients are burdened with multiple chronic comorbidities and require many drugs. The literature reports that patients requiring hemodialysis average 10 to 12 medications. Because of the complexities of their disease states, drug regimens in these patients frequently change, with multiple care providers prescribing the drugs. When multiple care providers are involved with the dialysis patient population, drug discrepancies often occur.

Drug discrepancies occur when a drug list is different from what the patient is actually taking. Drug discrepancies can place the patient at risk for drug overdosing, under-dosing, omission, wrong drug administration, and adverse drug events. To minimize the potential drug-associated problems in patients with chronic co-morbidities, accurate medication lists are essential.

In addition to minimizing drug-related problems, routine medication reconciliation promotes patient autonomy towards the decisions surrounding their care. Receiving important information concerning their health and their medications, clients can actively participate as a member of the team. Accepting more responsibility, the client will make informed decisions and provide the necessary guidance towards their future goals.

Our regional renal program has initiated a monthly reconciliation process for dialysis patients. This designated review process serves as an opportunity to evaluate the accuracy of the patients' medication lists (i.e., drug discrepancies). Also, the research group will survey the patients after six months of medication reconciliation and evaluate their knowledge surrounding their medication lists contributing to ongoing self-management. An additional survey will assess the nursing staff after six months and evaluate if their knowledge has changed with medication reconciliation. This research will hopefully minimize drug-related problems and promote self-care management within the end stage renal disease population.

Burnout in nephrology nurses: Are you at risk?

Lori Harwood, RN, MSc, CNeph(C), Barbara Wilson, RN, MScN, CNeph(C), and Jane Ridley, RN(EC), MScN, CNeph(C), London, ON

Occupational burnout can have serious implications on productivity, nurses' health, service usage, patient outcomes and health care costs. Burnout among nurses is a growing area of interest for researchers given the current nursing shortage. Nephrology nurses, like nurses in other areas, are not immune to the effects of work-related stress. A recent study conducted by these authors reported that 40.8% of Canadian nephrology nurses experienced symptoms of burnout. This poster presentation will report on current research in the area and the effect of burnout on nephrology nurses' mental and physical health outcomes, patient outcomes and job retention. This poster presentation will also have an interactive component. Assessment tools will be on hand with which nurses not only can perform self-assessment if they are at risk for burnout, but also explore and share interventions in which they engage to prevent burnout.

Contact hour: 2.0 hrs

Prevention of death in chronic kidney disease: The role of implantable cardioverter defibrillators

By Suzette Turner, RN(EC), MS, FNP, Orhan Onalan, MD, and Barbara Bickle, RN, MN

Learning objectives

After reading the article, the reader will be able to:

1. Determine the benefit of implantable cardioverter defibrillators (ICDs) in patients with chronic kidney disease (CKD).
2. Recognize common complications for patients receiving ICDs.
3. Describe the care of a patient with an ICD.

Abstract

Cardiac arrhythmia is associated with increased mortality and morbidity in patients with chronic kidney disease (CKD) (McCullough & Sandberg, 2004). The implantable cardioverter defibrillator (ICD) has been shown to decrease mortality of patients with cardiac arrhythmias, yet CKD patients are usually excluded from clinical trials. This article discusses the ICD as it relates to CKD patients, including care of the patient and possible complications that can be encountered.

Key words: chronic kidney disease (CKD), implantable cardioverter defibrillator (ICD), arrhythmia

Introduction

There were an estimated 33,832 people with end stage renal disease (ESRD) in Canada at the end of 2006, an increase of 69.7% since 1997 (Canadian Institute for Health Information [CIHI], 2008). Of these patients, 20,465 were on dialysis and 13,367 were living with a functioning kidney transplant. There were 5,321 newly diagnosed patients with chronic kidney disease (CKD) in 2006, an increase of 34% in the number of cases since 1997 (3,958). An estimated 13% of adults aged 20 or older (26 million adults) have evidence of CKD in the United States (U.S.) (Coresh, Selvin, Stevens, Manzi, Cusek, Eggers et al., 2007) and its prevalence is expected to increase dramatically. Currently, more than 400,000 people in the U.S. are undergoing chronic dialysis, with some estimates predicting that the number may increase to more than 2 million by the year 2030 (USRDS, 2008).

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Submitted for publication: July 3, 2009.
Accepted for publication in revised form: July 25, 2009.

What is the risk of cardiac death in CKD patients?

CKD has been associated with an increased risk of cardiovascular morbidity and mortality (McCullough & Sandberg, 2004). Studies have consistently shown that even mild renal disease is independently associated with cardiovascular disease, including ventricular arrhythmias and sudden cardiac death (SCD) (Foley, Parfrey, & Sarnak, 1998; Go, Chertow, Fan, McCulloch, & Hsu, 2004; Hreybe, Dyer, Daubert, Quigg, Estes, Anderson et al., 2006). In fact, death from cardiovascular causes is 10 to 20 times more common with CKD than in the non-renal population (Bongartz, Cramer, Doevendans, Joles, & Braam, 2005; Raine, Margreiter, Brunner, Ehrich, Geerlings, Landais et al., 1992). Dialysis patients have high mortality rates. In the U.S., the annual mortality rate for dialysis patients in 2004 was 230 deaths per 1,000 patient years (Herzog, Mangrum, & Passman, 2008).

What is the most common cause of death in CKD patients?

Cardiac disease is the leading cause of death in dialysis patients, accounting for 45% of all-cause mortality (Foley, Parfrey, Sarnak, 1998; Herzog, 2003; Herzog, Mangrum & Passman, 2008). Arrhythmic death is responsible for most of the cardiac deaths in these patients with approximately 60% of cardiac mortality and 25% of all-cause mortality attributed to cardiac arrest and/or arrhythmia (Herzog; Herzog, Mangrum & Passman). The prognosis is even worse for dialysis patients who survive SCD, with a survival rate of only 15% at one year (Herzog).

Why are CKD patients at high risk for sudden cardiac death (SCD)?

Although SCD can occur in patients with structurally normal hearts, most events occur in patients with some form of

underlying heart disease. A triggering factor usually interacts with the underlying substrate to produce the fatal arrhythmia. Of these, acute myocardial ischemia is likely to be the most common initiating event in the general population. The increased risk of SCD in CKD patients is likely due to a combination of several interacting factors. Some of these factors are similar to those for the general population. In comparison to patients with normal renal function, patients with CKD have been found to have an increased prevalence of coronary artery disease (CAD), silent myocardial ischemia, ventricular arrhythmias, atrial fibrillation and valvular calcification (Das, Aronow, McClung, & Belkin, 2006). CKD is often associated with other significant comorbidities including diabetes, hypertension, cerebrovascular disease, and infection. However, CKD patients are also subject to unique factors that can both alter the underlying substrate and trigger ventricular arrhythmic events. These include abnormal myocardial infrastructure such as interstitial fibrosis due to chronic uremia, microvascular disease or endothelial dysfunction, calcium and phosphate deposition, and significant left ventricular hypertrophy due to hypertension or anemia (Herzog, Mangrum & Passman, 2008). Additionally, an increase in electrical instability may be seen due to fluid shifts, autonomic imbalance/increased sympathetic activity, ventricular repolarization heterogeneity, inflammatory state, acid/base disturbances, and electrolyte abnormalities (Bleyer, Russell, & Satko, 1999; Herzog, Mangrum & Passman, 2008; Miyazaki, Matsuoka, Itabe, Usui, Ueda, Okuda et al., 2000; Morris, Galiatsou, Stewart, Rodger, & Jardine, 1999).

What is an implantable cardioverter defibrillator (ICD)?

The ICD was implanted in the first human in 1980 under general anesthetic via a thoracotomy incision. The procedure is now less invasive and is typically done on an outpatient basis. The device is implanted transvenously with local anesthesia and conscious sedation. An electrophysiologist or an implanting cardiologist generally implants it.

An ICD (see Figure One) is, in its simplest form, an electronic device consisting of a generator and a lead (electrode) system that is transvenously implanted in the upper left chest—the pectoral region. The left side is usually chosen, as it is closest to the heart. The generator contains a microprocessor to control the analysis of the cardiac rhythm and the delivery of therapy, a memory component to store electrocardiographic data, a high-voltage capacitor and a battery (Gehi, Mehta, & Gomes, 2006). The generator can, therefore, analyze the type of waveform, rates of the arrhythmia, electrocardiographic signal before, during and after treatment, activity level, and heart rate variability, as well as atrial and ventricular rates. All of the data are catalogued independently of arrhythmias.

The pulse generator is placed subcutaneously or submuscularly (see Figure Two). Its purpose is to monitor the heart and treat detected abnormal tachy and brady arrhythmias. The electrodes pass intravenously from the defibrillator to the right atrium and or right ventricle (see Figure Two). The ICD reliably terminates the vast majority of life-threatening tachyarrhythmias by initiating rapid pacing or delivering a shock, as appropriate, and provides pacing in the case of bradyarrhythmias (Exner, Klein, & Prystowsky, 2001). The ICD has a functional life of between five and nine years, depending on how much it is used.

As of 2009, the cost of an ICD varies from $17,000 to $25,000 (Canadian dollars) depending on the manufacturer. From an economic feasibility standpoint, this represents about 0.1% of Canada's $130 billion health care budget and would be equivalent to 13% of the amount spent on the purchase of statin drugs (Simpson, O'Neill, Sholdice, Dorian, Kerr, Ross et al., 2005). The safety and efficacy of the ICD have been established in both primary and secondary prevention trials (Connolly, Gent, Roberts, Dorian, Roy, Sheldon et al., 2000; Epstein, Dimarco, Ellenbogen, Estes, Freedman, Gettes et al., 2008; Kadish, Dyer, Daubert, Quigg, Estes, Anderson et al., 2004; Kuck, Cappato, Siebels, & Ruppel, 2000).

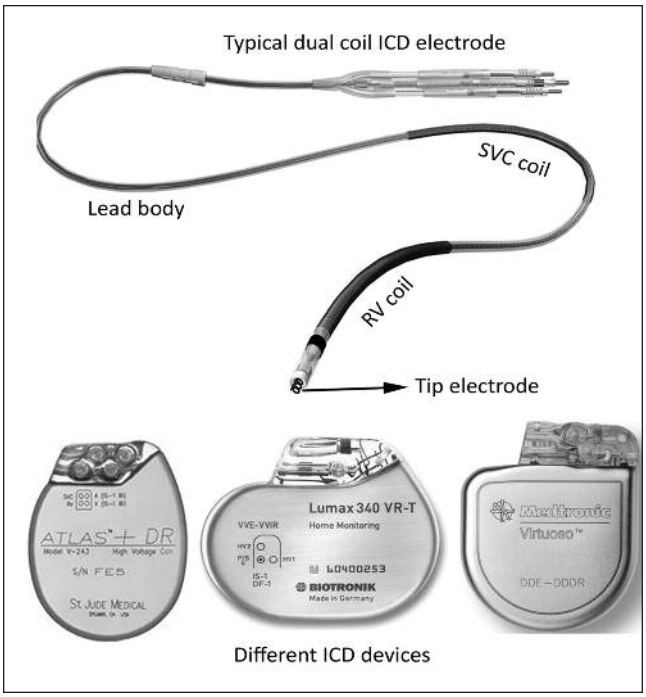

Figure One.
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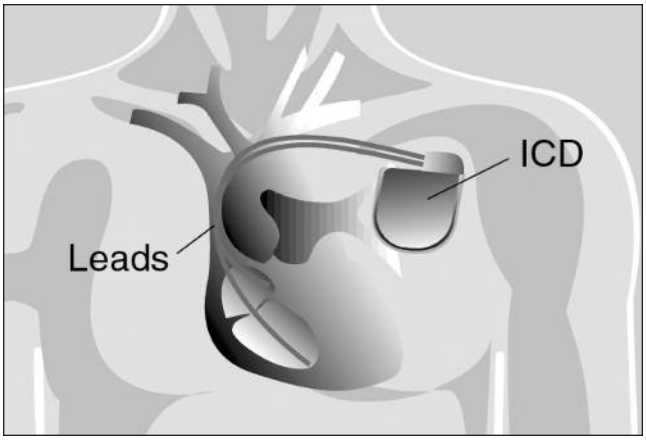

Figure Two. Illustration of a dual chamber implantable cardioverter defibrillator (ICD) system in the human body.
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What is the benefit of ICDs in patients with CKD?

An implantable cardioverter defibrillator (ICD) can terminate episodes of ventricular tachycardia (VT) or fibrillation (VF), thus reducing the risk of sudden death. The initial indications for an ICD were for patients who had survived a cardiac arrest or an episode of sustained ventricular tachycardia (secondary prevention). In the past 10 years, clinical trials have clearly established the benefit of ICDs in high-risk patients who have never suffered from an episode of SCD or VT (Connolly, Gent, Roberts, Dorian, Roy, Sheldon et al., 2000; Kadish, Dyer, Daubert, Quigg, Estes, Anderson et al., 2004; Kuck, Cappato, Siebels, & Ruppel, 2000). European and North American guidelines strongly recommend the prophylactic implantation of ICDs in patients with a reduced left ventricular ejection fraction (LVEF), provided the patient is not in New York Heart Association functional class IV and has a life expectancy longer than one year (Epstein, Dimarco, Ellenbogen, Estes, Freedman, Gettes et al., 2008; Vardas, Auricchio, Blanc, Daubert, Drexler, Ector et al. 2007). More patients are currently receiving ICDs as a result of revised guideline statements and changes in reimbursement (Epstein, Dimarco, Ellenbogen, Estes, Freedman, Gettes et al., 2008). Currently, the majority of ICDs are implanted for primary prevention of SCD.

Interestingly, studies have consistently shown that the presence of CKD is a significant predictor of mortality in ICD recipients (Chen-Scarabelli & Scarabelli, 2007; Eckart, Gula, Reynolds, Shry, & Maisel, 2006; Parkash, Stevenson, Epstein, & Maisel, 2006; Turakhia, Vahosy, Lee, Tseng, Lee, Badhwar et al., 2007). In a recent meta-analysis of seven studies, Sakhuja, Keebler, Lai, McLaughlin Gavin, Thakur, Bhatt et al. (2009) analyzed the effect of ICDs on mortality in dialysis patients. Despite having ICDs, patients receiving dialysis had a 2.7-fold higher mortality compared with those not receiving dialysis (Sakhuja et al., 2009). Other studies found that the risk of death seems to be proportional to the degree of renal dysfunction and that patients on dialysis are at highest risk (Hreybe, Razak, & Saba, 2007; Turakhia, Vahosy, Lee, Tseng, Lee, Badhwar et al., 2007). A recent substudy of the Multicenter Automatic Defibrillator Implantation Trial-II (MADIT-II) trial demonstrated that the risk of SCD significantly increased as renal function declined, as survival benefit from the ICD was only noted in patients with estimated GFR ≥ 35 mL/min/m^2 (Goldenberg, Moss, McNitt, Zareba, Andrews, Hall et al., 2006). One small study showed a progressive increase in defibrillator thresholds with worsening renal function (Wase, Basit, Nazir, Jamal, Shah, Khan et al., 2004). These data suggest that CKD patients may not extract the same survival benefits from the ICD as their non-CKD counterparts. Patients with CKD have considerably higher mortality from noncardiac causes, for which an ICD provides no benefit (Chen-Scarabelli & Scarabelli, 2007; Turakhia, Vahosy, Lee, Tseng, Lee, Badhwar et al. 2007; Wase, Basit, Nazir, Jamal, Shah, Khan et al., 2004). In addition, death from pump failure, post-shock electromechanical dissociation despite arrhythmia termination, or failure of ICD therapy may partly explain the attenuated response to ICD therapy in this population (Beattie, Soman, Sandberg, Yee, Borzak, Garg et al., 2001; Pires, Hull, Nino, May, & Ganji, 1999).

On the other hand, studies have shown that patients with CKD are at a higher risk for VT and SCD. Consistent with this, CKD was found to be a significant predictor of appropriate ICD therapies (Hreybe, Bedi, Barrington, Bazaz, Ganz et al., 2006; Robin et al., 2006). In a retrospective cohort study, ICD implantation was associated with a 42% relative risk reduction in all-cause mortality, as compared to dialysis patients without ICDs (Herzog, Weinhandl, Strief, Collins & Gilbertson, 2005). It should be noted that patients with renal insufficiency have been under-represented, excluded, or had no renal function data reported from most primary and secondary prevention trials (Bardy, Lee, Mark, Poole, Packer, Boineau et al., 2005; Buxton, Lee, Fisher, Josephson, Prystowsky & Hafley, 1999; Moss, Hall, Cannom, Daubert, Higgins, Klein et al., 1996; Moss, Zareba, Hall, Klein, Wilber, Cannom et al., 2002). For example, in the largest primary prevention trial, SCD-HeFT, the median creatinine level was only 97.2 µmol/L (Bardy, Lee, Mark, Poole, Packer, Boineau et al., 2005) and patients with creatinine level ≥221 µmol/L were excluded. In the MADIT-II trial, patients who had a baseline serum creatinine >265 µmol/L or patients on dialysis were not enroled (Moss, Zareba, Hall, Klein, Wilber, Cannom et al., 2002). Thus, currently available data on the benefits of ICD in patients with CKD are limited and are not sufficient to generalize the guideline recommendation for primary defibrillator implantation to all subsets of CKD patients.

Amin, Fox, Kalahasty, Shepard, Wood & Ellenbogen (2008) conducted an analysis using a model that examined the outcome of ICD versus non-ICD patients with varying degrees of renal dysfunction (CKD stages I through V—see Table One). The results of this comprehensive analysis suggest that ICD benefit in CKD patients relates primarily to the stage of kidney disease and the patient's age. Thus, among patients with normal or mildly reduced kidney function, stages I and II CKD, ICD therapy was demonstrated to be independently associated with a significant survival benefit. In patients with more advanced renal dysfunction (stages III to V CKD), ICD benefit was shown to be age dependent. Specifically, defibrilla-

Table One. Stages of chronic kidney disease

Stage	Description	GFR (mL/min/1.73m^2)
I	Kidney damage with normal or increased GFR	>90
II	Kidney damage with mild decrease GFR	60–90
III	Moderate decrease GFR	30–60
IV	Severe decrease GFR	15–30
V	Kidney failure	<15

Note: GFR = glomerular filtration rate
(Adapted from Levin, A. (2003). The advantage of a uniform terminology and staging system for chronic kidney disease (CKD). **Nephrology Dialysis Transplantation, 18**, p. 1448.)

Table Two. Indication for implantable cardioverter defibrillator therapy

ICD therapy is indicated in patients (Class I):

- Who are survivors of cardiac arrest due to ventricular fibrillation or hemodynamically unstable sustained VT after evaluation to define the cause of the event and to exclude any completely reversible causes.
- With structural heart disease and spontaneous sustained VT, whether hemodynamically stable or unstable.
- With syncope of undetermined origin with clinically relevant, hemodynamically significant sustained VT or ventricular fibrillation induced at electrophysiological study.
- With LVEF less than 35% due to prior myocardial infarction who are at least 40 days post-myocardial infarction and who are in NYHA functional Class II or III.
- With nonischemic dilated cardiomyopathy who have an LVEF less than or equal to 35% and who are in NYHA functional Class II or III.
- With left ventricular dysfunction due to prior myocardial infarction who are at least 40 days post-myocardial infarction, have an LVEF less than 30%, and are in NYHA functional Class I.
- With nonsustained VT due to prior myocardial infarction, LVEF less than 40%, and inducible ventricular fibrillation or sustained VT at electrophysiological study.

ICD implantation is reasonable (Class IIa):

- For patients with unexplained syncope, significant LV dysfunction, and nonischemic dilated cardiomyopathy.
- For patients with sustained VT and normal or near normal ventricular function.
- For patients with hypertrophic cardiomyopathy who have 1 or more major risk factor for SCD.
- For the prevention of SCD in patients with arrhythmogenic right ventricular dysplasia/cardiomyopathy who have one or more risk factors for SCD.
- To reduce SCD in patients with long-QT syndrome who are experiencing syncope and/or VT while receiving beta blockers.
- For nonhospitalized patients awaiting transplantation.
- For patients with Brugada syndrome who have had syncope.
- For patients with Brugada syndrome who have documented VT that has not resulted in cardiac arrest.
- For patients with catecholaminergic polymorphic VT who have syncope and/or documented sustained VT while receiving beta blockers.
- For patients with cardiac sarcoidosis, giant cell myocarditis, or Chagas disease.

NYHA = New York Heart Association; LVEF = left ventricular ejection fraction; VT = ventricular tachycardia; SCD = sudden cardiac death.

Modified from Epstein, A.E., Dimarco, J.P., Ellenbogen, K.A., Estes, N.A., 3rd, Freedman, R.A., Gettes, L.S., et al. (2008). ACC/AHA/HRS 2008 Guidelines for device-based therapy of cardiac rhythm abnormalities. **Heart Rhythm, 5**, e38.

tor benefit was pronounced in patients <80 years of age who had moderate renal dysfunction stage III CKD, with decreasing age thresholds for ICD benefit in stages IV (less than 75 years) and V (less than 65 years) CKD.

Based on available information, ICD therapy should not be withheld based on the presence of CKD. ICD is indicated in all patients for secondary prevention of SCD regardless of renal function (see Table One). All patients considered for primary ICD therapy should have their glomerular filtration rate (GFR) estimated. Indications for primary ICD implantation for patients with mild and moderate renal dysfunction (GFR ≥30 mL/min/1.73m^2 — see Table One) should follow the current guidelines (see Table Two). Current data regarding ICD efficacy in patients with ESRD on dialysis are very limited. Available data suggest that age may be an important factor for attenuated ICD response with progressive impairment of renal function. Thus, primary ICD therapy in patients with severe CKD or ESRD should be considered after a comprehensive assessment of all age-related factors and comorbidities that potentially reduce survival and increase procedural complications.

Table Three. Complications in 161,470 patients with implantable cardioverter defibrillator (ICD) therapy

Major adverse events	
Pneumothorax	822 (0.51%)
Cardiac arrest	555 (0.34%)
Coronary venous dissection	239 (0.15%)
Hemothorax	155 (0.10%)
Pericardial tamponade	149 (0.09%)
Cardiac perforation	136 (0.08%)
Stroke	106 (0.07%)
Myocardial infarction	53 (0.03%)
Infection related to device	53 (0.03%)
Deep phlebitis	42 (0.03%)
Transient ischemic attack	35 (0.02%)
Arteriovenous fistula	11 (0.01%)
Cardiac valve injury	3 (0.00%)
Total patients with major adverse events	2175 (1.35%)
Minor adverse events	
Hematoma	1719 (1.06%)
Lead dislodgment	1767 (1.09%)
Drug reaction	170 (0.11%)
Superficial phlebitis	75 (0.05%)
Conduction block	70 (0.04%)
Peripheral embolus	55 (0.03%)
Peripheral nerve injury	8 (0.00%)
Total patients with minor adverse events	3740 (2.32%)
Total patients with adverse events (major or minor)	5734 (3.55%)
In-hospital mortality	678 (0.42%)

Modified from Peterson, P.N., Daugherty, S.L., Wang, Y., Vidaillet, H.J., Heidenreich, P.A., Curtis, J.P., et al. (2009). Gender differences in procedure-related adverse events in patients receiving implantable cardioverter-defibrillator therapy. **Circulation, 119**, 1081.

What are the complications of having an ICD?

Just as with medications, the ICD can have undesirable complications. Procedure or device-related complications include, but are not limited to pneumothorax, lead dislodgement, pocket hematoma, pericardial tamponade, thrombosis of the brachial, subclavian or jugular veins, inappropriate shocks, infection necessitating removal of the ICD system, perioperative stroke, transient ischemic attack, and death. Peterson and colleagues (2009) reported complication rates (see Table Three) in patients undergoing first-time ICD implantation between January 2006 and December 2007 using the National ICD Registry (NICDR). Among the NICDR patients analyzed, 3.55% experienced an adverse event, 1.35% had a major event, and 0.42% died. In a systematic review of randomized clinical trials and observational studies, a peri-implantation mechanical complication rate of 5.3% and a mortality rate of 1.3% were estimated (Ezekowitz, Rowe, Dryden, Hooton, Vandermeer, Spooner et al., 2007). ICD pocket infection could be the most important complication, as it may require total system removal due to the potential for endocarditis and systemic seeding resulting in sepsis. It is known that renal insufficiency impairs immunity and increases the risk of infection five-fold compared to those with preserved renal function (Bloom, Heeke, Leon, Mera, Delurgio, Beshai et al., 2006). Consistent with this, Herzog, Li & Collins (2004) reported an incidence of 5.4% for device-related infections at two years among 1,400 dialysis patients receiving ICDs from 1996 to 2001. Dialysis patients demonstrated an increased risk of bleeding and infection post-ICD implantation (Dasgupta, Ghossein, & Passman, 2005), as well as a higher-than-expected prevalence of increased defibrillation thresholds (Dasgupta, Montalvo, Medendorp, Lloyd-Jones, Ghossein, Goldberger et al., 2007). Dialysis patients may also present unique challenges to device implantation for example, device placement on the same (ipsilateral) side as the dialysis access has been associated with high rates of subclavian venous stenosis and occlusion (Teruya, Abou-Zamzam, Limm, & Wong, 2003).

Patients undergoing hemodialysis are at a higher risk (17% to 76%) of receiving shocks as a result of electrolyte imbalance and arrhythmias (Buemi, Coppolini, Bolignano, Sturiale, Campo, Buemi et al., 2009). Intradialytic arrhythmias are multifactorial in nature with the dialysis treatment itself, the uremic state and the dialyziability of some drugs playing a role. In patients with dialyzable anti-arrhythmic drugs, rhythm alterations can be caused by the drug removal during hemodialysis treatments.

The dialysis treatment itself is an arrhythmogenic stimulus, as it induces alterations in physical-chemical features of body fluids modifying pH, temperature, and electrolyte concentrations that regulate the myocardial tissue excitability (Buemi, Coppolini, Bolignano, Sturiale, Campo, Buemi et al., 2009). Potassium and calcium are the affected electrolytes and can "induce severe electrocardiographic abnormalities, including ventricular tachycardia, heart failure and sudden death" (Buemi, Coppolini, Bolignano, Sturiale, Campo, Buemi et al., p. 75).

Uremic patients are characterized by a "pro-arrhythmic substrate" (Buemi, Coppolini, Bolignano, Sturiale, Campo, Buemi et al., 2009, p. 75) because of the high prevalence of ischemic heart disease, left ventricular hypertrophy, and autonomic neuropathy. For example, dialysis-induced hemodynamic and electrical-chemical changes can result in sinus node dysfunction and atrioventricular block (Buemi, Coppolini, Bolignano, Sturiale, Campo, Buemi et al., 2009). An additional ICD complication is related to shocks delivered. Multiple shocks are linked to myocardial injury and fibrosis, whereas sporadic shocks are associated with altered

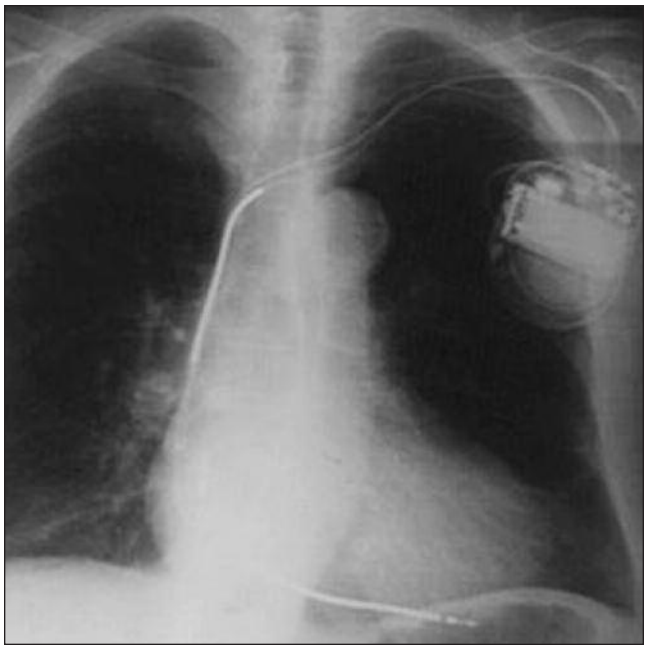

Figure Three. A chest x-ray image from a patient with a dual chamber implantable cardioverter defibrillator (ICD) device.

Figure Four. A typical programmer
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quality of life (Exner, Klein & Prystowsky, 2001; Friedmann, Thomas, Inguito, Kao, Metcalf, Kelley et al., 2006; Shea, 2004; Thomas, Friedmann, Kao, Inguito, Metcalf, Kelley et al., 2006).

How do you care for a patient after an ICD?

Patients are usually evaluated within 24 hours after implantation of an ICD. This involves assessment of the wound and integrity of the ICD, as well as evaluation of lead position on chest x-ray (see Figure Three). A wand attached to a programmer (see Figure Four) is placed over the ICD site. More recently, some manufacturers have developed wireless programmer technology eliminating the need for a wand. Each programmer is specific to the ICD of the manufacturer. This interrogation provides information on whether or not arrhythmias have been detected, if therapies have been delivered, the integrity of the lead(s), and battery life. Battery life is evaluated to determine the need for generator change. The time varies and is dependent on how often pacing is used, the complexity of the ICD programming and the number of therapies given. This procedure is much like the initial implantation but, generally, a more minor operation. The leads stay in place unless there is an indication for lead(s) revision. This would have been anticipated prior to the surgery. Subsequent follow-up appointments are done at four to six weeks after implantation to re-evaluate wound healing and ICD function. These follow-ups are then decreased to three to six months depending on the needs of the patient and manufacturer's recommendations. For the first month after implantation, patients are discouraged from lifting their arm above their shoulder on the ipsilateral side of implantation. This is done in order to prevent lead dislocation. Patients are, however, advised to make small circles with their arms a few times per day to prevent the development of frozen shoulders. Wound care instructions are also provided.

Although technologic advances have greatly reduced the potential effects of electromagnetic interference (EMI), patients should be advised to avoid strong electromagnetic fields because of potential interference with sensing circuitry and the possibility of inappropriate shocks. The ICD generally cannot distinguish intrinsic from extrinsic signals. Examples of potential hazards include arc welders, large generators, and magnetic resonance imaging (MRI) magnets. Airports are another source of EMI, though it appears that walking through security does not allow enough time for a signal to result in a shock. It is recommended that patients carry their identification card to notify security personnel that they have an implantable device. Household appliances such as microwave ovens and cell phones do not pose a serious threat (Dyrda & Khairy, 2008). It is recommended that cell phones should not be stored in the ipsilateral pocket of the ICD. The hospital is often another place for EMI, the most common of which is electrocautery. This could result in multiple clinical responses in the defibrillator, the most common being inappropriate shocks. As a result, it is recommended that therapies be suspended during surgical procedures, especially if it is within the thoracic area. External paddles should be applied during the procedure in case of an urgent need for defibrillation. Therapies should be reactivated as soon as the procedure is over. In urgent situations where this is not possible, the anesthetist could apply a magnet for the course of the procedure, which will suspend therapies for most ICDs. An exhaustive list of potential EMI is beyond the scope of this article and comprehensive sources can be obtained from the manufacturers.

An ICD shock, although life-saving is usually an uncomfortable experience and some patients describe pain. This pain may be psychologically incapacitating, particularly if the shocks occurred within a short time of each other (Shea, 2004). If the patient receives one shock, they should stop what they are doing and follow-up with their clinic as soon as possible. If the patient receives multiple shocks, they should go to an emergency department to evaluate urgently the ICD. Patients need to be reminded to always keep their ICD identification cards with them. This allows care providers to easily identify which programmer should be used to interrogate the ICD. Some patients with ICDs require emotional or psychological support for anxiety, depression, and difficulties in adjusting to life with an ICD and or shocks. The dedicated ICD clinic staff can help with many of these issues (Sears & Conti, 2002). Referral to a psychologist or psychiatrist may also be helpful. Support groups are helpful, some of which are accessible online, but are not widely available for patients and their families.

A substantial issue for the patient and society as a whole relates to driving. Shea (2004) notes that the main concern is complete or partial loss of consciousness due to ventricular arrhythmias prior to termination by the ICD while driving. This should be discussed prior to the patient receiving this device. These restrictions are perceived as difficult and have an immediate consequence on lifestyle (Vijgen, Botto, Camm, Hoijer, Jung, Le Heuzey et al., 2009). Since the first implantation in the 1980s, the concern regarding sudden incapacitation causing harm to self or others while driving has been of paramount importance. As a result, national and international consensus statements have been written (Simpson, Doiran, Gupta, Hamilton, Hart, Hoffmaster et al., 2004; Vijgen, Botto, Camm, Hoijer, Jung, Le Heuzey et al.). The concerns patients experience range from increased dependence placed on others to anger regarding a change in the way of earning a living (Vijgen, Botto, Camm, Hoijer, Jung, Le Heuzey et al.). A patient who receives primary prevention implantation of an ICD is restricted from driving for a month until lead stability (granulation of tissue around the lead) is ensured. Driving restriction for patients with ICDs for secondary prophylaxis is six months. If the patient is a commercial driver, this privilege is lost, resulting in economic challenges, as well as lifestyle changes (Shea, 2004; Simpson, Doiran, Gupta, Hamilton, Hart, Hoffmaster et al.). The impact of the vehicle and the time spent behind the wheel or combined with the risk of incapacitation from ventricular tachycardia (VT) or fibrillation (VF) results in unfavourable outcomes as a commercial driver (Vijgen, Botto, Camm, Hoijer, Jung, Le Heuzey et al.) and, as such, are reflected in the guidelines. The information provided to patients should be based on provincial laws. The first point of contact with the health care system is the point at which the ministry of transportation should be notified of these restrictions.

Patients should be reminded that the ICD is not curative; therefore, they should continue to take their prescribed medications. Although ICDs are extremely effective in terminating life-threatening arrhythmias, some patients may require adjunctive therapy to reduce the frequency of arrhythmic events that require therapy. This generally consists of additional prescribed medications and/or radiofrequency catheter ablation. Patients should also be advised of the need to have the contact number for their clinics at all times and, if this is not possible, the 1-800 phone number of the manufacturer should always be accessible. Most companies provide around-the-clock worldwide service and will go to all health care facilities in an emergency, 24 hours per day.

The ICD represents an attractive therapeutic solution for patients with CKD. It has been shown to improve survival as both a primary and secondary prophylaxis in CKD patients. Given the high incidence of SCD among this population, an ICD should always be considered. Ongoing research is indicated to determine risk stratification of this expanding CKD population and the specific needs of these patients within health care.

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CONTINUING EDUCATION STUDY QUESTIONS

Contact hour: 2.0 hrs

Prevention of death in chronic kidney disease: The role of implantable cardioverter defibrillators

By Suzette Turner, RN(EC), MS, FNP, Orhan Onalan, MD, and Barbara Bickle, RN, MN

1. What is the most common cause of death in chronic kidney disease (CKD) patients?
(a) liver failure
(b) cardiac disease
(c) diabetes
(d) strokes

2. Where is the most common location for implantable cardioverter defibrillators (ICD) to be implanted?
(a) right side of the chest
(b) abdominal area
(c) midsternum
(d) left side of the chest

3. What is the main purpose of the ICD?
(a) to monitor the muscular function of the heart
(b) to determine the pump function of the heart
(c) to terminate episodes of ventricular tachycardia or fibrillation
(d) to evaluate the function of the left ventricle

4. Patients with an ICD on chronic hemodialysis are at an increased risk of:
(a) developing a pneumothorax
(b) developing lead dislodgement
(c) developing a pocket haematoma
(d) receiving shocks

5. What is the recommended action by the Ministry of Transportation after a patient receives an ICD for secondary prevention?
(a) no restrictions of the driver's licence
(b) suspension of the driver's licence for one month
(c) suspension of the driver's licence for three months
(d) suspension of the driver's licence for six months

6. What is the most common indication for implantation of an ICD?
(a) assessment of the perfusion of the coronary arteries
(b) primary intervention
(c) secondary intervention
(d) evaluation of valve function

7. What should the health care professional ensure happens to the ICD prior to thoracic surgery?
(a) that therapies are suspended during surgery
(b) no action is indicated
(c) that the pacemaker function of the ICD is checked
(d) that the family doctor is informed of the surgery

8. If a patient receives a single shock from an ICD, what should the patient do?
(a) continue on with his/her life
(b) visit the emergency department
(c) follow up with the ICD clinic as soon as possible
(d) visit the family doctor

9. If a patient receives multiple shocks from a defibrillator what should the patient do?
(a) continue on with his/her life
(b) visit the emergency department
(c) follow up with the ICD clinic as soon as possible
(d) visit the family doctor

10. How long is the arm restricted from going above the patient's shoulder on the side of implant?
(a) four weeks
(b) eight weeks
(c) four months
(d) eight months

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 hrs continuing education

Prevention of death in chronic kidney disease: The role of implantable cardioverter defibrillators

Volume 19, Number 3

By Suzette Turner, RN(EC), MS, FNP, Orhan Onalan, MD, and Barbara Bickle, RN, MN

Post-test instructions:

- Select the best answer and circle the appropriate letter on the answer grid below.
- Complete the evaluation.
- Send only this answer form (or a photocopy) to:
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  336 Yonge St., Ste. 322,
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- If you receive a passing score of 80% or better, a certificate for 2.0 contact hours will be awarded by CANNT.
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6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d

Evaluation

	Strongly disagree				Strongly agree
1. The offering met the stated objectives.	1	2	3	4	5
2. The content was related to the objectives.	1	2	3	4	5
3. This study format was effective for the content.	1	2	3	4	5

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   50 75 100 125 150

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Reduced drug costs from switching hemodialysis patients from epoetin alfa in multidose vials to pre-filled syringes

By Lori D. Wazny, PharmD, Colette B. Raymond, PharmD, MSc, Michelle K. Do, BSc Pharm, and Dan E. Skwarchuk, CGA

Abstract

Objective: *We sought to evaluate epoetin alfa drug costs in hemodialysis (HD) patients after a province-wide switch from multidose vials (MDV) to prefilled syringes (PFS).*

Methods: *A retrospective study of epoetin alfa drug costs and estimated doses based on these costs during a six-month period of MDV usage (2007) were compared to a PFS usage period (2008). Data were collected from quarterly counts of HD patients receiving epoetin alfa in the Manitoba Renal Program (MRP) and monthly inventory billing records.*

Results: *756 patients received epoetin alfa MDV were compared to 799 patients receiving epoetin alfa PFS. Average weekly dose calculated from drug costs was 13,282 units (MDV) versus 11,689 units (PFS). Average weekly costs were $195.71 (MDV) versus $183.23 (PFS). This translated to an estimated $12.48 per patient per week in savings ($518,519 annual savings across the Manitoba Renal Program).*

Conclusion: *The switch from epoetin alfa MDV to epoetin alfa PFS realized cost savings, likely as a result of reduced drug wastage.*

Key words: epoetin alfa, multi-dose vials, pre-filled syringes, hemodialysis, cost-savings, drug wastage

Introduction

Erythropoietic-stimulating agents (ESAs) such as epoetin alfa and darbepoetin alfa are frequently used for the treatment of anemia of chronic kidney disease (CKD) (KDOQI, 2006; Moist, 2008). ESAs have reduced the need for blood transfusions, decreased the frequency and severity of anemia-associated morbidity, and improved quality of life (Duh, Weiner, White, Lefebvre, & Greenberg, 2008; Siegel et al., 2008).

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Submitted for publication: March 27, 2009.
Accepted for publication in revised form: May 30, 2009.

The two ESAs currently available in Canada are epoetin alfa (Eprex®) and darbepoetin alfa (Aranesp®). Our provincial renal program provides care to all patients with CKD in Manitoba (population 1.2 million). In 2004, a policy was developed where darbepoetin alfa would be used as the treatment of anemia of CKD, where previously epoetin alfa was used. Due to a contract decision in June 2006, all patients on hemodialysis (HD) in the Manitoba Renal Program (MRP) were converted from darbepoetin to epoetin alfa multi-dose vials (MDV) (Raymond et al., 2008). In April 2008, the MRP converted all HD patients from epoetin alfa MDV to epoetin alfa pre-filled safety needle syringes (PFS). The main reason for the switch to epoetin alfa PFS was concern about potential drug wastage with MDV. To support this theory, we performed an evaluation of the amount of epoetin alfa remaining in the MDV discarded in the sharps containers at one of our provincial HD units (n=133 HD patients) over a four-week period in October 2007. On visual exam, 26% of all discarded MDV had at least 0.2 ml (4,000 units) of epoetin alfa left over. Even considering a 10% (0.1 ml) overfill in the MDV, (Janssen-Ortho, 2008), this suggested that there was still 0.1 ml (2,000 units) of epoetin alfa wasted. This suspicion of drug wastage with MDV led us to evaluate the average doses and associated costs after conversion to PFS. Secondary reasons that also favoured a switch to epoetin alfa PFS included: recent provincial safety needle legislation (Government of Manitoba, 2004), availability of epoetin alfa in a safety needle syringe format (Janssen-Ortho, 2007), the lack of human serum albumin in PFS (an issue with MDV administration to Jehovah's Witnesses), and ease of administration.

Published studies have evaluated dosing patterns, drug costs, dosing ratios between epoetin alfa and darbepoetin alfa, and hematological outcomes of ESAs (Hymes et al., 2007; Rasu, Crawford, Manley, & Balkrishnan, 2008; Raymond et al., 2008; Vekeman et al., 2007). However, no studies to date have evaluated if the higher acquisition cost per unit of epoetin alfa in PFS format is offset by reduced drug wastage compared to MDV. The purpose of this study was to evaluate epoetin alfa drug costs and doses calculated from drug costs in patients receiving HD after a province-wide switch from MDV to PFS.

Methods

This was a retrospective study of epoetin alfa drug costs during a six-month MDV usage period (July to December of

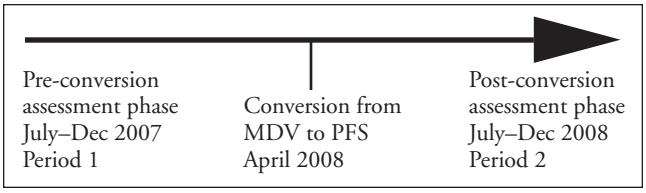

Figure One. Data collection process

2007, hereafter referred to as period one) versus a six-month PFS usage period (July to December of 2008, three months post-conversion, hereafter referred to as period two) (see Figure One). This study consisted of all HD patients receiving epoetin alfa within the MRP who received epoetin alfa from July 2007 through December 2008. These patients were converted from epoetin alfa MDV to epoetin alfa PFS in April of 2008. Due to patient attrition for reasons of death or discontinuation of hemodialysis, the patients in period one and period two were identical. Epoetin alfa was administered intravenously during all time points. Patients on peritoneal dialysis and patients with CKD not receiving dialysis were excluded because they had always received epoetin alfa PFS.

Data were collected from quarterly counts (March 31, June 30, September 30, and December 31) of the number of patients on HD receiving epoetin alfa in the MRP and monthly inventory billing records. Data collected through the monthly billing records included the number of vials and units of epoetin alfa purchased. All data were entered and analyzed using Excel® 2003. Counts of the number of patients on HD receiving epoetin alfa were collected by unit clerks and hemodialysis nurses in each provincial dialysis unit. The wholesale acquisition costs for the PFS all strengths and the MDV (20,000 units/mL) were acquired from the McKesson 2008 ordering manual and were used to calculate drug costs. Epoetin alfa was priced at $15.68 and $14.73 per 1,000 units for the PFS and MDV, respectively.

The average number of patients from July to December was calculated by averaging quarterly patient counts from June 30 and December 31 for each year. In order to calculate the average dose of epoetin alfa per patient per week, the total number of epoetin alfa units purchased in the MRP was divided by the average number of patients on HD receiving epoetin alfa, then dividing by 26 weeks (July 1 to December 31).

The average epoetin alfa units purchased per patient per week (dose calculated from drug costs) was calculated as follows:

Total number of units purchased ÷ Average number of patients * 26 weeks

The cost per patient per week was calculated as follows:

Cost of drug ÷ Average number of patients * 26 weeks

Results

A total of 756 patients on HD who received epoetin alfa MDV (period one) were compared to 799 patients on HD who received epoetin alfa PFS (period two). Table One shows the total units purchased and the cost of epoetin alfa during the MDV and PFS periods respectively. Total epoetin alfa purchased decreased from 261,080,000 units (period one) to 242,681,000 units (period two), despite a net increase of 43 patients. The average weekly dose calculated from drug costs per patient during the MDV period was 13,282 units versus 11,689 units during the PFS period (see Table Two). The average weekly cost of epoetin alfa was $195.71 per patient during the MDV period versus $183.23 per patient during the PFS period (see Table Two). This equates to a weekly cost savings of $12.48 per patient with PFS. With an average of 799 patients on HD receiving epoetin alfa PFS in the 2008 evaluation period, this results in predicted cost savings of $518,519 per year.

Discussion

In this retrospective analysis, a switch from epoetin alfa MDV to epoetin alfa PFS demonstrated considerable cost-savings to our provincial renal program. We postulate that the reason for the observed decrease in average dose from period one to period two is due to less drug wastage with the PFS.

Strengths of this analysis include the fact that this was a comprehensive, population-based data collection that included all patients receiving HD in Manitoba. A diverse range of patients (i.e., acutely ill and stable patients) was included and the change to PFS occurred province-wide in a discrete time period (April 2008). In addition, our two periods for comparison comprised the same six-month time period in each year (July to December), and allowed a three-month window after the switch to PFS before beginning data collection for dosing to stabilize with the new formulation.

This study is subject to several limitations. Firstly, the average weekly dose calculated from drug costs was calculated based on units of epoetin alfa purchased, not what was actually prescribed. To address this issue, we examined data from one of our provincial HD units where data on actual prescribed doses in September 2008 were available (n=133 patients). The actual average administered weekly dose per patient from the patient charts was 13,650 units was very similar to 13,401 units based on purchased units in that HD unit (data not shown). This sensitivity analysis suggests that by using units purchased for our analysis rather than actual prescribed doses, we did not overestimate the average weekly epoetin alfa dose per patient.

A second limitation is that in spring 2008, one HD unit initiated a pharmacist-led anemia management algorithm that preferentially uses epoetin alfa intravenously three times per week and is more aggressive in the use of maintenance dosing of intravenous iron than traditional individual physician prescribing at that unit. The change in anemia management at

Table One. Manitoba Renal Program epoetin alfa utilizations

	Total Units Purchased	Drug Cost
TOTAL MDV (July–Dec. 2007) (20,000 units)	261,080,000	$3,846,883
TOTAL PFS (July–Dec. 2008) (all strengths)	242,681,000	$3,803,993

MDV: multidose vial. PFS: prefilled syringe.

Table Two. Comparison of utilization and expenditures with epoetin multidose vials and prefilled syringes

	July–Dec 2007	July–Dec 2008	Savings
Average # of patients	756	799	–
Average dose calculated from drug costs per patient per week (units)	13,282	11,689	1,593
Cost per patient per week	$195.71	$183.23	$12.48

MDV – multidose vial. PFS – prefilled syringe.

this unit may have contributed to the overall provincial dose reductions. However, only 128 patients dialyze at this site and a decrease in dose was demonstrated for four of the other five provincial dialysis units.

Thirdly, the patients included in period one were not the same as those in period two, due to patient turnover among the HD population. Fourthly, we did not collect patient demographics. However, previous studies of the HD population at the MRP suggest a population with stable demographics over time (Raymond, Collins, Bernstein, Skwarchuk, & Vercaigne, 2006; Raymond et al., 2008, Raymond & Wazny, 2009). We would not anticipate that the patient demographics would differ significantly during the two time periods of this study.

Finally, this study did not examine clinical anemia management parameters such as hemoglobin and iron studies. We did not collect information about other important factors, which would be expected to influence epoetin alfa dosing including: concurrent medical conditions, medications, bleeding episodes, blood transfusions, infections or inflammation. Without these clinical parameters we cannot definitively state that clinical targets were met along with the observed epoetin alfa dose reduction. However, previous MRP studies of HD patients have consistently documented anemia management parameters within the current Canadian Society of Nephrology guidelines (range HgB 100-120, target 110 g/L) (Moist et al., 2008). In an evaluation of conversion ratios between epoetin and darbepoetin in all HD patients receiving ESAs in the MRP, mean values for hemoglobin concentrations were 113.6 and 114.4 g/L, transferrin saturations were 28.8 and 29.9% and ferritin concentrations were 527 and 441 ug/L in 2003 and 2005, respectively (n=482 and 604 patients) (Raymond et al., 2008). In another similar study, we observed mean hemoglobin concentrations for 169 HD patients converted from darbepoetin alfa to epoetin alfa to be 113.3 and 116.4 g/L, transferrin saturations to be 30.6 and 29.0% and ferritin concentrations to be 517 and 466 ug/L in 2006 and 2007, respectively (Raymond & Wazny, 2009). We would not anticipate that the patient population would differ significantly from previously published results, nor would we anticipate any systematic trend towards and increased prevalence of factors impacting epoetin alfa doses (e.g., blood transfusions) to have impacted the study population differently from period one to period two.

Implications for practice

Epoetin alfa PFS offer convenience and safety, as well as a potential to reduce a HD program's epoetin alfa costs. Other institutions can consider the significant cost savings demonstrated in this study when considering a switch from epoetin alfa MDV to PFS. At the time of writing, the MDV epoetin alfa has been withdrawn from the Canadian market, and it is important for centres to know that a change to PFS may result in cost savings. It is important to realize, however, that an individual institution's drug acquisition cost also plays an important role in how much cost savings can be realized with this switch.

In conclusion, despite higher wholesale drug acquisition cost per 1,000 units, epoetin alfa PFS were cost saving compared to epoetin alfa MDV in our provincial renal program, likely as a result of reduced drug wastage. Due to the fact that the EPO 20,000 unit MDV are now withdrawn from the Canadian market, it is unlikely that another opportunity to study this will arise. However, in countries where both drug formats are still available, future research could evaluate a conversion between epoetin alfa MDV and PFS using actual prescribed doses.

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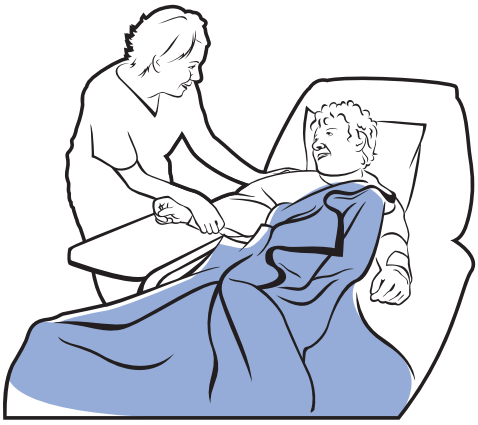
Bedside Matters…

The far side



I often wonder how many of us have had personal encounters with illness.

It might be your own, or the sickness of a loved one. Sometimes I can tell which of my colleagues have learned lessons this way.

I credit my life experiences for the development of my empathy.

Being close to my parents, the near-death crisis of my father's ruptured aneurysm led me through a journey of disbelief, fear and hope. When he lived through the ordeal, I felt the responsibility of trying to prevent him from ever being sick again. I guess that's when I learned that the sick person is not the only one who needs care and teaching. The whole family is entitled to our attention if recuperation is to be optimal. Each person needs support. If the family members feel cared for themselves, have you noticed how the level of anxiety is reduced and the trust is enhanced?

Recently, I have been sick enough to declare myself on sick leave, and this has lasted more than two months. What happened to my life? Talk about disbelief. I could no longer participate in most of the activities I enjoy. Walking around the house was an effort. What was the cause? How long would it last? How could I possibly stay in control of the pain?

Suspended outside my life, I expressed to my friends that I was operating at 50 per cent. I didn't look any different to them. That made me feel even more isolated.

I have had a refresher course in empathy.

Does this remind you of the "sick" people we look after? People and their families who are struggling to find their way back to normal, when the concept of normal has shifted.

Young dialysis patients have young friends who continue going to pubs and playing baseball and going away camping. How can we help a young patient adjust to a new and limited style of life? Are we doing all we can?

I think of the frail old folks who I encourage to hang in and wait to see if tincture of time on dialysis will help them feel better. Now I realize that this might mean a little more time than I did before my own progress seemed to be in slow motion. They have already lived through so many changes. With a little education and coaching, maybe optimism for some meaning left in life can be part of their experience.

Hopefully we can stay present, listen and really accompany them as they adjust to the realities and make decisions for their own care.

Please share a meaningful moment of learning from your professional life. Send me your idea and I'll help you publish it. Send to Lee at ***lee.beliveau@fraserhealth.ca***

Lee Beliveau, RN, CNeph(C), staff nurse, hemodialysis unit, at Surrey Hospital, Surrey, British Columbia

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Pharmacy news and reviews

What's the buzz?

As renal health care professionals, we are often the health care providers that our patients see most frequently. As a result, we are confronted with questions regarding health news, or issues raised by Health Canada in the media regardless of whether it is an issue related to chronic kidney disease (CKD) or primary care. Sometimes these questions can be difficult to answer, as the media's slant or information on the internet may be sensationalized and not a true representation of the complexity of evidence behind the story.

This article is the third article in a series entitled "What's the buzz" that will highlight recent "newsworthy" developments and attempt to demystify the content and context of the story. This article will provide readers with some background information, evidence-based facts, and discussion that will assist them in responding to their patients' questions.

Headline: Common blood pressure drugs should not be combined, doctors urge

(www.CBC.ca, January 18, 2009)

The article goes on to state that Angiotension Converting Enzyme Inhibitors (ACEIs) and Angiotension II Receptor Blockers (ARBs), when used in combination, increase the risk of sudden cardiac death, kidney disease and other complications.

The source: A study entitled "The Ongoing Telmisartan Alone and in Combination with Ramipril Global Endpoint Trial (ONTARGET)" (Yusef et al., 2008). This study was published in the **New England Journal of Medicine** in April 2009, and has prompted much discussion among cardiologists, internists, and nephrologists alike. It was an attempt to demonstrate that ARBs are equivalent to ACEIs in the prevention of cardiovascular events in high-risk patients.

Patient population: 25,620 patients ≥55 years of age who had established atherosclerotic vascular disease or diabetes with end-organ damage. 27% were woman, 85% had cardiovascular disease, 69% had hypertension and 38% had diabetes. At baseline, mean serum creatinine level was 94 umol/L, mean estimated glomerular filtration rate (eGFR) was 74 ml/min/1.73m^2, and mean urine albumin:creatinine ratio was 0.82 mg/mmol.

Exclusion criteria: Patients were excluded if they had major renal artery stenosis, uncorrected volume or sodium depletion, serum creatinine level >265 µmol/L, and uncontrolled hypertension.

Intervention: Telmisartan 80 mg/day + ramipril 10 mg/day

Comparator: Telmisartan 80 mg/day or ramipril 10mg/day

Patients were followed for 56 months after a three to four week run-in period.

Outcome: The primary objective was to determine if 80 mg of telmisartan daily was as effective as ramipril 10 mg daily in reducing the primary composite endpoint of death from cardiovascular causes, myocardial infarction, stroke, or hospitalizations for heart failure. As well, they wanted to determine if the combination of these agents was superior to either agent alone.

There were numerous secondary outcomes. However, renal-specific outcomes were evaluated in a separate publication (Mann et al., 2008). They evaluated a composite endpoint of dialysis, doubling of serum creatinine level, and death and a secondary outcome of dialysis and doubling of serum creatinine. Other outcomes included decline in eGFR and urinary albumin excretion.

Results: There were no significant differences in the primary composite endpoint or any component of the primary endpoint between the three groups. This finding shows that telmisartan 80 mg once daily (an ARB) is non-inferior to ramipril 10 mg once daily (an ACEI) in the prevention of events in patients with high cardiovascular risk factors. The combination of therapy showed no benefit over either drug alone for the primary outcome and contrary to this headline, **did not** increase incidence of sudden cardiac death.

The results regarding the renal outcomes were somewhat unexpected. Although there were no differences in any of these outcomes when telmisartan was compared to ramipril, the combination of these agents significantly increased the incidence of the primary composite endpoint of dialysis, doubling of creatinine level and death. (13.4% telmisartan, 13.5% ramipril and 14.5% combination, HR=1.09; 1.01-1.18, p=0.037). (Note: This was driven by the renal outcomes, as there was no difference in death.) The secondary renal outcome, dialysis or dou-

by Dr. Jennifer Lynn Ryan, BSc Pharm, Pharm D, ACPR, Nephrology Pharmacist, Atlantic Health Sciences Corporation, Saint John, NB

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bling of serum creatinine was similar between the two agents, but higher in the combination group (2.1% telmisartan, 2.03% ramipril, 2.49% in combination; HR=1.24; 1.01–1.51 p= 0.038). Within this outcome, acute dialysis was more common in the combination group. However, there was no difference in the endpoint of chronic dialysis. The eGFR significantly declined in all cases combination>telmisartan>ramipril and urinary albumin excretion was significantly decreased in all groups combination>telmisartan>ramipril and the combination of agents prevented new onset microalbuminuria compared to the other groups.

A higher incidence of hypotension and hyperkalemia was also reported in the combination group compared to the other groups.

Among subgroups, combination therapy provided no benefit in potentially high-risk patients, such as those with diabetes and nephropathy, hypertension and eGFR <60 ml/min, and tended to cause more adverse effects in lower-risk groups, such as those without diabetes, hypertension and microalbuminuria and with eGFR >60 ml/min. However, these subgroups were small and these results should be interpreted with caution.

Considerations:

- This study highlights the importance of using clinically important outcomes such as doubling of creatinine and dialysis, as opposed to surrogate markers such as urinary albumin excretion.
- These results contradict previous studies that led us to believe that a decrease in urinary protein results in a reduction in renal disease progression in all populations.
- This study does not address the benefits or risks of combination ACEI/ARB in patients with congestive heart failure.
- This study does not adequately address management of patients with significant proteinuria due to non-diabetes or non-hypertensive causes.
- This study does not adequately address management of patients with <60 ml/min, as these numbers were very small. In this small subgroup, the combination was not significantly worse.
- This study does not adequately address management of patients without cardiovascular risk factors.
- It is important to remember that decreased GFR is a known effect of ACEIs and ARBs and part of their mechanism of action. They are thought to be renoprotective for the same reason. The decrease in renal eGFR could have been predicted. However, the increased incidence of significant renal impairment (doubling of creatinine and dialysis) was unexpected.

Implications of this study on current practice: This study questions the utility of using urinary protein excretion as a marker in managing progression of CKD and highlights the importance of looking at other important markers such as decline in eGFR when conducting future research. This trial cautions against the use of combination therapy in patients with, or at risk for coronary artery disease, but it's difficult to generalize these results to patients with eGFR <60 ml/min and patients with significant proteinuria. Dual blockade with ACEI and ARB may still have a role in select patients, but perhaps should be reserved for patients with significant proteinuria >1 g/day with careful monitoring of potassium, creatinine, and blood pressure. Further studies are needed to identify patients who may benefit from this combination despite potential adverse effects. Patients asking about these headlines should be referred to their family doctor or nephrologist for assessment.

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Technically speaking

Approval to move forward with national dialysis certification

The Canadian Board of Examiners (CBE) promotes safe technical practice by promoting the certification of individuals in biomedical engineering and, now, dialysis technology. Recently, CBE received formal approval from the International Certification Commission (ICC) to incorporate dialysis under its umbrella for certification purposes. This follows a comprehensive national interest survey, which showed continued interest in certification for dialysis technologists. The expedient completion to this project's approval was made possible because of the cooperation between the Canadian executive for CBE and the Canadian Dialysis Technical Certification group. The Dialysis Technical Certification team wishes to acknowledge the work of Derek Uttley, Secretariat, and Murray Greenwood, Co-chair for CBE-BMET, in helping this important project come to fruition.

More information on dialysis technical certification can be found at **http://bmetcertcanada.ncf.ca/**

Patricia Loughren, RN, BScN, MA(ED), Health Sciences, Georgian College, Barrie, ON
On behalf of the Dialysis Technical Certification Team: Mukesh Gajaria, Charles Estridge, Shripal Parikh, Dave Riggs, Robert Greening, Martin Dyke

Guidelines for authors

The **CANNT Journal** invites letters to the editor and original manuscripts for publication in its quarterly journal. We are pleased to accept submissions in either official language – English or French.

Which topics are appropriate for letters to the editor?

We welcome letters to the editor concerning recently published manuscripts, association activities, or other matters you think may be of interest to the CANNT membership.

What types of manuscripts are suitable for publication?

We prefer manuscripts that present new clinical information or address issues of special interest to nephrology nurses and technologists. In particular, we are looking for:

- original research papers
- relevant clinical articles
- innovative quality improvement reports
- narratives that describe the nursing experience
- interdisciplinary practice questions and answers
- reviews of current articles, books and videotapes
- continuing education articles.

How should the manuscript be prepared?

Form: The manuscript should be typed, double-spaced, single-sided on 8.5 x 11 inch white paper. One-inch margins should be used throughout, and the pages should be numbered consecutively in the upper right-hand corner. More formal research or clinical articles should be between five and 15 pages. Less formal narratives, question and answer columns, or reviews should be fewer than five pages.

Style: The style of the manuscript should be based on the **Publication Manual of the American Psychological Association** (**APA**), Fifth Edition (2001), available from most college bookstores.

Title page: The title page should contain the manuscript title, each author's name (including full first name), professional qualifications [i.e. RN, BScN, CNeph(C)], position, place of employment, address, telephone and fax numbers, and e-mail address. The preferred address for correspondence should be indicated.

Abstract: On a separate page, formal research or clinical articles should have an abstract of 100 to 150 words. The abstract should summarize the main points in the manuscript.

Text: Abbreviations should be spelled out the first time they are used with the abbreviation following in brackets, for example, the Canadian Association of Nephrology Nurses and Technologists (CANNT). Generic drug names should be used. Measurements are to be in Standards International (SI) units. References should be cited in the text using APA format. A reference list containing the full citation of all references used in the manuscript must follow the text.

Tables/Figures: Manuscripts should only include those tables or figures that serve to clarify details. Authors using previously published tables and figures must include written permission from the original publisher. Such permission must be attached to the submitted manuscript.

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Each manuscript will be acknowledged following receipt. Research and clinical articles are sent out to two members of the **CANNT Journal** review panel to be reviewed in a double-blind review process. All manuscripts may be returned for revision and resubmission. Those manuscripts accepted for publication are subject to copy editing; however, the author will have an opportunity to approve editorial changes to the manuscript. The criteria for acceptance for all articles include originality of ideas, timeliness of the topic, quality of the material, and appeal to the readership.

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INDICATIONS AND CLINICAL USE

RENAGEL (sevelamer hydrochloride) is indicated for: the control of hyperphosphatemia in patients with end-stage renal disease (ESRD) undergoing dialysis.

CONTRAINDICATIONS

RENAGEL (sevelamer hydrochloride) is contraindicated in the following situations:

- patients with hypophosphatemia
- patients with bowel obstruction
- patients hypersensitive to sevelamer hydrochloride or one of the other ingredients in the product (colloidal silicon dioxide, stearic acid).

WARNINGS AND PRECAUTIONS

General

RENAGEL (sevelamer hydrochloride) tablets should be swallowed intact and should not be crushed, chewed, or broken into pieces.

Patients with renal insufficiency may develop hypocalcemia. As RENAGEL does not contain calcium, serum calcium levels should be monitored and elemental calcium should be supplemented whenever considered necessary. In cases of hypocalcemia, patients should be given an evening calcium supplement. Approximately 1000 mg elemental calcium is recommended.

Caution should be exercised to avoid hypophosphatemia, a serum phosphorus of < 0.8 mmol/L (see DOSAGE AND ADMINISTRATION).

The safety and efficacy of RENAGEL in patients with renal disease who are not undergoing dialysis has not been studied.

Gastrointestinal

The safety and efficacy of RENAGEL in patients with dysphagia, swallowing disorders, severe gastrointestinal (GI) motility disorders, or major GI tract surgery have not been established. Caution should be exercised when RENAGEL is used in patients with these GI disorders.

Special Populations

Pregnant Women: The safety of RENAGEL has not been established in pregnant women. In preclinical studies, there was no evidence that RENAGEL induced embryolethality, fetotoxicity or teratogenicity at the doses tested (up to 1 g/kg/day in rabbits; up to 4.5 g/kg/day in rats). RENAGEL should only be given to pregnant women if the benefits outweigh the risks.

Nursing Women: There have been no adequate, well-controlled studies in lactating, or nursing women.

Pediatrics: The safety and efficacy of RENAGEL has not been established in pediatric patients. The minimum age of patients treated with RENAGEL in clinical trials was 18 years old.

Geriatrics: No special considerations are needed for elderly patients.

Monitoring and Laboratory Tests

Serum phosphorus and serum calcium should be monitored every 1 to 3 weeks until the target phosphorus level is reached. The dose of RENAGEL should be adjusted based on serum phosphorus concentration and titrated
to a target serum phosphorus of ≤ 1.8 mmol/L.

RENAGEL does not contain calcium or alkali supplementation; serum calcium, bicarbonate, and chloride levels should be monitored.

ADVERSE REACTIONS

Clinical Trial Adverse Drug Reactions

Because clinical trials are conducted under very specific conditions the adverse reaction rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse drug reaction information from clinical trials is useful for identifying drug-related adverse events and for approximating rates.

In a combined safety database comprised of 483 patients with end-stage renal disease undergoing hemodialysis, adverse events reported at an incidence ≥10% are provided in Table 1. From this database, adverse events are also presented separately from a single long-term randomized clinical study for RENAGEL and calcium. The adverse events presented in the table below are not necessarily attributed to RENAGEL treatment. The incidence of these events was not dose related.

Table 1: Adverse Events in Patients with End-Stage Renal Disease undergoing Hemodialysis

	Total AEs reported.	52 weeks Study of RENAGEL vs. calcium (calcium acetate and calcium carbonate)	
System Organ Class Event	**RENAGEL** **N = 483** **%**	**RENAGEL** **N = 99** **%**	**calcium** **N = 101** **%**
Gastrointestinal Disorders			
Vomiting	24.4	22.2	21.8
Nausea	25.3	20.2	19.8
Diarrhea	21.1	19.2	22.8
Dyspepsia	15.7	16.2	6.9
Constipation	13.3	8.1	11.9
Infections and Infestations			
Nasopharyngitis	13.9	14.1	7.9
Bronchitis	5.4	11.1	12.9
Upper Respiratory Tract Infection	7.0	5.1	10.9
Musculoskeletal, Connective Tissue and Bone Disorders			
Pain in Limb	13.7	13.1	14.9
Arthralgia	11.4	12.1	17.8
Back Pain	6.0	4.0	17.8
Skin Disorders			
Pruritus	10.4	13.1	9.9
Respiratory, Thoracic and Mediastinal Disorders			
Dyspnea	15.7	10.1	16.8
Cough	11.6	7.1	12.9
Vascular Disorders			
Hypertension	9.3	10.1	5.9
Nervous System Disorders			
Headache	18.4	9.1	15.8
General Disorders and Site Administration Disorders			
Dialysis Access Complication	4.3	6.1	10.9
Pyrexia	8.7	5.1	10.9

In one hundred and forty three patients with end-stage renal disease undergoing peritoneal dialysis with treatment duration of 12 weeks, adverse events reported at an incidence ≥10% are provided in Table 2 below. The adverse events presented in the table below are not necessarily attributed to RENAGEL treatment. The incidence of these events was not dose related.

Table 2: Adverse Events in Patients with End-Stage Renal Disease Undergoing Peritoneal Dialysis

System Organ Class Event	**RENAGEL** **(N=97)** **%**	**calcium** **(N=46)** **%**
Gastrointestinal disorders		
Dyspepsia	17.5	8.7
Vomiting	11.3	4.3
Peritonitis	11.3	4.3

The most frequently occurring serious adverse event with RENAGEL use was peritonitis at 8.2%, compared to 4.3 % with calcium. Patients receiving dialysis are subject to certain risks for infection specific to the dialysis modality. Peritonitis is a known complication in patients receiving peritoneal dialysis (PD). Therefore, patients on PD should be closely monitored to ensure the reliable use of appropriate aseptic technique with the prompt recognition and management of any signs and symptoms associated with peritonitis.

Less common clinical trial adverse events

The following adverse events have been observed with RENAGEL use with an incidence of <10%, but greater than calcium and without attribution to causality, including: abdominal distension, constipation, diarrhea, nausea, chest pain, fatigue, pyrexia, catheter site infection, anorexia, headache, cough and pruritis.

Some patients experienced adverse events related to hypercalcemia in the calcium group but not in the RENAGEL group.

Post-Market Adverse Drug Reactions

During post-marketing experience with RENAGEL, the following have been reported without attribution to causality: pruritis, rash, and abdominal pain.

OVERDOSAGE

Since RENAGEL (sevelamer hydrochloride) is not absorbed, the risk of systemic toxicity is minimal. RENAGEL has been given to healthy volunteers at doses up to 14 grams per day for 8 days with no adverse effects. The maximum average daily dose of RENAGEL that has been given to hemodialysis patients is 13 grams.

DOSAGE AND ADMINISTRATION

Dosing Considerations

- The tablets should not be bitten, chewed or broken apart prior to dosing.
- RENAGEL (sevelamer hydrochloride) should be taken immediately prior to or with meals, since its action is to bind ingested phosphate (see ACTION AND CLINICAL PHARMACOLOGY, Mechanism of Action)
- When administering any other medication where a reduction in the bioavailability of that medication would have a clinically significant effect on safety or efficacy, the physician should consider monitoring blood levels or dosing that medicine apart from RENAGEL to prevent GI binding (at least one hour before or three hours after RENAGEL).

Recommended Dose and Dosage Adjustment

The recommended dosing to be used when initiating RENAGEL in patients not using another phosphate binder are outlined below:

When switching from calcium-based phosphate binders to RENAGEL,

Starting Dose	
Initial Serum Phosphorus	**RENAGEL Tablets 800mg**
> 1.8 and < 2.4 mmol/L	3 tablets per day (2.4 grams)
≥ 2.4 mmol/L	6 tablets per day (4.8 grams)

an equivalent starting dose on a mg/weight basis of RENAGEL should be prescribed. Dosage adjustments, when necessary should be recommended every 1 to 3 weeks by increasing one tablet per meal (3 per day) until the target serum phosphorus levels are met.

The total daily dose should be divided according to meal portions during the day.

Average Maintenance Dose: Dosage should be adjusted based upon the target serum phosphorus levels. The dose may be increased or decreased by one tablet per meal at two week intervals as necessary. The average final dose in the chronic phase of a 52 week Phase 3 clinical trial designed to lower serum phosphorous to 1.6 mmol/L or less was approximately 7.1 grams, (approximately nine 800 mg tablets per day equivalent to three 800 mg tablets per meal). The maximum average daily RENAGEL dose studied was 13 grams.

Missed Dose

- If a dose is forgotten, it should be skipped. Double dosing is not advisable.

DOSAGE FORMS, COMPOSITION AND PACKAGING

RENAGEL (sevelamer hydrochloride) tablets are film-coated compressed tablets containing 800 mg of sevelamer hydrochloride. RENAGEL contains the following excipients: colloidal silicon dioxide and stearic acid. The RENAGEL tablet coating contains hypromellose and diacetylated monoglyceride. The printing ink contains iron oxide black (E172), propylene glycol, isopropyl alcohol and hypromellose (hydroxypropyl methylcellulose).

RENAGEL 800 mg Tablets are supplied as oval, film-coated tablets, imprinted with "RENAGEL 800," on the crown, single side.

RENAGEL 800 mg Tablets are available in bottles of 180 tablets.

STORAGE AND STABILITY

Store at controlled room temperature 15°C to 30°C. Protect from moisture.

Product monograph available on request.

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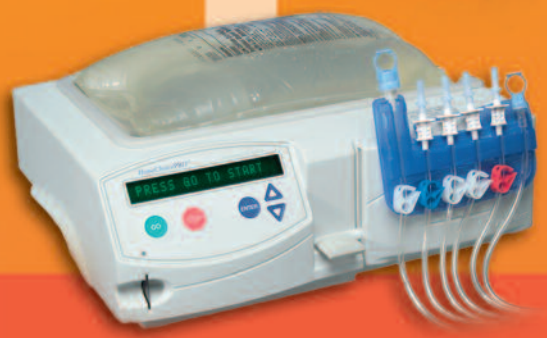

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❑ Baccalaureate	❑ Baccalaureate
❑ Master's	❑ Master's
❑ Doctorate	❑ Doctorate

I am At Present Studying Toward:

Nursing	*Non-Nursing*
❑ Specialty Certificate	❑ Specialty Certificate
❑ Baccalaureate	❑ Baccalaureate
❑ Master's	❑ Master's
❑ Doctorate	❑ Doctorate

Primary Area of Practice

❑ Progressive renal insufficiency (pre-dialysis)
❑ Transplantation
❑ Hemodialysis
❑ Peritoneal
❑ Pediatrics
❑ Other (Specify) _____

Return to **CANNT**
Mailing Address:

Debbie Maure, CANNT,
Suite #322, 336 Yonge St., Barrie, Ontario, L4N 4C8
Telephone (705) 720-2819 Fax (705) 720-1451

Demande d'adhésion

Prénom _____

Nom de famille _____

Adresse à domicile _____

Ville _____

Province _____ Code postal _____

Téléphone (D) (_____) _____ - _____

(T) (_____) _____ - _____

Télécopieur (_____) _____ - _____

Courrier électronique _____

Employeur _____

Adresse de l'employeur _____

Ville _____

Province _____ Code postal _____

Adresse de correspondance ❑ domicile ❑ travail

Acceptez-vous que l'ACITN ajoute votre nom et votre adresse sur des listes d'envois qu'elle juge pertinentes et appropriées? ❑ Oui ❑ Non

❑ Nouveau membre ou ❑ Renouvellement

Numéro de l'ACITN # (si renouvellement) _____

Nom de la personne qui vous a recommandé de joindre l'ACITN: _____

Frais d'adhésion (TPS #100759869)
Les frais d'adhesion sont deductibles d'impots.

❑ Un an: 70,00 $ + 3,50 TPS = 73,50 $
❑ Deux ans: 130,00 $ + 6,50 TPS = 136,50 $
❑ Tarif étudiant: 35,00 $ + 1,75 TPS = 36,75 $*
**La demande doit inclure une preuve d'inscription à plein temps*

Je joins $ _____

payable à l'ACITN.
Mode de paiement:
❑ Chèque ❑ Mandat de poste ou chèque visé

❑ Visa ❑ Mastercard

Nom du titulaire de la carte: _____

Numéro de la carte: _____

Date d'expiration: _____

Signature: _____

❑ J'ai obtenu la désignation CNeph(C)/cdt
Année de désignation _____

Numéro d'enregistrement professionel _____

Date du dernier renouvellement : _____

❑ Je suis membre de l'ACI

Demandeurs de l'Ontario seulement
Faites vous partie de l'AOIA?
❑ Oui ❑ Non

Statut professionnel

❑ Infirmière(ier) autorisée(sé)
❑ Infirmière(ier) auxilaire autorisée(sé) / infirmière(ier) auxilaire
❑ Technicienne / technicien
❑ Technologue
❑ Autre (spécifier) _____

Années d'éxperience en néphrologie _____

Domaine de responsabilité

❑ Soins directs ❑ Enseignement
❑ Administration ❑ Recherche
❑ Technologie ❑ Autre (spécifier)

Milieu de travail

❑ Soins actifs ❑ Services de santé indépendants
❑ Unité d'autosoins ❑ Secteur privé

Plus haut niveau d'instruction?

Infirmière(ier)	*Autres*
❑ Diplôme	❑ Diplôme
❑ Baccalauréat	❑ Baccalauréat
❑ Maîtrise	❑ Maîtrise
❑ Doctorat	❑ Doctorat

Je poursuis présentement des études:

Domaine Infirmière(ier)	*Autre domaine*
❑ Certificat	❑ Certificat
❑ Baccalauréat	❑ Baccalauréat
❑ Maîtrise	❑ Maîtrise
❑ Doctorat	❑ Doctorat

Secteur de pratique spécialisé

❑ Insuffisance rénale progressive (pré-dialyse)
❑ Transplantation
❑ Hémodialyse
❑ Péritonéale
❑ Pédiatrie
❑ Autre (spécifier) _____

Poster à **ACITN**
Adresse postale :

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