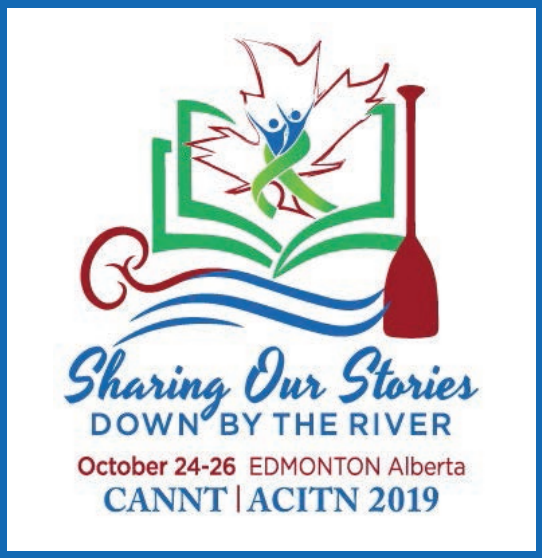
CANNT|ACITN
Canadian Association of Nephrology Nurses and Technologists
l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie

CANNT JOURNAL
JOURNAL ACITN

Volume 29, Issue 1 January–March 2019



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October 24-26 EDMONTON Alberta

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JANUARY–MARCH 2019 • VOLUME TWENTY-NINE • ISSUE ONE

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The CANNT Journal is printed on recycled paper.

The CANNT Journal is the official publication of the Canadian Association of Nephrology Nurses and Technologists, 4 Cataraqui St., Suite 310, Kingston, ON K7K 1Z7, telephone: (613) 507-6053, fax: 1-866-303-0626, email: cannt@cannt.ca. Published quarterly, the journal is received by all members of CANNT. Subscriptions are: Canada $80.00 (plus HST), US. $90.00, Outside N. America $115.00. Back issues, when available, are $7.50 (+HST) per issue and are available from the editors. Opinions expressed by writers in the CANNT Journal are not necessarily those held by the editors or CANNT. Contrasting views by our readership and membership are welcome. All letters, comments and articles are to be sent to the CANNT office, 4 Cataraqui St., Suite 310, Kingston, ON K7K 1Z7.

1-877-720-2819
Website: www.cannt.ca

The CANNT Journal accepts articles (manuscripts) on an ongoing basis.

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 2291-644X (Online)
ISSN 1498-5136 (Print)

The CANNT Journal is produced by Pappin Communications,
The Victoria Centre, 84 Isabella St., Unit 2, Pembroke, Ontario K8A 5S5

Editor-In-Chief
Jovina Bachynski, MN, RN(EC), CNeph(C)
T: (905) 845-2571 ext 6307
Email: cannt.journal1@gmail.com

Managing Editor
Heather Coughlin, Pembroke, Ontario

Layout and Design
Sherri Keller, Pembroke, Ontario

Advertising Sales
Heather Coughlin, Pappin Communications
84 Isabella St., Unit 2, Pembroke, ON K8A 5S5
T: (613) 735-0952; F: (613) 735-7983
Email: heather@pappin.com
Rate card: www.pappin.com

JOVINA BACHYNSKI

Letter from the Editor

The *CANNT Journal* welcomes you to its first edition of 2019. We look forward to another banner year for our readers. The CANNT association comes under the helm of another fearless leader, Janice MacKay, who, along with an excellent team of like-minded individuals in the Board of Directors, are in constant pursuit of ways and means of ensuring excellence in Canadian nephrology nursing and technological care, and, by extension, in nephrology writing. You, the readers, are the beneficiaries of this impassioned endeavour.

March 14, 2019, was designated as World Kidney Day. It is estimated that 850 million people worldwide suffer from kidney disease from various etiologies. This year's theme, *Kidney Health for Everyone Everywhere*, highlighted the disparity and inequity in kidney health worldwide. "This year, **World Kidney Day** sets out to raise awareness of the high and increasing burden of kidney diseases worldwide and the need for strategies for kidney disease prevention and management. Kidney Health for Everyone Everywhere calls for **universal health coverage (UHC) for prevention and early treatment of kidney disease**. The ultimate goal of a UHC policy is to promote population health by ensuring universal, sustainable and equitable access to essential healthcare of high quality, protecting people from health impoverishment and improving equity in health across socioeconomic groups" (ISN/IFKF, 2019). This is a reminder of the great privilege of being able to provide such care to our patients with kidney disease in Canada.

In this issue, we bring you two articles (Quinan et al.'s *Transhepatic central venous hemodialysis catheter insertion: A creative approach for managing challenging vascular accesses* and Simpson's *Development of a patient engagement learning module—A quality improvement initiative*) on divergent topics that highlight efforts to improve patient care and experience that are ubiquitous in our collective clinical practice. In our continuing education series, McLelland and Battistella discuss the implications of direct oral anticoagulant use, as an alternative to warfarin in the management of atrial fibrillation in hemodialysis.

I look forward to the abstracts and posters that have been submitted for consideration for CANNT 2019 ("Sharing our Stories Down by the River") in Edmonton on October 24–26. In a nod to this year's symposium theme, I encourage you to share your "stories" and submit manuscripts to the *CANNT Journal* that present new clinical information or address issues that resonate with the nephrology community at large. We at the *CANNT Journal* are always on a quest to present articles that could reaffirm or change practice in the pursuit of excellence in nephrology care.

Sincerely,
Jovina Bachynski, MN, RN(EC), CNeph(C)
Editor, *CANNT Journal*

REFERENCE

International Society of Nephrology ISN) & International Federation of Kidney Foundations (IFKF) (2019). *World Kidney Day – Kidneys & women's health – Include, value, empower.* Retrieved from https://www.worldkidneyday.org/2019-campaign/2019-wkd-theme/

JOVINA BACHYNSKI

Lettre de la rédactrice en chef

Bienvenue à cette première édition de 2019 de la *Revue de l'ACITN*, qui marque le début d'une autre brillante année pour nos lecteurs. L'ACITN a désormais une nouvelle capitaine à la barre, Janice MacKay. Elle et la formidable équipe d'administrateurs qui l'entoure recherchent constamment des moyens de garantir l'excellence des soins infirmiers et technologiques en néphrologie au Canada et, par extension, dans les publications en néphrologie. Vous, nos lecteurs, êtes les bénéficiaires de cette mission.

Le 14 mars 2019 a été désigné Journée mondiale du rein. À l'échelle mondiale, il y aurait 850 millions de personnes atteintes de néphropathie d'étiologies diverses. Le thème de cette année, La santé rénale accessible à tous partout dans le monde, met l'accent sur la disparité et l'iniquité en santé rénale. Cette année, la Journée mondiale du rein a pour but de sensibiliser les gens au fardeau lourd et croissant des néphropathies à travers le monde ainsi qu'à la nécessité de mettre en place des stratégies de prévention et de prise en charge des néphropathies. Le thème La santé rénale accessible à tous, partout dans le monde appelle à une assurance-maladie universelle pour la prévention de la néphropathie et son traitement précoce. L'objectif ultime d'une politique d'assurance-maladie universelle est de promouvoir la santé de tous au moyen d'un accès universel, équitable et durable à des soins de santé de qualité, pour ainsi éviter l'appauvrissement dû à la maladie et accroître l'équité en santé au sein de toutes les classes socioéconomiques (ISN/IFKF, 2019). Quel grand privilège que celui de pouvoir fournir de tels soins aux patients atteints de néphropathie au Canada!

Dans le présent numéro, vous trouverez ces deux articles : Transhepatic central venous hemodialysis catheter insertion: A creative approach for managing challenging vascular accesses, de Quinan et ses collaborateurs, et Development of a patient engagement learning module – A quality improvement initiative, de Simpson. Ils présentent deux enjeux prévalents dans notre pratique clinique collective et relatent le travail fait pour améliorer les soins au patient et son expérience. Dans notre série sur la formation continue, McLelland et Battistella traitent des effets d'un traitement par un anticoagulant oral plutôt que par la warfarine pour la prise en charge de la fibrillation auriculaire en contexte d'hémodialyse.

J'ai hâte de voir les affiches et les résumés soumis pour l'édition 2019 de notre congrès, sous le thème Sharing our Stories Down by the River, lequel se tiendra du 24 au 26 octobre, à Edmonton. En clin d'œil à ce thème, je vous invite à partager vos « histoires » en soumettant à la *Revue de l'ACITN* des articles traitant de nouvelles données cliniques ou abordant des questions pertinentes pour la communauté en néphrologie en général. Nous sommes toujours à la recherche de publications qui sauront raffermir ou faire évoluer les pratiques en néphrologie, toujours dans l'optique d'atteindre l'excellence.

Cordialement,
Jovina Bachynski, MN, RN(EC), CNeph(C)
Rédactrice en chef,
Revue de l'ACITN

RÉFÉRENCE

International Society of Nephrology (ISN) et International Federation of Kidney Foundations (IFKF) (2019). *World Kidney Day – Kidney Health for Everyone Everywhere*. Extrait de https://www.worldkidneyday.org/2019-campaign/2019-wkd-theme/

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Les publications antérieures, lorsque disponibles, coûtent 7,50 $ (+TVH) chacune. Les opinions émises par les auteurs dans ce journal ne sont pas nécessairement partagées par l'Association ni par le corédactrices en chef. Nous invitons les lecteurs à nous faire part de leurs opinions. Toute correspondance devra être envoyée à l'ACITN, 4 Cataraqui St., Suite 310, Kingston, ON K7K 1Z7.

1-877-720-2819; Site web : www.cannt.ca

Le Journal ACITN accepte des articles (manuscrits) de façon continue.

Le journal ACITN 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 2291-644X (En ligne)
ISSN 1498-5136 (Dans la presse)

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Pappin Communications
The Victoria Centre, 84 rue Isabella, suite 2,
Pembroke, Ontario K8A 5S5.

Rédactrice en chef
Jovina Bachynski, MN, RN(EC), CNeph(C)
T: (905) 845-2571 ext 6307
Courriel : cannt.journal1@gmail.com

Éditeur
Heather Coughlin, Pembroke, Ontario

Conception et design
Sherri Keller, Pembroke, Ontario

Publicité
Heather Coughlin, Pappin Communications
84 Isabella St., Unit 2, Pembroke, ON K8A 5S5
T: (613) 735-0952; F: (613) 735-7983
Courriel : heather@pappin.com
Publicité : www.pappin.com

JANICE MACKAY

President's Message

I am very proud to be writing my first President's Message for the first quarterly issue of the *CANNT Journal* in 2019. I sincerely hope that you are all surviving our Canadian winter weather. It has been an exceptionally cold January/February, and I am holding out hope that the groundhog will let us have an early spring!

I would first like to thank our now Past President, Heather Dean. Heather did an incredible job continuing the growth of CANNT. I am confident that I can speak for the entire CANNT Board of Directors in saying that her dedication to the association membership and its mission statement is truly appreciated. I am eagerly looking forward to continuing to build upon this work. To recap, we introduced our new website, and gave our newsletter and logo an upgrade. Let us keep the momentum going into 2019 and beyond.

CANNT has a very energetic and determined Board of Directors. We met in October 2018 for our annual face-to-face strategic planning meeting over the two days leading up to the annual conference in Quebec City. It was invaluable to have this opportunity to put our collective thoughts together and come up with some great ideas! We reviewed and discussed our mission, vision, and values, and our communication plan and membership enhancement ideas, and discussed the timeline for review of our current standards. One of the best things about our Board representatives meeting together is that we are able to share some thoughtful ideas and embrace a variety of opinions that help to mold the best plan for success of our association. We encourage our membership to communicate with their Board members. We are here to serve the association, and we value your ideas and opinions.

I really encourage all members to get involved in 2019! No matter if you are brand new to nephrology or have decades of professional experience, anyone and everyone can benefit from being a member of CANNT. We know nurses and technologists are well positioned to influence and advance the care and practice of people living with kidney disease. CANNT believes that nurses and technologists, with their specialized knowledge base and skillset in nephrology nursing and technological care, can make a difference through leadership and advocacy for kidney health in Canada. Your CANNT association is hopeful that you will broaden your nursing journey as a member of CANNT.

World Kidney Day (March 14, 2019) is a global awareness campaign aimed at raising awareness of the importance of our kidneys. I do hope that all of our nephrology professionals had an opportunity to express their unique approach to raising awareness in their respective areas of practice. It is uplifting to have an engaged membership that interacts regularly with us. Through ongoing member communication, you have relayed thoughts on how to improve, what to keep doing, and questions on why we do things the way we do.

Your Board of Directors and our Events and Management team look forward to sustaining a strong network for nephrology professionals along with you.

CANADIAN NURSES ASSOCIATION (CNA) REPORT

- It is important that our specialty is recognized, and I do want to take this opportunity to let you know that we continue to be a member in good standing of the CNA – Canadian Network of Nursing Specialties. There are 3,846 nurses across all specialties who are due to renew their certification in 2019.
- Specialty association membership discount! Nurses who are members of CANNT SAVE 20% on their initial or renewal application fees. Contact CANNT to obtain a discount voucher.

- *Canadian Nurse* is inviting submissions in both new and existing article categories. With the launch of CNA's all-digital format in early 2019, they plan to feature more articles on patient outcomes, workplace improvements, and other topics in practice, education, policy, research, and administration. Content will include stories about successes and challenges in the workplace, in-depth analyses, opinion pieces, profiles, research summaries, advice from experts, and insights into all aspects of the profession. Since *Canadian Nurse* is a magazine with a broad-based readership (not an academic journal), submissions written by a single author that have a distinct point of view work best.

- **New specialty exams in 2019** – In November, CNA will offer an exam in gerontological nursing to licensed/registered practical nurses and an exam in pediatric nursing to registered nurses. This is a broad step forward for CNA to explore specialty certification to licensed/registered practical nurses. See more at **https://www.cna-aiic.ca/en/certification**

With enthusiasm and respectfully submitted,
Janice MacKay
CANNT President 2018–2020

CANNT REPRESENTATIVES/ CONTACTS; REPRÉSENTANTS/ CONTACTS ACITN

CNA Liaison/Liaison pour AIIC:
Janice MacKay, RN, CNeph(C), CCRP
T: 402-210-7439
mackaj@ucalgary.ca

Kidney Foundation of Canada, MAC Representative/Fondation du rein—Comité de médical consultatif:
Janice MacKay, RN, CNeph(C), CCRP
T: 402-210-7439
mackaj@ucalgary.ca

Bursary Committee/ Comité des Bourses:
Janice MacKay, RN, CNeph(C), CCRP
T: 402-210-7439
mackaj@ucalgary.ca

CANNT Administrative Office/ Bureau National de l'ACITN:
4 Cataraqui St., Suite 310
Kingston, ON K7K 1Z7
Phone: 613-507-6053
Same Toll Free: 1-877-720-2819
Fax: 1-866-303-0626
General email: cannt@cannt.ca

2019 Conference: October 24–26, 2019 Edmonton, AB
cannt@cannt.ca

Journal advertising contact/Personne contact pour la publicité du Journal:
Heather Coughlin
Pappin Communications,
84 Isabella Street, Pembroke, ON K8A 5S5
T: 613-735-0952; F: 613-735-7983
heather@pappin.com
Rate card: www.pappin.com

JANICE MACKAY

Message de la présidente

C'est avec fierté que je vous écris mon premier Mot de la présidente dans le cadre du premier numéro trimestriel de 2019 de la *Revue de l'ACITN*. J'espère que vous survivez bien à notre hiver canadien. Janvier et février ont été exceptionnellement froids, mais j'ose espérer que la marmotte nous annoncera un printemps précoce.

J'aimerais tout d'abord remercier notre présidente sortante, Heather Dean. Elle a fait un travail formidable pour alimenter la croissance de l'ACITN. Je me permets sans hésiter de vous dire, au nom du conseil d'administration, que le dévouement de Heather à l'association et à sa mission est grandement apprécié. Je suis ravie de poursuivre les efforts dans cette voie. Cela dit, quoi de neuf? Nous avons depuis peu un nouveau site Web, et notre logo et notre infolettre se sont refait une beauté. Nous comptons bien continuer sur cette lancée en 2019!

L'ACITN peut compter sur des administrateurs dynamiques et déterminés. Notre réunion de planification stratégique annuelle a eu lieu en octobre 2018, en personne, juste avant notre congrès tenu à Québec. Ç'a été une superbe occasion de rassembler et de brasser nos idées : nous avons discuté de notre mission, de notre vision et de nos valeurs, de notre plan de communication, de nos idées pour bonifier l'adhésion, et enfin, d'un échéancier pour la révision de nos normes actuelles. Cette réunion annuelle des administrateurs a de spécial qu'elle permet de partager un tas de bonnes idées et d'opinions diversifiées qui façonnent collectivement notre plan de réussite. Nous invitons par ailleurs nos membres à rester en contact avec leurs administrateurs – nous sommes là pour vous servir, et vos idées nous importent.

J'encourage chaleureusement tous les membres à s'impliquer en 2019! Que vous soyez novice ou très expérimenté dans le domaine de la néphrologie, l'adhésion à l'ACITN est faite pour vous. Nous savons que le personnel infirmier et technologue est apte à influencer positivement les soins aux patients atteints de néphropathie. Grâce à ses connaissances et à son savoir-faire, le personnel infirmier et technologue peut jouer un rôle de meneur et de défenseur des intérêts des patients en santé rénale au Canada. Nous souhaitons que vous poursuiviez l'élargissement de vos horizons professionnels avec l'ACITN.

Le 14 mars 2019 sera la Journée mondiale du rein, une campagne de sensibilisation à l'importance de la santé rénale. J'espère que tous les professionnels en néphrologie auront l'occasion de faire valoir leur approche de sensibilisation dans leur domaine de pratique. Quel encouragement de voir nos membres interagir régulièrement avec nous! Grâce à vos communications assidues, vous nous avez transmis vos interrogations et vos commentaires sur nos points forts et nos points à améliorer.

C'est avec ferveur que les administrateurs (avec notre partenaire Events and Management) continueront, à vos côtés, de nourrir un solide réseau de professionnels en néphrologie.

RAPPORT DE L'ASSOCIATION DES INFIRMIÈRES ET INFIRMIERS DU CANADA (AIIC)

- Il importe que notre domaine de spécialité rayonne! En ce sens, notre association demeure membre en règle du Réseau canadien des spécialités en soins infirmiers. Cette année, 3846 infirmières et infirmiers, toutes spécialités confondues, doivent renouveler leur certification.
- Profitez de la promo! Les membres de l'ACITN obtiennent 20 % de réduction sur les frais d'admission ou de renouvellement. Communiquez avec l'ACITN pour recevoir votre coupon promotionnel.
- La revue *Infirmière canadienne* lance un appel de propositions pour toutes les catégories d'articles (existantes et inédites). Avec le lancement d'une version entièrement électronique de la revue en 2019, l'AIIC prévoit publier plus d'articles sur les résultats thérapeutiques, sur l'amélioration des milieux de travail ainsi que sur des thèmes concernant la pratique, l'éducation, les politiques, la recherche et l'administration. Vous pourrez lire des histoires de réussites et de défis, des analyses approfondies, des articles d'opinion, des profils, des résumés de recherche, des conseils d'experts; en bref, la revue jettera un regard sur l'ensemble des facettes de la profession. La revue *Infirmière canadienne* étant destinée à un large lectorat (par opposition à une revue spécialisée), les articles écrits par un seul auteur et comportant un point de vue bien distinct sont privilégiés.
- **Nouveaux examens de spécialités en 2019 –** En novembre, l'AIIC fera passer un examen en soins infirmiers gériatriques à l'intention des infirmières et infirmiers auxiliaires autorisés, ainsi qu'un examen en soins pédiatriques à l'intention des infirmières et infirmiers autorisés. L'AIIC fait ainsi un grand pas en matière de certification de spécialité pour les infirmières et infirmiers auxiliaires autorisés. Pour en savoir plus, consultez le **https://www.cna-aiic.ca/fr/certification**

Avec dévouement et enthousiasme,
Janice MacKay,
présidente de l'ACITN 2018-2020

NOTICE BOARD

- Canadian Nurses Association (CNA) Exam Timeline.
  https://www.nurseone.ca/certification/renewing-your-certification#sthash.IDBqg5i7.dpuf

	Spring 2019	Fall 2019
Initial exam or renewal by exam application window	**Jan. 10–March 31, 2019**	**June 3–Sept. 12, 2019**
Certification exam window	**May 1–15, 2019**	**Nov. 1–15, 2019**
Renewal by continuous learning application window *Apply by June 1 to save 10% on your renewal fee*	**Jan. 10–Nov. 1, 2019**	

N.B. CNA will provide 20% discount for initial certification, re-certification, and re-write examination fees in 2019 to active members of CANNT. For more information, contact the CANNT National Office at cannt@cannt.ca

- **April 14–17, 2019.** American Nephrology Nurses' Association (ANNA) National Symposium, Hilton Anatole, Dallas, TX. **www.annanurse.org**
- **June 1, 2019.** Canadian Nurses Association (CNA) Annual General Meeting, Vancouver, BC. **www.cna-aiic.ca**
- **June 13–16, 2019.** 56th European Renal Association – European Dialysis and Transplant Association (ERA-EDTA) Congress, Budapest, Hungary. **www.era-edta.org**
- **September 14–17, 2019.** 48th Annual European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA) International Conference: *New Pathways I the Renal Setting – Caring Together by Integrating Modern Technology Based on Knowledge and Education*, Prague, Czech Republic. **www.edtna-erca.com**
- **September 18, 2019.** Nephrology Health Care Professionals' Day (celebrated every third Wednesday of September annually)
- **October 24–26, 2019.** Canadian Association Nephrology Nurses and Technologists (CANNT) 51st National Symposium 2019: *Sharing our Stories Down by the River*, River Cree Resort and Casino, Edmonton, AB. **www.cannt.ca**
- **November 5–10, 2019.** The American Society of Nephrology (ASN) 2019 Kidney Week, Walter E. Washington Convention Center, Washington, DC. **www.asn-online.org**
- **May 2–5, 2020.** ISPD-EuroPD Joint Congress, Scottish Event Campus (SEC), Glasgow, Scotland. **www.ispd-europd2020.com**

CANADIAN NURSES ASSOCIATION

Nephrology Certification Registration Status Report 2018

Initial and Renewal by Exam to Renew in 2018	Renewal by Continuous Learning (CL) Hours	Total of Initials and Renewals	Due
51	124	175	256

CANNT Awards

There are several awards and grants that CANNT members can apply for yearly. Members can also nominate a fellow CANNT member for their outstanding work in nephrology.

For more information on eligibility and forms for award applications, see **http://www.cannt.ca** under ***Resources - Awards, Bursaries & Grants***.

IMPORTANT: Members may apply for more than one bursary per year but will only be able to be the recipient of one award per year.

Deadline to apply: May 1, 2019 or June 30, 2019 (varies for different awards).

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Transhepatic central venous hemodialysis catheter insertion: A creative approach for managing challenging vascular accesses

By Patty Quinan, Abdurrahman Eddeb, and Harold Borenstein

ABSTRACT

Establishing and maintaining functional vascular access (VA) for patients on hemodialysis can be challenging. Alternative options must be considered when conventional options are not possible or preservation of a single remaining venous access site to achieve permanent VA is required (Lorenz et al., 2010; Rajan, Croteau, Sturza, Harvill, & Mehall, 1998; Smith, Ryan, & Reddan, 2004). This case report describes a 55-year-old male with multiple failed vascular access procedures, bilateral occlusion of internal and external jugular, subclavian, and innominate veins, and frequent episodes of catheter-related bacteremia (CRB) resulting in hospitalization. A unique plan of care involved the use of a bridging transhepatic catheter pending the insertion of a definitive arteriovenous (AV) graft. The success of this intervention was dependent on collaboration between nephrology, interventional radiology, and vascular surgery team members.

Key words: transhepatic, vascular access, central venous catheter, arteriovenous

INTRODUCTION

Conventional vascular access (VA) options for patients requiring hemodialysis include arteriovenous (AV) fistula, AV graft and central venous catheter (CVC) (i.e., dual-lumen hemodialysis catheter). Long-term use of CVC is associated with high morbidity and hospitalization rates, increased treatment costs, and poor survival (Lok & Mokrzycki, 2011; Maki, Kluger, & Crnich, 2006; Mermel et al., 2009). As such, CVC use is indicated as a bridge to AV access creation, peritoneal dialysis, or renal transplantation within six months. Further, it should be restricted to patients requiring acute or emergency dialysis, and to patients who are otherwise deemed medically or surgically unsuitable for AV access creation (Battistella, Bhola, & Lok, 2011; Jindal et al., 2006; NKF-KDOQI, 2006; Quinan et al., 2011).

AUTHOR NOTE

Patty Quinan, MN, RN, CNeph(C), Clinical Nurse Specialist, Vascular Access Coordinator; Abdurrahman Eddeb, MD, FRCPC, Interventional Radiologist; Harold Borenstein, MD, FRCPC, Nephrologist, Humber River Hospital, Toronto, ON

Address for correspondence: Patty Quinan, Humber River Hospital, 1235 Wilson Avenue, Toronto, ON M3M 0B2.

Phone: (416) 242-1000 ext 22150; email: ***pquinan@hrh.ca***

Functional VA is essential to patient survival. However, establishing and maintaining functional vascular access for some patients can be challenging and often requires non-conventional and creative approaches (Lorenz et al., 2010). In patients with chronic central vein occlusion who are not candidates for conventional approaches, alternative hemodialysis (HD) access sites include recanalization of occluded neck and chest veins, and femoral veins, catheterization of enlarged collateral vessels, translumbar puncture of the inferior vena cava (IVC), and transhepatic catheter placement (Biswal, Nosher, Siegel, & Bodner, 2003; Kinney, 2003; Lund, Trerotola, & Scheel, 1995; Rajan et al., 1998; Weeks, 2002). Lorenz et al. (2010) suggest that occlusion of the infrarenal IVC may result in technical failure of the translumbar approach and further limit options to transhepatic or direct right atrial catheterization. The following case report describes a unique approach to the management of a challenging vascular access.

CASE REPORT

Mr. E. is a 55-year-old male who started on conventional in-centre hemodialysis in 2006 with a right internal jugular catheter. Past medical history includes hypertension, diabetes, hyperlypidemia, myocardial infarction, chronic cerebral vascular disease, and dementia. In addition, the patient had severe and frequent infectious complications including methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia, extended-spectrum beta-lactamase (ESBL) urinary tract infection, *Staphylococcus aureus* diskitis at L4-S1, and osteomyelitis.

Vascular access history includes failed left and right arm AV fistulas and AV grafts, and bilateral central vein occlusion (Figure 1). The patient previously had five femoral dialysis catheter-related bacteremias (CRB) within a three-month interval, resulting in catheter exchanges, removals, and line holidays (i.e., line removal and reinsertion after 24–48 hours), and was subsequently being dialyzed with a right tunneled femoral CVC.

After multiple failed VA procedures, a plan to establish alternative, non-conventional vascular access options became necessary for the patient's survival. Peritoneal dialysis was considered; however, due to his history of numerous catheter procedures and episodes of dialysis CRB, he was deemed unsuitable (Figure 1).

An episode of CRB and pulmonary emboli (confirmed by Computer Tomography [CT] scan) led to hospitalization. Treatment included systemic anticoagulation and treatment for CRB from a right tunneled femoral

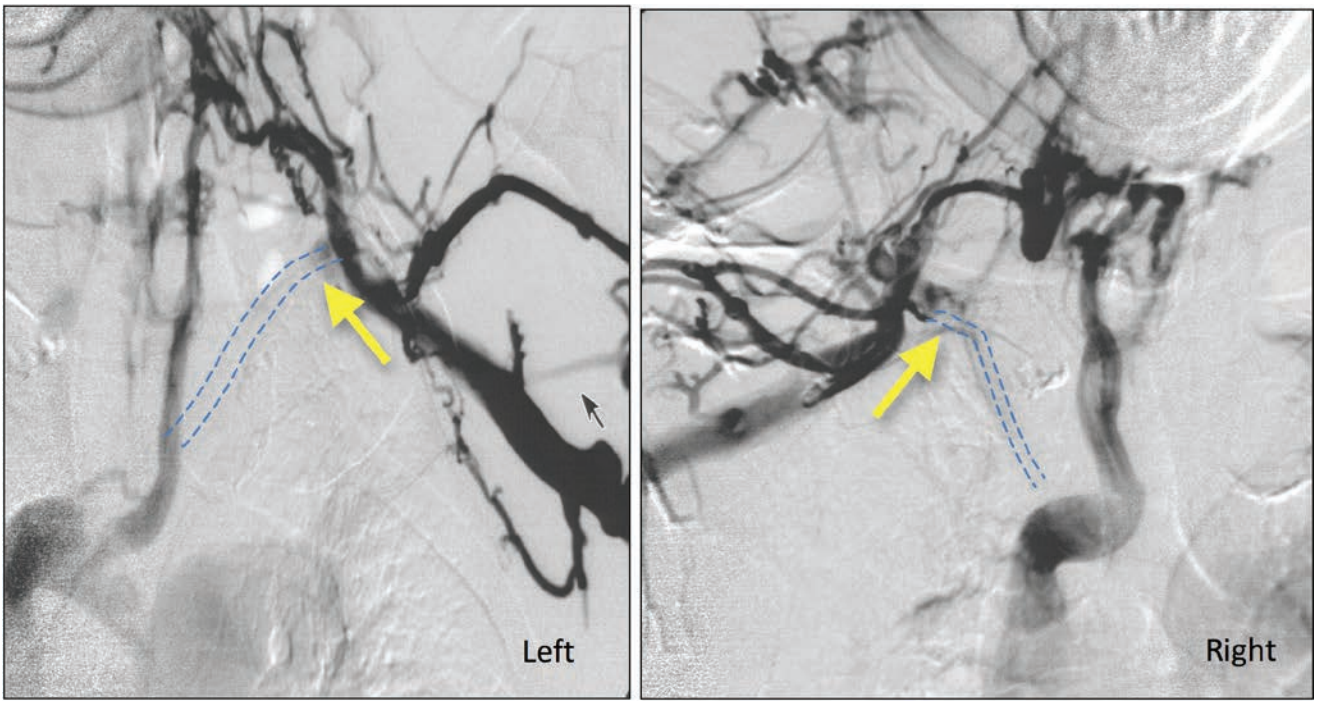

Figure 1. Superior vena cavogram shows chronic occlusion of the left and right innominate veins.

dialysis catheter with broad antibiotic coverage against *Pseudomonas aeruginosa* growth in blood cultures. Due to the complexity of the patient's case, the vascular access coordinator (VAC) presented the case at monthly dialysis access rounds to the vascular surgeons, interventional radiologists, and nephrologists for review. Discussions included establishing a short-term alternative central venous VA, removing the tunneled femoral CVC, and placing a polytetrafluroethylene (PTFE) synthetic graft in the left upper thigh as the definitive VA. The rationale for removing the right femoral catheter prior to placement of the leg graft was to optimize graft function and longevity, and reduce the risk of infection. Since conventional central venous access was not an option, non-conventional short-term options such as translumbar and transhepatic CVC procedures were discussed.

The vascular surgeon reviewed bilateral duplex ultrasounds of leg arteries and veins, and deemed that the patient was suitable for placement of an AV leg graft. The plan was to perform surgery once blood cultures were negative; however, episodes of CRB persisted. Pre-operative instructions from the vascular surgeon prior to placement of an AV leg graft included daily Chlorhexidine scrubs to both groins to minimize the risks of post-operative infection.

The interventional radiologist considered both translumbar and transhepatic catheter options, and decided to proceed with a transhepatic catheter procedure. A translumbar approach was avoided due to the possibility of thrombosis of the inferior vena cava (IVC) in the setting of a plan for placement of an AV leg graft. Therefore, the interventional radiologist planned to insert a transhepatic CVC and remove the infected tunneled femoral CVC.

ANGIOGRAPHIC PROCEDURAL DETAILS: TRANSHEPATIC CVC INSERTION AND REMOVAL OF TUNNELED FEMORAL CVC

The patient's pre-existing right femoral CVC was successfully removed over a guidewire and replaced by a vascular sheath into the proximal portion of the IVC. The diagnostic catheter was then advanced into the right hepatic vein, and a venogram was carried out.

A 22-gauge Chiba needle was advanced into the liver parenchyma from a right-sided intercostal approach into the peripheral portion of the opacified right hepatic vein (Figure 2). A 0.18 guidewire was then advanced through

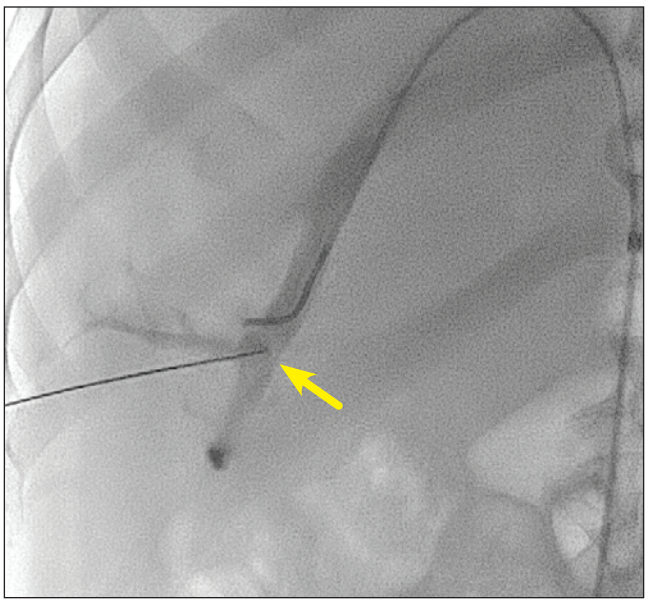

Figure 2. Needle advanced into the right hepatic vein via a right-sided intercostal approach

the needle and eventually into the right atrium (Figure 3). The tract within the liver parenchyma was dilated using a 14-French peel-away sheath. Eventually, a 24-cm (Cardiomed®) CVC was tunnelled through the skin on the right side and advanced through the sheath where its tip was placed into the right atrium (Figure 4).

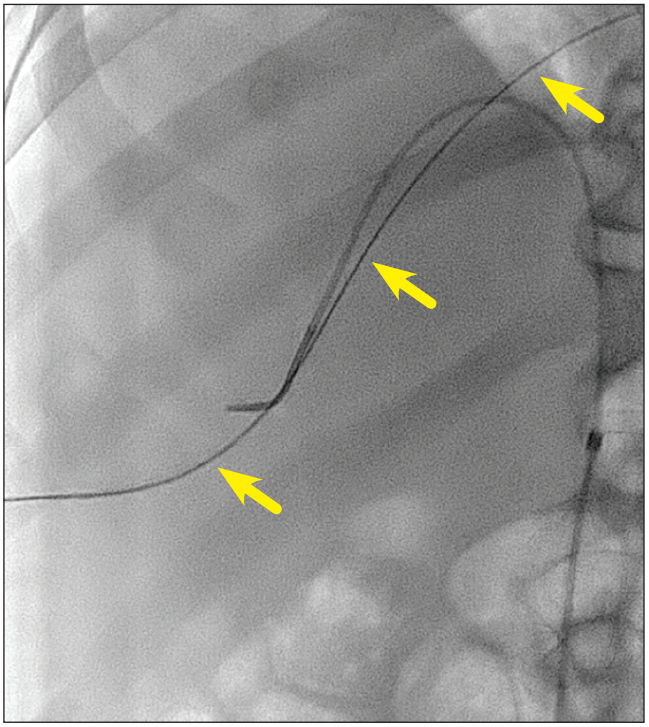

Figure 3. Guidewire is advanced through the needle.

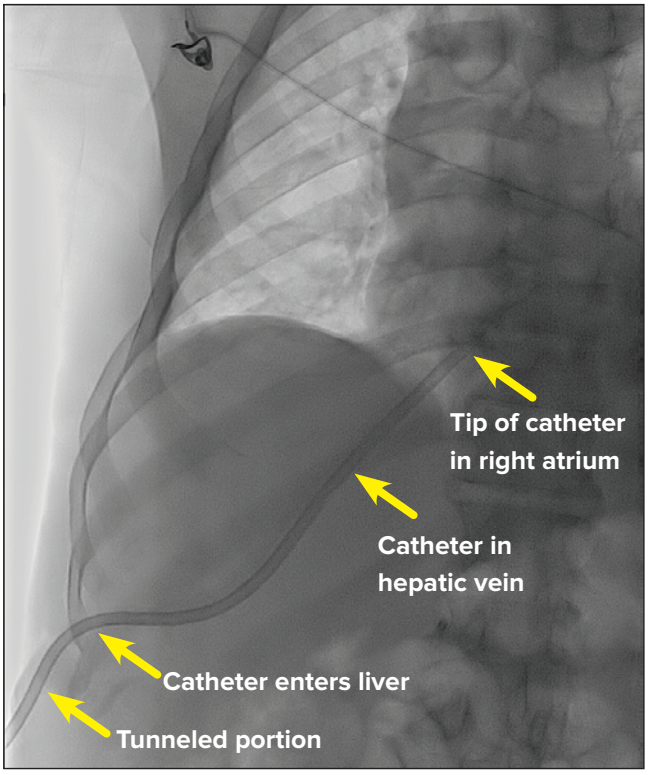

Figure 4. A 24-cm CVC is tunneled and advanced with tip in right atrium.

After the skin tunnel was created and the HD catheter was sutured in place, satisfactory flow was demonstrated through both ports of the right tunneled transhepatic CVC. The vascular sheath and catheter from the right femoral vein was removed without complications.

NURSING IMPLICATIONS FOR CARE OF TRANSHEPATIC CVC

Mr. E. remained in hospital throughout the entire time that the transhepatic catheter was in place. The nursing staff on the in-patient unit, the transportation staff, and the nurses in dialysis were instructed to exercise extreme caution when providing direct patient care and during patient transfers to avoid tugging or pulling on the HD catheter. Nurses were instructed to monitor the catheter site frequently for bleeding or catheter dislodgement, and to ensure that the dressing material remained intact. The transhepatic dialysis catheter was secured in place with a transparent dressing material and changed at least every seven days, in accordance with the Centres for Disease Control and Prevention (CDC) (2011) guidelines (O'Grady et al., 2011). An order was obtained from the nephrologist not to remove the exit site sutures while the catheter was in situ in an effort to reduce the likelihood of migration or accidental dislodgement of the catheter, bleeding, and access loss. It is noteworthy that Mr. E. experienced only one episode of CRB while the transhepatic catheter was in place.

SURGICAL PLACEMENT OF LEFT ARTERIOVENOUS LEG GRAFT

One-week post-transhepatic catheter insertion, Mr. E. was scheduled for vascular surgery for placement of a left AV thigh polytetraflouroethylene (PTFE) graft. However, two days before surgery, the patient developed rigors while on HD, and IV antibiotics were administered. After discussion with the vascular surgeon and the nephrologist, the decision was made to proceed with surgery. Blood cultures grew *E. coli*, and the patient was treated with ceftazidime, ertapenem, and cefazolin intravenously, and oral ciprofloxacin.

Placement of the left AV thigh graft occurred five days after insertion of the right transhepatic CVC. The surgical procedure was tolerated well, and a strong bruit was noted throughout the leg graft during the immediate post-operative period. On assessment, the bruit and thrill were strong, and three weeks post-operatively, the AV graft was deemed ready for cannulation. A duplex ultrasound confirmed an access flow volume of 1,000 mL/min with no evidence of stenosis. A plan was made to remove the transhepatic catheter once cannulation was successful for three consecutive dialysis treatments.

Twenty-five days after placement of the left leg AV graft, cannulation was initiated using two 16-gauge needles. At a blood flow rate of 300 mL/min, the venous and arterial pressure readings of 150 mmHg and –150 mmHg were recorded, respectively. Hemostasis after needle removal was achieved after 10 minutes for each site. After discussions with the nephrologist, vascular surgeon, and interventional radiologist, the transhepatic catheter was removed without incident 38 days post AV graft insertion. The transhepatic catheter was in situ for a total of 43 days (6 weeks).

ANGIOGRAPHIC PROCEDURE: REMOVAL OF TRANSHEPATIC CVC AND EMBOLIZATION OF THE LIVER PARENCHYMA TRACT

Under sterile conditions and fluoroscopic control, the patient's pre-existing right transhepatic catheter was withdrawn over a guidewire (Figure 5). The extrahepatic venous location of the tip of the catheter was confirmed with contrast injection (Figure 6). The transhepatic catheter was then removed without complications. The tract within the liver parenchyma was then embolized using a 12 mm Amplatzer Vascular Plug II (Figure 7). The Amplatzer plug was successfully deployed in the tract. Mild oozing from the site disappeared following the deployment of the plug (Figure 8).

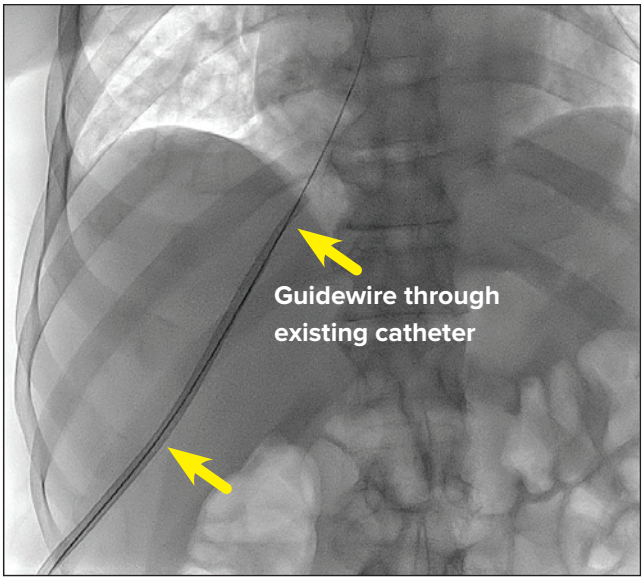

Figure 5. Withdrawal of pre-existing right transhepatic CVC over a guidewire

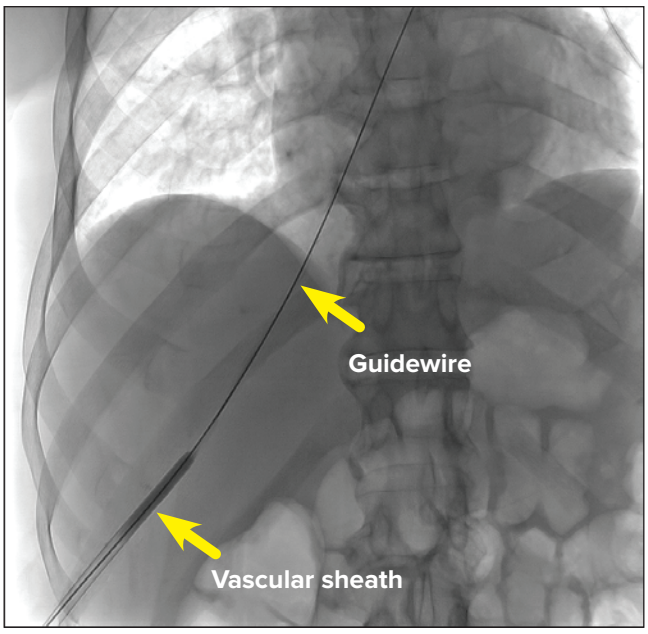

Figure 6. Confirmation of catheter tip extrahepatic venous location with contrast

DISCUSSION

Interventional radiologists, in collaboration with the nephrology team (nephrologists, VAC, and nurses), and vascular surgeons play an integral role in achieving and maintaining functional vascular accesses for all patients on hemodialysis. However, establishing VA for some patients presents a significant challenge and may require non-traditional approaches (Lorenz et al., 2010; Rajan et al., 1998; Weeks, 2002).

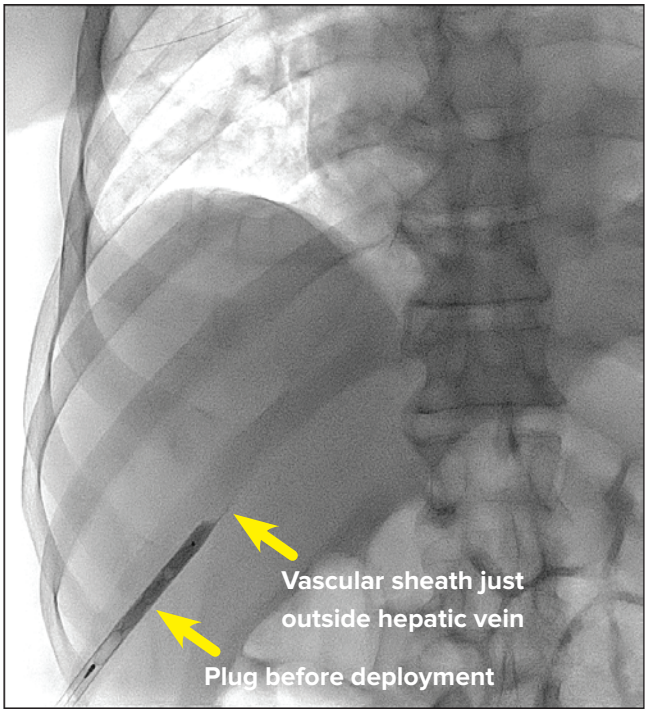

Figure 7. Embolization of liver parenchyma tract with Amplatzer plug

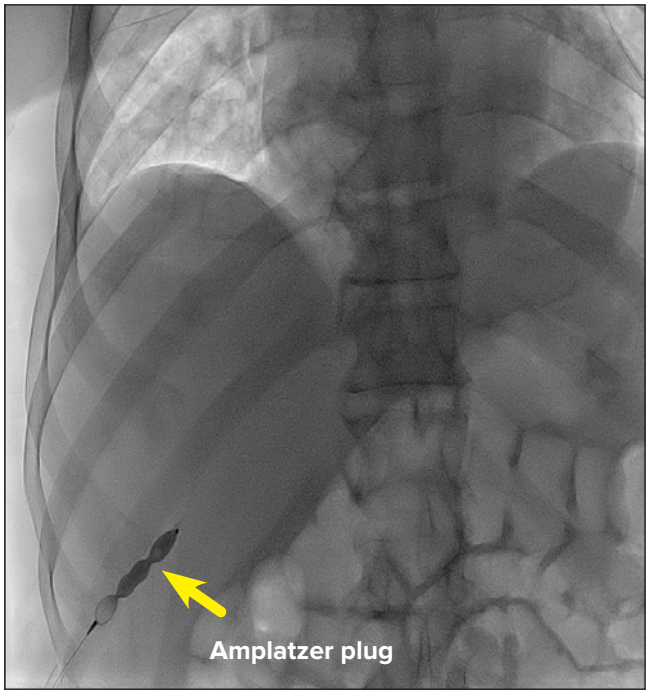

Figure 8. Final deployment of Amplatzer plug

The first report of successful placement of a transhepatic HD catheter was a case report by Po, Koolpe, Allen, Alvez, & Raja (1994), who concluded that the transhepatic route was sufficient for adequate dialysis. Further studies report that transhepatic HD catheters are considered a safe and viable option for patients with limited options; however, they suggest that there are maintenance issues and complications (Ghasemi Esfe et al., 2010; Lorenz et al., 2010; Sanal et al., 2016; Smith et al., 2004; Younes et al., 2011). Ghasemi Esfe et al. (2010) reported a complication rate of 29%, which is significantly higher than jugular access. Complications include: bleeding; biliary tract communication; infection; hepatic dysfunction; migration into the subcutaneous soft tissue, retroperitoneum, or iliac veins; dislodgement; and thrombosis (Kim & Lund, 2002; Rajan et al., 1998; Sanal et al., 2016; Smith et al., 2004; Stavropoulos et al., 2003; Younes et al., 2011). Despite the substantial risks associated with transhepatic catheters, Smith et al. (2004) and Wacker, Lipuma, and Blum (2005) reported patency rates greater than 120 days in more than 50% of patients, and more recently, Sanal et al., (2016) reported patency rates of 50% at 136 days. Transhepatic catheters are considered a feasible option in patients who have exhausted conventional VA approaches and should be used as a last access (Lorenz et al., 2010; Smith et al., 2004; Stavropoulos et al., 2003; Waker, Lipuma & Blum, 2005; Sanal et al., 2016).

CONCLUSION

Transhepatic catheter placement is demonstrated as a bridge to establishing a functional AV access. In this case report, the transhepatic CVC was in place for a total of 38 days with only one episode of catheter occlusion requiring instillation of alteplase (Cathflo®) for restoration of catheter patency. It should be noted that due to sluggish flow from the arterial (red) catheter lumen, the catheter was connected in the reverse position with each dialysis, even immediately after the catheter was inserted. The urea reduction ratio remained consistently above 70%, and pre-dialysis serum potassium levels remained below 5.6 mmol/L. Successful cannulation of the left AV leg graft was achieved 25 days post-operatively and was maintained, thus allowing for the removal of the transhepatic catheter.

Our single patient experience with a transhepatic catheter as a bridge therapy proved to be highly successful, and may be considered for patients who have exhausted conventional vascular access options. Transhepatic catheter placement by the interventional radiologists will be considered at our centre in the future as an option in the management of patients who have exhausted conventional vascular accesses. Younes et al. (2011) and Sanal et al. (2016) evaluated functional outcomes of 22 and 34 catheters, respectively, and concluded that transhepatic catheters provide alternative short-term and long-term access for patients who are dependent on chronic HD and have inaccessible central venous routes. Furthermore, the authors suggest that with effective use of imaging modalities, transhepatic venous catheterization has high technical success and low rates of morbidity and complication rates in experienced hands. Generalizability of this approach to VA may be limited to centres with advanced expertise in interventional radiology and remains to be determined. Further studies would be required to determine its feasibility for longer-term VA in patients on chronic HD.

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Development of a patient engagement learning module—A quality improvement initiative

By Cheryl J. Simpson

ABSTRACT

Nurses and other healthcare clinicians can apply patient engagement into their clinical practice to improve the care they provide to their patients. The purpose of this article is to discuss a quality improvement initiative aimed to increase the knowledge and awareness of patient engagement among clinicians who work with patients who have chronic kidney disease. A quantitative pretest posttest approach was used in the project. Nine clinicians participated in the project, and the results showed that clinicians' knowledge and awareness about patient engagement increased from a mean pretest score of 5.22 to a mean posttest score of 6.22, ($p = 0.08617$). The outcome of the project was the development of a Microsoft® PowerPoint presentation and an e-learning module for clinicians to learn about and apply the principles of patient engagement to their clinical practice.

BACKGROUND

Chronic kidney disease (CKD) is a global health problem and affects all age groups (Arora et al., 2013; National Institute of Diabetes and Digestive and Kidney Diseases [NIDDKD], n.d.). In Ontario, it is estimated that about 12,000 people require predialysis care and about 10,500 people require dialysis (Ontario Renal Network [ORN], n.d.). It is also estimated within Ontario that about 25% of new patients with CKD proceed directly to dialysis treatment without prior care (ORN, n.d.). It has, therefore, become imperative for healthcare organizations to contribute to decreasing the effects that CKD has on society and the healthcare system.

Healthcare practitioners are expected to work with patients who have CKD regarding healthcare choices and options that are patient-centred and take into consideration the patients' psychosocial context (Barnes, Hancock, & Dainton, 2013; Novak, Costantini, Schneider, & Beanlands, 2013). The movement towards healthcare professionals collaborating with patients enabled the opportunity for the concept of patient engagement to be applied and integrated within a healthcare setting (Carman et al., 2013; Novak et al., 2013). The concept of patient engagement builds upon the self-management theory (SMT) used in kidney disease management (Carman et al., 2013; Novak et al., 2013). Patient engagement has allowed for a bi-directional flow and shared responsibility with decision-making between the healthcare professional(s) and patient(s), and has also enabled patients to become active participants with their medical and healthcare needs (Carman et al., 2013).

Patient engagement has been defined as a means for healthcare professionals to actively engage, partner, and collaborate with patients and their families to understand their needs, experiences, and preferences, and then engage in processes of shared decision-making to ensure care plans reflect the patient's needs and circumstances (Health Quality Ontario, 2017). Patient engagement has become a health strategy to improve health outcomes for chronic illnesses in Ontario Canada (Cancer Care Ontario [CCO], 2015; Health Quality Ontario, 2017; ORN, n.d.; Verma et al., 2013). To facilitate uptake of patient engagement practices within in a clinical practice setting, quality improvement initiatives should focus their efforts towards healthcare professionals (Carman et al., 2013; Health Quality Ontario, 2017; Molnar, Barua, Konvalinka, & Schick-Makaroff, 2017; Novak et al., 2013; Thomas, Gallagher, & Jain, 2014). Clinicians may not be familiar with the term and meaning of patient engagement and, therefore, teaching and educational initiatives can be used as a strategy to help clinicians apply patient engagement practices when they work with patients who have CKD (Carman et al., 2013; Molnar, et al., 2017; Novak et al., 2013; Thomas et al., 2014).

PURPOSE

The purpose of this paper is to provide an overview of a quality improvement project that aimed to increase the knowledge and awareness about patient engagement among clinicians who work within a Multi-Care Kidney Clinic (MCKC) (i.e., predialysis clinic). The focus of the project was on the development of an e-learning module for the clinicians to learn about patient engagement. The expected outcome for the project was for the Microsoft® PowerPoint presentation and e-learning module to be used within the MCKC, as a tool to teach clinical staff and students about patient engagement, and contribute to improved patient engagement practices among the clinicians.

AUTHOR NOTE

Cheryl Simpson, DNP, MN, HBSc, RN, GNC(C), Walden University, MN, USA

Correspondence concerning this article should be addressed to Cheryl J. Simpson at ***cheryl.simpson@waldenu.edu***

METHODS

A quantitative pretest and posttest design was used to answer the question, "Can the educational presentation increase the clinicians' knowledge about patient engagement?"

Sample and Setting

The project occurred in an MCKC within Ontario. The institutional review board (IRB) at Walden University reviewed and approved the project. There were nine participants in the project. The number of participants was based on the clinicians who agreed to participate in the project and would be able to attend the educational presentation.

Development of the Educational Presentation

A needs assessment that focused on the clinicians within the MCKC was conduted to determine the clinicians' knowledge, understanding, or perceptions about patient engagement, as well as to facilitate the development of the patient engagement educational presentation (Hodges & Videto, 2011; Kelly, 2011; Kettner, Moroney, & Martin, 2013). The Lewin's force field analysis (LFFA) was incorporated into the needs assessment to help assess the operational processes within the MCKC that would help identify opportunities for how the clinicians can learn about patient engagement (Baulcomb, 2003; Shirey, 2013).

A literature review was completed to obtain sources of evidence to develop the Microsoft® PowerPoint presentation on CKD and patient engagement. The sources of evidence included literature from databases (OVID, PubMed, and CINAHL) and sources of evidence from organizations (Ontario Renal Network [ORN], National Kidney Foundation [NKF], National Institute of Diabetes and Digestive Kidney Disease [NIDDKD], Cancer Care Ontario [CCO], Registered Nurses' Association of Ontario [RNAO] Best Practice Guidelines, Canadian Institute for Health Information [CIHI], and Agency for Healthcare Research and Quality [AHRQ]). The presentation also included reference to information relating to the Shared End-Stage Renal Patients – Decision Making (SHERPA-DM) tool (Murray, Bissonnette, Kryworuchko, Gifford, & Calverley, 2013; Murray, Taylor-Kluke, & Page, 2015; Murray, n.d.). The SHERPA-DM tool is an evidence based tool that provides a template for clinicians that supports shared decision-making and patient engagement practices with patients who have CKD (Barry & Edgman-Leitan, 2012; Murray et al., 2013; Murray et al., 2015; Murray, n.d.). The completed PowerPoint presentation was reviewed by a few clinicians within the nephrology program for their feedback about the presentation, followed by a trial presentation for further feedback, comments, and edits. The feedback, comments, and edits from the clinicians were then used to make changes and create the final draft of the Microsoft® PowerPoint presentation. The final draft Microsoft® PowerPoint presentation was also used as the template for the e-learning module.

Implementation Phase

The Multi-Care Kidney Clinic (MCKC) employees were informed about the project, as well as the search for volunteers to participate in the project, at team huddles and meetings. An email message was also sent out to the MCKC team with an information consent letter attached in the email. Interested clinicians were to inform the project team leaders and/or manager.

Consent was obtained from the participants. The educational presentation was presented in a didactic style with multiple check point choice questions throughout the presentation. The educational presentation was 30 minutes in length with a five-minute pre-survey questionnaire and a five-minute post-survey questionnaire.

DATA COLLECTION AND ANALYSIS

The pre-survey and post-survey questionnaires were used to collect the data. These questionnaires were adapted from the hospital's previous educational evaluation surveys and were also based on resources that were used to teach on how to develop survey questions (Taylor-Powell & Renner, 2009). The data obtained from the pre and post questionnaires were collected and transferred into Microsoft® Excel Analysis Toolpak for data analysis. The mean pretest score was compared to the mean posttest score to determine if there was a statistical difference ($p< 0.05$) between the pretest and posttest scores.

RESULTS

There were nine participants in the project comprised of five registered nurses, three registered dietitians, and one social worker. All participants were female. The ages of the participants ranged from 21–69 years of age, with 45% of the participants being in the age range of 50–59 years of age. The mean pretest score was 5.22 (65%) and the mean posttest score was 6.22 (78%). Statistical data analysis showed no statistical difference ($p = 0.08617$) between the mean pretest posttest scores. The Wilcoxon signed-rank, nonparametric test to determine the difference between two related samples was conducted (see Table 1 and Table 2). The test for symmetry assumption was conducted with a boxplot of the differences between the pretest and posttest scores. The assumption of symmetry was met. Statistical data analysis showed no statistical difference ($p = .088$) between the mean pretest and posttest scores. Statistical software IBM SPSS Statistics for Windows (Version 24.0. Armonk, NY: IBM Corp.) was used for the statistical analysis in this project.

Table 1. *Test Statistics*[a]

	Posttest to Pretest
Z	-1.709[b]
p-value	.088

[a] *Wilcoxon Signed Ranks Test*
[b] *Based on negative ranks*

Table 2. *Descriptive Statistics*

	N	Mean	Standard Deviation	Minimum	Maximum
Pretest Scores	9	5.222	0.9718	4.0	7.0
Posttest Scores	9	6.222	1.3017	4.0	8.0

DISCUSSION

Despite the results not being statistically significant, there was a 10% increase from the mean pretest score to the posttest score, which could potentially suggest clinical significance especially for clinicians learning how patient engagement strategies can be applied with their patients in their clinical practice settings (Cancer Care Ontario ORN, 2015; Fortnum, Smolonogov, Walker, Kairaitis, & Pugh, 2015; Goovaerts et al., 2015; Nursing Alliance For Quality Care, n.d.; Prey et al., 2014). The results of this project supported the development and use of the e-learning module for clinicians within the MCKC to learn about patient engagement. Furthermore, the results also support other health teaching initiatives in increasing knowledge about concepts or practices geared towards improving care (Barnes et al., 2013; Fortnum et al., 2015; Goovaerts et al., 2015; Nursing Alliance for Quality Care, n.d.; Prey et al., 2014; Thomas et al., 2014). Based upon the results, the educational presentation from the project became the template for the patient engagement Microsoft® Powerpoint presentation and e-learning module for clinicians within the MCKC to learn about patient engagement.

The implication from this project is that an educational presentation can be used in a hospital setting for healthcare professionals to learn about patient engagement (Barnes et al., 2013; Thomas et al., 2014). The educational presentation can be used as a PowerPoint presentation to facilitate oral presentations, or as an e-learning module. A positive feature of using an e-learning module is that it can be an alternative way for teaching staff, instead of having in-services or formal education class days (Ball et al., 2011; Barnes et al., 2013). Clinicians can review the module on their own time and pace, and can even choose to review the module outside of work hours. Hospital settings will have to ensure that they have the resources (i.e., computers, resources, and information technology or health informatics support) to ensure that their staff will have adequate and appropriate access and ability to use computers, so that they can use the e-learning module (Ball et al., 2011). In a hospital setting that does not have computers, resources, or accessibility to computers, then the e-learning module may not be beneficial to that hospital and staff (Ball et al., 2011).

The use of quality improvement strategies, such as the LFFA, facilitated the ability to do a needs assessment within the nephrology program. By doing the needs assessment, the project allowed for the development of a plan that would address the facilitators and barriers within the MCKC. The limitation of this project is that it is not a research study and, hence, a true cause and effect can neither be established nor assumed. The project also had a very small number of participants and, therefore, the outcome of the project cannot be generalized to other departments. Therefore, it is recommended that healthcare organizations or departments complete their individual needs assessment, so that an appropriate educational strategy can be developed to meet the needs of that department or organization.

CONCLUSION

In conclusion, this quality improvement initiative showed how an e-learning module can be developed for staff and students within the MCKC to learn about patient engagement. This project was also able to demonstrate an approach that can help healthcare practitioners become familiar with the concept of patient engagement (CCO, n.d., 2015; ORN, n.d.). There are many opportunities to support patient engagement practices within a clinical setting (Molnar et al., 2017). Teaching and education initiatives should be used as strategies to help healthcare practitioners learn about patient engagement and facilitate the adoption of patient engagement practices (Barnes et al., 2013; CCO, n.d., 2015; Fortnum et al., 2015; Goovaerts et al., 2015; Nursing Alliance for Quality Care, n.d.; ORN, n.d.; Prey et al., 2014; Thomas et al., 2014).

ACKNOWLEDGEMENTS

The author would like to acknowledge: Dr. Janice M. Long, PhD, MSN, RN, Professor; Paulette Lewis, MScN, BHScN, RN(EC), ACNP, Nephrology Nurse Practitioner; Clint Gunn, MScN, CNeph(C), Patient Care Manager; Veronica Javier, MSW, RSW, Nephrology Social Worker; and Catherine Chung, MSc, MBA, Process Improvement Facilitator.

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CONTACT HOUR: 2.0 HRS

The role of direct oral anticoagulants (DOACs) in hemodialysis

By Cassandra McLelland and Marisa Battistella

LEARNING OBJECTIVES

1. Describe the role of direct oral anticoagulants (dabigatran, rivaroxaban, apixaban, and edoxaban) in patients with atrial fibrillation.
2. Discuss the risks and benefits of direct oral anticoagulants in patients on hemodialysis.

BACKGROUND

Atrial fibrillation is a supraventricular tachyarrhythmia that is especially prevalent in the hemodialysis population with an estimated prevalence of 15 to 40% (Turakhia et al., 2018). Patients with atrial fibrillation on dialysis are at a higher risk of thromboembolism due to traditional risk factors such as hypertension and cardiovascular disease, increased platelet activation during hemodialysis, and systemic inflammation. Moreover, they are also at an increased risk of bleeding due to platelet dysfunction secondary to uremia and use of heparin during dialysis (Bhatia, Hsu, & Kim, 2018). Although the use of anticoagulants for stroke prevention in this population remains controversial, warfarin has historically been the drug of choice if anticoagulation is deemed necessary (Tsai, Marcus, Patel, & Battistella, 2017).

In the general population with normal kidney function, direct oral anticoagulants (DOACs) have largely replaced warfarin as the anticoagulant of choice in patients with atrial fibrillation. Randomized controlled trials comparing DOACs to warfarin have shown that they are non-inferior or superior to warfarin, and confer a lower risk of bleeding (Granger et al., 2011; Patel et al., 2011; Connolly et al., 2006; Giugliano et al., 2013). In addition, they do not require routine monitoring of the International Normalized Ratio (INR), and have fewer drug, food, and lifestyle interactions (e.g. alcohol and smoking) than warfarin. However, patients on dialysis were excluded from these landmark DOAC trials. Despite the paucity of data regarding the efficacy and safety of DOACs in this population, observational data have shown that the use of these drugs has increased in clinical practice (Siontis et al., 2018). A recent systematic review aimed to evaluate the use of DOACs in hemodialysis. The studies included in this systematic review, as well as more recent data, are discussed below (Feldberg et al., 2018).

AUTHOR NOTE

Cassandra McLelland, PharmD, Pharmacy Resident, University Health Network, Toronto, ON

Marisa Battistella, PharmD, ACPR, Clinician Scientist, Assistant Professor, Leslie Dan Faculty of Pharmacy, University of Toronto, Pharmacy Clinician Scientist, Clinical Pharmacist – Nephrology, University Health Network, Toronto, ON

Address for correspondence: Marisa Battistella, University Health Network, 200 Elizabeth Street, EB 214, Toronto, ON M5G 2C4 Email: ***marisa.battistella@uhn.ca***

PHARMACOLOGIC PROPERTIES

Unlike warfarin, which exerts its therapeutic effect via vitamin K antagonism, the DOACs bind directly to and inhibit endogenous clotting factors. Rivaroxaban, apixaban, and edoxaban bind and inhibit factor Xa, whereas dabigatran inhibits factor IIa (thrombin). Although warfarin takes several days to achieve its peak therapeutic effect, the DOACs have a much faster onset and offset, with therapeutic anticoagulation occurring following a single dose. Furthermore, these medications have fewer drug-drug interactions compared to warfarin, and their effects are not affected by dietary interactions with vitamin K (López-López et al., 2017). See Table 1 for a comparison of the pharmacokinetic parameters of the different agents.

In contrast with warfarin, monitoring of drug levels or INR is not required with DOACs, thus eliminating the need for additional blood draws and dose changes. Both patients and healthcare providers may find DOACs to be more convenient than warfarin, although the cost of these medications may be prohibitive if the patient does not have Ontario Drug Benefit (ODB) coverage or private insurance (López-López et al., 2017).

Dabigatran

In comparison to the other DOACs, dabigatran exerts its anticoagulant effects by directly binding to and inhibiting thrombin. Approximately 85% of the drug is renally cleared, and it is removed by hemodialysis due to its relatively low level of protein binding (Ashley & Dunleavy,

Table 1. *Comparison of Anticoagulants*

	Warfarin	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Mechanism of action	Vitamin K antagonist	Direct thrombin inhibitor	Direct factor Xa inhibitor	Direct factor Xa inhibitor	Direct factor Xa inhibitor
Notable drug interactions	Inhibitors or inducers of CYP1A2, 2C9, 2C19, 3A4 Vitamin K-containing foods (e.g. green leafy vegetables)	P-glycoprotein Inhibitors substrates (e.g. cyclosporine, tacrolimus, amiodarone) or inducers (rifampin)	CYP3A4 and P-glycoprotein Inhibitors (clarithromycin, diltiazem) or inducers (phenytoin, carbamazepine)	CYP3A4 and P-glycoprotein Inhibitors (clarithromycin, diltiazem) or inducers (phenytoin, carbamazepine)	P-glycoprotein inhibitors or substrates (e.g. cyclosporine, tacrolimus, amiodaraone) or inducers (rifampin)
% of unchanged drug eliminated by the kidneys	0%	85%	27%	6%	50%
Dialyzability	Not dialyzable	Dialyzable (~60% over 4 hours)	Not dialyzable	Not dialyzable	Not dialyzable

2014). Dose reductions are recommended in patients older than 75 years with additional bleeding risk factors, or if the patient is taking a strong P-glycoprotein inhibitor, such as amiodarone or verapamil.

Only one study has attempted to assess the safety and efficacy of dabigatran relative to warfarin in hemodialysis patients (Chan, Edelman, Wenger, Thadhani, & Maddux, 2015). In a retrospective cohort study of American data, there was no statistically significant difference in embolic stroke compared with warfarin (relative risk 1.71, 95% CI 0.97–2.99) or minor bleeding (relative risk 1.10, 95% CI 0.93–1.29). However, patients taking dabigatran had a higher risk of major bleeding (relative risk 1.76, 95% CI 1.44–2.15) and a higher mortality rate as a result of bleeding. To further highlight this risk, the authors reported that the increased risk of major bleeding was present even when compared with patients on warfarin who had INR readings within 2 to 3 (the standard INR target for atrial fibrillation) more than 60% of the time.

Rivaroxaban

Rivaroxaban was the first factor Xa inhibitor to enter the market in Canada. Approximately 36% of the drug is renally cleared, and it is not dialyzed due to a high protein-bound fraction. The usual dose in normal renal function is 20 mg, with a recommended dose reduction to 15 mg if creatinine clearance is less than 50 mL/minute (Ashley & Dunleavy, 2014).

In an open-label, single-dose pharmacokinetic study of eight patients on hemodialysis, the area under the curve (AUC), or total exposure to the drug, was increased by 56% after administration of a 15-mg dose compared to healthy control subjects (Dias et al., 2016). In a second pharmacokinetic study investigating the use of rivaroxaban 10 mg in patients on hemodialysis, the AUC was determined to be comparable to the AUC following administration of 20 mg in healthy patients. However, this study did not have a control group, and instead relied on data from previous pharmacokinetic studies of rivaroxaban in healthy patients. The second phase evaluating administration of 10 mg daily for seven days demonstrated that the drug did not accumulate significantly following multiple doses.

In a retrospective cohort study using American data of patients on hemodialysis, there was no significant difference in the incidence of embolic stroke compared to warfarin (relative risk 1.80, 95% CI 0.89–3.64) (De Vriese et al., 2015). However, the use of rivaroxaban was associated with a higher risk of major bleeding (RR 1.45, 95% CI 1.09–1.93) and minor bleeding (RR 1.36, 95% CI 1.12–1.64), as well as a higher mortality rate secondary to bleeding. There was no difference in the rates of major bleeding when the reduced dose of rivaroxaban (15 mg) was compared to warfarin.

Apixaban

Approximately 27% of apixaban is renally cleared, making it an attractive option for patients with chronic kidney disease. The drug is approved for use in creatinine clearance higher than 25 mL/min based on the ARISTOTLE trial, with a recommended dose reduction in patients who have two of the following three criteria: aged 80 years or older, body weight of 80 kg or more, and/or serum creatinine over 133 u/mol (Ashley & Dunleavy, 2014).

In the United States, the FDA has endorsed the use of apixaban in patients on hemodialysis. This recommendation is based on a small pharmacokinetic study, which showed a 36% increase in apixaban exposure after a single 5-mg dose administered to eight patients on hemodialysis (Wang et al., 2016). A subsequent multiple-dose pharmacokinetic study showed that the reduced dose (2.5 mg) administered to patients on hemodialysis showed similar drug concentrations as the standard dose (5 mg) in patients without chronic kidney disease. Furthermore, administration of the standard 5 mg dose resulted in supratherapeutic drug concentrations in these patients (Mavrakanas, Samer, Nessim, Frisch, & Lipman, 2017).

A retrospective cohort study using American data compared the use of apixaban and warfarin in patients with atrial fibrillation and end-stage kidney disease (Siontis et al., 2018). The results demonstrated that there was a lower risk of major bleeding (hazard ratio 0.72, 95% CI 0.59–0.87), but no significant differences in intracranial bleeding, gastrointestinal bleeding, or death. In a subgroup analysis of apixaban, the 5-mg dose demonstrated a lower risk of stroke (hazard ratio 0.64, 95% CI 0.42–0.97) compared to warfarin, although there was no difference with the 2.5-mg dose. This study did not report on minor bleeding, or provide information on body weight, INR measurements, or adherence.

Edoxaban

There is currently no safety or efficacy data to support the use of edoxaban in patients on hemodialysis. Therefore, its use in clinical practice cannot be recommended at this time.

CONCLUSION

The use of DOACs for atrial fibrillation in the hemodialysis population has been increasing after initial approval for the general population in Canada. Both rivaroxaban and dabigatran appear to be associated with an increased risk of bleeding, and should not be used in these patients. The use of edoxaban should also be avoided due to its lack of data in the hemodialysis population. Although a retrospective cohort study and pharmacokinetic data have generated some promising preliminary results regarding the use of apixaban, these findings need to be further assessed with randomized controlled trials before its use can be recommended in this population. Until additional data emerge for DOACs, warfarin remains the oral anticoagulant of choice in hemodialysis. However, due to the high risk of bleeding in this population, the real decision remains whether anticoagulation is truly needed.

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CONTINUING EDUCATION STUDY QUESTIONS **CONTACT HOUR: 2.0 HRS**

The role of direct oral anticoagulants (DOACs) in hemodialysis

By Cassandra McLelland and Marisa Battistella

1. Which anticoagulant has traditionally been the drug of choice in patients on hemodialysis for atrial fibrillation?
   a) Dabigatran
   b) Rivaroxaban
   c) Edoxaban
   d) Warfarin

2. Which direct oral anticoagulant (DOAC) is a direct thrombin inhibitor?
   a) Dabigatran
   b) Rivaroxaban
   c) Edoxaban
   d) Apixaban

3. What is the mechanism of action of warfarin?
   a) Direct thrombin inhibitor
   b) Direct factor Xa inhibitor
   c) Vitamin K antagonist
   d) Vitamin K agonist

4. Which statement is true regarding edoxaban?
   a) It is a direct thrombin inhibitor
   b) It is safe to use in patients on dialysis
   c) It is effective in patients on dialysis
   d) There is no data regarding its use in dialysis

5. What is the INR target for atrial fibrillation in dialysis patients?
   a) 1 to 2
   b) 2 to 3
   c) 2.5 to 3.5
   d) There is no specific target

6. Which of the following is FALSE regarding the outcomes of a retrospective cohort study comparing the use of warfarin and apixaban in dialysis patients?
   a) Lower risk of major bleeding with apixaban
   b) Lower risk of intracranial bleeding with apixaban
   c) Lower risk of stroke with apixaban 2.5mg, but not apixaban 5mg
   d) No difference in death

7. Which of the following drugs confers an increased risk of bleeding due to a drug interaction with apixaban?
   a) Cyclosporine (inhibitor of CYP3A4 and P-gp)
   b) Phenytoin (inducer of CYP3A4)
   c) Metronidazole (inhibitor of CYP2C9)
   d) Amlodipine (substrate of CYP3A4)

8. Which of the following is NOT a factor contributing to a patient's increased risk of thromboembolism?
   a) Presence of traditional risk factors
   b) Platelet activation during hemodialysis
   c) Platelet dysfunction secondary to uremia
   d) Systemic inflammation

9. Which of the following vitamins will affect INR?
   a) Vitamin A
   b) Vitamin B12
   c) Vitamin D
   d) Vitamin K

10. Which of the following is removed by dialysis?
    a) Warfarin
    b) Dabigatran
    c) Rivaroxaban
    d) Apixaban

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 HRS CONTINUING EDUCATION

The role of direct oral anticoagulants (DOACs) in hemodialysis

Volume 29, Number 1

By Cassandra McLelland and Marisa Battistella

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1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
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
4. Minutes required to read and complete:	50	75	100	125	150

Comments: _____

_____

_____

_____

COMPLETE THE FOLLOWING:

Name: _____

Address: _____

_____

CANNT member? ❑ Yes ❑ No Expiration date of card _____

CANNT Nominations

NOMINATING FORM

Position:

_____

Name of Candidate:

_____

Membership Number:

_____

Nominated by*:
1. Name:

_____

2. Membership Number:

_____

**Nominations can only be made by current members.*

***I agree to let my name stand for office and if elected, I agree to serve my term of office.*

_____
Signature of candidate**

Date: _____

CALL FOR NOMINATIONS 2019

The CANNT Nominating Committee is looking for CANNT/ACITN members to apply for the following positions on the CANNT/ACITN Board of Directors. Positions will commence in October 2019 in Edmonton.

Deadline for nominations is June 1, 2019.

The positions open are:
VP Western Region (Three-year term), VP Quebec (Three-year term)
VP Ontario (Three-year term), VP Technologists (Three-year term)

Eligibility for office: Member in good standing (executive of a specialty association) and 25 hours can be claimed annually toward certification hours.

GENERAL REQUIREMENTS

Each candidate must:

- Understand the responsibilities of each position.
- Be willing to commit the required amount of time to fulfill the duties of the office.
- Be willing to work within parliamentary procedure, which is used to ensure an efficient and fair voting procedure by self-governing organizations.
- Will submit a National Officer Candidate Information Form available online at **www.cannt.ca** or from the National Office (see address below).

BENEFITS TO BOARD MEMBERSHIP

- Having a direct voice in how your Association is run.
- Complimentary registration for the annual conference, with travel and accommodations covered as well!
- CNA recognition of a professional committee membership/participation (executive of a specialty association), and 25 hours can be claimed annually toward certification hours.

POSITION DESCRIPTIONS

1. **Regional Vice-President:** Elected by membership for a period of three years. Promotes and facilitates the goals and objectives of the Association throughout the region. The Vice-President represents his or her region's concerns and acts as a liaison between the Board of Directors and the membership. Will act as liaison to the annual conference planning committee, when the conference is being hosted in the Regional Vice-President's region.
2. **Vice-President Technologists:** Elected by membership for a period of three years. Promotes and facilitates the goals and objectives of the association. The Vice-President represents the concerns and addresses issues of the technologists on a local and national level to the Board of Directors. Be available to consult with the technical representation for the annual conference.

For more information and forms for candidates and nominations, see **www.cannt.ca** under ***Members – Call for Nominations for the CANNT Board of Directors***.

CANNT National Office
4 Cataraqui Street, Suite 310,
Kingston, ON K7K 1Z7
www.cannt.ca
Email: cannt@cannt.ca
Tel: 613-507-6053

CANNT Membership

First Name _____

Last Name _____

Home Address _____

City _____

Province _____ Postal Code _____

Telephone (H) (_____) _____ - _____

(W) (_____) _____ - _____

Email _____

Employer _____

Employer Address _____

City _____

Province _____ Postal Code _____

Do you consent to the use of your name and address on mailing lists that CANNT has considered pertinent and appropriate?
❑ Yes ❑ No

Do you consent to the use of your email for all correspondence with CANNT?
❑ Yes ❑ No

❑ New Member or ❑ Renewal

CANNT # (if renewal): _____

Membership Fee (HST #100759869)
Membership fee is tax deductible.
❑ One Year: $75.00 + HST/GST
❑ Two Years: $140.00 + HST/GST
❑ Student Rate: $37.50 + HST/GST*
**Proof of full-time enrolment must accompany application*
AB/BC/SK/MB/NT/NU/QC/YT: 5% GST; ON/NL/NB: 13% HST; PEI: 14% HST; NS: 15% HST

I enclose $ _____
made payable to Canadian Association of Nephrology Nurses and Technologists.

Method of payment:
❑ Cheque ❑ Money order ❑ Visa ❑ Mastercard

Cardholder Name: _____

Credit Card Number: _____

Expiry Date: _____ 3-digit CVV code: _____

Signature: _____

Return to **CANNT**
Mailing Address:

CANNT,
4 Cataraqui Street, Suite 310
Kingston, ON K7K 1Z7

❑ I have attained CNeph(C)/cdt designation

❑ I am a member of CNA

Ontario applicants only
Do you belong to RNAO?
❑ Yes ❑ No

Professional Status
❑ Registered Nurse
❑ Registered Practical Nurse/Registered Nursing Assistant/ Licensed Practical Nurse
❑ Technician
❑ Technologist
❑ Other (Specify) _____

Number of years in nephrology _____

Area of responsibility
❑ Direct Patient Care
❑ Administration
❑ Technical
❑ Teaching
❑ Research
❑ Other (Specify) _____

Work environment
❑ Acute Care
❑ Self-Care Unit
❑ Independent Health Care
❑ Private Sector

Highest level of education

Nursing	*Non-Nursing*
❑ Diploma	❑ Diploma
❑ 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
Choose one
❑ Adults
❑ Combined Adult/Pediatrics
❑ Pediatrics
❑ Other

Select all that apply
❑ Full-Care Hemo
❑ Self-Care Hemo
❑ Home/Independent Hemo
❑ In-Patient Nephrology
❑ In-Patient Peritoneal Dialysis
❑ In-Patient Transplantation
❑ Home/Independent PD
❑ Out-Patient Transplantation
❑ Clinical Educator
❑ Academic Educator
❑ Corporate Education
❑ Vascular/Body Access
❑ Nurse Navigator
❑ Research
❑ Administration
❑ Corporate Sales

Guidelines for Authors

The Canadian Association of Nephrology Nurses and Technologists (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, 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)*, Sixth Edition (2009), 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 [e.g., RN, BScN, CNeph(C)], position, place of employment, address, telephone, fax numbers, and email 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/Reference List: Proper names 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. Table/figure formatting should comply with APA style.

How should the manuscript be submitted?
Email your manuscript to: **cannt.journal1@gmail.com**. Include a covering letter with contact information for the primary author and a one-sentence biographical sketch (credentials, current job title and location) for each author.

How are manuscripts selected for the CANNT Journal?
Each manuscript will be acknowledged following receipt. Research and clinical articles are sent out to two members of the *CANNT Journal* manuscript 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 editor reserves the right to accept or reject manuscripts. The criteria for acceptance for all articles include originality of ideas, timeliness of the topic, quality of the material, and appeal to the readership. Manuscripts that do not comply with APA formatting and style will be returned to the author(s).

What are the implications for copyright ownership?
Authors should note that manuscripts will be considered for publication on the condition that they are submitted solely to the *CANNT Journal*. Upon acceptance of submitted material, the author(s) transfer(s) copyright ownership to CANNT. Statements and opinions contained within the work remain the responsibility of the author(s). Authors retain the right to include their respective published work in a thesis or dissertation provided that it is not published commercially. Although no permission is required in this instance, it is expected that you reference *CANNT Journal* as the original source. All other material may not be reproduced without the written permission of CANNT.

Checklist for authors

Cover letter
Article

- Title page to include the following:
  - Title of article
  - Each author's name (including full first name)
  - Professional qualifications
  - Position
  - Place of employment
  - Author to whom correspondence is to be sent, including address, phone, fax number, and email address
- Text of article, with abstract if applicable, **double-spaced, pages numbered**
- References (on a separate sheet)
- Tables (one per page)
- Illustrations (one per page)
- Letters of permission to reproduce previously published material

Revised March 2018

Lignes directrices à l'intention des auteurs

Le Journal de l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN) vous invite à faire parvenir articles, textes et manuscrits originaux pour publication dans son journal trimestriel. Nous sommes heureux d'accepter vos documents soumis dans l'une ou l'autre des langues officielles, anglais ou français.

Quels sont les sujets d'article appropriés?
Nous acceptons les articles portant sur des manuscrits récemment publiés, des activités de l'Association ou tout sujet d'intérêt pour les membres de l'ACITN.

Quels types de manuscrits conviennent à la publication?
Nous préférons des manuscrits qui présentent de nouveaux renseignements cliniques ou qui traitent des enjeux propres aux champs d'intérêt des infirmières et infirmiers et des technologues en néphrologie. Nous recherchons plus particulièrement :

- Exposés de recherche originaux
- Articles cliniques pertinents
- Rapports sur des approches innovatrices en matière d'amélioration de la qualité
- Textes narratifs relatant une expérience de pratique infirmière ou technologique
- Textes sous forme de questions et de réponses sur la pratique interdisciplinaire
- Revues d'articles courants, de livres et films
- Articles en éducation continue.

Comment les manuscrits doivent-ils être présentés?
Forme : Le manuscrit doit être présenté à double interligne avec une marge de 1 po et une numérotation consécutive des pages dans le coin supérieur droit de la page. Les articles plus formels de recherche ou d'études cliniques doivent compter de 5 à 15 pages. Les articles moins formels, tels que textes narratifs, questions-réponses ou revues, doivent compter moins de 5 pages.

Style : Le style du manuscrit doit être conforme au manuel de publication de l'Association américaine de psychologie (AAP), 6e édition (2009), offert dans la plupart des librairies universitaires.

Page titre : La page titre doit inclure le titre du manuscrit ainsi que les renseignements suivants : nom de chacun des auteurs (incluant prénoms au complet), titres professionnels (c.-à-d., inf., B.Sc. Inf., CNéph[C]), titre du poste occupé, nom de l'employeur, adresse, numéros de téléphone et de télécopieur et adresse courriel. L'adresse privilégiée de correspondance doit aussi être indiquée.

Résumé : Sur une page distincte, les articles formels de recherche ou d'études cliniques doivent être accompagnés d'un résumé de 100 à 150 mots, reprenant brièvement les principaux points du manuscrit.

Texte/Liste de références : Les sigles, abréviations ou acronymes doivent être écrits au long la première fois qu'ils apparaissent dans le texte, suivis de l'abréviation entre parenthèses; p. ex., Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN). Les noms génériques des médicaments doivent être employés. Les unités de mesure doivent être indiquées selon le Système international d'unités (SI). Les références doivent être citées dans le texte en utilisant le format de l'AAP. Une liste de références comprenant la bibliographie complète de toutes les références utilisées doit suivre le texte.

Tableaux/Figures : Les manuscrits ne doivent inclure que les tableaux et figures (incluant schémas, illustrations, croquis, etc.) visant à clarifier certains détails. Les auteurs qui utilisent des tableaux et des figures qui ont déjà fait l'objet d'une publication doivent fournir l'autorisation écrite de l'éditeur d'origine et la joindre au manuscrit soumis. La mise en forme des tableaux et des figures doit être conforme au style de l'AAP.

De quelle manière doit-on soumettre les manuscrits?
Veuillez envoyer par courriel votre manuscrit à : **cannt.journal1@gmail.com**

Veuillez inclure une lettre de présentation en précisant les coordonnées de l'auteur principal ainsi qu'une notice biographique d'une phrase (incluant titres de compétences, titre du poste actuel et lieu de travail) pour chaque auteur.

Quel est le processus de sélection des manuscrits pour publication dans le Journal de l'ACITN?
À la réception de chaque manuscrit, un accusé de réception est envoyé. Les articles de recherche et d'études cliniques sont envoyés à deux membres du comité de révision du Journal de l'ACITN afin d'être révisés suivant un processus à double insu. Tous les articles peuvent être retournés aux auteurs pour révision et nouvelle soumission par la suite. Les manuscrits acceptés pour publication peuvent subir des changements éditoriaux; toutefois, les auteurs pourront approuver ces changements. La rédactrice en chef se réserve le droit d'accepter ou de refuser tout manuscrit. Les critères d'acceptation pour tous les manuscrits comprennent l'originalité des idées, l'actualité du sujet, la qualité du matériel et l'attrait des lecteurs. Les manuscrits qui ne sont pas conformes à la mise en forme et au style de l'AAP seront renvoyés à l'auteur ou aux auteurs.

Quelles sont les conséquences du transfert des droits d'auteur?
Les auteurs doivent prendre note que les manuscrits seront considérés pour publication à la condition qu'ils ne soient soumis qu'au *Journal de l'ACITN*. Sur acceptation du matériel soumis, les auteurs transfèrent leur droit d'auteur à l'ACITN. Les déclarations et opinions émises par les auteurs dans leurs articles, textes ou manuscrits demeurent leur responsabilité. Les auteurs conservent le droit d'insérer leurs travaux publiés respectifs dans une thèse ou un mémoire, pour autant que ces derniers ne soient pas publiés à des fins commerciales. Bien qu'aucune permission ne soit requise en pareil cas, il est attendu que les auteurs indiquent en référence le *Journal de l'ACITN* comme source originale. Tous les autres documents ne peuvent être reproduits sans l'autorisation écrite de l'ACITN.

Aide-mémoire à l'intention des auteurs

Lettre de présentation
Article

- Page titre incluant les renseignements suivants :
  - Titre de l'article
  - Nom de chaque auteur (incluant prénoms au complet)
  - Titres de compétences
  - Titre du poste actuel
  - Nom et adresse de l'employeur
  - Nom de l'auteur à qui la correspondance doit être envoyée (incluant adresse, numéros de téléphone et de télécopieur et adresse courriel)
  - Texte de l'article avec résumé, s'il y a lieu à **double interligne et pages numérotées**
- Références (sur une feuille distincte)
- Tableaux (un par page)
- Figures (une par page)
- Lettre d'autorisation pour tout matériel ayant déjà fait l'objet d'une publication