Canadian Journal of Cardiology 34 (2018) 1333–1340

Clinical Research

Health Outcome and Follow-up Care Differences Between First Nation and Non-First Nation Coronary Angiogram Patients: A Retrospective Cohort Study

Annette Schultz, PhD, RN,[a] Lindsey Dahl, MSc,[a] Elizabeth McGibbon, PhD, RN,[b] Jarvis Brownlie, PhD,[c] Catherine Cook, MD, MSc, CCFP, FCFP,[d] Basem Elbarouni, MD, FRCPC,[e] Alan Katz, MBChB, MSc, CCFP,[f] Thang Nguyen, MD, FRCPC,[e] Jo Ann Sawatzky, PhD, RN,[a] Moneca Sinclaire, PhD,[a] Karen Throndson, MN, RN,[e] and Randy Fransoo, PhD[f]

[a] College of Nursing Rady Faculty of Health Sciences (RFHS), University of Manitoba, Winnipeg, Manitoba, Canada

[b] Rankin School of Nursing Faculty of Health Sciences, St. Francis Xavier University, Antigonish, Nova Scotia, Canada

[c] Department of History, Faculty of Arts, University of Manitoba, Winnipeg, Manitoba, Canada

[d] Indigenous Health, RFHS, University of Manitoba, Winnipeg, Manitoba, Canada, First Nations, Métis and Inuit Health, Max Rady College of Medicine, RFHS, University of Manitoba, Winnipeg, Manitoba, Canada

[e] St. Boniface General Hospital, Max Rady College of Medicine, RFHS, University of Manitoba, Winnipeg, Manitoba, Canada

[f] Manitoba Centre for Health Policy, and College of Medicine, RFHS, University of Manitoba, Winnipeg, Manitoba, Canada

ABSTRACT

Background: First Nations (FN) people experience high rates of ischemic heart disease (IHD) morbidity and mortality. Increasing access to angiography may lead to improved outcomes. We compared various outcomes and follow-up care post-index angiography between FN and non-FN patients.

Methods: All index angiography patients in Manitoba were identified between April 1, 2000 and March 31, 2009 and categorized into acute myocardial infarction (AMI) or non-AMI groups based on whether their angiogram occurred within 7 days of an AMI. Cox proportional hazard models estimated associations between FN status and outcomes related to mortality, subsequent hospitalizations, revascularizations, and physician visits.

Results: Cardiovascular mortality was higher among FN patients in the non-AMI group (hazard ratio [HR] = 1.50, 95% confidence interval [CI], 1.17-1.94) and in the AMI group (HR = 1.57, 95% CI, 1.05-2.35). FN

RÉSUMÉ

Contexte : Les taux de morbidité et de mortalité liés à la cardiopathie ischémique sont élevés au sein des Premières Nations (PN). Or un accès accru à l'angiographie pourrait améliorer l'évolution de l'état de santé. Nous avons comparé, chez des patients appartenant aux PN et chez des patients n'appartenant pas aux PN, les résultats de divers paramètres et les soins de suivi après une angiographie de référence.

Méthodes : Des patients du Manitoba ayant passé une angiographie de référence ont été répertoriés entre le 1er avril 2000 et le 31 mars 2009, et divisés en deux groupes, soit infarctus aigu du myocarde (IAM) et non-IAM, selon que l'examen angiographique avait ou non été réalisé dans les 7 jours suivant un IAM. Des modèles de régression des hasards proportionnels de Cox ont été utilisés pour l'évaluation des associations entre l'appartenance aux PN et les résultats relatifs à la mortalité, aux hospitalisations ultérieures, aux revascularisations et aux visites chez le médecin.

Ischemic heart disease (IHD) is a leading cause of death in Canada.[1] Efforts to reduce IHD mortality have not benefitted First Nation (FN) people to the same extent as the general population.[2] FN people are disproportionately affected by IHD, as evidenced by higher rates of acute myocardial infarctions (AMI), IHD hospitalizations, and mortality.[3-6] Although explanations for health disparities between FN and non-FN populations in Canada commonly focus on individual lifestyle and behavioural choices, there is emerging agreement that historical and persistent colonial practices influence health status and access to health care.[7,8] Index coronary angiography represents an entry point into the

Received for publication July 3, 2018. Accepted July 18, 2018.

Corresponding author: Dr Annette Schultz, CR3022 369 Tache Avenue, Winnipeg, Manitoba R2H-2A6, Canada. Tel.: +1-204-258-1311.
E-mail: annette.schultz@umanitoba.ca

See page 1339 for disclosure information.

https://doi.org/10.1016/j.cjca.2018.07.418

patients were also more likely to have a subsequent hospitalization for AMI (HR = 2.26, 95% CI, 1.79-2.85) in the non-AMI group. FN patients in the non-AMI group were less likely to receive percutaneous coronary intervention (HR = 0.85, 95% CI, 0.73-0.99) and more likely to undergo coronary artery bypass graft (HR = 1.26, 95% CI, 1.10-1.45). FN patients in both groups were less likely to visit a cardiologist/cardiac surgeon, internal medicine specialist, or family physician within 3 months and 1 year of angiography.

Conclusions: Cardiovascular health and follow-up care outcomes of FN and non-FN patients who undergo angiography are not the same. Addressing Indigenous determinants of health are necessary to improve cardiovascular outcomes.

Résultats : La mortalité cardiovasculaire a été plus élevée chez les patients des PN du groupe non-IAM (rapport des risques instantanés [RRI] = 1,50; intervalle de confiance [IC] à 95 % : 1,17-1,94) et du groupe IAM (RRI = 1,57; IC à 95 % : 1,05-2,35). Chez les patients des PN, la probabilité d'hospitalisation ultérieure pour un IAM a aussi été plus élevée (RRI = 2,26; IC à 95 % : 1,79-2,85) dans le groupe non-IAM. Chez les patients des PN du groupe non-IAM, la probabilité d'intervention coronarienne percutanée a été plus faible (RRI = 0,85; IC à 95 % : 0,73-0,99) et la probabilité de pontage aortocoronarien, plus élevée (RRI = 1,26, IC à 95 % : 1,10-1,45). Dans les deux groupes de patients des PN, on a en outre observé une plus faible probabilité de visite chez un cardiologue ou un cardiochirurgien, un interniste ou un médecin de famille au cours des 3 mois et de l'année ayant suivi l'examen angiographique.

Conclusions : Chez les patients des PN, les résultats relatifs à la santé cardiovasculaire et aux soins de suivi ne sont pas les mêmes que chez les patients n'appartenant pas aux PN. Il est donc nécessaire d'agir sur les déterminants de la santé des populations autochtones pour améliorer les résultats cliniques cardiovasculaires.

cardiac-care system for many patients with IHD, and improving access to angiography may reduce cardiovascular disparities between FN and non-FN people.[9,10]

FN patients who undergo angiography following AMI have similar rates of revascularization procedures (percutaneous coronary intervention [PCI] and coronary artery bypass graft [CABG]) as non-FN patients, yet experience worse long-term survival.[9] A comparison of cardiovascular-related mortality rates between FN and non-FN people following angiography has not been investigated, and Canadian studies have not considered outcomes among patients who undergo angiography for reasons other than AMI. Therefore, to extend our understanding of cardiovascular health disparities, the objective of this study was to investigate mortality, subsequent hospitalization, revascularization, and physician-visit outcomes after index angiography procedures performed on FN and non-FN patients in Manitoba, Canada. As outcomes may vary between acute and nonacute patients, eligible index angiogram patients were stratified by whether the patients' angiograms were performed during hospitalization for AMI or not.

Material and Methods

Study design

This retrospective cohort study analyzed health administrative data collected by the universal, publicly funded health insurance system in Manitoba and housed in the secure Manitoba Population Research Data Repository at the Manitoba Centre for Health Policy (MCHP). (Repository data is bound by legislation, professional ethical standards, and moral responsibility to never share, sell under any circumstance, or use the data for purposes other than approved research. Therefore, the data used in this study is not publicly available.) Data files were linked at the individual level using a scrambled identifier and included the Manitoba Health Insurance Registry, Hospital Abstracts, Medical Claims, MCHP Vital Statistics Mortality Registry, and Indian Registry System (IRS) (Supplemental Table S1). Study approval was obtained from the University of Manitoba's Education and Nursing Research Ethics Board; the Manitoba Health Information Privacy Committee; and the Manitoba First Nations Ethics Board, Health Information Research Governance Committee (HIRGC), with support from the research team at Nanaandawegimig, the First Nations Health and Social Secretariat of Manitoba.

Study setting

Manitoba is a province of approximately 1.3 million people, of whom 105,820 (8%) are registered FN.[11] Although primary health care services for status FN people living on reserve are funded through federal programs, the provincial government funds hospital, physician, and specialist services for all Manitobans.[12] Because cardiac catheterization is considered a specialist service, all angiography procedures in Manitoba are captured in the provincial administrative data system held at MCHP. Cardiac catheterization facilities were located in 2 tertiary hospitals in Winnipeg during the study period. Because ethnicity is not recorded in hospital discharge records, identification of FN patients required a linkage between administrative data files and the IRS file; HIRGC's approval included access to the IRS file and required linkage.

Study cohort

All Manitobans aged $\geq$18 years receiving angiograms between April 1, 2000 and March 31, 2009 were identified in the Hospital Abstracts data file using the Canadian Classification of Health Interventions (CCI) procedure code 3.IP.10. Angiograms were considered index events if the patient had not received an angiogram or revascularization procedure (PCI or CABG) in the preceding 365 days. There were a total of 29,103 angiograms identified (Fig. 1). Patients who did not meet the study definition for an index angiogram and patients who died during their angiogram hospitalization were excluded. The final study cohort consisted of 25,816 patients (FN = 1499; non-FN = 24,317). Angiograms were stratified to either AMI or non-AMI groups, based on whether or not a diagnosis of AMI was made within the 7 days preceding the