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Infection Control Practices in In-Center Hemodialysis Units During Wave 1 of the COVID-19 Pandemic in Ontario, Canada: Research Letter

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Abstract

Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a virus that caused coronavirus disease 2019 (COVID-19), the multisystem disease central to the COVID-19 pandemic. As patients receiving in-center maintenance hemodialysis require treatment 3 times weekly, they were unable to fully isolate. It was important for in-center hemodialysis units to implement robust infection control practices to ensure patient safety and minimize risk of transmitting SARS-CoV-2 among patients and staff. There are 27 renal programs within Ontario, Canada, providing care for about 9000 people across about 100 in-center hemodialysis units. These units are funded by the Ontario Renal Network (ORN), which is part of the provincial agency Ontario Health.

Objective: The objective was to track infection control practices that were implemented by in-center hemodialysis units and be able to provide a descriptive narrative of the COVID-19 pandemic response of Ontario's hemodialysis units between March and September 2020.

Methods: Between May and September 2020, data were collected from Ontario's 27 renal programs on the implementation of key infection control practices, including symptom screening, use of personal protective equipment, testing, practices specifically related to patients from congregate living settings, other prevention practices, and outbreak management. There were 4 data collection cycles, each approximately 1 month apart. The results were compiled and shared across the province, and infection control practices were also discussed at provincial COVID-19 teleconferences hosted by the ORN.

Results: By March 2020, all but one renal program had implemented one or more forms of symptom screening, all renal programs had implemented physical distancing in waiting rooms and restricted visitors, and 74% of renal programs had implemented universal masking for all staff. By April 2020, 89% of renal programs had implemented universal masking for all patients, 52% had implemented enhanced contact and droplet precautions for suspected or positive cases, and 59% of renal programs tested all patients from congregate living settings regularly (with a low symptom threshold for testing). Infection control practices became more homogeneous across renal programs over time, and most practices were in place as of the last data collection.

Conclusions: The renal system in Ontario was able to respond quickly within the first 2 months of the pandemic to minimize the spread of COVID-19 within in-center hemodialysis units. Through provincial teleconferences, infection control practices were shared across the province as the pandemic and hemodialysis unit responses evolved. This supported renal programs to advocate locally if their hospital was lagging in practices felt to be of value in other hemodialysis units. Although no direct correlation can be made regarding the implementation of infection control practices within in-center hemodialysis units and the number of COVID-19 cases in this population, the limited number of outbreaks in hemodialysis units may have been influenced by the proactive response of renal programs. Practices described in this article may support management and response to subsequent waves of COVID-19 or future similar infectious diseases.

Keywords
COVID-19, in-center hemodialysis, infection control

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Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus caused the coronavirus disease 2019 (COVID-19) pandemic. Patients receiving maintenance hemodialysis are at increased risk of SAR-CoV-2 infection and death from COVID-19.[1-6] Frequency of treatments and inherent inability of patients receiving in-center hemodialysis to self-isolate put these individuals at higher risk. It was important for renal programs to implement robust infection control measures within in-center hemodialysis units to minimize risk to patients and staff. There are 27 renal programs in Ontario, Canada, providing hemodialysis in about 100 units mostly located within hospitals. At any given time, there are about 9000 individuals receiving in-center hemodialysis in Ontario.

At the start of the pandemic, infection control practices within in-center hemodialysis units in Ontario varied widely, depending on regional prevalence of COVID-19, as well as local hospital infection control policies. The objective was to track infection control practices that were implemented by hemodialysis units, to provide a descriptive narrative of the COVID-19 pandemic response of the province's hemodialysis units between March and September 2020. This time frame generally represented the first wave of the COVID-19 pandemic in Ontario. The World Health Organization declared COVID-19 as a global pandemic on March 11, 2020, and Ontario declared a state of emergency on March 17, 2020.

Methods

The Ontario Renal Network (ORN) is part of the provincial agency Ontario Health, and funds and manages services for patients with chronic kidney disease. A role of ORN during the COVID-19 pandemic was to support information sharing among renal programs. In May 2020, ORN launched an initiative to collect data on implementation of infection control practices within in-center hemodialysis units. No infection control practices were mandated by ORN.

An Excel-based data collection tool was developed with input from key nephrology stakeholders, which consisted of 6 tabs covering key areas of infection control practices, including symptom screening; use of personal protective equipment (PPE); testing; practices for hemodialysis patients from congregate living settings; other prevention practices; and outbreak management. Outbreak was defined as 2 or more laboratory-confirmed cases in a hemodialysis unit within a 14-day period, where transmission was considered likely to have occurred in that unit. Each tab asked binary yes/no questions on infection control practices and implementation dates. Free-text fields captured additional information. The data collection tool was shared with all renal programs.

Baseline data were collected retrospectively, as infection control practices implemented prior to May 2020 were captured in the first collection. Data were collected 4 times, approximately 1 month apart, in May, June, July, and September. Data were provided by all renal programs, typically by the administrative director of the renal program or manager of the hemodialysis unit. Following each data submission, information was consolidated into 1 file and shared with renal programs to facilitate knowledge transfer. Infection control practices were also discussed at regular provincial COVID-19 teleconferences hosted by the ORN, which provided a forum for renal programs to discuss practices.

Results

Table 1 shows a summary of key infection control practices, and change in utilization by the renal programs (n = 27) from when the practices were first introduced to September 2020 (last data collection).

Symptom Screening

Symptom screening was conducted at 4 points: by phone prior to hemodialysis treatment, at the entrance of the hospital where the hemodialysis unit was located, at the entrance of the hemodialysis unit, and at the individual hemodialysis chair. While symptom screening at the hospital entrance was a hospital policy, other forms of screening were instituted by renal programs. Almost all renal programs implemented screening practices early in the pandemic, having one or more forms of screening in place by March 2020. By April, all 27 renal programs were screening either at the entrance of the hemodialysis unit or hemodialysis chair, and 10 (37%) had implemented all 4 types of symptom screening. Most renal programs kept at least 1 screening practice in place as of September, and 23 (85%) continued to screen at the hemodialysis chair.

Use of PPE

Renal programs implemented PPE policies to protect patients and staff despite initial challenges in obtaining certain PPE supplies. By April 2020, all renal programs had instituted universal masking for clinical staff. Procedural masks were provided to staff, with 10 (37%) also providing face shields. In addition, 10 (37%) renal programs provided N95 masks for specific circumstances—for example, where staff cared for patients with COVID-19 or during aerosol-generating

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Table 1. Timeline of Infection Control Practices in Ontario Hemodialysis Units During the Initial Response to SARS-CoV-2.

Infection control practice	Month that the practice was first introduced	Proportion of renal programs that implemented by the end of first month, %	Proportion of renal program that still had in place as of September 2020, %
Symptom screening			
By phone prior to hemodialysis treatment	March 2020	44	52
At the entrance of hospital	March 2020	89	96
At the entrance of hemodialysis unit	March 2020	78	70
At hemodialysis chair	March 2020	70	85
Use of personal protective equipment			
Contact/droplet precautions for positive or suspected patients	March 2020	89	100
Universal masking for staff	March 2020	74	100
Universal masking for patients	April 2020	89	100
Testing			
At least 1 point prevalence test of all patients	April 2020	33	100
Dialysis patients from congregate living settings			
At least 1 point prevalence test of all patients from congregate living settings	April 2020	59	100
Cohorting of all patients from congregate living settings	April 2020	37	37
Other prevention practices			
Physical distancing in waiting rooms	March 2020	100	100
Physical distancing between dialysis chairs	March 2020	63	63
Visitor restrictions	March 2020	100	100

medical procedures. For patients with positive and suspected COVID-19, all renal programs implemented contact and droplet precautions, with the use of masks, gowns, gloves, and face shields—24 (89%) had this practice in place by the end of March. Five (19%) renal programs implemented contact and droplet precautions for all hemodialysis patients.

All renal programs implemented universal masking of patients in the hemodialysis unit by May 2020. A total of 22 (81%) renal programs provided patients with procedural masks, and 5 (19%) provided fabric masks. As of September, these PPE practices remained in place.

Testing

Testing for COVID-19 became an important way to minimize spread of infection within the unit. While a low symptom threshold was used, testing capacity and turnaround times posed a challenge early on. Due to uncertainties around asymptomatic cases, in April 2020, at least 9 (33%) renal programs conducted 1-time testing of all in-center hemodialysis patients to determine point prevalence. Widespread testing was also triggered by outbreaks. In June 2020, ORN led a province-wide initiative to conduct COVID-19 surveillance testing of all patients and staff within in-center units.[7] Outside of this initiative, testing of staff was rarely performed, unless they experienced symptoms or there was an outbreak. Low symptom threshold for testing continued into September.

Practices for Hemodialysis Patients From Congregate Living Settings

Renal programs implemented specific practices for patients from congregate living settings, such as long-term care and retirement homes. Regular testing (up to weekly) of patients was implemented in 16 (59%) renal programs by April 2020. Regular testing was also done at some long-term care homes where patients resided. By September, 5 (19%) had stopped this practice, and only tested symptomatic or suspected patients. A total of 13 (48%) renal programs implemented contact and droplet precautions for all patients from congregate living settings. Cohorting hemodialysis patients from congregate living settings in a separate area of the unit was also a strategy used to limit spread of the virus. In April, 10 renal programs cohorted all patients to the same hemodialysis shift, 13 (48%) cohorted only patients with positive and suspected COVID-19, and 15 (56%) cohorted patients from long-term care homes with outbreaks.

Other Prevention Practices

Other infection control practices included physical distancing and strict visitor policies. All renal programs implemented physical distancing within waiting rooms, but only 17 were able to distance between hemodialysis chairs due to limited space. Other strategies included curtains or barriers between hemodialysis chairs. To maximize physical distancing between

staff, staggered break schedules, additional spaces for breaks, and limits on number of people in break rooms were implemented. In March 2020, all renal programs also implemented no visitor policies, with the exception of essential caregivers, which was still in place as of September.

Outbreak Management

Between March and September 2020, there were 3 COVID-19 outbreaks in in-center hemodialysis units. Two occurred in the Greater Toronto Area, where community prevalence was the highest. Following outbreaks, renal programs conducted testing of all hemodialysis patients and staff, and contact tracing to identify potential exposures. Other infection control practices including contact and droplet precautions and cohorting of patients were also used.

Discussion

Recognizing the inherent risk of patients receiving in-center hemodialysis, renal programs in Ontario were quick to implement infection control practices to limit spread of COVID-19. Renal programs benefited from rapid knowledge transfer through regular provincial COVID-19 teleconferences, and reported that knowing what others had implemented helped them implement similar practices. For example, renal programs that faced challenges with accessing COVID-19 tests initially were able to advocate with their Infection Prevention and Control departments, knowing that other renal programs were testing patients using a low symptom threshold. Renal programs with a few COVID-19 cases early on (eg, in Northern Ontario) were able to proactively implement infection control practices. Over time, variations in practices in hemodialysis units across the province decreased.

While this article describes infection control practices that were implemented in hemodialysis units, effectiveness and direct correlations with COVID-19 cases cannot be determined. In addition, community transmission was a key factor in the spread of COVID-19 in certain regions of the province. There were also a significant number of outbreaks in long-term care homes during this time, where many hemodialysis patients reside. As such, despite robust infection control practices in hemodialysis units, patients may have contracted COVID-19. Nonetheless, limited outbreaks in hemodialysis units may be an indicator that infection control practices implemented early on contributed to minimizing spread of COVID-19.

Conclusions

The renal system in Ontario was able to respond quickly within the first 2 months of the pandemic to minimize spread of COVID-19 within in-center hemodialysis units. Practices described in this article may support future management and response to subsequent waves of COVID-19 or similar infectious diseases.

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

All authors provided their consent for publication.

Availability of Data and Materials

The de-identified data underlying this article will be shared on reasonable request to the corresponding author.

Declaration of Conflicting Interests

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