



Introduction

- Approximately 37,000 bloodstream infections occur each year in the United States among hemodialysis patients with central venous catheters (CVC).^{1,2} CVC access is associated with higher infection rates (4.2 cases/100 patient-months for permanent CVCs and 27.1 cases/100 patient-months for temporary CVCs) as compared to arteriovenous fistula (AVF; 0.5 cases/100 patient-months) or arteriovenous graft (AVG; 0.9 cases/100 patient-months) access types.
- DaVita initiated a pilot in partnership with the Armstrong Institute to reduce CVC-related bloodstream infections in outpatient hemodialysis patients. The pilot program was based on the validated Johns Hopkins Comprehensive Unit-based Safety Program (CUSP) and Translating Research into Practice (TRIP) approach. CUSP has been shown to reduce catheter-related bloodstream infections in the acute care setting.³⁻⁵

Objective

To apply the CUSP/TRIP approaches found to be successful in the acute care setting to the outpatient dialysis setting to improve/prevent CVC-related bloodstream infections.

Methods

- We conducted a collaborative, multifaceted, quality improvement program in 26 Maryland-area DaVita hemodialysis facilities. Project facilities were compared to 99 nonproject facilities in Maryland.
- In November 2011, following 3 months of training on the principles of CUSP, the pilot in-center teams were surveyed using a modified hospital survey on patient safety culture (HSOPS) tool to examine key elements of safety and practice in the facilities.
- The 56-question survey examined 7 dimensions related to patient safety culture, 5 related to infection prevention, and 4 related to outcomes.
- Tools for outpatient dialysis patients and teams were developed, and dialysis-specific interventions were implemented. CVC-related bloodstream infection rates were monitored using blood culture and treatment data collected from Davita's electronic medical record.
- Bloodstream infections (numerator for infection rates) were defined as a positive blood culture. Positive cultures taken within 3 days were counted as a single infection. All rates were represented per 100 treatments.

Catheter-Related Bloodstream Infection Reduction in the Outpatient Hemodialysis Setting

¹DaVita HealthCare Partners, Denver, CO; ²Johns Hopkins University Armstrong Institute for Patient Safety and Quality, Baltimore, MD; ³DaVita Clinical Research, Minneapolis, MN

Results

- The safety survey was completed by 431 out of 497 employees (86.7%). The overall goal of the survey was to:
- Engage employees in an open dialogue about safety
- Encourage a nonpunitive response to error
- Generate sustainable solutions to safety issues identified through teammate engagement
- The survey tool results were reviewed with each individual facility and action plans implemented as needed.
- Composite scores regarding a patient safety culture at baseline are shown in Figure
- Composite scores regarding infection prevention at baseline are shown in Figure 2
- Through the TRIP process, areas for systematic improvement in pre-, intra-, and post-dialysis CVC care were identified from medical literature review.
- A procedural CVC dressing kit with checklist, antimicrobial swabs for skin preparation, triple-antibiotic ointment for exit site application, alcohol swabs to facilitate hub scrub, and exit site dressing was developed. Pilot centers received hands-on training to reinforce the CVC dressing change procedure and kit utilization.
- Enhanced teammate engagement was facilitated through the development and implementation of a tool/management process designed as a daily exercise to prepare the team to collectively identify and plan for high-risk patients.
- Teammate engagement was also driven through the utilization of an infection tracking calendar for new CVC-related bloodstream infection episodes.
- During the evaluation period, we saw a greater decline in CVC-related rates in project clinics than in non-project clinics (Figure 3).



Figure 1. Composite Scores: Patient Safety Culture

---- Strengths: Areas that scored above 75% in survey

--- Opportunities for improvement: Areas that scored at 50% or below.

David Van Wyck, MD¹; Nancy Culkin, RN, BSN, CNN¹; Peter Provonost, MD, PhD, FCCM²; Christine Goeschel, ScD, MPA, MPS, RN²; Mahesh Krishnan, MD, MPH, MBA³; Levi Njord, MSc¹; Allen Nissenson, MD¹





---- Strengths: Areas that scored above 75% in survey

---- Opportunities for improvement: Areas that scored at 50% or below.

Figure 3. Catheter-Related Bloodstream Infection Rates in Project and Nonproject Facilities



Conclusions

The chronic outpatient environment varies greatly from the in-center acute care environment. With modification to adjust for the chronic outpatient setting, the application of the CUSP and TRIP tools and interventional approaches that reduce catheter-related bloodstream infections in hospitals can be successfully applied to reduce catheter-related bloodstream infections in chronic dialysis facilities.

References

- . Klevens RM, Edwards JR, Andrus ML, et al. Special Report: Dialysis Surveillance Report: National Healthcare Safety Network (NHSN)—Data Summary for 2006. Sem Dialysis. 2008;21(1):24-28.
- . Reducing bloodstream infections in an outpatient hemodialysis center--New Jersey, 2008-2011. MMWR. Mar 16 2012;61(10):169-173.
- Provonost PJ, Goeschel CA, Colantuoni E, et al. Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: Observational study. BMJ. 2010;340:c309. doi 10.11361/bmj.c309.
- 4. Using a Comprehensive Unit-based Safety Program to Prevent Healthcare-Associated Infections. Agency for Healthcare Research and Quality (AHRQ) Web site. http://www.ahrq.gov/professionals/quality-patient-safety/cusp/. Accessed 25 September 2013.
- Translating Research Into Practice TRIP-II: Fact Sheet. Agency for Healthcare Research and Quality (AHRQ) Web site. http://www.ahrq.gov/research/findings/factsheets/translating/tripfac/index.html. Accessed 4 October 2013.

Acknowledgments

We extend our sincere appreciation to the teammates in more than 1,800 DaVita clinics who work every day to take care of patients and also to ensure the extensive data collection on which our work is based. We thank DaVita Clinical Research[®] (DCR[®]), and specifically acknowledge Michele G. Scheid of DCR for editorial contributions in the preparation of this poster. DCR is committed to advancing the knowledge and practice of kidney care. We would also like to acknowledge Lisa Lubomski, Sallie Weaver, Mike Rosen, and Kathryn Taylor of Johns Hopkins Armstrong Institute for their contributions toward the development and implementation of the methodology presented in this poster.

This study was funded by DaVita Clinical Research through a grant to the Johns Hopkins Armstrong Institute for Patient Safety and Quality, Baltimore, Maryland.

*Correspondence: nancy.culkin@davita.com

Poster available at www.davitaclinicalresearch.com

American Society of Nephrology Kidney Week, 5-10 November 2013; Atlanta, GA.