Evidence Brief: Clinical and Economic Burden of Peripheral Intravenous Catheter-Associated Complications in a U.S. Hospital Discharge Database[1]

Purpose

- Nearly 200 million peripheral intravenous (PIV) catheters are used annually in the US.[2] PIV-associated complications such as bloodstream infection (BSI) are currently under-evaluated.[3]
- The purpose of this study was to estimate the clinical and economic impact of PIV-associated complications on hospitalized patients.

Methods

Study design

- **Retrospective Database Analysis**
- **2-year period**, from July 2013 to June 2015
- **Hospital discharge data** from the **Premier database** (more than 700 US hospitals and 6 million patient discharges per year)

Inclusion criteria

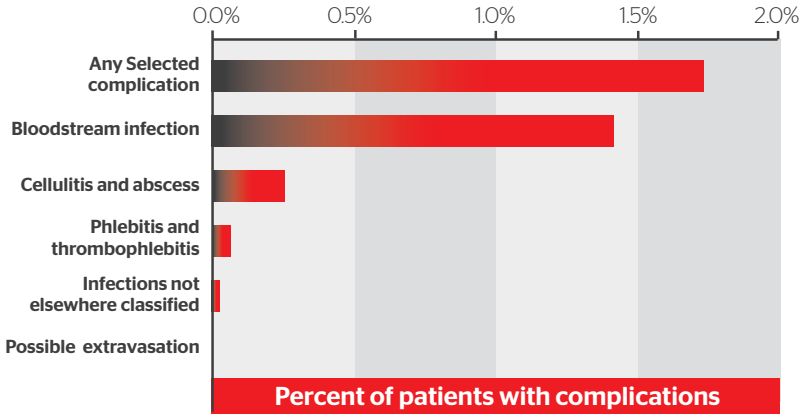
- Patients having 1 of 7 primary diagnoses unlikely to cause a complication of interest: Congestive heart failure (CHF), chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), diabetes mellitus with complications (DM), myocardial infarction (MI), pneumonia, and major trauma.

Statistical analysis

- **Multivariate analyses** compared length of stay (LOS), cost, admission to ICU, and discharge status for patients by PIV complication status.
- A large patient population allows for a **powered statistical analysis** (n=588,375)

Patient Complications

Figure 1. Selected Complication Rates Associated with PIV



Results

Overall **1.8% of patients (n=10,354) had a PIV-associated complication,** and rates varied by primary diagnosis: pneumonia (2.67%) to COPD (0.98%).

BSI was the most common complication (1.45% of included patients, or 82.2% of all complications) and ranged from 2.46% (pneumonia) to 0.67% (CKD).

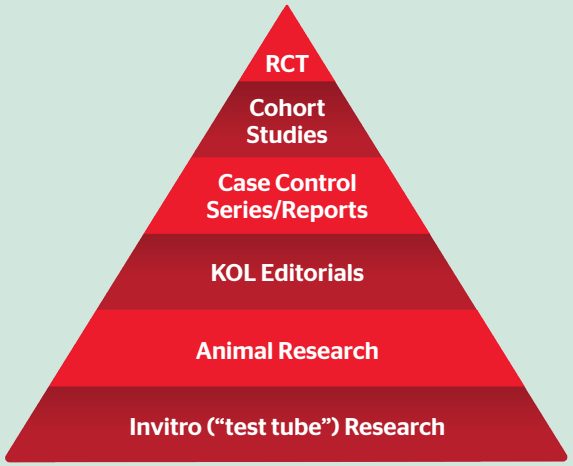
Patients with a complication were more likely to be admitted to the ICU VS those without (20.4% vs 11.0%),

less likely to be discharged home (62.4% vs. 77.6%),

and more likely to have died (3.6% vs 0.7%) (P<0.001 for all)

Conclusion

Patients with PIV-associated complications have longer LOS, higher costs, and greater risk of death than patients without.



What is the Premier database?

- One of the **largest, statistically certified hospital databases** in the world
- **Covers more than 700 US hospitals** and approximately 6 million (20% of all) US inpatient hospital discharges annually

Why was this database used?

- Used in over 350 peer-reviewed publications
- Contains **real-world data** on hospital resource use, costs, outcomes, and patient/hospital demographics[4]
- **Results can be generalized** to a broad hospital market

What is multivariate analysis?

- Analyzes data that arise from more than one variable.

Clinical Studies Evaluating PIV-BSI

Author	Year	Publication
Guembe	2017	The Journal of Hospital Infection
Mermel	2017	Clinical Infectious Diseases
Sato	2017	BMC Infectious Diseases
DeVries	2016	Journal of the Association for Vascular Access
Kovacs	2016	American Journal of Infection Control
Heinrich	2013	GMS Hygiene and Infection Control
Mestre	2013	American Journal of Infection Control
Rickard	2013	The Medical Journal of Australia
Dychter	2012	Journal of Infusion Nursing
Hadaway	2012	Journal of Infusion Nursing
Trinh	2011	Infection Control and Hospital Epidemiology
Pien	2010	American Journal of Medicine
Easterlow	2009	Journal of Clinical Nursing
Zing	2009	International Journal of Antimicrobial Agents
Pujol	2007	Journal of Hospital Infection
Maki	2006	Mayo Clin Proc.

Insertion of an IV catheter is an invasive procedure that introduces multiple risks and potential morbidities, and even mortality, and should be given the respect that it deserves.[5]

References: 1. Lim S, Adams E, Hyde R, Broder M, Chang E, Reddy SR, Tarbox M, Bentley T, Ovington L. Clinical and Economic Burden of Peripheral Intravenous Catheter-Associated Complications in a U.S. Hospital Discharge Database. Poster presented at: 31st Annual Scientific Meeting of the Association for Vascular Access; 2017 Sep 16-19; Phoenix, AZ. 2. Maki DG et al. The risk of bloodstream infection in adults with different intravascular devices: a systematic review of 200 published prospective studies. Mayo Clin Proc. 2006;81:1159-1171. 3. Zingg W, Pittet D. Peripheral venous catheters: an under-evaluated problem. Int J Antimicrob Agents 2009;34 Suppl4:S38-42. 4. Premier Research ServicesTM. Premier Inc. website. https://www.premierinc.com/transforming-healthcare/healthcare-performance-improvement/premier-research-services/. Accessed June 3, 2016. 5. Helm R. Accepted but Unacceptable: Peripheral IV Catheter Failure Rate. Journal of Infusion Nursing. May/June 2015; Vol 38, 3:190-203.

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