UAMS EM Journal Club Summary
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Clinical Bottom Line

The evidence comparing infection rates in US guided PIVs and traditionally placed PIVs is sparse. The infection rates of both in our cohort study were so low, it appears it would take a much larger study for a difference to be detected (if there is one).

We all agreed that for ALL ultrasounds performed, we should wipe in and wipe out. For any potentially contaminated ultrasound (any venous or arterial access, open skin or abscess, etc), we should be wiping in and out as well as using a probe cover or sterile glove to protect the probe from contamination.

It is also important to note that using a probe cover and sterile gel are mandated by the joint commission for broken skin, vascular access, and for scanning pregnant patients.

PICO Question

In patients needing IV placement, is there a difference in infection risk in patients receiving a traditional peripheral IV versus an US-guided PIV?

In conjunction with the above, we also considered the following questions: In patients for whom you are placing an ultrasound-guided peripheral intravenous line, what is the standard for sterilizing and/or cleaning the ultrasound probe? What is the current practice pattern?

Background

Ultrasound use is becoming more of a mainstay in EDs not only for diagnostic reasons but also for obtaining access. As the scope of US use broadens, having standards for maintaining probe cleanliness for the sake of probe and patient protection is important. Also, as US guided PIVs become more common, it's important to know infection rate comparisons between traditionally placed PIVs and US guided PIVs.

Article #1

Carrico R, Furmanek S, English C. Ultrasound probe use and reprocessing: Results from a national survey among U.S. infection preventionists. *Am J Infect Control*. 2018;46(8):913-920.

Pubmed link: https://www.ncbi.nlm.nih.gov/pubmed/29866632

The Basics:
Survey comparing current practice of US probe cleaning/sterilization to the reported national standard and expectations.

Inclusion Criteria:

Exclusion Criteria:

Results:
Survey sent to nearly 13,000 providers but only had 2-3% response rate. Survey questions were not disclosed in the article. Most entities who responded are not keeping up with the current national standards for disinfection.

Strengths:
Sent to a large amount and a diverse group of facilities and people utilizing ultrasound in different settings, including nonphysicians.

Limitations:
Very poor response rate
No access to survey questions
Many responders excluded due to not knowing the full sterilization process at their facilities
The listed expectations are quite strict, including things like high-level disinfection after central venous access

Article #2

Adhikari, S., Blaivas, M., Morrison, D., & Lander, L. (2010). Comparison of infection rates among ultrasound-guided versus traditionally placed peripheral intravenous lines. *Journal of Ultrasound in Medicine*, *29*(5), 741-747.

Pubmed link: https://www.ncbi.nlm.nih.gov/pubmed/20427786

Validity Rating: Moderate risk of bias

The Basics
Retrospective review of 402 patients who had peripheral IV lines placed under ultrasound guidance compared with 402 matched control patients receiving traditionally placed PIV. Patients were assessed during their hospital stay for signs of infection associated with the PIV placement.

Inclusion Criteria
-Adult patients who had a PIV placed in the ED and were admitted to the hospital over a 1-year period. Patients who had a PIV placed using traditional landmark approach through the study period were randomly selected from the same ED patient database to serve as a control group. Control patients were matched to the USG group by admission day and shift.

Exclusion Criteria
- Patients with PIVs started at another facility or location.

Primary Outcome
-Infection based on the centers for Disease Control and Prevention Guidelines for Health Care-Assocated Skin and Soft TIssues infection

Follow up

-Three chart reviewers used a standardized data extraction while doing chart reviews. Researchers reviewed the complete medical record, including ED and inpatient nursing notes, inpatient physician progress notes, flow sheets, order sheets, medication records, blood and wound cultures, and discharge summaries for documentation of the peripheral IV site, catheter size, duration the IV catheter was in place, and of signs and symptoms of peripheral IV catheter-related infections.

Results

-Groups with similar mean time for insertion to removal.
-2 infections in US group vs. 3 infections in traditional.
    -No statistical difference between the two groups for rates of infection.

Limitations/Biases

-Low population size for an event that has a low incidence (would need a larger number of patients to detect true rates of this rare outcome).
-Populations not controlled
-Strict definition of bacterial infection
-More experienced nurses placing USGPIVs where as traditional includes all nurses
-Relied on documentation of complications
-Retrospective analysis and researchers were not blinded.
-Patients were not followed after discharge.