JAMA Network Open

Invited Commentary | Critical Care Medicine

Peripheral Vasopressors for Shock—More Evidence to Do Less

Matthew T. Siuba, DO, MS

+ Related article

Author affiliations and article information are listed at the end of this article.

Interest in the use of peripheral intravenous (PIV) catheters to administer vasoactive medications to patients in shock has grown in recent years. Potential benefits include faster shock reversal as well as avoidance of central venous catheters (CVCs) to decrease complications related to placement and line-associated infections. The latest Surviving Sepsis Campaign guidelines even suggest using peripheral vasopressors rather than delaying vasopressor initiation until CVC placement,[1] though it is a weak recommendation based on low-quality evidence. To update the evidence base, ZhangJian et al[2] conducted a systematic review and meta-analysis on the outcomes of peripheral vasopressor use.

ZhangJian et al[2] identified 49 studies (including 33 060 PIV catheters) of critically ill adult patients receiving peripheral vasopressors in a variety of hospital settings, with the primary goal of identifying adverse events (AEs).[2] Secondarily, they sought to identify the rate of CVC avoidance. The pooled rate of minor AEs (such as injection site pain, swelling, extravasation, and cellulitis) was low at 2.6%. Major AEs were even less frequent at 1.4%, largely due to venous thromboemboli associated with midline catheters, with only 1 tissue necrosis event identified. Notably, there was a higher rate of observed minor complications in prospective compared with retrospective studies, which is not unexpected given likely differences in rigor of monitoring. CVC avoidance across studies was significantly heterogenous, with a pooled proportion of about 60%. The authors attributed this heterogeneity to study-level differences in protocols and resources.

To my knowledge, there are no multicenter randomized clinical trials comparing CVC with PIV administration of vasoactive medications. However, given that CVCs are associated with a 3% risk of major complications[3]—twice the rate of major AEs found in the study by ZhangJian et al[2]—these findings may prompt clinicians to consider use of PIVs for vasoactive drugs in critically ill patients. Several technical and system-based factors must be considered. The majority of vasoactive medications in ZhangJian and colleagues'[2] review were catecholamines, which have well-established reversal agents (such as phentolamine) for tissue extravasation.[4] Reversal agent efficacy is less clear for medications such as vasopressin and angiotensin II, the latter of which was not included in ZhangJian and colleagues'[2] study. One also needs to consider what maximal vasopressor dose might be delivered via PIV, with higher doses possibly increasing the risk of extravasation injury as well as the risk of hemodynamic collapse should the PIV fail. This emphasizes the need for a back-up PIV in the situation of primary PIV failure, along with careful consideration of how and where the PIV is placed. Uncertainty also remains as to whether a traditional PIV vs midline catheter should be favored, a choice that requires more data to clarify, in addition to a consideration of hospital- and patient-based factors. None of this is possible without clear systems of care, including protocols for ongoing monitoring, addressing AEs, and determining when escalation to CVC is necessary.[5,6]

In some ways, administering vasoactive medications via PIV requires us to do more (frequent monitoring, safety checks, practice changes, etc) in order to do less (CVC placement), which is a common issue in medical minimalism.[7] However, ZhangJian and colleagues[2] have demonstrated that PIV administration of vasopressors likely can be accomplished safely, with perhaps less discomfort and harm, compared with conventional CVC-based approaches in some critically ill patients.

ARTICLE INFORMATION

Published: March 16, 2026. doi:10.1001/jamanetworkopen.2026.0668

Corresponding Author: Matthew T. Siuba, DO, MS, Department of Pulmonary and Critical Care Medicine, Integrated Hospital Care Institute, Cleveland Clinic, 9500 Euclid Ave, L2-330A, Cleveland, OH 44195 (siubam@ccf.org).

Author Affiliation: Department of Pulmonary and Critical Care Medicine, Integrated Hospital Care Institute, Cleveland Clinic, Cleveland, Ohio.

Conflict of Interest Disclosures: None reported.

REFERENCES

1. Evans L, Rhodes A, Alhazzani W, et al. Surviving Sepsis Campaign: international guidelines for management of sepsis and septic shock 2021. *Crit Care Med*. 2021;49(11):e1063-e1143. doi:10.1097/CCM.0000000000005337

2. ZhangJian SJ, Niu KY, Chen CB, Seak CJ, Yen CC. Incidence of adverse events in peripheral intravenous vasopressor use: a systematic review and meta-analysis. *JAMA Netw Open*. 2026;9(3):e260710. doi:10.1001/jamanetworkopen.2026.0710

3. Teja B, Bosch NA, Diep C, et al. Complication rates of central venous catheters: a systematic review and meta-analysis. *JAMA Intern Med*. 2024;184(5):474-482. doi:10.1001/jamainternmed.2023.8232

4. Loubani OM, Green RS. A systematic review of extravasation and local tissue injury from administration of vasopressors through peripheral intravenous catheters and central venous catheters. *J Crit Care*. 2015;30(3):653.e9-653.e17. doi:10.1016/j.jcrc.2015.01.014

5. Fabick AC, Hawn JM, Barwick KW, Weeda ER, Goodwin AJ, Bell CM. Comparison of extravasation events related to the peripheral administration of vasopressors prior to and following implementation of an institutional protocol. *J Am Coll Clin Pharm*. 2023;6(7):709-717. doi:10.1002/jac5.1844

6. Gandhi ZJ, Dugar S, Sato R. Do I always need a central venous catheter to administer vasopressors? *Cleve Clin J Med*. 2024;91(5):287-291. doi:10.3949/ccjm.91a.23033

7. Siuba MT, Carroll CL, Farkas JD, Olusanya S, Baker K, Gajic O. The zentensivist manifesto: defining the art of critical care. *ATS Sch*. 2020;1(3):225-232. doi:10.34197/ats-scholar.2020-0019PS