

Article Appraisal

**Article:**  **“Safety of peripheral administration of vasopressor medications: A systematic review”**

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**Background and Study Objective(s):** Traditionally, vasopressor medications have been administered via central venous catheters (CVC’s). There are several disadvantages to CVC placement including the time consuming nature of the procedure as well as numerous potential complications including pneumothorax, vascular injury, retained guide wires, among others. Earlier initiation of vasopressors may be associated with reduced mortality by improving end organ perfusion sooner in critically ill patients. Therefore, there has been a growing trend towards administration of vasopressor medications via peripheral IV’s (PIVs). There is little evidence to support the safety of this practice and so these authors sought to evaluate the safety of delivering vasopressor medications via peripheral IV catheters.

**Study Design:** This study was a systematic review and meta-analyses. They performed an extensive literature search of prospective and retrospective studies of peripheral vasopressor infusions in adults. They included papers that were RCT’s, prospective or retrospective studies and included 20 or more patients as well as had continuous peripheral infusions of vasopressors and reported incidence of adverse events. Their exclusion criteria included studies with less than 20 patients, not in English, pressors delivered via PICC lines, pressor infusions in the OR, “push-dose” pressors, and patients not in shock.

The primary outcome was the incidence of adverse events related to the infusion of peripheral vasopressors. This included any episodes of extravasation, limb ischemia, skin necrosis, compartment syndrome, infection, or other complications requiring treatment.

The secondary outcome was details of administration protocols, policies, and guidelines regarding the management of the infusion (ie. frequency of observation).

**Results:** Their search identified 7 studies which contained 1436 peripherally administered vasopressor infusions. These studies were published between 2009 - 2018 and included anywhere from 20 - 734 patients. Most IV catheters were either 18G or 20G in size. The average duration of infusion was 22 hours. The most commonly administered agents were norepinephrine (49%), followed by phenylephrine (38%), and then the remainder were a mix of dopamine, vasopressin, and metaraminol.

With regards to the primary outcome, the incidence of adverse extravasation events was 38 / 1436 or 2.6%. Importantly, none of these events resulted in any skin necrosis, limb ischemia, compartment syndrome, or complications requiring surgical intervention. Two of the studies did treat all extravasation events (per pre-determined protocol) using topical nitroglycerine past and subcutaneous phentolamine.

**Validity of Results:** This study addresses a clear, clinically relevant question. The authors used clear pre-defined inclusion criteria and an appropriate study design for their stated objective (evaluating safety). One limitation of their search strategy was excluding papers not in English which could have led to an omission of some additional data. Other limitations include the relative lack of studies on this topic, mixed quality of the included studies, and variations in vasopressor infusion dose and concentration. Furthermore, there was no data collected on either IV site or timing of the extravasation events which eliminates the ability to draw any conclusions as to best practices.

**Generalizability of Results:** This systematic review included studies which were primarily conducted in the US, UK, and Australia and in mostly the ICU or HDU environment. These healthcare settings and populations are similar to Canada however the ICU / HDU environment has much smaller nursing to patient ratios which may add to the safety of this practice given their ability to perform frequent observation of the IV site and monitoring of theses infusions.

**The Bottom Line:** The administration of vasopressors via peripheral IV’s is a safe and pragmatic practice in which the benefits likely outweigh the small risk of harm. It should be noted that these infusions should be of a limited duration and under close observation to maximize safety. There is insufficient data to comment on the safest peripheral IV size or site. Overall extravasation events are uncommon and unlikely to lead to major complications.