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Abstract:

**BACKGROUND:** Peripheral venous catheters (PVCs) are commonly used in clinical practice. However, varying degrees of phlebitis often occur in patients receiving intravenous injections. The relevant literature suggests that phlebitis occurrence is highly associated with the catheter gauge, insertion site, and catheterization duration. Nevertheless, no meta-analysis has been performed on the influence of these three factors on the occurrence of phlebitis.

**OBJECTIVE:** The objective of this study was to determine whether any significant differences exist in the occurrence of phlebitis between catheters of 20 gauge or smaller and those larger than 20 gauge, between catheters inserted in the antecubital fossa and those inserted in other locations on the upper limbs, or between catheters inserted for more than 96 hours and those inserted for 96 hours or less.

**METHODS:** Using a systematic approach, we searched for literature published between 2006 and 2017 in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, ProQuest, and Cochrane Library databases. We used Comprehensive Meta-analysis Version 2 to perform our meta-analysis. After the screening and review processes, we identified 17 studies that met our selection conditions. Among these studies, 14 contained complete data for meta-analysis. These studies involved 4,343 patients and 5,846 PVCs.

**RESULTS:** Regarding the overall effect size in the meta-analysis, the results of the forest plot comparing catheters of 20 gauge or smaller and those larger than 20 gauge presented a risk ratio (RR) of 0.88 (95% confidence interval [0.67, 1.17],  $p = .380$ ), indicating no statistically significant difference in the occurrence of phlebitis between catheters of the aforementioned gauges. The results of the forest plot comparing catheters inserted in the antecubital fossa and those inserted in other locations on the upper limbs presented an RR of 1.05 (95% confidence interval [0.82, 1.34],  $p = .696$ ), indicating no statistically significant difference in the occurrence of phlebitis between catheters inserted in the aforementioned locations. The results of the forest plot comparing catheters inserted for more than 96 hours and those inserted for 96 hours or less presented an RR of 1.13 (95% confidence interval [0.49, 2.61],  $p = .779$ ), indicating no statistically significant difference in the occurrence of phlebitis between catheters inserted for the aforementioned durations.

**DISCUSSION:** The empirical results of this meta-analysis can serve as a reference for hospital management for selecting the PVC gauge, insertion site, and catheterization duration. In addition to the three factors that we analyzed, whether any other factors influence the occurrence of phlebitis in patients with catheter implantation is worth investigating in future research.

Reference:

Chang, W.P. and Peng, Y.X. (2018) Occurrence of Phlebitis: A Systematic Review and Meta-analysis. *Nursing Research*. 67(3), p.252-260.



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