

“It was found that a 45% catheter to vein ratio was the optimal cut off with high sensitivity and specificity to reduce the risk of VTE” Sharp et al (2014).

Reference:

Sharp, R., Cummings, M., Fielder, A., Mikocka-Walus, A., Grech, C. and Esterman, A. (2014) The catheter to vein ratio and rates of symptomatic venous thromboembolism in patients with a peripherally inserted central catheter (PICC): A prospective cohort study. International Journal of Nursing Studies. December 19th. .

Catheter to vein ratio and rates of symptomatic venous thromboembolism
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Abstract:

BACKGROUND: Peripherally inserted central catheters (PICCs) are a common vascular access device used in clinical practice. Their use may be complicated by adverse events such as venous thromboembolism (VTE). The size of the vein used for PICC insertion and thus the catheter to vein ratio is thought to be a controllable factor in the reduction of VTE rates in patients who have a PICC. However, an optimal catheter to vein ratio for PICC insertion has not previously been investigated to inform clinical practice.

OBJECTIVES: To determine the effect of the catheter to vein ratio (proportion of the vein measured at the insertion point taken up by the catheter) on rates of symptomatic VTE in patients with a PICC and identify the optimal ratio cut-off point to reduce rates of this adverse event.

METHOD: Adult patients waiting for PICC insertion at a large metropolitan teaching hospital were recruited between May and December 2013. Vein diameter at the PICC insertion site was measured using ultrasound with in-built callipers. Participants were followed up at eight weeks to determine if they developed symptomatic VTE.

RESULTS: Data were available for 136 patients (50% cancer; 44% infection; 6% other indication for PICC). Mean age was 57 years with 54% males. There were four cases of confirmed symptomatic VTE (two involving the deep veins, one peripheral vein and one pulmonary embolism). Receiver operator characteristic (ROC) analysis determined that a 45% catheter to vein ratio was the ideal cut off point to maximise sensitivity and specificity

(AUC 0.761; 95% CI 0.681-0.830). When a ratio of 46% or above was compared to one that was less than or equal to 45% using a log binomial generalised linear model it was found that participants with a catheter to vein ratio $>45\%$ were 13 times more likely to suffer VTE (relative risk 13, $p=0.022$; CI 1.445-122.788).

CONCLUSION: It was found that a 45% catheter to vein ratio was the optimal cut off with high sensitivity and specificity to reduce the risk of VTE. However, further research is needed to confirm these results as although adequately powered; the number of cases of VTE was comparatively small, resulting in wide confidence intervals.

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