



Based on these findings, the facility determined that EKG guidance is effective and its use was implemented for all bedside PICC placements in which a P wave was discernible” Cales and Rheingans (2016).

Abstract:

Objective: The purpose of this institutional review board-approved, single-blinded, randomized controlled trial was to evaluate the effectiveness of bedside peripherally inserted central catheter (PICC) tip placement using a nonproprietary electrocardiogram (EKG) machine and wide-mouth EKG clip connected to the right arm lead and PICC guide wire. The hospital site in this study was an 800-bed community, nonacademic, Magnet hospital in the southeastern United States.

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Methods: All patients who provided consent and were eligible for bedside PICC insertion were randomly assigned to either standard PICC insertion or standard PICC insertion plus EKG guidance. Placement was identified by observing for P wave changes, which indicated PICC tip location in relationship to the sinoatrial node in the superior vena cava. After the PICC lines were placed, 2 radiologists blinded to treatment assignment independently reviewed

confirmatory chest radiographs. De-identified data were collected and analyzed.

Results: One hundred eighty-seven patients participated in this study. Of all patients, 94.6% had a baseline rhythm with a discernable P wave. The time to insert the PICC while using EKG guidance increased by a mean difference of 9 minutes ( $P = .001$ ). The time to notification of the floor nurse that the PICC was read by a radiologist and ready to use for infusions was not significant between groups. In the control group, 91.8% of PICC lines were placed to completion at the bedside vs 90.2% in the experimental group ( $P = .710$ ). PICCs placed with EKG guidance were successfully placed with the first attempt or 1 pass (89%;  $n = 91$ ) vs PICCs placed without EKG guidance (75%;  $n = 63$ ;  $P = .01$ ). Of the control group, 40% ( $n = 34$ ) and of the experimental group, 48% ( $n = 49$ ) had PICC lines placed within 1.5 cm of the sinoatrial junction. Of the control group, 53% ( $n = 45$ ) and of the experimental group, 65% ( $n = 66$ ) had PICC lines placed within 1.5 cm of the sinoatrial junction to 3.0 cm above the sinoatrial junction ( $P = .10$ ). Of the control group, 64.8% ( $n = 55$ ) and of the experimental group, 82.2% ( $n = 84$ ) had PICC lines placed within 1.5 cm of the sinoatrial junction to 6.0 cm above the sinoatrial junction ( $P = .3$ ). Of the control group, 7.1% ( $n = 6$ ) and of the experimental group, 2.9% ( $n = 3$ ) had PICC lines placed 6.1 cm or more above the sinoatrial junction. Of the control group, 18.8% ( $n = 16$ ) and of the experimental group, 8.8% ( $n = 9$ ) had PICC lines placed too deep in the superior vena cava and below 1.6 cm ( $P < .05$ ). PICCs inserted with or without EKG guidance statistically had the same amount of chest radiograph images performed ( $P = .083$ ). Three groups reviewed the chest radiographs to determine the PICC tip location and they agreed to the location 82% of the time and a significant positive correlation between all 3 groups existed. The PICC Team subjectively identified 22 patients as obese. No statistical significance was realized among patients not identified as obese vs those identified as obese.

Conclusions: The data revealed that the control and experimental groups were equally distributed for baseline demographic characteristics such as sex and age. Importantly, it was determined that 94% of participants had a discernable P wave and were candidates for the use of EKG guidance. The time to insert a PICC line at bedside with the use of EKG guidance increased the procedure time by a mean of 9 minutes; however, the ultimate influence on patient care resulted in a savings of 67 minutes after factoring in an average of 76 minutes for radiograph confirmation. Complications and the need to reposition PICC lines were not found to be significant or vastly different or improved with or without the use of EKG

guidance. PICC lines placed with the use of EKG guidance were significantly unlikely to be repositioned. Lastly, it was found that obesity did not play any particular role. Based on these findings, the facility determined that EKG guidance is effective and its use was implemented for all bedside PICC placements in which a P wave was discernable.

Reference:

Cales, Y.K. and Rheingans, J. (2016) Electrocardiogram-Guided Peripherally Inserted Central Catheter Tip Confirmation Using a Standard Electrocardiogram Machine and a Wide-Mouth Electrocardiogram Clip Compared with Traditional Chest Radiograph. *The Journal of the Association for Vascular Access*. 21(1), p.44-54.

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