

**Abstract:**

**Purpose:** To determine whether the use of a magnetic tracking and electrocardiography-guided catheter tip confirmation system (TCS) is safe and noninferior to fluoroscopy concerning positioning accuracy of a peripheral inserted central catheter (PICC).

**Methods:** In this prospective, randomized, single-center study, adult patients scheduled for PICC insertion were assigned 1:1 either to TCS or fluoroscopy. The primary objective was a noninferiority comparison of correct PICC tip position confirmed by X-ray obtained immediately after catheter insertion. Time needed for PICC insertion and insertion-related complications up to 14 days after the procedure were secondary outcomes to be assessed for superiority.

**Results:** A total of 210 patients ( $62.3 \pm 14.4$  years, 63.8% male) were included at a single German center between June 2016 and October 2017. Correct PICC tip position was achieved in 84 of 103 TCS (82.4%) and 103 of 104 fluoroscopy patients (99.0%). One-sided 95% lower confidence limit on the difference between proportions was -23.1%. Thus, noninferiority of TCS was not established ( $p > 0.99$ ). Insertion of PICC took longer with TCS compared to fluoroscopy ( $8.4 \pm 3.7$  min vs.  $5.0 \pm 2.7$  min,  $p < 0.001$ ). Incidence of complications within a mean follow-up of  $5.0 \pm 2.3$  days did not differ significantly between groups.

**Conclusion:** Noninferiority of TCS to fluoroscopy in the incidence of correct PICC tip position was not reached. Ancillary benefit of TCS over fluoroscopy including less radiation exposure and lower resource requirements may nonetheless justify the use of TCS. The study is registered with Clinical.Trials.gov (Identifier: NCT02929368).

**Reference:**

Mack, V., Nißler, D., Kasikci, D., Malouhi, A., Aschenbach, R. and Teichgräber, U. (2020) Magnetic Tracking and Electrocardiography-Guided Tip Confirmation System Versus Fluoroscopy for Placement of Peripherally Inserted Central Catheters: A Randomized, Noninferiority Comparison. *Cardiovascular and Interventional Radiology*. June 17th. <https://doi.org/10.1007/s00270-020-02551-0>.