Abstract:

Purpose: To develop formulas that predict the optimal length of a peripherally inserted central catheter (PICC) from variables measured on anteroposterior (AP) chest radiography (CXR).

Materials and methods: A total of 134 patients who underwent PICC insertion at the angiography suites were included. Clinical information such as patient height, weight, sex, age, cubital crease to inferior carina border length (CCL), and approach side were recorded. The following variables via measurement on AP-CXR were also collected: (1) distance from the T1 to T12 vertebra (DTV), (2) maximal horizontal thoracic diameter (MHTD), and (3) clavicle length (CL).

Results: Significant correlations between CCL and the following variables were identified in linear regression analyses: approach side, height, weight, sex, DTV, MHTD, and CL. Multiple regression results motivated the following two formulas: (1) with height data, estimated CCL (cm) = 12.429 + 0.113 × Height + 0.377 × MHTD (if left side, add 2.933 cm, if female, subtract 0.723 cm); (2) without height data, estimated CCL = 19.409 + 0.424 × MHTD + 0.287 × CL + 0.203 × DTV (if left side, add 3.063 cm, if female, subtract 0.997 cm). Estimated final PICC length can be calculated as (Estimated CCL, cm) + 4.0 (distance from inferior carina border to about 2.0 vertebra body unit, cm) - (distance from set cubital crease to designated puncture point, cm).

Conclusion: This study suggests new formulas to predict the appropriate PICC length for bedside insertion using previous AP-CXRs. With this formula, ideal positioning of the catheter’s tip can be achieved in the clinical practice, avoiding or minimalizing the exposed catheter out of skin. These formulas may be helpful for patients who cannot undergo intra-hospital transport due to hemodynamic instability or who are concerned about isolation precautions due to any infectious-related contamination.

Reference: