Abstract:

INTRODUCTION: Peripherally inserted central catheters are very common devices for short, medium and long-term therapies. Their performance is strictly dependent on the correct tip location, at the junction between the upper caval vein and the right atrium. It is very important to obtain an estimated measure of the catheter, in order to reach the cavo-atrial junction and optimize the catheter length. Estimated measures are often obtained using cutaneous landmarks.

OBJECTIVE: Evaluate the reliability of cutaneous landmark-based length estimation during catheter insertion. Identify any patient’s related factors that may affect cutaneous landmarks reliability.

METHODS: We used two distinct techniques and collected data about cutaneous landmark-based length estimation, electrocardiographic guided intravascular length, age, weight and height. We studied the reliability of possible correcting factors, balancing the error average by regression models, and we found and tested two different models of prediction.

RESULTS: A total number of 519 patients were studied. The average bias, between the two studied length assessment by cutaneous landmarks and electrocardiographic guided catheter length, were 3.77 ± 2.44 cm and 3.28 ± 2.57 cm, respectively. The analysed prediction models (deviance explained 43.5%, Akaike information criterion = 1313.67% and 43.4%, Akaike information criterion = 1313.92), fitted on the validation set, showed a root mean square error of 3.07 and 3.06.

CONCLUSION: Landmark-based length estimation for preventive catheter length assessment seems to be unreliable, when associated with post-procedural tip location. They are useful for distal trimming catheters to optimize the ‘out of skin’ portion when associated with electrocardiographic tip location. Models identified for balancing bias are probably not useful.

Reference: