



# In Depth: Determining Optimal Central Venous Catheter Length During Insertion

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Central venous catheter (CVC) placement is one of the most common procedures performed in patients today. Despite measures to improve the safety of this procedure such as use of ultrasound guidance, CVC placement is still associated with a significant risk of complications [1]. In particular, malpositioned CVCs are associated with an increased risk of vascular complications and catheter malfunction [2]. Currently, there is no well-accepted strategy for ensuring correct catheter tip positioning. Thus, Mo and colleagues are to be complimented on their data-driven derivation of a formula to improve CVC catheter placement [3].

Mo et al. performed a prospective study evaluating the relationship between easily measurable clinical landmarks and the cavoatrial junction during non-emergent, ultrasound-guided, right internal jugular CVC placement [3]. The study is to be commended for the use of angiography to position the catheter and to measure the distance of the tip to the cavoatrial junction (this distance being defined as the alpha value). Chest radiography has been criticized for its inadequacy in identifying both CVC tip position [4] and the cavoatrial junction [5]. Moreover, the authors' approach is practical for the majority of CVCs placed in the intensive care unit or elective settings. Their formula is simple to use and standardizes CVC depth while still allowing for individualized patient care, as it incorporates

patient-specific distances (i.e., from the insertion point to the clavicular notch).

Better estimation of appropriate CVC length may lead to shorter procedural durations; decreased need for catheter removal, repositioning, or replacement; and fewer associated complications. Ideally, a prospective trial would evaluate whether routine use of the formula improves these outcomes in a more heterogeneous patient population. For example, although age, height, and body mass index were not correlated with the alpha value in the authors' analysis, the Korean population did not include many obese patients; the mean body mass index was 25 kg/m<sup>2</sup>. Nonetheless, this formula provides an evidence-based starting point for estimating CVC insertion depth while incorporating patient-specific factors.

## References

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