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Letter to the Editor

Predicting the Optimal Depth of Ultrasound-Guided Right Internal Jugular Vein Central Venous Catheters in Neonates☆

Dear Editor:

We read with interest the article entitled "Predicting the optimal depth of ultrasound-guided right internal jugular vein central venous catheters in neonates" by Montes-Tapia et al. [1], which was published in the September 2020 issue of the *Journal of Pediatric Surgery*. The authors developed a simple formula that could predict the optimal length of the central venous catheter (CVC) for right internal jugular vein catheterization in neonates. The formula was simple to calculate by incorporating the body weight as a single variable and using the carina as an anatomical reference point in order to place the catheter tip. After placement of the CVC, a chest radiograph was routinely taken to confirm the location of the tip and to rule out the occurrence of puncture-related complications. Before this publication, many researchers had developed various formulas to predict the optimal length of the CVC in pediatric patients, using different body measurements and venous routes [2–4]; however, this study is unique in that the formula was validated in neonates. Although the authors performed a large volume prospective study in a particular subset of patients and drew a reasonable conclusion, we are concerned that a post-procedure chest radiograph may not be deemed necessary by most readers, and pediatric surgeons at the inception of their career may be misled.

The most common rationale in developing this formula to predict the optimal length of the CVC is to avoid the need for a post-procedure chest radiograph and, consequently, shorten the overall procedure time while minimizing the risk of radiation exposure. A catheter that is inserted too deeply requires repositioning and another chest radiograph for position confirmation. A catheter that is inserted too shallowly cannot be advanced and must be exchanged to maintain sterility. It is not required to obtain a chest radiograph to ensure the proper CVC position according to the formula. However, serious and sometimes fatal puncture-related complications, such as pneumothorax or hemothorax, can hardly be detected without a post-procedure chest radiograph, and these complications are not related to catheter length or tip position. In addition, catheters that are unintentionally inserted into veins can be identified only after performing a chest radiograph [5,6]. To our knowledge, there have been no studies that have validated the safety and efficacy of formula-guided CVC placement without a post-procedure chest radiograph, and it is not clearly discussed in this article if the formula can ultimately eliminate the need for this confirmatory test. Formulas can shorten the overall procedure time by minimizing the risk of repositioning or catheter exchange, but in my opinion, a chest radiograph is still necessary to confirm complications after completion of the procedure. Therefore, regardless of the use of a formula, the decision to finish the procedure should be made after confirmation with a chest radiograph.

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☆ Conflict of interest: none