Success rates for accurate UAC placement are highest when formulae that involve body measurements are used" Lean et al (2017).

Abstract

BACKGROUND: Umbilical arterial catheter (UAC) insertion is a common procedure in the neonatal intensive care unit (NICU). Correct placement of the tip of the UAC at first attempt minimises handling of the infant and reduces the risk of infection and complications. We aimed to determine the accuracy of 11 published formulae to guide UAC placement.

METHODS: This was a one-year prospective observational study in a tertiary NICU. Clinicians used their preferred formula for UAC insertion, with X-rays performed immediately post-procedure to check the tip position. Birth weight and measurements included in the 11 formulae were recorded within 48 hours. The gold standard insertion distance was defined as the distance from the abdominal wall to the mid-descending aorta, at T8 level on X-ray (range T6-T10). Insertion length using the 11 formulae was calculated and compared with this gold standard distance.

RESULTS: One hundred and three infants were included, with median (IQR) gestational age and weight of 28 (26-33.5) weeks and 980 (780-2045) g, respectively. The predicted value of the 11 formulae to place the UAC in correct position ranged from 51.0% to 73.8%. Formulae that involved direct body part measurements showed the highest predicted success rates, smallest mean difference from T8 and narrowest limits of agreement using the Bland-Altman method.

CONCLUSION: Success rates for accurate UAC placement are highest when formulae that involve body measurements are used. However, even the most accurate method would result in more than 25% of UACs needing manipulation to achieve an optimal position.

Reference:

Lean, W.L., Dawson, J.A., Davis, P.G., Theda, C. and Thio, M. (2017) Accuracy of 11 formulae to guide umbilical arterial catheter tip placement in newborn infants. Archives of Disease in Childhood. Fetal and Neonatal Edition. August 17th. .

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