

Development of an anthropometric prediction model for neonatal PICC insertion Depth: a multicenter study

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References

1. Aldauskienė I, Tamelienė R, Marmienė V, Rimdeikienė I, Šmigelskas K, Kėvalas R. Influence of parenteral nutrition delivery techniques on growth and neurodevelopment of very low birth weight newborns: A randomized trial. *Medicina*. 2019;55(4):82.
2. Wu Y, Yan J, Tang M, Hu Y, Wan X, Li X, et al. A review of neonatal peripherally inserted central venous catheters in extremely or very low birthweight infants based on a 3-year clinical practice: complication incidences and risk factors. *Frontiers in Pediatrics*. 2022;10:987512.
3. Wrightson DD. Peripherally inserted central catheter complications in neonates with upper versus lower extremity insertion sites. *Advances in Neonatal Care*. 2013;13(3):198-204.
4. Sarmento Diniz ER, de Medeiros KS, Rosendo da Silva RA, Cobucci RN, Roncalli AG. Prevalence of complications associated with the use of a peripherally inserted central catheter in newborns: a systematic review protocol. *PLoS One*. 2021;16(7):e0255090.
5. Chen I-L, Ou-Yang M-C, Chen F-S, Chung M-Y, Chen C-C, Liu Y-C, et al. The equations of the inserted length of percutaneous central venous catheters on neonates in NICU. *Pediatrics & Neonatology*. 2019;60(3):305-10.
6. Doyle SC, Bergin NM, Young R, England A, McEntee MF. Diagnostic accuracy of ultrasound for localising peripherally inserted central catheter tips in infants in the neonatal intensive care unit: a systematic review and meta-analysis. *Pediatric Radiology*. 2022;52(12):2421-30.
7. Pittiruti M, Scoppettuolo G, La Greca A, Emoli A, Brutti A, Migliorini I, et al. The EKG method for positioning the tips of PICCs: Results from two preliminary studies. *Journal of the Association for Vascular Access*. 2008;13(4):179-86.
8. Sharpe EL, Curry S, Wyckoff MM. NANN Neonatal Peripherally Inserted Central Catheters: Guideline for Practice, 4th ed. *Adv Neonatal Care*. 2024;24(4):313-5.
9. Lok CE, Huber TS, Lee T, Shenoy S, Yevzlin AS, Abreo K, et al. KDOQI Clinical Practice Guideline for Vascular Access: 2019 Update. *Am J Kidney Dis*. 2020;75(4 Suppl 2):S1-s164.
10. Doyle SC, Bergin NM, Young R, England A, McEntee MF. Diagnostic accuracy of ultrasound for localising peripherally inserted central catheter tips in infants in the neonatal intensive care unit: a systematic review and meta-analysis. *Pediatr Radiol*. 2022;52(12):2421-30.
11. Zubi ZBH, Abdullah AFB, Helmi M, Hasan TH, Ramli N, Ali A, et al. Indications, Measurements, and Complications of Ten Essential Neonatal Procedures. *Int J Pediatr*. 2023;2023:3241607.