Why the mini-Magic is not magic – a neonatologist's point of view

Giovanni Barone, Vito D'Andrea, Mauro Pittiruti

The recent 'miniMAGIC' paper by Ullman and coworkers (1) tries to provide evidence-based recommendations for selecting venous access devices (VAD) in neonates.
We appreciate the efforts of the Authors, but we think that many of these recommendations are questionable and/or inappropriate, for several reasons:

- **The authors do not consider preterm neonates**. This subpopulation of neonates represents the majority of admission to NICU, inevitably requiring a VAD for hydration and nutrition. The preterm baby needs special consideration in terms of VAD, with different choices based on clinical condition, expected duration of IV infusion, diameter of the available veins, risk for systemic or local infection, and so on.

- **The authors do not differentiate between critical vs. stable neonates.** On the contrary, all major studies suggest different approaches to VAD selection in unstable, critically ill newborns, who require VADs appropriate for hemodynamic monitoring, high-flow infusion, blood sampling, etc., and sometimes with double lumen.

- **The authors perpetuate the confusion of terminology between Epicutaneo-Caval-Catheter (ECC) and Peripherally Inserted Central Catheters (PICC).** The 1-2.7 Fr ECCs used in neonates are completely different from the ultrasound-guided 3—5 Fr PICCs used in children and adults. ECCs and PICCs are associated with different performances and different incidence of complications: if compared to ECC, PICCs are appropriate for blood sampling, for high flow infusion (up to 1 ml/sec vs 1 ml/min of ECC), for hemodynamic monitoring, for infusion of blood products; and they have extended dwell time (even months); etc. (2).

- **The authors mention midline catheters as appropriate in newborns, though there is no evidence to support them.** Available studies on the use of midline catheters in the neonatal population are very small and of poor quality. Data about the advantages and disadvantages of midline catheters vs. ECCs are missing.

- **The authors suggest the placement of PICC > 3 Fr in neonates that need frequent blood draws.** This suggestion is not clear and probably dangerous. To the best of our knowledge, no study has ever proven the presence of a vein of adequate diameter for a 3 Fr catheter in in the arm or the limbs of neonates (3). On the contrary, ultrasound guided placement of 3-4 Fr catheters in the deep veins of neck and groin has been recently reported to be safe and relatively easy in term and preterm infants. (4).

- **The authors suggest using the umbilical catheter for more than one week.** Even though this extended use of the umbilical catheter may be technically possible, it's not clear the reason

to recommend it, especially if we consider the risk of complications. All recent literature consistently suggests an early removal of umbilical catheter, i.e. before day 5 after birth (5).

In conclusion, the 'mini-MAGIC' does not seem 'magic' at all. It does not support the clinician in the choice of the proper VAD in different clinical situations. Rather, it offers a range of possible options, some of which questionable, without offering criteria of choice.

References

1. Ullman AJ, Bernstein SJ, Brown E, et al. The Michigan Appropriateness Guide for Intravenous Catheters in Pediatrics: miniMAGIC. *Pediatrics*. Jun 2020;145(Suppl 3):S269-S284.
2. Barone G, Pittiruti M. Epicutaneo-caval catheters in neonates: New insights and new suggestions from the recent literature. *Journal of Vascular Access*. Epub ahead of print 2019. DOI: 10.1177/1129729819891546.
3. Barone G, D'andrea V, Vento G, et al. A systematic ultrasound evaluation of the diameter of deep veins in the newborn: Results and implications for clinical practice. *Neonatology*. Epub ahead of print 2019. DOI: 10.1159/000496848.
4. Barone G, Pittiruti M, Ancora G, et al. Centrally inserted central catheters in preterm neonates with weight below 1500 g by ultrasound-guided access to the brachio-cephalic vein. *J Vasc Access*. Epub ahead of print 2020. DOI: 10.1177/1129729820940174.
5. Sanderson E, Yeo KT, Wang AY, et al. Dwell time and risk of central-line-associated bloodstream infection in neonates. *J Hosp Infect*. 2017 Nov;97(3):267-274.