



Editorial

Neonatal percutaneous central venous catheters: Equations for the inserted length and locations of the insertion sites



The use of percutaneous central venous catheters (PCVCs) for central venous access is a routine and essential part of neonatal intensive care, particularly in the care of extremely preterm infants. It has been suggested that insertion of PCVCs is associated with sepsis, embolism, intravascular thrombosis, or pericardial effusion with tamponade.^{1,2} Besides, a case of ruptured PCVC has been reported as well.³ Repositioned PCVC or repeated mechanical stress might be related to the rupture of PCVCs.³ A proper insertion site with correct catheter tip location is therefore utmost important during the first attempt to place the PCVCs.

In general, the ideal tip location of the PCVCs is either in the inferior vena cava near to the diaphragm or in the superior vena cava before the right atrial junction, depending on the insertion site. Currently, there is no existing formulation that can be used beforehand to estimate the optimal insertion length of PCVCs in the field of neonatal intensive care. In this issue of *Pediatrics and Neonatology*,⁴ Chen et al. proposed equations of the inserted length of PCVCs for newborn infants. The equations were made using the data of 214 newborn babies with PCVCs and were validated in another 102 newborn babies. There were five different equations depending on the insertion sites (the foot, femoral vein, popliteal vein, hand, and axillary vein). This is very practical for clinical application. In Chen et al.'s study,⁴ the mean gestational age and birth body weight of the enrolled babies were 31.6 weeks and 1639 g, respectively. Of the 214 PCVCs, 22% (46) were inserted in the upper extremities; the mean body weight and body length at the insertion date were 2408 g and 44 cm, respectively. The remaining 78% (168/214) of the PCVCs were inserted in the lower extremities; the mean body weight and body length at the insertion date were 1689 g and 44 cm, respectively. In view of the gestational age, body weight, and body length, it is inevitable for the readers to question if these equations can be used in extremely preterm and tiny babies.

Another issue is the location of the insertion site. Chen et al. suggested that it is preferential to insert PCVCs from lower extremities because complications, such as infection, occlusion, phlebitis, and leakage, are not life threatening.⁴ On the other hand, Bashir et al. indicated that there is no difference in the total PCVCs-related complications between upper and lower extremity PCVCs.⁵ Goldwasser et al. collected and analyzed the data of 176 PCVCs in a level III neonatal intensive care unit and showed that a central location is ideal for the tip of a PCVC.⁶ When this is not achievable, an intermediate location is preferable to a more peripheral position.⁶ In a retrospective study consisting of 379 PCVCs in extremely preterm infants, PCVCs inserted in the lower extremity were more likely to have a centrally placed tip position compared with PCVC lines inserted in the upper extremities.⁷

In conclusion, using the equations to estimate the inserted length of PCVC beforehand and choosing a proper insertion site may reduce the rate of adjustment and prevent serious complications.

Conflict of interest

I have nothing to disclose.

Ming-Chou Chiang*

Department of Pediatrics, Chang Gung Memorial Hospital,
Taoyuan, Taiwan
Graduate Institute of Clinical Medical Sciences, Chang
Gung University College of Medicine, Taoyuan, Taiwan

* Division of Neonatology, Department of Pediatrics, Chang
Gung Memorial Hospital, 5, Fu-Shin Street, Guishan District,
Taoyuan 33305, Taiwan. Fax: +886 3 328 8957.

E-mail address: newborntw@gmail.com

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