

Letter to the Editor

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Submitted: 23-02-2024

Accepted: 14-05-2024

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DOI: <https://doi.org/10.47338/jns.v13.1304>

Are subclavian percutaneous central venous catheters an alternative to Hickman-Broviac catheters in neonates and young infants?

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DEAR SIR

We have previously reported the high Hickman-Broviac catheter-related morbidity in our pediatric settings [1]. We observed that several Broviac catheter-related complications, such as infections, unintentional removal, bleeding, and even vein thrombosis, were common. This was explained by the excessive use of this kind of tunneled surgical catheter, even for short periods of treatment or for perioperative patients. A quality process was implemented, with actions based on careful indications and patient selection, a nursing teaching program, and a multidisciplinary catheter management protocol [2]. However, Hickman-Broviac catheters remained the main central venous access in our institution for neonates and young infants aged less than 3 months because of the unavailability of peripherally inserted central catheters (PICCs) and the difficulty of percutaneous CVC (central venous catheter) placement, particularly with the unavailability of ultrasound techniques [3]. Nevertheless, there is little data about the feasibility, difficulty, and risks of percutaneous CVCs in neonates and young infants, particularly in our population. In this letter to the editor, I want to present and discuss the feasibility of our new strategy to replace Hickman-Broviac catheters with subclavian percutaneous ones, referring to an exceptional case report.

We report the case of a newborn who was hospitalized at the age of 22 days for severe dehydration due to profuse diarrhea. The newborn weighed 2.9 kg and was initially managed with peripheral venous access for 24 hours, used just for hemodynamic resuscitation before anesthesia. Then, a right internal jugular Broviac catheter was placed under sevoflurane sedation and facial mask spontaneous ventilation. The catheter was complicated by a non-documented infection that occurred 15 days after catheter insertion. A second Broviac catheter was placed in the left internal jugular vein two days later after verifying the presence of

efficient collaterals on the venous Doppler. This second Broviac catheter was accidentally removed two days after its placement. The peripheral venous access was poor, and the patient required long-term intravenous therapy. An axillary Hickman-Broviac catheter was widely discussed. Then, a multidisciplinary decision was made regarding the placement of a percutaneous subclavian CVC under sedation. The patient weighed 3 kg, and a single-shot percutaneous CVC was inserted (one-way 3 French diameter Adhe-els® catheter) in the left subclavian vein after a preload of 10 ml/kg to improve the subclavian vein diameter and facilitate the vein catheterization. This CVC was successfully used for 23 days for crystalloid load and antibiotherapy before its accidental removal. The patient's condition improved, with a weight gain of 500g noted along with the improvement of dehydration. A second CVC was placed under the same conditions on the same side after two attempts to save the other central veins, following a Doppler examination to rule out vein thrombosis. This case report showed that, in our conditions, a percutaneous subclavian catheter used for a neonate in severe condition was safe and efficient. The generalization of this strategy is still under study and requires further investigation.

We should mention that the outcomes of percutaneous CVCs may vary depending on the pediatric population selected [4]. Furthermore, the literature concerning percutaneous CVCs in neonates is limited, and the outcomes generally depend on the experience of the team and the quality of nursing [3, 5]. This may be due to technical issues with percutaneous CVC implantation in newborns. This technique is uncommon and calls for specialized skills in CVC placement. There are still no guidelines regarding the preferred site of CVC placement or the optimal size of the catheter to use [5]. We think that percutaneous CVCs may have an increased risk of vein thrombosis in neonates because of the small size of the vein, which

can reduce vein patency and may favor thrombosis. Moreover, conditions in low- and middle-income countries are particular and specific for each hospital, generally leading to increased rates of catheter-related morbidity [3]. Based on our previous results that showed lower rates of complications with percutaneous CVCs [4] compared to Broviac catheters [1, 2], we may prefer percutaneous CVCs. Furthermore, percutaneous CVCs may preserve long-term vein patency; however, Broviac catheters often require venous ligation with definitive vein obstruction. We think that the recent modification in our protocols by introducing percutaneous CVCs among neonates should be assessed in terms of feasibility, difficulties, and morbidity. Hosseinpour M et al. evaluated these two venous access methods in a previous Indian experience and demonstrated that there was no significant difference in the CVC indications, catheter life days, or rate of complications [6]. However, there is

a risk of procedure failure during percutaneous catheterization and a risk of accidental arterial puncture, which is not common during surgical catheter placement [6]. A comparison between tunneled Broviac catheters and percutaneous subclavian vein catheterization in our neonatal population using the landmark technique should be investigated in the next step of our vascular access quality process before addressing our venous access strategy.

Acknowledgments: Nil.

Conflict of Interest: None declared

Source of Support: Nil

Consent to Publication: No clinical figure is used in this manuscript.

Author Contributions: Author(s) declared to fulfill authorship criteria as devised by ICMJE and approved the final version.

REFERENCES

1. Kammoun M, Jarraya A, Ketata H, Ammar S, Zouari M, Regaieg C, et al. Risk factors for Hickman-Broviac catheter complications: An experience from a Tunisian hospital. *J Neonatal Surg.* 2022;11:26.
2. Kammoun M, Jarraya A, Ammar S, Kolsi k. Improvement of Broviac catheter-related outcomes after the implementation of a quality management system: A before-and-after prospective observational study. *J Neonatal Surg.* 2023;12:3.
3. Jarraya A, Kammoun M, Chtourou A, Ammar S, Kolsi K. Complications and its risk factors of percutaneous subclavian vein catheters in pediatric patients: enhancing the outcomes of a university hospital in a low-income and middle-income country. *World J Pediatr Surg.* 2023;6:e000523.
4. Jarraya A, Kammoun M, Sarhan A, Abdelhedi A, Kolsi K. Percutaneous infraclavicular subclavian vein catheters in paediatric cancer patients in comparison with critically ill children: a one-year experience from a Tunisian hospital. *Br J Nurs.* 2024;33:S28-S32.
5. Chen IL, Ou-Yang MC, Chen FS, Chung MY, Chen CC, Liu YC, et al. The equations of the inserted length of percutaneous central venous catheters on neonates in NICU. *Pediatr Neonatol.* 2019;60:305-310.
6. Hosseinpour M, Mashadi MR, Behdad S, Azarbad Z. Central venous catheterization in neonates: Comparison of complications with percutaneous and open surgical methods. *J Indian Assoc Pediatr Surg.* 2011;16:99-101.