Safety and Efficacy of Dual-Lumen PowerPICC 5Fr for Pediatric Hematopoietic Stem Cell Transplantation: A Case Series

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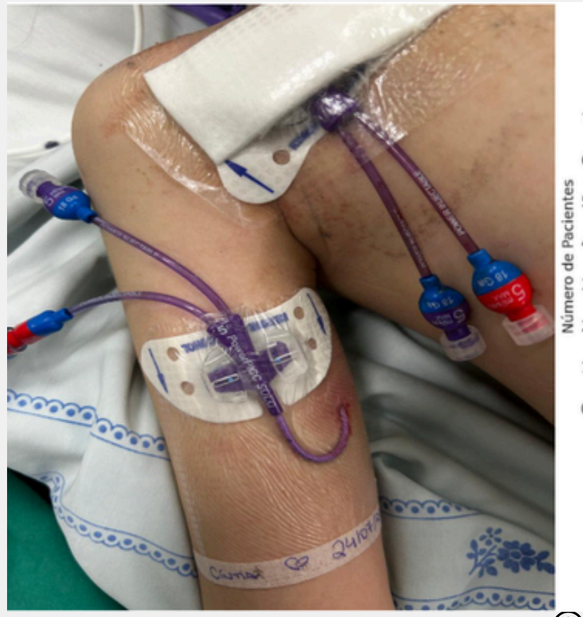
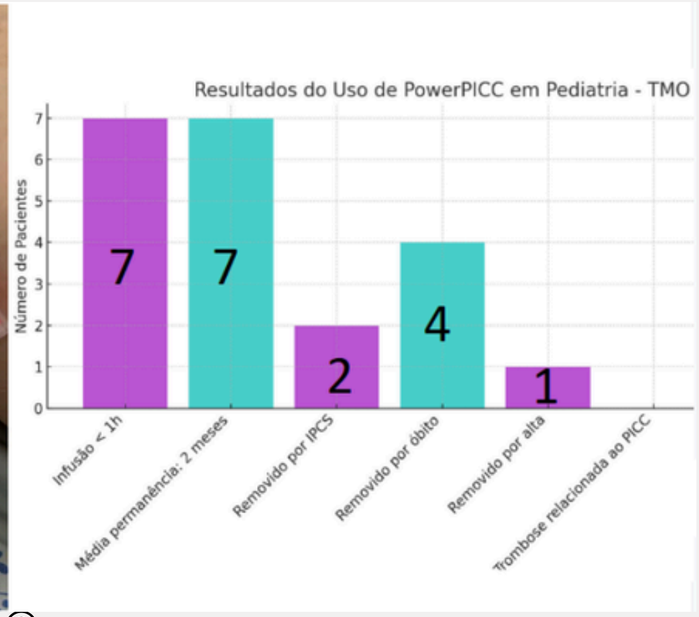
Introduction: Pediatric hematopoietic stem cell transplantation (HSCT) requires reliable, long-term, and high-performing vascular access devices to support complex treatment regimens. The PowerPICC Solo 5Fr, a dual-lumen catheter capable of infusion rates up to 5 mL/s, has been increasingly utilized as a viable alternative to traditional short-term central venous catheters (CVCs), providing enhanced precision and potentially reducing the risk of complications.

Methods: This descriptive case series included seven consecutive pediatric patients undergoing allogeneic HSCT between April 2023 and April 2025. In all cases, a PowerPICC Solo 5Fr catheter was inserted in the upper extremities by a specialized vascular access nursing team with expertise in ultrasound-guided placement. To accommodate the administration of multiple therapeutic agents and complex infusions, a second PowerPICC 5Fr was inserted centrally by a pediatric surgeon in the operating room. No patient required short-term CVC placement. Ultrasound was used to verify the catheter-to-vein ratio, maintaining it below 25% in all cases to minimize the risk of thrombosis.





Conclusions: The dual-lumen PowerPICC Solo 5Fr is a safe and effective vascular access option for pediatric HSCT when strict technical standards are observed, including appropriate catheter-to-vessel sizing, insertion by a skilled team, and continuous monitoring. The absence of thrombosis and optimal device functionality support its use in complex pediatric settings and align with current international recommendations for best practices.

KeKeywords: Central venous catheter; Hematopoietic stem cell transplantation; Pediatrics; Vascular access; Ultrasound guidance.
Conflict of Interest: None.

Results: All seven patients successfully received hematopoietic cell infusions within one hour. The mean catheter dwell time was two months. Two devices were removed due to primary bloodstream infections, four following therapy completion in patients who subsequently died, and one at hospital discharge. Importantly, no catheter-related thrombosis was observed. Maintaining the catheter-to-vein ratio below 25% was confirmed as a protective factor. Device performance consistently met clinical requirements, demonstrating both reliability and safety as primary and secondary vascular access in this high-risk population.