

## 32 Neonatal and Pediatric Intraosseous and Central Venous Access



### REFERENCES

1. Foex B: Discovery of the intraosseous route for fluid administration. *J Accid Emerg Med* 17: 136, 2000.
2. Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC). Part II: Pediatric advanced life support. *JAMA* 255: 2961, 1986.
3. Brunette DD, Fischer R: Intravascular access in pediatric cardiac arrest. *Am J Emerg Med* 6: 577, 1988.
4. Horton MA, Beamer C: Powered intraosseous insertion provides safe and effective vascular access for pediatric emergency patients. *Pediatr Emerg Care* 24: 347, 2008.
5. Rosetti VA, Thompson BM, Miller J, Mateer JR: Aprahamian C. Intraosseous infusion: an alternative route of pediatric intravascular access. *Ann Emerg Med* 14: 885, 1985.
6. Steele R, Irvin CB: Central line mechanical complication rate in emergency medicine patients. *Acad Emerg Med* 8: 204, 2001.
7. Von Hoff DD, Kuhn JG, Burris HA 3rd, Miller LJ: Does intraosseous equal intravenous? A pharmacokinetic study. *Am J Emerg Med* 26: 31, 2008.
8. Guy J, Haley K, Zuspan SJ: Use of intraosseous infusion in the pediatric trauma patient. *J Pediatr Surg* 28: 158, 1993.
9. Davidoff J, Fowler R, Gordon D, et al: Clinical evaluation of a novel intraosseous device for adults: prospective, 250-patient, multi-center trial. *JEMS* 30: 20, 2005.
10. Moore GP, Pace SA, Busby W: Comparison of intraosseous, intramuscular, and intravenous administration of succinylcholine. *Pediatr Emerg Care* 5: 209, 1989.
11. Davidoff J, Fowler R, Gordon D, et al: Clinical evaluation of a novel intraosseous device for adults: prospective, 250-patient, multicenter trial. *JEMS* 30: 20, 2005.
12. Ummenhofer W, Frei FJ, Urwyler A, Drewe J: Are laboratory values in bone marrow aspirate predictable for venous blood in paediatric patients? *Resuscitation* 27: 123, 1994.
13. Hurren JS: Can blood taken from intraosseous cannulations be used for blood analysis? *Burns* 26: 727, 2000.
14. Brickman KR, Krupp K, Rega P, et al: Typing and screening of blood from intraosseous access. *Ann Emerg Med* 21: 414, 1992.
15. Abdelmoneim T, Kisssoon N, Johnson L, et al: Acid-base status of blood from intraosseous and mixed venous sites during prolonged cardiopulmonary resuscitation and drug infusions. *Crit Care Med* 27: 1923, 1999.
16. EZ-IO® Infusion system. Available at: <http://www.vidacare.com/ez-io/index.html>. Accessed May 27, 2010.
17. Bone Infusion Gun® device. Available at: [http://www.waismed.com/PR\\_PediBIG.html](http://www.waismed.com/PR_PediBIG.html). Accessed May 27, 2010.
18. Fiorito BA, Mirza F, Doran TM, et al: Intraosseous access in the setting of pediatric critical care transport. *Pediatr Crit Care Med* 6: 50, 2005.
19. Ribeiro JA, Price CT, Knapp DR Jr: Compartment syndrome of the lower extremity after intraosseous infusion of fluid. A report of two cases. *J Bone Joint Surg Am* 75: 430, 1993.
20. Blumberg S, Gorn M, Crain E: Intraosseous infusion: a review of methods and novel devices. *Pediatr Emerg Care* 24: 50, 2008.
21. Hasan MY, Kissoon N, Khan TM, et al: Intraosseous infusion and pulmonary fat embolism. *Pediatr Crit Care Med* 2: 133, 2001.
22. van Rijn RR, Knoester H, Maes A, et al: Cerebral arterial air embolism in a child after intraosseous infusion. *Emerg Radiol* 15: 259, 2008.
23. Stenzel JP, Green TP, Fuhrman BP, et al: Percutaneous central venous catheterization in a pediatric intensive care unit: a survival analysis of complications. *Crit Care Med* 17: 984, 1989.
24. Johnson EM, Saltzman DA, Suh G, Dahms et al: Complications and risks of central venous catheter placement in children. *Surgery* 124: 911, 1998.
25. Janik JE, Conlon SJ, Janik JS: Percutaneous central access in patients younger than 5 years: size does matter. *J Pediatr Surg* 39: 1252, 2004.
26. Eisen LA, Narasimhan M, Berger JS, et al: Mechanical complications of central venous catheters. *J Intensive Care Med* 21: 40, 2006.
27. Implement the Central Line Bundle. Cambridge, MA, Institute for Healthcare Improvement. Available at: <http://www.ihi.org/ihi/topics/criticalcare/intensivemedicalchanges/implementthecentrallinebundle.htm>. Accessed October 18, 2008.
28. Lukish J, Valladares E, Rodriguez C, et al: Classical positioning decreases subclavian vein cross-sectional area in children. *J Trauma* 53: 272, 2002.
29. Skippen P, Kisssoon N: Ultrasound guidance for central vascular access in the pediatric emergency department. *Pediatr Emerg Care* 23: 203, 2007.
30. Vergheze ST, Nath A, Zenger D, et al: The effects of the simulated Valsalva maneuver, liver compression, and/or Trendelenburg position on the cross-sectional area of the internal jugular vein in infants and young children. *Anesth Analg* 94: 250, 2002.
31. Warkentine FH, Clyde Pierce M, Lorenz D, Kim IK: The anatomic relationship of femoral vein to femoral artery in euvolemic pediatric patients by ultrasonography: implications for pediatric femoral central venous access. *Acad Emerg Med* 15: 426, 2008.
32. Green C, Yohannan MD: Umbilical arterial and venous catheters: placement, use, and complications. *Neonatal Netw* 17: 23, 1998.
33. Yiiter M, Arda IS, Hiçsonmez A: Hepatic laceration because of malpositioning of the umbilical vein catheter: case report and literature review. *J Pediatr Surg* 43: E39, 2008.

### USEFUL WEB RESOURCES

WaisMed: BIG® Bone Injection Gun—[http://www.waismed.com/PR\\_PediBIG.html](http://www.waismed.com/PR_PediBIG.html)  
Vidacare: EZ-10® Infusion System—<http://www.vidacare.com/ez-io/index.html>