

Wiest D, Allee J, Deshmukh S

University of Florida , Gainesville , Florida, United states

Purpose: The use of intraosseous (IO) access for resuscitation has been well established for emergency use in critically ill pediatric patients. Its use has been described for both fluid resuscitation and blood transfusion. Our literature search provided no documented use for acute intraoperative resuscitative needs in pediatric patients with congenital cardiac disease. We present a 7-month-old cardiac transplant patient who required extensive resuscitation via bilateral IO access.

Clinical Feature: We encountered a 7 month old 5.6 kg female with a history of hypoplastic left heart with subsequent heart transplant at 1 month of age. Other pertinent history included peritoneal dialysis 18 hours daily, myoclonic encephalopathy, abnormal thyroid and liver function, and known difficult IV access. The patient presented to our institution for emergent replacement of a fractured Broviac catheter following a diagnosis of fever suspicious for sepsis. Physical appearance revealed cushingnoid body habitus with signs of extravascular fluid overload. Vitals were ABP 64/34, P 130, RR 35, and SpO2 92% on 0.5 L of nasal cannula oxygen. A recent echocardiogram showed mild to moderate depression of biventricular systolic function. Once in the operating room, induction commenced with oxygen, nitrous oxide, and sevoflurane via mask. A 24 gauge right antecubital IV was obtained only after multiple attempts in all extremities. An endotracheal tube was easily placed using direct laryngoscopy. Following intubation, the patient experienced a bradycardic event and subsequent cardiac arrest. At this time peripheral IV access was found to be non-functional. Resuscitation required chest compressions and administration of drugs via the ETT while establishing bilateral IO access. Further resuscitation took place with blood transfusions and fluid and drug administration via the IO access. After several rounds of compressions and medications the patient's vital signs stabilized. Compelled by the need for secure IV access a subclavian Broviac catheter was subsequently obtained by pediatric surgery.

Discussion: The use of IO needles allows for emergent venous access in patients of all ages and size. While the skill is one that many practitioners are intimidated to utilize, it remains time efficient and maintains a high success rate during first attempt. There are various IO needle types and suggested sites of use. The use of non-IO needles such as butterfly needles, spinal needles, and 18-gauge intravenous catheters for IO access have also been described. Complications such as extravasation of fluid, bone fractures, and cellulitis have been reported with IO use. Recommended maximum duration of use remains 3 to 4 hours. IO access remains the second most commonly used technique next to intravenous access for emergent resuscitative needs. It maintains the advantage for use in volume and drug resuscitation, lower complication rate, ease of placement, and highest placement success rate.

References:

1. Hamed RK, Hartman S. J Clin Anesth 2013.
 2. Joseph G, Tobias JD. J Clin Anesth 2008; 20:469-473.
 3. Luck RP, et al. Jour Emerg Med 2010; 39:4.
 4. Nijssen-Jordan, C. CJEM 2000; 2(1).
 5. Rajani AK, et al. Pediatrics 2011; 128:e954.
-