The practice of reducing the core temperature of a cardiac arrest or stroke patient to protect the brain and increase the probability of a full return to normal function is rapidly gaining acceptance and practice in the EMS arena.

Evidence from multiple clinical studies\(^1\)\(\text{-}^8\) show positive results from the use of Therapeutic Hypothermia (TH), EMS systems are developing protocols and practices for its use in the field. The process of TH involves deliberately cooling down a patient’s body to between 32-34°C to reduce hypoperfusion and reperfusion injury, especially to the brain. To achieve this cooling state, pre-hospital systems use methods such as surface cooling with cold blanket technology and ice packs, vascular infusion of chilled saline, or a combination of these.

But what if infusion of chilled saline through intravenous access isn’t possible due to collapsed veins? Can the go-to tool in the EMS technician’s kit – intravenous access with a device like the EZ-IO Intraosseous Infusion System – be used?

**THE SCIENCE OF IO TO REDUCE CORE TEMPERATURE.** There are a number of case reports and studies\(^9\)\(\text{-}^13\) that demonstrate the effective use of intravenous vascular access in reducing core body temperature. In the most recently published abstract,\(^14\) researchers described a study designed to determine if IO access could be used as effectively as intravenous access to reduce core temperatures. The answer is yes, and as TH adoption continues, chilled infusion through the IO route with devices like Vidacare’s EZ-IO\(^\text{TM}\) Intraosseous Infusion System, particularly in the humeral insertion site, should be considered.

Presented at the National Association of EMS Physicians in January 2012, the abstract Infusing Chilled Saline Through the Intraosseous Route Is Equivalent to Infusion Through the Intravenous Route in Reducing the Core Temperature in Swine concluded that IO and IV access are equally efficient in administering a chilled saline solution to reduce core body temperature.

**HUMERAL SITE FOR OPTIMAL FLOW.** When using IO access to induce therapeutic hypothermia on a patient, the optimal site may be the proximal humerus. Two recent studies demonstrated flow rates are greater in the humerus than the tibia and have high pre-hospital placement success rates.\(^9\)\(\text{-}^11\)

In the article Hurt So Good: Easing IO Pain and Pressure,\(^10\) researchers studied the relationship between infusion pressure and flow rates; and the effect of lidocaine on intravenous infusion pain for the tibia and humerus insertion sites. The study’s authors concluded that the proximal humerus should be strongly considered for optimal flow rates as data showed the humerus provides greater flow rates than the tibia at all infusion pressure levels. While the tibia provides adequate IO infusion rates for most situations, when greater flow rates are required, the proximal humerus proved superior. Moreover, for the conscious patient, IO infusion pain is more easily managed through the humeral site.

A second study on the humeral insertion site, Humerus Intraosseous Access Success Rate in Adult Out-of-Hospital Cardiac Arrest,\(^11\) explores success with the proximal humerus in the pre-hospital cardiac arrest patient. In a report of results, researchers examined 405 cardiac arrests, with humeral access attempts in 61 percent of the cases. The overall success rate was 94 percent, and first attempt successful placement – defined as stable placement with sufficient flow – was 91 percent. This study illustrated a high degree of paramedic success in establishing intravenous access outside the hospital and showed humeral IO access to be a reliable method of fluid and medication delivery for the out-of-hospital cardiac arrest population.

**TH AND IO – A LIFE-SAVING COMBINATION.** As the practice of TH increases, the ability to obtain rapid and reliable vascular access for cooling is vital. Devices like the EZ-IO Intraosseous Infusion System make that possible. To ensure success and optimal flow follow standard IO guidelines: consider the proximal humeral site, flush first, use a pressure bag or infusion pump, and remember that any fluid or drug that can be infused through a peripheral IV can be infused through the IO.\(^11\)\(\text{-}^13\)

Vidacare’s EZ-IO\(\text{TM}\) Intraosseous Infusion System – the first battery-powered device to establish immediate vascular access and the first IO device FDA-cleared for humeral insertion – is used by 90 percent of US advanced life support ambulances and over half of US Emergency Departments, as well as the US Military.