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"Superior Venous Access: Midline vs Ultrasound IVs, a Randomized Clinical Trial"

Obtaining intravenous access (IVA) is the most common procedure performed in the emergency department (ED). Placement of IVA allows for blood work and delivery of intravenous fluids and medications. IVA is a critical component to many ED visits and allows for the diagnosis and treatment of life threatening conditions. Despite the routine placement of IVA, this simple procedure can be extremely challenging to perform in some patients. As many as 1 in 9 patients may be considered a difficult venous access (DVA) patient. Patients who are unable to receive IVA with standard measures by palpation and visualization, may require a rescue procedure. We define a rescue procedure as requiring ultrasound guidance for peripheral IV, midline placement, or central venous catheter (CVC) placement.

The implementation of ultrasound guided peripheral IVs (UGPIV) have greatly reduced the need for placement of CVCs. CVC placement can be a time-consuming procedure associated with significant complications including infection, pneumothorax, or vascular injury. Although safer, UGPIVs are associated with infiltration and have failure rates as high as 44%. The placement of midline catheters is an emerging middle ground between UGPIV and CVCs. Midline catheters are associated with lower infection rates than CVCs, and midlines can be used for up to 29 days. Midlines are however associated with their own complications including thrombosis and are more expensive than UGPIVs. It is, however, unclear if ED patients with DVA should receive an UGPIV or a midline catheter. We seek to compare the failure rates for midline catheters against UGPIVs.

Patients will be selected who are deemed likely for admission and are DVA patients. Patients will be prospectively enrolled and randomly assigned to receive either standard UGPIV or a midline. Outcome measures including length of survival of the catheter, complications, and need for further IVA will be documented. We will plan to enroll 54 patients in each arm to detect a 25% difference in survival by 72 hours. We will complete a cost analysis for the two arms to determine if midline placement should be routinely used for patients with difficult vascular access over standard ultrasound guided peripheral IVs.