Near-Infrared Imaging in Intravenous Cannulation in Children: A Cluster Randomized Clinical Trial

WHAT’S KNOWN ON THIS SUBJECT: Gaining intravenous access in children can be difficult. Recently, several near-infrared devices have been introduced attempting to support intravenous cannulation by visualizing veins underneath skin. Only one of those devices has been evaluated systemically thus far and results are inconclusive.

WHAT THIS STUDY ADDS: Although it was possible to visualize veins with near-infrared in most patients, the VascuLuminator did not improve the success of cannulation. An explanation is that the main problem is probably not localization of the vein but insertion of the cannula.

OBJECTIVE: Intravenous cannulation is a widespread medical procedure that can be difficult in children. Visualization of veins with near-infrared (NIR) light might support intravenous cannulation. Therefore, we investigated the effectiveness of an NIR vascular imaging system (VascuLuminator) in facilitating intravenous cannulation in children in the operating room.

METHODS: This was a pragmatic, cluster randomized clinical trial in all consecutive children (0–18 years) scheduled for elective surgery and in need of intravenous cannulation at a tertiary pediatric referral hospital. Daily operating rooms (770 patients) were randomized for allocation of the VascuLuminator or control group. The primary outcome was success at first attempt; the secondary outcome was time to successful cannulation.

RESULTS: Success at first attempt was 70% (171/246) with and 71% (175/245) without the use of the VascuLuminator (P = .69). Time to successful cannulation was 162 (±14) seconds and 143 (±15) seconds respectively (P = .26). In 83.3%, the vein of first choice was visible with the VascuLuminator.

CONCLUSIONS: Although it was possible to visualize veins with NIR in most patients, the VascuLuminator did not improve success rate or time to obtain intravenous cannulation. There are 3 possible explanations for this result: first, it could be that localization of the vein is not the main problem, and therefore visualization is not a solution; second, the type of system used in this study could be less than optimal; and, third, the choice of the patient population in this study could be inappropriate. Pediatrics 2013;131:e191–e197