Letter to the Editor

Novel vein viewing system assists with venepuncture in children

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About two decades ago, near-infrared spectroscopy was introduced as diagnostic tool in neonatology [1]. Near-infrared spectroscopy is based on the different light absorption coefficients of oxygenated and deoxygenated hemoglobin and enables clinicians to measure cerebral blood oxygen concentrations in sick newborns. More recently, Zeman et al. [2] designed a medical device which employs a similar technology combined with an infrared video camera to project real-time images of superficial blood vessels on to a patient's skin (United States Patents 5969754 and 7239909, Fig. 1).

It was hypothesized that the vein viewer (Luminetx, Memphis, TN) could be used to improve venous access in children. The equipment was donated to our children's ward by a charitable organization. Fifty children under the age 16 (median age 77.5 months) who required venepuncture or peripheral venous cannulation as part of their standard clinical care were recruited. The study was approved by our research and development department. The procedures were performed by pediatric doctors and nurses of varying seniority who subsequently filled out a questionnaire regarding their experience with the vein viewer. They stated that the

visibility of peripheral veins was improved in three quarters of the young patients. A majority of 72% commented positively on the new device, whereas 28% were undecided or found it not useful. The size of the vein viewer is comparable to a pediatric mobile X-ray machine but it does not emit ionizing radiation. No adverse effects were noted.

A recent study has demonstrated that two thirds of children and their parents consider phlebotomy the most distressing experience during a hospital admission despite the fact that topical anesthetics and play therapy are routinely used in most pediatric departments to prevent or alleviate pain [3]. However, it appears that formal training in venepuncture and cannulation for pediatric trainee doctors is rare. The novel vein-imaging device described here may be able to reduce the number of puncture attempts, particularly in those children in whom venous access proves difficult. It could also assist with the insertion of central venous catheters in pediatric oncology patients but so far, no trials have been conducted. In a future development, this technology can be utilized to create robotic systems that allow fully automated phlebotomy.

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Fig. 1. Left hand of a child volunteer showing superficial dorsal veins as seen with the vein viewer (and clinodactyly of the 5th finger).

References

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