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CORRESPONDENCE

Letter to the Editor on the original article "Ultrasound-guided peripheral intravenous access placement for children in the emergency department" by "Takehito Otani"

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To the Editor:

With interest, we read the article entitled "Ultrasound-guided peripheral intravenous access placement for children in the emergency department" by Otani et al. [1]. Their study investigated the success rates of intravenous cannulation in a pediatric emergency setting, in which patients after one failed conventional attempt were allocated to either ultrasound-guided ($n = 99$) or conventional technique ($n = 100$). They concluded that ultrasound guidance using a real-time, dual-operator method led to a lower success rate (65%) than the conventional technique (84%). However, we feel that this result should be interpreted with the following considerations.

If the physical limitations of the behavior of ultrasound in tissue are not fully understood by the operator, failure of vascular cannulation will result [2, 3]. There is a discrepancy between what is shown on the ultrasound monitor and the underlying anatomy, due to the expanding three-dimensional ultrasound field within the tissue, which is strengthened when strong reflective objects like needles are inserted. Needle reflection in the periphery of this ultrasound field will be interpreted by ultrasound machines as coming from the center of the transmitted beam, and hence be represented inaccurate on the screen. Moreover, unintentional transducer movements are common made mistakes during ultrasound-guided interventions [4]. Particularly, a dual-operator method is sensitive to such errors, and the impact of this phenomenon is more pronounced when targeting smaller structures, like vessels, in pediatric patients. Additionally, even in adults, the proficiency in ultrasound-guided peripheral intravenous cannulation to achieve a success rate up to 90% requires at least 25 procedures, opposed to the 10 during the study of Otani et al. [1, 5].

We believe that ultrasound will increase first-attempt success rate for vascular access, when considered early based on predictive scales for difficult vascular access, by knowledgeable and experienced practitioners, who understand the reflection of a needle in an ultrasound field and its interpretation by the ultrasound machine.

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