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for PVRI are correct, and only the units are printed incorrectly. Even if the resistances were computed incorrectly, I do not believe the important conclusions of the paper would be altered. In addition, a typographical error appears in figure 5, in which the units of heart rate are stated as beats/m² instead of beats/min.

Previously, I have reviewed the reasons for the apparently counterintuitive multiplication of SVR by BSA to compute SVRI, but they are applicable to PVRI. To summarize, blood pressure is a physical measurement (its physical units are dyn·cm⁻²) that should not be scaled to BSA. Ohm’s law for fluids states that $\Delta P = \text{flow} \times \text{resistance}$. The flow (physical units cm³/s), when divided by BSA generates a flow index (e.g., CI = CO/BSA). Yet, the product flow index × resistance index must also equal $\Delta P$. To restate this for the pulmonary circulation, $\Delta P = \text{CI} \times \text{PVRI}$. Dimensional analysis of this equation reveals that PVRI must be calculated as $\text{PVRI} = \text{PVR} \times \text{BSA}$, and the units of PVRI must be dyn·cm⁻²·m². Because this error is still seen in the literature, I believe it deserves to be publicized more widely throughout the anesthesiology community.

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References


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In Reply—We agree with the comments made by Larach about the units of pulmonary vascular resistance index used in our recent paper. Pulmonary vascular resistance index was calculated as $\Delta P$ divided by cardiac index or, in other words, as pulmonary vascular resistance times body surface area. Therefore, the units shown in table 1, table 3, and figure 5 are wrong because of a typographical error and should have been written as dyn·s·cm⁻³·m². We have to thank Larach for his careful reading of our paper.

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Skeletal Muscle Relaxation in Patients Undergoing Electroconvulsive Therapy

To the Editor—Like Beale et al., we found that applying the electrical stimulus for electroconvulsive therapy just after complete abolition of the adductor pollicis muscle response to ulnar nerve stimulation resulted in less-than-satisfactory attenuation of motor activity. We have had much better results using the posterior tibial nerve. This nerve is easily stimulated by placing the electrodes posterior and inferior and posterior to the medial malleolus. Stimulation causes plantar flexion of the toes.

Since we usually use one foot as an “isolated limb,” it is a simple matter to uncover both feet, place the stimulator on one and a tour-
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niquet or blood pressure cuff on the other, and observe both feet. After administration of 1 mg/kg succinylcholine, the nerve is stimulated at a rate of one impulse per second using a supramaximal stimulus. When there is complete abolition of response, the stimulus for the electroconvulsive therapy is applied.

The foot as the site of nerve stimulation has the added advantage that it is less likely to be crowded with other devices (armbands, armboards, intravenous tubing or catheters, cables for pulse oximeters) than is the wrist.

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References


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Modifying the Needle Guide of the Site Rite Enhances Performance in Pediatric Patients

To the Editor.—The efficiency of using ultrasonically guided cannulation of the internal jugular vein in adults using the Site Rite by Dymax Corporation is well established.1 The Site II is a two-dimensional echo with two depths of fields, 2 and 4 cm. This version of the machine is optimal for pediatric patients and can be transported in a briefcase-size carrying case. For inserting central venous catheters, a small echo probe is placed inside a sterile sheath. A sterile needle guide is attached to the outside of the probe, and then a needle can be placed under direct echo guidance, into the vessel beneath the skin. The needle guide that is supplied by the manufacturer is designed to be used with an 18-G needle that is at least 3.3 cm long. It then intersects with the echo beam at 1.5 cm beneath the skin.

This large-size needle is inappropriate for small pediatric patients. In pediatric patients, the vessel often is cannulated first with a 22-G, 2.2-cm intravenous catheter. These catheters are too short to intersect with the echo beam while remaining in the standard needle guide. The consequence of pulling the needle out of the needle guide during insertion is that the needle will go less deep and may miss the vessel to be cannulated. The needle guide is modified by cutting the top of the guide as shown in figure 1. The 22-G intravenous catheter then can be inserted so that it will intersect the vessel at the proper depth while remaining in the needle guide. This modification, which allows the catheter to remain in the guide, has enhanced the success rate for cannulating central veins in small patients.

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Fig. 1. The standard needle guide is modified by trimming off the top so that the intravenous catheter can be inserted further into the skin to intersect the vessel.