“Blood volume determination using an intravenous optical fiber”

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Accurate blood volume determination is essential for case management in critical care as well as for patient evaluation throughout chronic disease states such as heart disease. However, the current methods of objective blood volume assessment are time-consuming, involve exposure of patients to radioactive substances, and require special licensing and handling of these radioactive substances. For these reasons, total blood volume determination occurs rarely and mostly in the domain of large medical research institutions. As a result, common clinical practice relies upon indirect clinical indicators of blood volume (e.g. heart rate, blood pressure, hematocrit, and hemoglobin) even though these may yield conflicting or misleading information. To improve the patient care, we are developing a prototype point-of-care analyzer to determine total blood volume within a few minutes without blood draws, radioactive substances, or outside laboratory processing. The rapid acquisition of patient blood volume will allow clinicians to utilize this information for immediate decision making as well as enable progressive monitoring of blood volume through therapeutic interventions. This technology promises to deliver a safe, reliable point-of-care device at a low cost that will take objective blood volume assessment from the domain of large medical research facilities to the front lines of clinical practice.