

# Pulse Dye Densitometry: A Novel Bedside Monitor of Circulating Blood Volume

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## Abstract

**Introduction:** Monitoring of circulating blood volume is important in the management of critically ill patients. Current methods of circulating blood volume measurements such as indicator dilution using radioisotopes or Evans blue dye are unsuitable for clinical application as these tests do not allow for frequent repeated measurements to be done. A direct bedside measurement of circulating blood volume using the principle of pulse dye densitometry was recently introduced. This is essentially an indicator dilution technique using indocyanine green combined with the principle of pulse spectrophotometry. **Methods:** This paper aims to review this method of circulating blood volume measurement and provide a summary of the published clinical trials that compared its accuracy with the other conventional methods of circulating blood volume measurement, based on a Medline search, spanning the period 1966 to August 2000. **Results:** Published studies show that pulse dye densitometry gives comparable results when compared to other conventional methods of blood volume measurement. Its ability to measure circulating blood volume accurately and repeatedly, as frequently as every 20 min makes it suitable for clinical application. **Conclusion:** Pulse dye densitometry provides for a rapid, semi-noninvasive and convenient bedside assessment of circulating blood volume that is applicable clinically. Further studies are needed to ascertain the impact of the use of pulse dye densitometry on the mortality and morbidity of the critically ill.

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**Key words:** Circulating blood volume measurement, Indocyanine green, Pulse dye densitometry, Pulse spectrophotometry

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