

Evaluation of the utility of the Vigileo FloTrac™ , LiDCO™ , USCOM and CardioQ™ to detect hypovolaemia in conscious volunteers: a proof of concept study

O'Loughlin E(1), Ward M, Crossley A, Hughes R, Bremner AP, Corcoran T. Anaesthesia. 2015 Feb;70(2):142-9. doi: 10.1111/anae.12949.

It is important to detect and treat hypovolaemia; however, detection is particularly challenging in the conscious, spontaneously breathing patient. Eight healthy male volunteers were monitored using four minimally invasive monitors: Vigileo FloTrac™ ; LiDCOrapid™ ; USCOM 1A; and CardioQ™ oesophageal Doppler. Monitor output and clinical signs were recorded during incremental venesection of 2.5% estimated blood volume aliquots to a total of 20% blood volume removed. A statistically significant difference from baseline stroke volume was detected after 2.5% blood loss using the LiDCO ($p = 0.007$), 7.5% blood loss using the USCOM ($p = 0.019$), and 12.5% blood loss using the CardioQ ($p = 0.046$) and the FloTrac ($p = 0.028$). Receiver operator characteristic curves for predicting $> 10\%$ blood loss had areas under the curve of 0.68-0.82. The minimally invasive cardiac output devices tested can detect blood loss by a reduction in stroke volume in awake volunteers, and may have a role in guiding fluid replacement in conscious patients with suspected hypovolaemia.