

General Clinical Specialties: Renal/Electrolyte/Hypertension

Renal/Electrolyte/Hypertension Posters

"Normalized hematocrit" (nHct) from blood volume analysis (BVA) offers enhanced accuracy over peripheral hematocrit (pHct) in assessment of red blood cell volume

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Objectives: Peripheral hematocrit (pHct), a mainstay in clinical assessment of red cell volume (RCV), may be misleading in the presence of volume status derangement. This study examined the relationship between pHct, RCV and volume status measured by blood volume analysis (BVA) in a large cohort of hospitalized patients. The study also examined the BVA parameter "normalized hematocrit" (nHct). We sought to determine whether nHct--which is normalized to correct for aberrant overall volume status--better reflects RCV status than pHct.

Methods: BVA studies were performed using a semi-automated system (BVA-100, Daxor Corp.) following injection of ¹³¹I-labeled albumin. All inpatient BVA studies between 12/9/2004 and 4/22/2008 were reviewed. pHct and BVA parameters nHct, RCV, plasma volume (PV), and total blood volume (TBV) were statistically analyzed. Bland-Altman analysis was used to assess concordance of pHct and nHct.

Results: 627 inpatient BVA studies were analyzed. Of these patients, 227 (36%) were normovolemic, 245 (39%) were hypervolemic, and 155 (25%) were hypovolemic. nHct and pHct showed >5 percentage points difference in 235/627 (37%) of cases. pHct and nHct showed very high correlation in the normovolemic patients ($R^2=0.9242$), but only moderate correlation in hypervolemic ($R^2=0.5693$) and hypovolemic patients ($R^2=0.7132$). nHct was a far better measure of true RCV status ($R^2=0.6864$) than pHct ($R^2=0.3307$) in the inpatient population.

Conclusions: Abnormal volume status is very common in hospitalized patients. Because of variations in PV and overall volume status, pHct measurement does not accurately reflect RCV status in many patients. nHct--which is corrected for abnormal volume status--gives a more accurate indication of RCV status and degree of anemia. Clinical use of BVA and nHct offers potential for more accurate diagnosis of anemia and more informed fluid management and transfusion decisions