

Acid-Base Disorders

David D. Nicolaou
Gabor D. Kelen
David M. Cline

REFERENCES

1. Berend K: Acid-base pathophysiology after 130 years: confusing, irrational and controversial. *J Nephrol* 26: 254, 2013. [PMID: 22976522]
2. Emmett M, Narins RG: Clinical use of the anion gap. *Medicine (Baltimore)* 56: 38, 1977.
3. Berend K, de Vries APJ, Gans ROB: Physiological approach to assessment of acid-base disturbances. *N Engl J Med* 371: 1434, 2014. [PMID: 25295502]
4. Stewart PA: Modern quantitative acid-base chemistry. *Can J Physiol Pharmacol* 61: 1444, 1983.
5. Seifter JL: Disorders of fluids and electrolytes. Integration of acid-base and electrolyte disorders. *N Engl J Med* 371: 1821, 2014. [PMID: 25372090]
6. Fidkowski C, Helstrom J: Diagnosing metabolic acidosis in the critically ill: bridging the anion gap, Stewart, and base excess methods. *Can J Anesth* 56: 247, 2009. [PMID: 19247746]
7. Kishen R, Honore PM, Jacobs R, et al: Facing acid-base disorders in the third millennium: the Stewart approach revisited. *Int J Nephrol Renovasc Dis* 7: 209, 2014. [PMID: 24959091]
8. Rastegar A: Clinical utility of Stewart's method in diagnosis and management for acid-base disorders. *Clin J Am Soc Nephrol* 4: 1267, 2009. [PMID: 19520748]
9. Dubin A, Meneses MM, Masevicius FD, et al: Comparison of three different methods of evaluation of metabolic acid-base disorders. *Crit Care Med* 35: 1264, 2007. [PMID: 17334252]
10. Martin M, Murray J, Berne T, Demertriades D, Belzberg H: Diagnosis of acid-base derangements and mortality prediction in the trauma intensive care unit: the physicochemical approach. *J Trauma* 58: 238, 2005. [PMID: 15706182]
11. Rocktaeschel J, Morimatsu H, Uchino S, Bellomo R: Unmeasured anions in critically ill patients: can they predict mortality? *Crit Care Med* 31: 2131, 2003. [PMID: 12973170]
12. Kurtz I, Kraut J, Ornekian V, Nguyen MK: Acid-base analysis: a critique of the Stewart and bicarbonate centered approaches. *Am J Physiol Renal Physiol* 294: F1009, 2008. [PMID: 18184741]
13. Ramadoss J, Stewart RH, Cudd TA: Acute renal response to rapid onset respiratory acidosis. *Can J Physiol Pharmacol* 89: 227, 2011. [PMID: 21423296]
14. Winter SD, Pearson JR, Gabow PA, et al: The fall of the serum anion gap. *Arch Intern Med* 150: 311, 1990. [PMID: 2302006]
15. Moviat M, van den Boogaard M, Intven F, et al: Stewart analysis of apparently normal acid-base state in the critically ill. *J Crit Care* 28: 1048, 2013. [PMID: 23910568]
16. Graber ML, Quigg RJ, Stempsey WE, Weis S: Spurious hyperchloraemia and decreased anion gap in hyperlipidaemia. *Ann Intern Med* 98: 607, 1983. [PMID: 6846974]
17. Mallat J, Michel D, Salaun P, et al: Defining metabolic acidosis in patients with septic shock using the Stewart approach. *Am J Emerg Med* 30: 391, 2012. [PMID: 21277142]
18. Mallet J, Barrailler S, Lemyze M, et al: Use of sodium-chloride difference and corrected anion gap as surrogate of Stewart variables in critically ill patients. *PLoS One* 8: e56635, 2014. [PMID: 23418590]
19. Berkman M, Ufberg J, Nathanson LA, et al: Anion gap as a screening tool for elevated lactate in patients with an increased risk of developing sepsis in the emergency department. *J Emerg Med* 36: 391, 2009. [PMID: 18815002]
20. Tsao YT, Tsai WC, Yang SP: A life-threatening double gap metabolic acidosis. *Am J Emerg Med* 26: 385.e5, 2008. [PMID: 18358977]
21. Treger R, Pirouz S, Kamanga N, Corry D: Agreement between central venous and arterial blood gas measurements in the intensive care unit. *Clin J Am Soc Nephrol* 5: 390, 2010. [PMID: 19546014]
22. Contenti J, Corraze H, Lemoel F, Levraut J: Effectiveness of arterial, venous, and capillary lactate as a sepsis triage tool in ED patients. *Am J Emerg Med* November 8, 2014. [Epub ahead of print]
23. Singer AJ, Taylor M, LeBlanc D, et al: ED bedside point-of-care lactate with suspected sepsis is associated with reduced time to iv fluids and mortality. *Am J Emerg Med* 32: 1120, 2014. [PMID: 25082597]
24. Talan DA, Moran GJ, Abrahamian FM: Severe sepsis and septic shock in the emergency department. *Infect Dis Clin N Am* 22: 1, 2008. [PMID: 18295681]
25. Gattinoni L, Carlesso E, Maiocchi G, et al: Dilutional acidosis: where to the protons come from? *Intensive Care Med* 35: 2033, 2009. [PMID: 19763537]
26. Adrogue HJ, Madias NE: Management of life-threatening acid-base disorders: Second of two parts. *N Engl J Med* 338: 107, 1998. [PMID: 9420343]
27. Berend K, van Hulsteijn LH, Gans ROB: Chloride: the queen of electrolytes? *Eur J Intern Med* 23: 203, 2012. [PMID: 22385875]
28. Gehlbach BK, Schmidt GA: Bench-to-bedside review: treating acid-base abnormalities in the intensive care unit—the role of buffers. *Crit Care* 8: 259, 2004. [PMID: 15312208]
29. Chen XF, Ye JL, Zhu ZY: The use of sodium bicarbonate in stages in treating hypoperfusion induced lactic acidemia in septic shock. *Zhonghua Wei Zhong Bing Ji Jiu Yi Xue* 25: 24, 2013. [PMID: 23611092]
30. Boyd JH, Walley KR: Is there a role for sodium bicarbonate in treating lactic acidosis from shock? *Curr Opin Crit Care* 4: 379, 2008 [PMID: 18614899]
31. Andrade OV, Ihara FO, Troster EJ: Metabolic acidosis in childhood: why, when and how to treat. *J Pediatr (Rio J)* 83: \$11, 2007. [PMID: 17508091]
32. Adeva-Andany M, Fernandez-Fernandez C, Mourino-Bayolo D, et al: Sodium bicarbonate therapy in patients with metabolic acidosis. *Sci World J* 2014: 627673, 2014.
33. Kraut JA, Kurtz I: Use of base in the treatment of severe academic states. *Am J Kidney Dis* 38: 703, 2001. [PMID: 11576874]
34. Dellinger RP, Levy MM, Rhodes A, et al: Surviving Sepsis Campaign. International guidelines for management of severe sepsis and septic shock: 2012. *Crit Care Med* 41: 580, 2013. [PMID: 23353941]