

3rd International Conference on Surgery and Anesthesia

November 17-19, 2014 Chicago, USA

What should you know about the Stewart acid-base method?

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Despite the abundance of acid-base studies and literature, there is still a tremendous amount of confusion and controversy regarding the best approach and understanding of complex acid-base disorders. This discussion started in 1880, when Arrhenius who won the Noble prize in chemistry, defined an acid as a substance that, when dissolved in water, produces an increased concentration of hydrogen ions. After World War I, Bronsted and Lowry developed the definition for acids as a substance that can donate H^+ and a base as a H^+ acceptor. In 1978, Peter Stewart challenged the traditional bicarbonate-based approach by proposing that the generalized Arrhenius definition of an acid, with Naunyn's ideas, is more useful to acid-base physiology than the Bronsted-Lowry definition. He adopted the concept of Singer and Hastings that plasma pH was determined by two independent factors, PCO_2 and strong ion charge and added the total concentration of weak buffers in plasma (A_{TOT}) as the third variable in 1983. Stewart's main reason for exploring acid-base physiology was that he found the bicarbonate centered approach confusing and inadequate and that he felt that the major use for bicarbonate and base excess was to determine the extent of a clinical acid-base disorder rather than the mechanism. The proponents of Stewart's approach believe that it not only offers a mechanistic explanation for the disorders but also provides the tool to make a more accurate diagnosis. Although nephrologists and renal physiologists have largely ignored Stewart's approach, it is increasingly popular in anesthesia and critical care medicine. The question, however, remains if we should abandon the anion gap concept to replace it with the "strong anion gap", and will be discussed in the lecture.

Biography

Kenrick Berend became an internist at the Academic Hospital Utrecht in Holland in 1989. His main working area is general internal medicine and dialysis and is an external teacher on Curacao for students and physicians of several universities from Holland. He has given lectures on acid-base issues in several countries and published papers in reputed journals.

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