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**Changes of serum chloride and metabolic acid-base state in critical illness.**

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Alterations of electrolytes and albumin cause metabolic acid-base disorders. It is unclear, however, to what degree these plasma components affect the overall metabolic acid-base state in the course of critical illness. We performed serial analyses of the metabolic acid-base state in 30 critically ill patients over the course of 1 week. We applied a physical-chemical acid-base model and used a linear regression model to determine the influence of sodium, chloride, unmeasured anions and albumin on the net metabolic acid-base state. Progressive hypochloraemia was identified as the main cause of developing metabolic alkalosis. Changes in serum chloride and unmeasured anions were responsible for changes of 41% and 22% in the metabolic acid-base state, respectively. Sodium and albumin played a minor role. In conclusion, chloride is the major determinant of metabolic acid-base state in critical illness.