

Combined disorders of acid-base balance

A combination of more acid-base disorders can be seen in clinical medicine quite often. The following types of acid-base disorders can be combined: *metabolic acidosis* and *alkalosis* and *respiratory acidosis* and *alkalosis*. Individual disorders can sum up or cancel out. When acidosis is combined with alkalosis, the resulting pH may be normal, but severe acid-base disorder may still be present.

The combination of metabolic acidosis and metabolic alkalosis is very important: in *the examination for acid-base disorder according to Astrup (blood gas test)*, every single parameter may be normal or only slightly deviated. Therefore, the combined acid-base disorder may not be recognized or it may be underestimated. But a medical intervention that affects only one part of the disorders can cause that the other disorder quickly outweighs. This can lead to a steep change in the pH of the internal environment and severe metabolic breakdown.

Conditions leading to combined acid-base disorders are not uncommon. Typical examples may be:

vomiting and diarrhea

vomiting leads to hypochloraemic alkalosis, diarrhea to acidosis due to loss of bicarbonates

prolonged vomiting

hypochloraemic alkalosis in vomiting is combined with ketoacidosis caused by fasting and lactic acidosis from insufficient tissue perfusion in hypovolemia

hepatorenal failure

combines hepatic metabolic alkalosis with renal acidosis

liver failure with respiratory insufficiency

severe hypoproteinemia in liver failure leads to pulmonary edema, lactic acidosis develops due to hypoxia

renal failure with nephrotic syndrome and severe hypoproteinemia

renal acidosis from sulfate and phosphate accumulation is accompanied by alkalosis in hypoproteinemia

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