Agreement between arterial and venous lactate concentrations in critically ill dogs

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Introduction: Arterial lactate concentrations are the gold standard for assessing hyperlactatemia in critically ill human patients, whereas in veterinary medicine venous lactate concentrations are routinely used. Our first hypothesis was that venous lactate concentrations could reliably predict arterial lactate concentrations in dogs. The second hypothesis was that there would be a correlation between hyperlactatemia and hyperglycaemia.
Materials and methods: Critical ill patients with possible hyperlactatemia that underwent emergency surgery were included. Lactate and glucose concentrations in arterial and venous blood were determined.
Results: A total of 21 dogs were included. Both lactate and glucose concentrations in arterial and venous blood had a significant strong positive correlation ($Rs = 0.822$, $p < 0.001$ and $Rs = 0.872$, $p < 0.001$, respectively), and lactate and glucose concentrations in arterial and venous blood did not significantly differ ($p = 0.627$ and $p = 0.149$, respectively). Selecting arterial lactate concentrations as the gold standard, sensitivity of venous lactate concentration was 87.50% and specificity 76.90%. No linear relationship was observed between arterial lactate and glucose concentrations or between venous lactate and glucose concentrations ($Rs = -0.092$, $p < 0.693$ and $Rs = 0.116$, $p < 0.616$, respectively).
Discussion/conclusion: Preliminary results demonstrate a significant strong correlation between arterial and venous lactate concentrations in dogs, even though agreement was imperfect. Normal venous lactate concentrations were likely to indicate normal arterial lactate concentrations. However, increased venous lactate concentrations were also observed in cases with arterial lactate concentrations within normal limits. No correlation was present between hyperlactatemia and hyperglycaemia. In conclusion, venous lactate concentrations can reliably predict arterial lactate concentrations, especially if they are severely increased.