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Transcutaneous Blood Gas Monitoring

Blood gas monitoring is vital when assessing ventilation and oxygenation in critically ill patients. Decisions regarding oxygen supplementation or mechanical ventilation are aided by PO_2 and PCO_2 measurements, but frequent blood sampling can be difficult and may lead to iatrogenic anemia, bruising, and pain. Transcutaneous monitors can detect changes in respiratory status more quickly than blood gas analysis and are widely used in human medicine, enabling clinicians to monitor neonates or patients without arterial access. This study investigated a comparison between transcutaneous and arterial blood gas values in critically ill dogs to verify whether the transcutaneous system can be used reliably in dogs.

The transcutaneous monitoring system was calibrated and used according to manufacturer instructions for human patients, with probe location extrapolated from data in human neonates. Canine subjects (n = 23 critically ill client-owned dogs) had indwelling arterial catheters, allowing for blood gas measurements to be taken concurrently with readings from the transcutaneous monitor. Agreement between transcutaneous and arterial PO_2 and PCO_2 was inferior to that found in comparable human studies. The transcutaneous system tended to overestimate PO_2 and PCO_2. Inaccuracies may have occurred for technical reasons (eg, inappropriate probe placement) or clinical reasons (eg, hypoperfusion, variations in tissue thickness). Other species-specific changes (eg, skin metabolism, local CO_2 production) may have also influenced the measurement accuracy. Therefore, the transcutaneous monitoring system cannot currently be recommended as a sole device for blood gas monitoring in critically ill dogs.

Commentary

The potential utility of transcutaneous blood gas measurements in veterinary patients cannot be overemphasized. Although this study indicated there is too much of a discrepancy between arterial blood gas and transcutaneous measurements in critically ill dogs, other veterinary studies have suggested that transcutaneous monitoring may be more accurate and useful in other clinical settings, such as assessing the viability of skin grafts. It is also yet unknown if transcutaneous blood gas monitoring would be applicable in other species, like cats or smaller mammals, from which arterial or venous blood gas measurements are more difficult to obtain.—*Heather Troyer, DVM, DABVP, CVA*

Source

Evaluation of a transcutaneous blood gas monitoring system in critically ill dogs. Holowaychuk MK, Fujita H, Bersenas AM. *JVECC* 24:545-553, 2014.

Vaccination: How Much is Enough?

Feline panleukopenia virus (FPV) has a high morbidity and mortality rate, and FPV vaccination is considered a core requirement. Kittens are routinely vaccinated every 3–4 weeks up to 16 weeks of age followed by boosters. This study evaluated a point-of-care diagnostic test for use in adult cats to determine if protective antibodies were present and to prevent over-vaccination. ImmunoComb Feline VacciCheck (vaccicheck.com) FPV results were compared to a gold standard of hemagglutination inhibition (HI). Sera from 347 cats were tested using the point-of-care test and HI. Sensitivity, specificity, and positive and negative predictive values were determined for 3 titer points (1:20, 1:40, 1:80). When compared to the HI test for the 3 titer points, the point-of-care test had a sensitivity of 79%, 83%, and 87% and a specificity of 89%, 86%, and 81%,

respectively. The point-of-care test specificity was considered comparable at a 1:20 titer.

Commentary

With recent vaccination guideline revisions in the past several years, the concept of prevaccination titers is gaining appeal. In addition, vaccine reaction and vaccine-associated sarcomas (VAS) in cats concern many owners even if recent studies show a far lower prevalence of VAS in the feline population. Study authors hoped the point-of-care test would perform with a minimum of false positives to ensure its safety as a screening test. Although the test was efficient (ready in 21 minutes), its 89% specificity did not meet the arbitrary >90% specificity cutoff. Twenty-three individuals had false positive results and therefore might not have been vaccinated in a general practice or shelter setting. Although this study did not support the sole use of this test for screening, it may prove useful in cases where patients are either immunocompromised or have an immune-mediated disease.—*Ewan Wolff, DVM, PhD*

Source

Evaluation of an in-house dot enzyme-linked immunosorbent assay to detect antibodies against feline panleukopenia virus. Mende K, Stuetzer B, Truyen U, Hartmann K. *J FELINE MED SURG* 16:805-811, 2014.