

Utility of the ultrasonographic measurement of caudal vena cava on aorta ratio for the diagnosis and the therapeutic follow-up of naturally-occurring hypovolemic shock in dogs

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The ultrasonographic (US) measurement of caudal vena cava on aorta (CVC: Ao) ratio was successfully used to assess volume status in experimental models of hypovolemia in dogs. It has been shown to be an easy, quick, and non-invasive technique with acceptable inter and intra-operator variabilities. The aim of this study was to determine the utility of the CVC: Ao ratio to detect naturally-occurring hypovolemic shock in dogs and evaluate its evolution after fluid resuscitation. Dogs with physical signs consistent with hypovolemic shock presented in our ICU (SIAMU) were prospectively included. CVC: Ao ratio was measured on the spleno-renal view of the AFAST protocol as previously described. All measures were performed before and after an intravenous crystalloid fluid bolus at 10 mL/kg. Reference intervals for CVC: Ao ratio were previously defined at our institution with the same US protocol as follows: 0.93-1.32. Seventeen dogs were included in the study. CVC: Ao ratios were below reference intervals at admission in 16/17 dogs and significantly increased after the fluid bolus (before=0.82 and after=0.92; $P=0.007$). Specifically, 7/17 dogs had a CVC: Ao ratio within reference intervals after the fluid bolus. Blood lactates did not significantly change between before and after bolus (before=4.0 mmol/L and after=3.9 mmol/L; $P=0.273$). Heart and respiratory rates were significantly decreased after the bolus (before=132 bpm and after=106 bpm, $P=0.002$; before=40 bpm and after=34 bpm, $P=0.032$; respectively). Capillary refill time significantly shortened between before and after bolus as well ($P=0.003$). No significant linear correlation was observed between the CVC: Ao ratio and physical parameters or blood lactates before and after fluid bolus. The US measurement of the CVC: Ao ratio appears as a valuable and promising tool for the diagnosis and the therapeutic follow-up of naturally-occurring hypovolemic shock in dogs. It appears to allow earlier quantitative detection of changes in intravascular volume status than blood lactates concentration in dogs.