




# American College of Veterinary Emergency and Critical Care (ACVECC) Consensus on the Rational Use of Antithrombotics in Veterinary Critical Care (CURATIVE) guidelines: Small animal

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Consensus  
Read it.

# Assessment of plasma lactate and core-peripheral temperature gradient in association with stages of naturally occurring myxomatous mitral valve disease in dogs

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## Abstract

**Objective** – To evaluate plasma lactate concentrations and core-peripheral temperature gradients as perfusion parameters in dogs with heart failure caused by myxomatous mitral valve disease (MMVD) and to determine whether the above perfusion parameters are correlated with disease stages.

**Design** – Prospective observational study.

**Setting** – University teaching hospital.

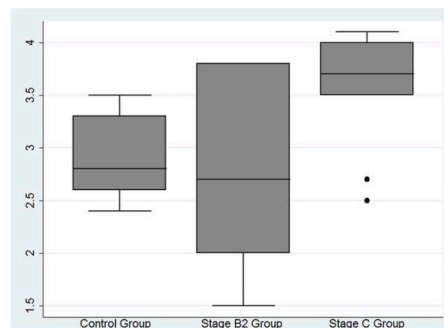
**Animals** – After excluding 129 dogs because of exclusion criteria, 7 dogs with heart failure classified as stage B2 and 10 dogs classified as stage C according to the American Heart Association (AHA)/American College of Cardiology (ACC) were included in the study. Six dogs without MMVD were evaluated as the control group.

**Interventions** – None.

**Measurements and Main Results** – Among the evaluated parameters, the plasma lactate concentrations were increased in stage C (median 3.70 mmol/L [33.3 mg/dL], interquartile range (IQR) 0.72 mmol/L [6.5 mg/dL]) compared with those in the control (median 2.80 mmol/L [25.2 mg/dL], IQR 0.8 mmol/L [7.2 mg/dL];  $P = 0.024$ ) and stage B2 groups (median 2.70 mmol/L [24.3 mg/dL], IQR 1.8 mmol/L [16.2 mg/dL];  $P = 0.045$ ). Significant differences were not observed in the core-peripheral temperature gradients among the control, stage B2, and stage C dogs.




**Conclusions** – Dogs with structural heart disease as a result of MMVD may have occult tissue hypoperfusion in stage C that is demonstrated by hyperlactatemia.

- Occult shock occurs in heart disease when CO decreases so get RAAS activation and peripheral vasoconstriction
- All vitals may be ok but from vasoconstriction get hypoperfusion
- May also get core peripheral temperature gradient during this stage
- 7 dogs with B2, 10 dogs with C, 6 dogs with no MMVD (healthy controls)
- Lactate increased in C (3.7 vs 2.8 vs 2.7)
- No significant difference in temperature gradient



**Figure 2:** Box-plot graph depicting the lactate levels (mmol/L) in the different experimental groups.

# ACVECC-Veterinary Committee on Trauma Registry Report 2013–2017

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## Abstract

**Objective** – To report summative data from the American College of Veterinary Emergency and Critical Care Veterinary Committee on Trauma (VetCOT) registry.

**Design** – Multi-institutional veterinary trauma registry data report.

**Setting** – VetCOT identified veterinary trauma centers (VTCs).

**Animals** – Dogs and cats with evidence of trauma presented to VTCs with data entered in the VetCOT registry September 1, 2013–March 31, 2017.

**Interventions** – VetCOT created a standardized data collection methodology for dog and cat trauma. Data were input to a web-based data capture system (REDCap)<sup>1</sup> by data entry personnel trained in data software use and operational definitions of data variables. Data on demographics, trauma type (blunt vs penetrating), preadmission care, hospitalization and intensive care requirement, trauma severity assessment at presentation (eg, modified Glasgow coma scale and animal trauma triage score), key laboratory parameters, necessity for surgical intervention, and case outcome were collected. Summary descriptive data for each species are reported.

**Measurements and Main Results** – Twenty-nine VTCs in North America, Europe, and Australia contributed information from 17,335 dog and 3,425 cat trauma cases during the 42-month reporting period. A large majority of cases presented directly to the VTC after injury (80.4% dogs and 78.1% cats). Blunt trauma was the most common source for injury in cats (56.7%); penetrating trauma was the most common source for injury in dogs (52.3%). Note that 43.8% of dogs and 36.2% of cats were reported to have surgery performed. The proportion surviving to discharge was 92.0% (dogs) and 82.5% (cats).

**Conclusions** – The VetCOT registry proved to be a powerful resource for collection of a large dataset on trauma in dogs and cats seen at VTCs. While overall survival to discharge was quite high, further evaluation of data on subsets of injury types, patient assessment parameters, interventions, and associated outcome are warranted.

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- 29 trauma centers with 17000 dogs, 3000 cats in 42months
- Blunt trauma most common for cats, penetrating for dogs
  - o Mostly bite wounds for dogs, HBC and other for cats
- 92% survival to discharge in dogs, 82.5% in cats

# Retrospective characterization of coma and stupor in dogs and cats presenting to a multicenter out-of-hours service (2012–2015): 386 animals

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## Abstract

**Objective** – To describe the signalment, etiology, and short-term outcome of dogs and cats presenting in a coma or stupor.

**Design** – Retrospective study conducted between May 2012 and February 2015.

**Setting** – Multicenter out-of-hours emergency service provider.

**Animals** – Three hundred eighty-six patients presenting in a coma or stupor to a multicenter out-of-hours emergency care provider.

**Interventions** – None.

**Measurements and Main Results** – Records were reviewed to determine the most likely etiology of coma or stupor. Short-term outcomes were defined as deceased (died or euthanized) or transferred (case handed over to a daytime clinic or discharged). There were 168 dogs (coma  $n = 112$ , stupor  $n = 56$ ) and 218 cats (coma  $n = 148$ , stupor  $n = 70$ ) identified. Coma and stupor were more prevalent in cats compared to dogs, and Chihuahuas were over represented. Blood glucose concentrations were frequently outside established reference intervals. Excluding undetermined causes, the most common causes in dogs included traumatic brain injury (TBI) 16.0% ( $n = 27$ , deceased  $n = 22$ ), hypoglycemia 10.7% ( $n = 18$ , deceased  $n = 8$ ), shock 10.1% ( $n = 17$ , deceased  $n = 16$ ), seizure 9.5% ( $n = 16$ , deceased  $n = 13$ ), and renal or hepatic dysfunction 5.3% ( $n = 9$ , deceased  $n = 7$ ). For cats, the most common causes included TBI 21.6% ( $n = 47$ , deceased  $n = 38$ ), renal or hepatic dysfunction 13.3% ( $n = 29$ , deceased  $n = 25$ ), intoxication 10.1% ( $n = 22$ , deceased  $n = 18$ ), hypoglycemia 6.0% ( $n = 13$ , deceased  $n = 4$ ), and shock 5.0% ( $n = 11$ , deceased  $n = 8$ ). When treatment was attempted, 46.0% of dogs ( $n = 44/96$ ) and 41.2% of cats ( $n = 35/85$ ) survived to be transferred. Compared to all other etiologies, death was less likely when coma or stupor was attributed to hypoglycemia.

**Conclusion** – In cases where a cause was determined, TBI was the predominant etiology of coma and stupor for both species. With the exception of coma and stupor attributed to hypoglycemia, the overall short-term prognosis was poor.

- 386 dogs and cats in coma or stupor
  - o More cats than dogs
  - o Chihuahuas overrepresented
- Common causes
  - o Dogs
    - TBI > Hypoglycemia > Shock > Seizure > Renal/hepatic disease
  - o Cats
    - Tbi > Renal/hepatic dysfunction > Intoxicatin > Hypoglycemia > Shock
- If treated
  - o 46% survival dogs (to transfer to home or rDVM as only out of hours hospital)
  - o 41% survival cats
- Better survival with hypoglycemia

# Determining prognosis in canine sepsis by bedside measurement of cell-free DNA and nucleosomes

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## Abstract

**Objective** – To investigate the use of plasma cell-free DNA (cfDNA) and nucleosome concentrations as prognostic biomarkers in canine sepsis.

**Design** – Prospective, observational cohort study conducted from June 2015 to February 2016.

**Setting** – University teaching hospital.

**Animals** – Forty-five dogs with sepsis, 10 dogs with nonseptic systemic inflammatory response syndrome (nSIRS), and 15 healthy controls were consecutively enrolled and followed to hospital discharge. Patients were eligible for enrollment if they met  $\geq 2$  SIRS criteria and had a documented or highly suspected bacterial infection. Dogs  $< 3$  kg or with a known coagulopathy were excluded.

**Interventions** – None.

**Measurements and Main Results** – Acute Patient Physiology and Laboratory Evaluation scores (APPLE) were calculated and outcomes recorded. Plasma cfDNA was measured using a benchtop fluorimeter. Plasma nucleosome concentrations were determined by ELISA. Plasma nucleosome and cfDNA concentrations in dogs with sepsis or nSIRS were compared to those of healthy controls and cfDNA concentrations in septic dogs with and without bacteremia were compared. Associations between cfDNA concentrations and nucleosomes, leukocyte count, neutrophil count, and APPLE scores were evaluated. For septic dogs, cfDNA concentrations relative to neutrophil count and nucleosome concentrations in survivors and nonsurvivors were compared. Alpha was set at 0.05. cfDNA concentrations were significantly higher in dogs with sepsis or nSIRS compared to healthy controls ( $P < 0.0001$  and  $P = 0.0034$ , respectively). Nucleosome concentrations were significantly higher in dogs with sepsis compared to healthy controls ( $P = 0.007$ ). There was limited association between cfDNA and nucleosome concentrations ( $r_s = 0.266$ ), and no association between cfDNA concentration and leukocyte count, neutrophil count, and APPLE<sub>full</sub> scores. Concentrations of cfDNA were positively correlated with APPLE<sub>fast</sub> score ( $r_s = 0.335$ ,  $P = 0.025$ ); however, cfDNA concentrations were significantly higher in dogs with bacteremia ( $P = 0.0299$ ). In dogs with sepsis, cfDNA concentrations relative to neutrophil count were significantly higher in nonsurvivors than in survivors ( $P = 0.008$ ).

**Conclusions** – In dogs with sepsis, high cfDNA concentrations relative to neutrophil count are associated with nonsurvival. Point-of-care cfDNA measurement may aid identification of bacteremia.

- Looking for biomarker that can be rapidly measured bedside and accurately predict illness severity/prognosis
- cfDNA comes from NETs, necrotic tissue, apoptotic cells
- cfDNA usually is removed but the process becomes saturated if release is increased
- NETosis may both reflect disease severity and contribute to sepsis pathogenesis
  - o Immunothrombosis
- cfDNA can inhibit fibrinolysis
- in febrile people high cfDNA predicts mortality, normal excludes infection
- nucleosomes also released with cellular damage
  - o in people can distinguish between sepsis and not sepsis incritical illness
- 45 dogs with sepsis, 10 with nonseptic SIRS (2 or more criteria), 15 health controls
- cfDNA was higher in sepsis or nSIRS than controls

- nucleosome higher in sepsis than controls
- no association between cfDNA and WBCs, apple score
- cfDNA higher in dogs with bacteremia than those without
- cfDNA relative to neutrophil (cfDNA/1000neuts) count was higher in survivors than non survivors
- survivors had higher neutrophil count than nonsurvivors in sepsis

## Case Series

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# Ultrasound-guided catheterization of the femoral artery in a canine model of acute hemorrhagic shock

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### Abstract

**Objective** – To describe a technique for gaining ultrasound-guided access to the femoral artery in an experimental model of acute hemorrhagic shock in anesthetized dogs.

**Case Series Summary** – Five healthy, purpose-bred adult male intact Beagles were enrolled in a respiratory mechanics study under general anesthesia. Upon completion of the primary study a hypovolemic state was induced by blood removal to achieve a mean arterial pressure  $\leq$  55 mm Hg. Dogs were positioned in dorsal recumbency with the hind limb extended caudally. An ultrasound probe was applied to the medial aspect of the hind limb and positioned in the transverse orientation so that the femoral artery was visualized in its short axis. The artery was identified by lack of compression and presence of visible pulsation. The probe was rotated 90° into the longitudinal orientation such that the artery was visualized in its long axis. Under ultrasound guidance a 19-gauge introducer needle was advanced into the lumen of the femoral artery. Using a modified Seldinger technique the needle was removed and a catheter was placed in the femoral artery. Correct placement of the catheter was verified by observation of the characteristic arterial blood pressure waveform. Upon completion of the study dogs were humanely euthanized. The femoral artery was successfully catheterized in 4/5 dogs and a hematoma was reported in 1/5 dogs.

**New or Unique Information Provided** – Ultrasound-guided femoral artery catheterization is feasible on anesthetized dogs with concurrent acute hemorrhagic shock.

# Emphysematous gastritis in a cat

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## Abstract

**Objective** – To describe the presentation, diagnosis, treatment, and outcome of a case of emphysematous gastritis (EG) in a cat.

**Case Series Summary** – A 15-year-old female neutered domestic short-hair cat presented for a 4-month history of weight loss and intermittent vomiting. Clinicopathologic and imaging findings suggested an underlying primary gastrointestinal (GI) disease, as well as possible hepatobiliary disease. Two days following exploratory laparotomy to obtain GI and liver biopsies, the patient became septic and intracellular bacteria were present on cytology of peritoneal effusion. On radiographs, the stomach was markedly distended with fluid and contained a thin gas opacity surrounding the stomach wall. The patient was taken back to surgery to identify a source of sepsis. At surgery, the patient's stomach was firm and emphysematous on palpation but grossly appeared normal. There were no signs of dehiscence of the previous biopsy sites. Stomach biopsy confirmed the presence of intralesional Gram-positive rods, consistent with microbial EG, and a light growth of a *Clostridium* sp. was cultured from abdominal fluid, consistent with clostridial peritonitis. During a third surgery for suspected septic peritonitis, a jejunostomy tube was placed for postgastric enteral feeding. The patient ultimately survived to discharge and is clinically stable 10 months later.

**New/Unique Information Provided** – EG is a rare but potentially fatal clinical entity in the human and veterinary literature with only 1 other case reported in cats. Though clostridial organisms have been reported in EG in people, this is the first implication of EG secondary to a *Clostridium* sp. in the cat. This is also the first report to document the use of a jejunostomy tube for postgastric enteral nutrition to treat EG in the veterinary literature.

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