


# Development and validation of a hemangiosarcoma likelihood prediction model in dogs presenting with spontaneous hemoabdomen: The HeLP score

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## Abstract

**Objective:** To calculate a risk prediction model for hemangiosarcoma (HSA) diagnosis in dogs presenting with nontraumatic hemoabdomen.

**Design:** Retrospective multicenter observational cohort study enrolling dogs presented 2003–2016.

**Setting:** Five academic veterinary medical centers.


**Animals:** A total of 406 dogs with nontraumatic hemoabdomen as the presenting complaint that underwent surgical exploration or necropsy and received a histological diagnosis. Overall, 219 dogs from 3 centers provided the data for model construction, and 187 dogs from 2 centers provided the population for external validation.

**Interventions:** None.

**Measurements and Main Results:** The risk score was modeled on 4 predictors: bodyweight ( $P = 0.01$ ), total plasma protein ( $P < 0.01$ ), platelet count ( $P < 0.01$ ), and thoracic radiograph findings ( $P = 0.02$ ). The incidence of HSA diagnosis was 36%, 76%, and 96% in the low risk ( $\leq 40$ ), medium risk (41–55), and high risk ( $> 55$ ) score groups, respectively. The risk score AUROC was 0.85 (95% CI 0.79–0.90) on the construction population, and 0.77 (95% CI 0.70–0.84) on the validation population.

**Conclusions:** The risk of HSA diagnosis in dogs presenting with nontraumatic hemoabdomen could be predicted using a simple risk score, which could aid in identification and treatment of dogs at lower risk for this diagnosis.

# Postmortem evaluation of renal tubular vacuolization in critically ill dogs

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[Correction added on April 18, 2019, after first online publication: Additional corrections received]

## Abstract

**Objective:** To describe the frequency of renal tubular vacuolization (RTV) as a surrogate of osmotic nephrosis and assess hyperosmolar agents as predictors of RTV severity.

**Design:** Retrospective study (February 2004–October 2014).

**Setting:** Veterinary teaching hospital.

**Animals:** Fifty-three client-owned, critically ill dogs that had a postmortem examination.

**Interventions:** None.

**Measurements and Main Results:** The frequency, severity, and location of RTV were determined in small group of critically ill dogs postmortem. Logistic regression was performed to assess cumulative 6% HES (670/0.75) and mannitol dose as predictors for RTV severity with presenting serum creatinine concentration, cumulative furosemide dose, and duration of hospitalization as covariates. RTV was noted in 45 (85%) of 53 critically ill dogs and was most commonly located to the medullary rays (68%). Cumulative 6% HES (670/0.75) dose ( $P = 0.009$ ) and presenting serum creatinine concentration ( $P = 0.027$ ) were significant predictors of RTV severity. For every 1 mL/kg increase in 6% HES (670/0.75) dose that a dog received, there was 1.6% increased chance of having more severe RTV (OR 1.016; 95% CI 1.004–1.029). In addition, for every 88.4  $\mu\text{mol/L}$  (1 mg/dL) increase in presenting serum creatinine, there was a 22.7% increased chance of having more severe RTV (OR 1.227; 95% CI 1.023–1.472). Cumulative mannitol ( $P = 0.548$ ) and furosemide ( $P = 0.136$ ) doses were not significant predictors of RTV severity.

**Conclusion:** In a small group of critically ill dogs, there was a high frequency of RTV identified on postmortem examination. Administration of 6% HES (670/0.75) and presenting serum creatinine concentration were significant predictors of RTV severity. Larger prospective studies are needed to determine the etiology and significance of RTV in dogs.

# Retrospective evaluation of the route and timing of nutrition in dogs with septic peritonitis: 68 cases (2007–2016)

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## Abstract

**Objective:** To determine the impact of route of nutrition on length of hospitalization and survival to discharge in dogs with septic peritonitis.

**Design:** Retrospective study from 2007 to 2016.

**Setting:** University teaching hospital.

**Animals:** Sixty-eight dogs with septic peritonitis that survived  $\geq 48$  hours.

**Interventions:** None.

**Measurements and Main Results:** Nutritional strategy was categorized into 1 of 4 groups: voluntary, feeding tube, parenteral (PN), and combined feeding tube and PN. Body weight, body condition score, time without caloric intake before and during hospitalization, length of hospitalization, and percentage of resting energy requirements provided during the first 3 days of nutritional support were recorded. Overall, 54/68 dogs survived (79%). Survival Prediction Index 2 scores were not significantly different between groups. Dogs receiving PN only were less likely to survive than those receiving any enteral nutrition (OR 9.7; 95CI 1.84–58.75). Compared to dogs not receiving PN, dogs receiving any PN were significantly less likely to survive (OR 9.66; 95% CI 1.7–105.8), and were in hospital significantly longer ( $P = 0.025$ ). Metabolic complications associated with PN were frequent but not associated with increased length of hospitalization or survival to discharge.

**Conclusions:** Dogs with septic peritonitis that received any PN were in hospital longer and less likely to survive but may have been sicker than those receiving other forms of nutritional support. Further studies are warranted to evaluate reasons for worse outcomes in dogs with septic peritonitis receiving PN.

## KEYWORDS

canine, enteral nutrition, nutritional support, parenteral nutrition, sepsis

# Clinicopathologic abnormalities associated with increased animal triage trauma score in cats with bite wound injuries: 43 cases (1998–2009)

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## Abstract

**Objective:** To document the clinical and clinicopathologic changes in cats presenting with trauma from bite wounds, identify common abnormalities associated with bite wounds, and to determine whether the calculated animal triage (ATT) score is related to any clinicopathologic abnormalities.

**Design:** Retrospective descriptive study.

**Setting:** University veterinary teaching hospital.

**Animals:** Forty-three client-owned cats that presented for bite wounds to a large, urban, veterinary hospital between 1998 and 2009.

**Interventions:** None.

**Measurements and main results:** Pertinent history, physical examination findings, results of biochemical testing, and outcome were extracted from medical records. Animal triage trauma score was calculated based on the physical examination at presentation in cats with adequate available information. Patients were classified as having either a low (<5) ATT ( $n = 20$ ) or a high ( $\geq 5$ ) ATT ( $n = 23$ ) score. Male cats were overrepresented (65.1%), and a majority of cats had outdoor access (53.4%). Low venous blood pH ( $P = 0.047$ ), high plasma lactate concentration ( $P = 0.018$ ), and low ionized calcium concentration ( $P = 0.004$ ) were associated with higher ATT scores.

**Conclusions:** There is a significant association between low venous blood pH, high plasma lactate concentration, and low ionized calcium concentration and higher ATT scores at presentation in cats suffering from bite wounds. Early recognition of these abnormalities may help to identify more severely injured patients.

# Traumatic atlantoaxial subluxation in dogs: 8 cases (2009–2016)

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## Abstract

**Objective:** To demonstrate the utility of advanced imaging in dogs with traumatic atlantoaxial subluxation (TAAS), and to report the presentation, treatment, and outcome for these dogs.

**Design:** Retrospective study (2009–2016).

**Setting:** University teaching hospital.

**Animals:** Eight dogs diagnosed with TAAS with magnetic resonance imaging (MRI), computed tomography (CT), or both.

**Interventions:** None.

**Measurements and Main Results:** Eight dogs met criteria for inclusion. Of these, 6 were male, median age was 4 years (range, 1.5–11 years), and median body weight was 4.9 kg (range, 3.0–25.0 kg). On presentation, 6/8 (75%) dogs were nonambulatory tetraparetic and the most common injury was trauma inflicted by another animal 5/8 (62.5%). Diagnosis of TAAS was made using a combination of imaging modalities including vertebral column radiographs in 7/8 (87.5%) (of which 71.4% were suspicious for TAAS), CT in 7/8 (87.5%), and MRI in 7/8 (87.5%). In 7/8 (87.5%) dogs, CT and/or MRI offered additional information regarding the extent of injuries. Vertebral fractures were identified in 62.5% (5/8) of dogs. The majority of dogs underwent surgical repair (7/8 [87.5%]). The most common complication was aspiration pneumonia (3/8 [37.5%]). All 8 dogs survived to discharge. At the time of discharge, 4/8 (50%) were ambulatory tetraparetic. The 4 dogs that were nonambulatory tetraparetic at discharge progressed to being ambulatory within 2 months of surgery.

**Conclusions:** Although TAAS is an uncommon occurrence it should be considered a differential for any trauma patient that is presenting with signs of a cranial cervical myelopathy. CT and MRI have been shown to be useful to identify the extent of injuries and to facilitate surgical planning. With appropriate care, these dogs can have an excellent prognosis.

# Retrospective evaluation of paired plasma creatinine and chloride concentrations following hetastarch administration in anesthetized dogs (2002–2015): 244 cases

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## Abstract

**Objective:** To evaluate changes in serum creatinine and chloride concentrations in anesthetized dogs that received 6% hydroxyethyl starch (HES) 670/0.7.

**Design:** Retrospective case series, 2002–2015.

**Setting:** University veterinary teaching hospital.


**Animals:** Two hundred forty-four client-owned dogs undergoing general anesthesia that received an HES solution.

**Interventions:** None.

**Measurements and Main Results:** Medical records of dogs that received an HES solution (6%, 670/0.7) while under general anesthesia during the study period were reviewed. Information obtained from the medical record included patient signalment, reason for anesthesia or diagnosis, body weight, amount of HES solution administered, pre- and postanesthesia creatinine value, pre- and postanesthesia chloride value, and day interval between measurements. Corrected chloride values were used for all statistical analysis. Dogs received a median dose of 6.3 mL/kg hetastarch during anesthesia. Median preanesthesia creatinine and corrected chloride values were 79.5  $\mu\text{mol/L}$  (0.9 mg/dL) (range 8.8–689.5  $\mu\text{mol/L}$  [0.1–7.8 mg/dL]) and 111 mmol/L (111 mEq/L) (range 80–123 mmol/L [80–123 mg/dL]), respectively. Median postanesthesia creatinine was 57.4  $\mu\text{mol/L}$  (0.65 mg/dL) (8.8–716  $\mu\text{mol/L}$  [0.1–8.1 mg/dL]). Median postanesthesia corrected chloride was 115 mmol/L (115 mEq/L) (range 87.5–129.6 mmol/L [87.5–129.6 mEq/L]). Mann-Whitney test analysis revealed a significant decrease in creatinine ( $\Delta \text{Cr}$  17.7  $\mu\text{mol/L}$  [0.2 mg/dL],  $P < 0.01$ ) and a significant increase in corrected chloride ( $\Delta \text{Cl}$  4.1 mmol/L [4.1 mEq/L],  $P < 0.01$ ) between pre- and postanesthesia values.

**Conclusions:** In a mixed population of hospitalized dogs undergoing general anesthesia that received a median dose of 6 mL/kg of HES, creatinine was lower and chloride was higher in the postanesthetic than in the preanesthetic period. The clinical significance of these changes and the role that HES administration played in them relative to concurrent therapies is unknown.

# Compartment syndrome of the muscles of mastication in a working dog following a traumatic training incident

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## Abstract

**Objective:** To describe acute compartment syndrome (CS) of the muscles of mastication in a working dog associated with a traumatic training event.

**Case Summary:** A 2.5-year-old male Belgian Malinois was evaluated for acute blindness, severe diffuse swelling of the head, and inability to close the jaw following a traumatic incident during a bite training drill. During the exercise, the maxillary canine teeth were locked on a bite sleeve. Magnetic resonance imaging of the head and ocular system identified diffuse muscle swelling and hyperintensity, most severe in the muscles of mastication. Ocular abnormalities were not identified. Rhabdomyolysis, CS, and indirect optic nerve injury were supported by measurement of increased intramuscular pressure. Bilateral decompressive fasciotomies over the masseter and temporalis muscles resulted in immediate and marked resolution of the swelling and jaw movement. Blindness, however, did not resolve.

**New or Unique Information Provided:** CS involving the muscles of mastication may occur as a complication of bite training and may result in irreversible and even life-threatening complications. Emergent decompressive fasciotomy is indicated to reverse swelling; however, visual deficits may not resolve.