

Clinical outcomes and prognostic factors associated with nonsteroidal anti-inflammatory drug overdose in dogs presented to an emergency room

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Objective: To describe case presentations, clinical signs, and outcomes following NSAID overdose in a clinical population of dogs and to identify factors associated with various outcomes including death or euthanasia, acute kidney injury, and suspected gastrointestinal ulceration (GIU).

Design: Retrospective study

Setting: University teaching hospital

Animals: 125 client-owned dogs presenting to an ER for NSAID overdose between January 2006 and December 2017.

Results: Vomiting was the most common clinical sign, seen in 46 of 125 dogs (36.8%). **AKI and suspected GIU were seen in 17 (13.6%) and 16 dogs (12.8%),** respectively. Thirty-two dogs (25.6%) ingested veterinary-formulated NSAIDs and 93 (74.4%) ingested human-formulated NSAIDs. No difference in any outcomes was seen between these two groups. 120 dogs (96%) survived to discharge. In multivariable analysis, the only significant finding was that the **number of days of anorexia increased the risk of death or euthanasia with an odds ratio of 2.7** (95% confidence interval [1.14–6.5], P = 0.02).

Conclusions: AKI and suspected GIU were seen less frequently than vomiting. Similar outcomes were seen for dogs ingesting veterinary- versus human-formulated NSAIDs. Owners presenting dogs with a longer duration of anorexia maybe more apt to euthanize. As this was a clinical population of dogs presenting to an emergency room, findings may be more broadly applicable to the general population than prior studies utilizing poison control center data.

TABLE 3 Specific drug ingestion and ingestion dosages in 125 dogs presenting to an emergency room with NSAID overdose

Drug	Number of patients (%)	Median mg/kg dose (range) ^a
Ibuprofen	73 (58.4%)	222 (11–2344)
Carprofen	23 (18.4%)	42 (12–500)
Naproxen	15 (12%)	165 (12–3000)
Deracoxib	8 (6.4%)	30 (16–62)
Aspirin	3 (2.4%)	348 (143–368)
Ketorolac	2 (1.6%)	4.3 (4.3)
Meloxicam	1 (0.8%)	0.8 (0.8)
Ibuprofen + aspirin	1 (0.8%)	
Ibuprofen + naproxen	1 (0.8%)	

- 70.4%) were hospitalized
- Median length of stay was 3 days (range: 1–11)
- Medical treatment included misoprostol (79.2%), PPI (64%), sucralfate (60.8%), famotidine (48.8%), ondansetron alone (16%), etc. Advanced therapies included hemoper-fusion in six of 125 dogs (4.8%), ILE in 3.2%, and IRRT 1.6%. Blood products 3.2%
- In the AKI group: 14 of 17 dogs ingested ibuprofen. Of these 14 dogs, 7 ingested <175 mg/kg (range: 21.6–150 mg/kg), 3 ingested >400 mg/kg (range: 425–2344 mg/kg), 2 ingested between 175 and 400 mg/kg, and for 2 the estimated dose was missing.
- Conclusions: AKI and suspected GIU were infrequent despite vomiting being common

Associations between surgical start time (regular vs after hours) and morbidity and mortality during hospitalization in dogs and cats

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- Objective: To examine the relationship between after-hours emergency surgery and morbidity or mortality in dogs and cats during hospitalization.
- Design: Cross-sectional study from September 1, 2013 to May 31, 2017.
- Setting: University teaching hospital.
- Animals: 474 dogs and 66 cats that underwent emergency general surgery (gastrointestinal, hepatobiliary, urogenital, soft tissue traumatic injury, splenectomy/excision of bleeding abdominal tumor, surgical revision, and negative exploratory categories) with the emergency surgery service. All patients were required to have complete medical records.
- Interventions: None.
- Results: Study animals were grouped as **exposed or not exposed** to after-hours emergency surgery. They were further classified as either **post-operatively dead or suffering morbidity** (yes or no). Additional exposure factors (age, sex, ASA status) were investigated. Multivariable logistic regression was used to identify and quantify any associations with mortality or morbidity. **In dogs, exposure to after-hours emergency general surgery was not associated with mortality or morbidity.** In dogs, both mortality and morbidity were **associated with ASA status**. In cats, mortality was not examined because the number of dead cats was small (n = 5). **The odds of morbidity were 3.4 times lower in cats having emergency surgery after hours, compared to cats admitted during regular hours** (odds ratio [OR], 0.29; 95% Confidence Interval

(CI), 0.09-0.93; P = 0.03). No other investigated exposure factors were associated with morbidity in study cats.

- Conclusions: **After-hours emergency surgery in dogs was not associated with increased risk of mortality and morbidity** at the study facility. **Feline patients having emergency surgery during regular hospital hours had a higher risk of morbidity**; further investigation of modifiable risk factors is warranted
- For both GI surgery was the most common cause for surgery followed by ST trauma
- Dogs:
 - 163 had emergency surgery during regular hours, and 311 had surgery after hours
 - Mortality: regular hours group, 15/163 (9%), vs 42/311 (14%) after hours
 - Morbidities: Regular hours group, 119/163 (73%) vs After hours surgery, 211/311 (68%)
- Cats:
 - 23 had emergency surgery during regular hours, while 43 had surgery after hours
 - Mortality: regular hours group, 2/23 (9%) died, vs 3/43 (7%) in after hours
 - Morbidities: regular hours group 18/23 (78%) vs after hours, 3/43 (7%) had morbidity
 - **Feline mortality could not be evaluated due to small number of cases**
- TLD:
 - After hour surgery **is not** assoc w increased morbidity/mortality in dogs
 - ASA status **is** assoc w increased morbidity/mortality in dogs
 - After hour surgery **is** assoc w increased morbidity in cats

A survey of emergency and critical care veterinarians regarding IV fluid bolus therapy and monitoring practices in small animals

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- Objective: To determine how veterinary emergency and critical care clinicians define IV fluid bolus therapy (FBT) and what constitutes a positive response to a fluid bolus.
- Design: Online survey of 222 emergency and critical care veterinarians between December 17, 2018, and March 1, 2019.
- Interventions: An online survey was provided to diplomates of the American College of Veterinary Emergency and Critical Care (ACVECC), residents of ACVECC-approved training programs, as well as house officers and emergency clinicians of a corporate multicenter emergency and specialty care veterinary hospital. The survey investigated

the administration of various crystalloid, colloid, and blood products for FBT, as well as expected physiological responses.

- Results: The majority of respondents considered **balanced isotonic crystalloids appropriate for FBT [99.1%]**. Respondents showed **greater variability in acceptance of 0.9% sodium chloride 47.30%, HTS 59.01%, and HES solutions (40.54%)**. **Most respondents did not consider plasma [19.82%] an appropriate choice**. The most commonly **used parameters** for monitoring FBT responses were **heart rate (99.10%), blood pressure (97.75%), capillary refill time (86.49%), lactate (81.53%)**, pulse pressure (68.02%), and rectal temperature (65.32%). The majority of respondents perceived that 0–20% (74.32%) of hypotensive patients are non-responsive to FBT.
- Conclusions: ECC clinicians favored balanced isotonic electrolyte solutions and hypertonic sodium chloride solutions for FBT over other options. When monitoring responses to FBT, heart rate, blood pressure, capillary refill time, and plasma lactate were among the most commonly monitored parameters, and there was a lack of familiarity with others. Despite the widespread use of FBT, these findings outline the need for further prospective clinical trials regarding the ideal fluid type and rate, as well as the appropriate responses to FBT




Fluid type	Acceptable (n = 222, %)	Mean minimum volume (mL) (Range)	Median maximal time frame (min)
Saline	105 (47.3%)	19.93 (5-500)	15
BES	220 (99.1%)	16.78 (1-500)	20
HES	90 (40.54%)	4.23 (1-10)	20
HTS	131 (59.01%)	3.25 (0.25-7)	15
Physiological plasma	44 (19.82%)	7.18 (1-20)	30

Number of respondents considering a given fluid type appropriate for fluid bolus therapy, as well as the mean minimum volume and maximal rate that would be appropriate. Saline, 0.9% sodium chloride; BES, balanced electrolyte solutions (lactated Ringer's, Hartmann's, Plasmalyte, Normosol, etc); HES, hydroxyethyl starch solutions; HTS, hypertonic saline.

TABLE 8 Routine monitoring parameters for FBT




Parameter	Respondents (n = 222, %)
HR	220 (99.10%)
PP	151 (68.02%)
CRT	192 (86.49%)
Rectal temperature	145 (65.32%)
BP	217 (97.75%)
Plasma lactate	181 (81.53%)
BE	62 (27.93%)
Thermal gradient	20 (9.01%)
SI	32 (14.4%)
CVP	2 (0.90%)
CVC _a (US)	15 (6.76%)
CVC _c (US)	12 (5.41%)
Echocardiography	9 (4.05%)
CVC _a (Rad)	1 (0.45%)
Mentation	9 (4.05%)
MM	1 (0.45%)
UOP	2 (0.90%)
PCV/TP	2 (0.90%)
RR	1 (0.45%)

Influence of long-stay jugular catheters on hemostatic variables in healthy dogs

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- Objective: To compare **hemostatic variables** performed on blood samples obtained from **indwelling jugular catheters or direct venipuncture over** a 72-hour period.
- Design: Prospective experimental study.
- Setting: University research laboratory.
- Animals: Five healthy neutered male purpose-bred Beagle dogs.
- Interventions: Each dog was sedated to facilitate placement of a long-stay 20-G polyurethane IV catheter into the jugular vein. Blood samples were obtained from the preplaced catheters at 4 time points corresponding to 0, 24, 48, and 72 hours relative to placement. Blood samples were also obtained by direct venipuncture of a peripheral vein using a 21-Ga butterfly catheter and evacuated blood tubes at the same time points. **Platelet count, platelet closure time, prothrombin time, activated partial throm-boplastin time, fibrinogen, and kaolin-activated TEG** were performed on these paired samples at each time point. The patency of the indwelling catheters was maintained by flushing every 6 hours with heparinized saline.
- Results: **No significant differences were identified in any of the hemostatic variables obtained by either blood collection technique at any time point during the study** ($P > 0.05$). There was also no significant day-to-day variation in any catheter-derived hemostatic variable obtained from individual dogs identified over the course of the study.
- Conclusions: These data suggest that **accurate hemostatic variables may be obtained using blood collected from indwelling jugular catheters**, maintained with heparinized saline for at least 72 hours, in healthy dogs

Prospective investigation of factors associated with success on the American College of Veterinary Emergency and Critical Care certification examination (2016-2018)

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- Objective: To assess the association of candidate attributes and residency training factors with success on the American College of Veterinary Emergency and CriticalCare (ACVECC) board certification examination and to develop multivariable models of first-attempt success.
- Design: Prospective survey-based study.
- Setting: Post-assessment ACVECC examination candidates. Animals: None.
- Interventions: None.
- Results: Comprehensive surveys were distributed to ACVECC examination candidates in 2016 to 2018 after completion of their assessments, but prior to publication of examination results. Unique anonymous candidate identification numbers were used to match survey responses to outcome data from the office of the ACVECC Executive Secretary. After curation to retain only the first response from each candidate, there were 97 unique candidate responses available for analysis. Univariate analyses identified multiple factors associated with first-attempt success and multiple differences between academic and private practice residency programs. Multivariable logistic regression modeling suggested that **5 factors were independently associated with first-attempt success** on the ACVECC examination, specifically **younger age, more weeks of study prior to the examination, training at a facility with more ACVECC Diplomates, training at a facility with more ACVECC residents, and having no requirement to manage both ER and ICU simultaneously.**
- Conclusions: Numerous resident and training center factors are associated with success in the ACVECC board certification examination. Residents and training centers might be able to use these data to enhance training, but caution must be exercised because these data are associative only.

Clinical features, outcome, and illness severity scoring in 32 dogs with urosepsis (2017–2018)

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Objective: To describe the clinical features, outcome, and utility of illness severity scoring in dogs diagnosed with urosepsis.

Design: Retrospective study (2017–2018).

Setting: University teaching hospital. **Animals:** Thirty-two dogs diagnosed with urosepsis secondary to pyometra, prostatitis, or pyelonephritis.

Interventions: None.

Results: Urosepsis was identified in 32 dogs, consisting of 28.1% with pyometra, 21.8% with prostatitis, and 50% with pyelonephritis. In total, 87.5% dogs survived to discharge, with the following group-specific survival rates: pyometra, 100%; prostatitis, 71.4%; and pyelonephritis, 87.5%. Positive bacterial cultures were obtained in 84.1% dogs. The most commonly implicated pathogens were *Escherichia coli* 37.8%, *Klebsiella pneumoniae* 21.6%, and *Staphylococcus pseudintermedius* 16.2%. MODS was identified 65.6%. Although the presence of MODS was not different between survivors and nonsurvivors ($P = 0.6$), nonsurvivors had more dysfunctional organs ($P = 0.04$). Nonsurvivors also had higher Acute Patient Physiology and Laboratory Evaluation (APPLE FAST) scores compared to survivors ($P = 0.01$).

Conclusions: **Survival of dogs with urosepsis was good and may be higher than for other sources of sepsis.** Compared to survivors, nonsurvivors had more dysfunctional organs and higher illness severity scores, which may be helpful in the assessment and management of dogs with urosepsis.