Evaluation of dose-response effects of short-term oral prednisone administration on clinicopathologic and hemodynamic variables in healthy dogs

Rebecca L. Tinklenberg

OBJECTIVE To determine whether a dose-response relationship exists between shortterm oral prednisone administration and common clinicopathologic variables, cardiovascular biomarkers, and systolic arterial blood pressure (SAP) in healthy dogs.
ANIMALS 8 healthy Beagles.
PROCEDURES Dogs underwent five 5-day experiments (no prednisone treatment [control condition] and prednisone administration at 0.5, 1, 2, and 4 mg/kg, PO, q 24 h), with a 9-day washout period between protocols. Analyses performed before and after treatments included a CBC, serum biochemical analysis, and determination of SAP, fractional excretion of electrolytes, urine protein-to-creatinine ratio, glomerular filtration rate (GFR), serum N-terminal pro B–type natriuretic peptide (NT-proBNP) and plasma cortisol concentrations, and plasma renin activity. Linear mixed-effects modeling was used to compare changes in variables from baseline (day 1 for the same experiment) among treatment conditions.
RESULTS Changes in serum glucose concentration and GFR were significantly greater after administration of prednisone at 4 mg/kg than for the control condition. Fractional excretion of sodium was decreased from baseline when dogs received 0.5, 1, or 4 mg of prednisone/kg, compared with results for the control condition. Several expected changes in clinicopathologic values were observed after prednisone administration at any dose. Changes in serum NT-proBNP concentration, plasma renin activity, and SAP did not differ from changes for the control condition at any prednisone dose.
CONCLUSIONS AND CLINICAL RELEVANCE Oral prednisone administration did not affect SAP, NT-proBNP concentration, or measures of renin-angiotensin-aldosterone system activation in healthy laboratory-housed dogs but was associated with relative increases in GFR and serum glucose concentration.

Intro

- Despite the anecdotal and theoretical concern that glucocorticoid administration might potentiate CHF in cats, no data exist to suggest adverse effects of short-term anti-inflammatory administration of oral intermediate-acting glucocorticoids in patients with heart disease. In fact, it is possible that diuretic effects of glucocorticoids may be beneficial to patients with CHF
- goal of the study: to determine whether a dose-response relationship exists for the effect of orally administered prednisone on hemodynamic and clinicopathologic variables in healthy dogs. (5 day course at different doses)

Results:

- Changes in body weight, SAP, plasma volume, and serum NT-proBNP concentration **did not differ** significantly after administration of prednisone at any dose, compared to controls
- GFR: when dogs received prednisone at the 4-mg/kg dose was **increased** compared to controls
- UPC: greater **increase** from baseline at the 4-mg/kg dose compared to control or doses of 0.5 mg/kg and 1 mg/kg.
- Fractional excretion of Na: was **decreased** from baseline at doses of 0.5, 1, and 4 mg/kg, compared to controls

- Na concentration **did not differ** significantly among treatment conditions.
- USG and fractional excretion of K also **did not differ** significantly among treatment conditions, but serum K was increased from baseline when dogs received the 1-mg/ kg dose of prednisone, compared to controls
- BG was **increased** from baseline when dogs received the 4-mg/kg dose of prednisone, compared to controls and for the doses of 0.5 mg/kg, 1 mg/kg, and 2 mg/ kg.
- Cl: All doses of prednisone were associated with **decreases** in serum Cl
- Albumin, TP, triglyceride, andMg and ALP **increased** compared to controls
- Total plasma cortisol: **decreases** were observed when dogs received prednisone treatment at any dose, whereas a small increase from baseline was observed in untreated dogs
- **No significant** changes in plasma free cortisol concentration or plasma angiotensin I concentration (measure of renin activity) were associated with prednisone treatment.
- Baseline values for 4 variables differed significantly among the 4 prednisone treatments. On pairwise comparisons, the baseline circulating band neutrophil concentration was higher at the start of the 0.5-mg/kg treatment period (0.19 X 103 cells/μL) than for all subsequent treatment periods (0.01 X 103 cells/μL, 0.02 X 103 cells/μL, and 0.0 X 103 cells/μL for the 1-, 2-, and 4-mg/kg treatments, respectively).
- Cholesterol: for the 2-mg/kg treatment (129 mg/dL) was lower than the baseline values for the controls (155 mg/dL) and the 0.5-mg/kg (151 mg/ dL) and 1-mg/kg (143 mg/dL) treatments.
- TP (6.1 g/dL) and albumin (3.4 g/dL) concentrations at baseline were higher for 4-mg/kg treatment, compared with those for the 0.5-mg/kg treatment only (total protein, 5.8 g/dL; albumin, 3.2 g/dL).

Discussion:

- only mild clinicopathologic and hemodynamic changes in healthy dogs following short-term (5-day) oral administration of prednisone at each of 4 doses (0.5, 1, 2, and 4 mg/kg) every 24 hours, with a 9-day washout period between protocols.
- Changes in mean SAP from baseline measurements (day 1, prior to drug administration for the prednisone treatment protocols) did not differ significantly from those for the control condition

TLDR: Oral prednisone administration did not affect SAP, NT-proBNP concentration, or measures of renin-angiotensin-aldosterone system activation in healthy laboratory-housed dogs but was associated with relative increases in GFR and serum glucose concentration.

Randomized controlled trial to evaluate a novel two-catheter technique for urethral catheterization in anesthetized healthy female cats and small dogs

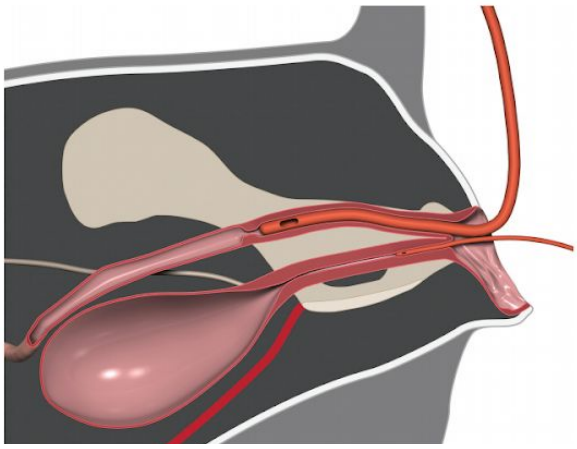
Brittany E. Abrams

OBJECTIVE To evaluate a novel 2-catheter technique for urethral catheterization in female cats and small dogs and compare the time required for and success rates achieved by use of the novel technique versus traditional methods (blind technique in cats and digital palpation in dogs) as performed by personnel (catheter placers [CPs]) with different levels of experience in urinary catheter placement.
ANIMALS 39 healthy sexually intact female animals (24 cats and 15 dogs weighing < 10 kg).
PROCEDURES 2 CPs were board certified in veterinary surgery, 1 of whom had experience with the novel technique, and the other did not. The third CP was a veterinary surgical intern who was unfamiliar with the novel technique. For each animal enrolled in the study, 1 CP performed catheterization with the novel technique and traditional methods. Data recorded included the time required for successful catheterization and whether a successful catheterization was achieved within a 3-minute time limit.
RESULTS The overall success rates were 79.5% (31/39 animals) with the novel technique and 43.6% (17/39 animals) with traditional methods. Median times for successful catheter placement were 48 seconds for the novel technique and 41 seconds for traditional methods. Among CPs, success rates or times to successful catheter placement did not differ significantly.
CONCLUSIONS AND CLINICAL RELEVANCE Study results suggested that the novel 2-catheter technique for urethral catheterization may be a more efficient option than traditional methods for gaining access to the urinary bladder in cats and small dogs, particularly when patient size limits use of instrumentation or digital palpation.

Introduction:

- goal of the study: to perform a randomized controlled trial to evaluate a novel 2-catheter technique for urethral catheterization in sexually intact female cats and small dogs and assess the time required for completion and success rate of the technique when applied by persons with different levels of experience and compare those findings with completion times and success rates of traditional methods of urethral catheterization (ie, blind technique in cats and digital palpation in dogs) performed by the same personnel. -
- We hypothesized that the novel 2-catheter technique for urethral catheterization would take less time to complete, compared with traditional methods, across CPs of differing skill levels.

Novel urethral catheterization technique: a larger red rubber catheter (10F in most adult cats and 18F in small dogs) was introduced into the vestibule and gently passed far cranially into the vaginal vault until abrupt resistance was met. The open end of the red rubber catheter was reflected dorsally and held in place with the CP's nondominant hand. With the dominant hand, the CP then introduced a smaller red rubber catheteri,j (5F in cats and 8F in dogs) into the vestibule. The smaller catheter was directed along the midline of the vestibule with a ventral trajectory at an approximately 45° angle. The tip of the catheter was used to gently probe the ventral surface of the vestibule until the catheter easily advanced through the urethral orifice



Results:

- 39 healthy sexually intact female animals (24 cats and 15 dogs weighing < 10 kg)
- The mean ± SD weight of animals was 3.7 ± 1.7 kg
- The overall success rates with the novel 2-catheter technique and traditional methods of urethral catheterization were 79.5% (31/39 animals) and 43.6% (17/39 animals), respectively
- Overall median time to perform either the blind insertion method in cats or the digital palpation method in dogs was 41 seconds.
- There was no difference in the median time for successful catheter placement between the novel 2-catheter technique and traditional methods.
- No significant differences in success rates or time to successful catheter placement were found among CPs.
- The smallest animals weighed 1.6 kg. Urethral catheter placement with a traditional method was not successful in either kitten, whereas use of the novel 2-catheter technique was successful. There were 16 occasions on which CPs failed to catheterize animals with a traditional method; however, those animals were successfully catheterized by means of the novel 2-catheter technique.

Discussion:

- The novel 2-catheter technique for urethral catheter placement in sexually intact female cats and small dogs had a significantly greater frequency of successful attempts, independent of CP experience. However, contrary to our hypothesis, a difference in time to successful catheter placement between techniques was not evident.

Usefulness of pericardial lung ultrasonography for the diagnosis of cardiogenic pulmonary edema in dogs

Yasutomo Hori

OBJECTIVE To investigate whether lung ultrasonography (LUS) performed around the heart, where the lungs are in contact with the pericardium (ie, pericardial LUS), could be used for the diagnosis of cardiogenic pulmonary edema (CPE) in dogs with degenerative mitral valve disease (DMVD).
ANIMALS 15 control dogs with healthy hearts and 26 dogs with DMVD.
PROCEDURES In a prospective multicenter study design, dogs with DMVD were assigned to 2 groups: those with CPE (n = 11) and those without CPE (15). Thoracic radiography, echocardiography, and pericardial LUS were performed for all dogs. For pericardial LUS, the left ventricular short-axis view was obtained with a sector probe (dog positioned in right parasternal recumbency) and the number of B lines was recorded. Accuracy of pericardial LUS for the diagnosis of CPE was calculated, with thoracic radiography used as the reference standard.
RESULTS On thoracic radiography, all dogs with CPE had a diffuse distribution of interstitial to alveolar pulmonary infiltrates. On pericardial LUS, most control dogs (14/15) and dogs with DMVD but no CPE (13/15) had ≤ 2 B lines, whereas all dogs with DMVD and CPE had ≥ 3 B lines. The presence of ≥ 4 B lines had high sensitivity (91%; 95% confidence interval, 62% to 98%) and excellent specificity (100%; 95% confidence interval, 89% to 100%) for the diagnosis of CPE, and the area under the receiver operating characteristic curve was 0.99.
CONCLUSIONS AND CLINICAL RELEVANCE Results suggested that identification of ≥ 4 B lines extending from the epicardium of the left ventricle into the lung field on pericardial LUS may be useful in the diagnosis of CPE in dogs with DMVD. Additional research is needed to determine whether pericardial LUS allows differentiation between CPE and pneumonia.

Intro:

- The purpose of the study reported here was to investigate whether pericardial LUS could be used to detect B lines in dogs with CPE and to determine its clinical usefulness for the diagnosis of CPE caused by DMVD.

Results:

- 41 dogs (23 males and 18 females), age range of 3.0 to 16.0 years and BW range of 2.4 to 14.7 kg, were included. Breeds included Chihuahua, Shih Tzu and others small breed dogs
- Eleven dogs in the DMVD group had CPE, and the remaining 15 had no CPE
- Chest rads of control dogs and dogs with DMVD but no CPE revealed no evidence of an interstitial pattern or mixed interstitial-alveolar pattern in the lung fields.
- Dogs with DMVD and CPE had a diffuse distribution of interstitial to alveolar pulmonary infiltrates mainly in the caudodorsal area
- Heart rate was significantly higher for dogs with DMVD but no CPE than for control dogs.
- Plasma NT-proBNP was significantly greater for dogs with DMVD and CPE than for control dogs.
- LA:Ao and LVIDDn were significantly higher for both subgroups of dogs with DMVD than for control dogs

- On pericardial LUS, most of the control dogs (14/15) and dogs with DMVD but no CPE (13/15) had ≤ 2 B lines from the epicardium
- Dogs with DMVD and CPE had a high prevalence of confluent B lines. To discriminate between dogs with CPE and those without CPE, the optimal cutoff value was 4 B lines, which resulted in high sensitivity (91%), excellent specificity (100%), and an AUC of 0.99
- The presence of ≥ 4 B lines was significantly more common in dogs with CPE (91% [10/11]) than in dogs without CPE (ie, dogs with DMVD but no CPE and control dogs)

Discussion:

- The presence of ≥ 4 B lines was highly sensitive and specific for the diagnosis of CPE in the study sample