ER & ICU Pot Pourri

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Objectives

- Discuss published information
  - Journal Club
- Take away new information
  - Clinically relevant
  - Easy to incorporate into practice

Why is this important?

- Information overload exists
  - Remain current
  - Deliver better patient care
- Clinically relevant papers
- Various journals

- Brady MA et al, Evaluating the use of plasma hematocrit samples to detect ketones utilizing urine dipstick colorimetric methodology in diabetic dogs and cats. J Vet Emerg Crit Care 2003, 13(1): 1-6.
- Smarick SD et al, Incidence of catheter-associated urinary tract infection among dogs in a small animal intensive care unit. J Amer Vet Med Assoc 2004, 224(12): 1936-1940.
- Drellich S, Intraabdominal pressure and abdominal compartment syndrome, Comp Cont Ed Pract Vet 2000: 764-768.
- Silverstein D et al, Assessment of changes in blood volume in response to resuscitative fluid administration in dogs. J Vet Emerg Crit Care 2005, 15(3): 185-192.
- Wierenga J et al, *In vitro* comparison of the effects of two forms of hydroxyethyl starch solutions on platelet function in dogs. Am J Vet Res 2007, 68: 605-609.
- Hofmeister E et al, Evaluating of veterinarians' and veterinary students' knowledge and clinical use of pulse oximetry. J Vet Med Educ 2005; 32: 272-277.

Original Study

Journal of Veterinary Emergency and Critical Care **13**(1) 2003, pp 1–6

Evaluating the use of plasma hematocrit samples to detect ketones utilizing urine dipstick colorimetric methodology in diabetic dogs and cats

Mark A. Brady, DVM, Jeffrey S. Dennis, DVM, DACVIM and Colette Wagner-Mann, DVM, PhD

J Vet Emerg Crit Care 2003, 13(1): 1-6.

Brady et al: Objective

- To determine whether plasma from a heparinized hematocrit tube placed on a urine dipstick would accurately reflect (positive or negative) urine ketone results in diabetic dogs and cats.

Brady et al: Design

- Prospective
- 37 dogs and 43 cats
  - private practice
  - client owned
- History or signs of hyperglycemia, glucosuria, diabetes mellitus
- Paired samples
  - Plasma dipstick compared to urine dipstick
- Color chart by manufacturer
- 2 observers

Brady et al: Results

- 4/80 animals discordant results
- Dogs:
  - 97% efficient
  - 96% sensitive
  - 100% specific
- Cats:
  - 93% efficient
  - 100% sensitive
  - 83% specific

Brady et al: Conclusions

- Plasma from hematocrit tubes can be clinically useful for detecting the presence or absence of ketonuria/ ketosis in diabetic dogs and cats.

Incidence of catheter-associated urinary tract infection among dogs in a small animal intensive care unit

Sean D. Smarick, VMD, DACVECC; Steve C. Haskins, DVM, DACVECC, DACVA; Janet Aldrich, DVM; Janet E. Foley, DVM, PhD; Philip H. Kass, DVM, PhD, DACVPM; Mack Fudge, DVM, MPVM, DACVECC; Gerald V. Ling, DVM

J Amer Vet Med Assoc 2004, 224(12): 1936-1940.

Smarick et al: Objective

- To determine incidence of and possible risk factors for catheter-associated UTIs among dogs in the ICU
- To compare results of bacterial culture of urine to catheter tip

Smarick et al: Design

- Prospective
- Aseptic standard protocol for urinary catheter placement and maintenance
- Daily urine cultures
- As available catheter tip cultures
- Sensitivity testing on isolates

Smarick et al: Results

- 4/39 developed UTI (10.3%)
- 85 dog-days
- 5 UTIs/100 dog-days
- Probability testing:
  - 94.9% day 1
  - 63.3% day 4

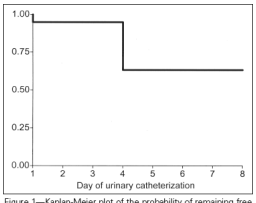


Figure 1—Kaplan-Meier plot of the probability of remaining free from catheter-associated urinary tract infection as a function of duration of catheterization for 39 dogs hospitalized in a small animal intensive care unit.

Smarick et al: Results

- Bacteria were susceptible
- Risk factors: minimal
- Culture tips
  - 8 positive (2 with & 6 without a UTI)
  - 25% pos. predictive value

Smarick et al: Conclusions

- Low risk for catheter-associated UTIs
- Catheter tip cultures not helpful
- Lower incidence than 2 previous studies
  - Reason for placement
  - Length of stay
  - Strict definition of UTI
- Sex has no role in UTI development

Intraabdominal Pressure and Abdominal Compartment Syndrome

Compend Contin Educ Pract Vet. August 2000;22(8):764-768. 40 Refs
Sharon Drellich[1]

Comp Cont Ed Pract Vet 2000: 764-768.

Drellich: Objective

- Review article
- How to
- Pathology
- Consequences
- Recommendations

IAP: How to

- Place and secure a Foley catheter into the urinary bladder
- Empty bladder
- Instill 1ml/kg saline
- Measure using manometer
  - just like CVP

IAP: Pathology

- Renal blood flow ↓ → oliguria
- Celiac and super. mes. art. blood flow ↓
- Hemorrhagic diarrhea
- Lactate
- Dysrhythmias
- Ventilatory impairment
- Cardiac output and stroke volume ↓

IAP: Pathology

Intraabdominal Pressure (cmH_2O)	Pathology
4-5	Normal
10-15	Post-operative (uncomplicated)
20-30	Severe abdominal distention

IAP: Recommendations

Intraabdominal Pressure (cmH_2O)	Recommendation
10-20	Pursue underlying cause
20-35	Volume resuscitate and +/- decompress
> 35	Surgery or abdominocentesis

Drellich: Conclusions

- Valuable monitoring parameter
- Controlled clinical studies needed

Original Study

Journal of Veterinary Emergency and Critical Care 15(3) 2005, pp 185–192

Assessment of changes in blood volume in response to resuscitative fluid administration in dogs

Deborah C. Silverstein, DVM, DACVECC, Janet Aldrich, DVM,* Steve C. Haskins, DVM, MS, DACVECC, DACVA,* Kenneth J. Drobatz, DVM, MSCE, DACVECC, DACVIM and Larry D. Cowgill, DVM, PhD, DACVIM*

J Vet Emerg Crit Care 2005, 15(3): 185-192.

Silverstein et al: Objective

- To determine the continuous changes in blood volume in response to fluid administration using an in-line hematocrit monitor

Silverstein et al: Design

- Prospective
- 5 treatments, >1 week washout
- Physiologic measurements
- Changes in blood volume recorded
- Average blood volume vs. time, AUC

D.C. Silverstein *et al.*

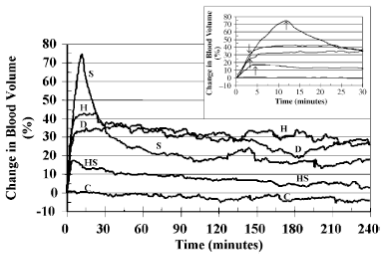


Figure 1: Mean continuous percent change in blood volume in normal dogs under control conditions (C) and following bolus infusion of 0.9% saline (S), 7.5% saline (HS), 6% dextran 70 (D), and 6% hetastarch (HES). Inset: Expanded time scale depicting the initial 30 minutes following start of infusions. Arrows represent the end of fluid administration (see text for fluid doses).

Silverstein et al: Conclusions

- Use any fluid to increase blood volume
- Hypertonic saline least effective at 30 min
- Study needed in ill population

Table 3: Mean ± SD efficiency ratios at selected time intervals following fluid administration to healthy dogs

Fluid	Post-infusion	30 minutes	240 minutes
0.9% saline (S)	0.8 ± 0.1 (HS)	0.4 ± 0.1 (HS,D,HES)	0.2 ± 0.1
7.5% saline (HS)	2.7 ± 0.5 (D,HES,S)	2.0 ± 0.2 (S)	0.5 ± 1.0
Dextran 70 (D)	0.9 ± 0.4 (HS)	1.4 ± 0.3 (S)	1.0 ± 0.6
Hetastarch (HES)	1.1 ± 0.3 (HS)	1.5 ± 0.3 (S)	1.1 ± 0.3

( ) significantly different, $P < 0.05$, compared to the indicated treatment.

In vitro comparison of the effects of two forms of hydroxyethyl starch solutions on platelet function in dogs

Janelle R. Wierenga, DVM; Karl E. Jandrey, DVM; Steve C. Haskins, DVM, MS; Fern Tablin, VMD, PhD

Am J Vet Res 2007, 68: 605-609.

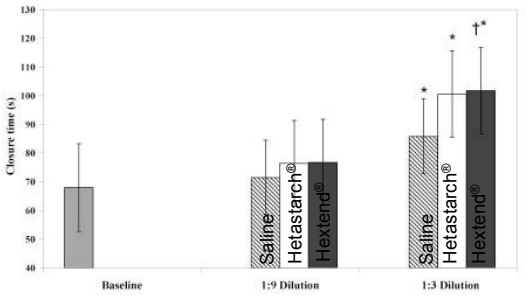
Weirenga et al: Objective

- To evaluate the effect of 2 hydroxyethyl starch preparations on canine platelet function

Weirenga et al: Design

- *In vitro* laboratory study
- 10 healthy dogs
- Hextend®, Hetastarch® & saline
  - 1:3 dilution ~ 30ml/kg dose
  - 1:9 dilution ~ 10ml/kg dose
- Measure closure times (PFA-100®)

Weirenga et al: Results



Weirenga et al: Conclusions

- All 3 solutions prolong closure times at 1:3 dilution
- HES were not different at any dilution
  - No difference on platelet function found
- Hextend different than saline at 1:3
  - More than a dilutional effect

Hot off the presses…

- That was *in vivo*; how about *in vivo*?

Research and Education Reports

Evaluating Veterinarians' and Veterinary Students' Knowledge and Clinical Use of Pulse Oximetry

Erik H. Hofmeister ■ Matt R. Read ■ Benjamin M. Brainard

J Vet Med Educ 2005; 32: 272-277.

Hofmeister et al: Objective

- To document the knowledge base of veterinary students, interns, specialists, and general practitioners regarding pulse oximetry
- To identify the common uses of pulse oximetry in veterinary practices

Hofmeister et al: Design

- Questionnaire
  - Knowledge/understanding of pulse ox.
- Residents and board-certified
  - ACVA & ACVECC (control)
- General practitioners at CE seminars
- Students in anesthesiology rotation

Hofmeister et al: Results

- Residents/specialists
  - 69%
- Senior students
  - 46%
- General practitioners
  - 34%

Hofmeister et al: Results

- Percent who said they received training
  - Senior students= 21%
  - General practitioners= 15%
  - They scored better than non-trained
- GPs did not use it on anesthetized critical patients

Hofmeister et al: Conclusions

- Veterinarians have poor understanding:
  - how the pulse oximeter works
  - the information it provides
  - how best to apply its info to patients
- Not used for the most benefit
- Better training needed