INTRODUCTION

Garret Pachtinger,
VMD, DACVECC
COO, VETgirl

Associate, VSEC

VETGIRL...ON-THE-RUN

The tech-savvy way to get CE credit!
A subscription-based podcast & webinar service offering veterinary RACE-approved, online CE

SUBSCRIPTION PLANS

VETgirl Standard: 50-60 podcasts/year
• $99/year
• 4 hours of RACE-CE

VETgirl ELITE: 50-60 podcasts/year plus 20 hours of webinars!
• $199/year
• 20+ hours of RACE-CE
MEMBERS: ITUNES DOWNLOAD!

FIND US ON SOCIAL MEDIA AND OUR BLOG!

LOGISTICS: CE CERTIFICATES

- No need to raise your hand!
- Type in questions
- Emailed to you 48 hours after the webinar
- Active participation = no quiz
- Watching video later, must complete quiz
  - ELITE members only
- Email / contact with ANY questions
  - garret@vetgirlontherun.com
  - justine@vetgirlontherun.com
CALL IN FROM SMART PHONE!

How To Join The Webinar
Wed, Jun 25, 2014 7:00 PM - 9:00 PM EDT

1. Click the link to join the webinar at the specified time and date:
https://optimalroom.net/a/190420/M0135573468

Note: This link should not be shared with others. It is unique to you.

2. Choose one of the following audio options:
TO USE YOUR COMPUTER AUDIO:
You will be connected to audio using your computer’s microphone and speakers (VOIP). A headset is recommended.

TO USE YOUR TELEPHONE:
You need to use your telephone. You must select “Use Telephone” after joining the webinar and call in using the numbers below.

United States:
Access Code: 617-250-436
Audio PIN: 6864 after joining the webinar
Webinar ID: 106-642-567

Vetgirl System Requirements

---

THE FIRST FULLY LICENSED ANTIVENIN BY THE USDA SINCE 1947

NEW F(ab)2 TECHNOLOGY – TWO BINDING SITES THAT NEUTRALIZE MORE VENOM TOXINS THAN CURRENT LICENSED ANTIVENIN PRODUCT

---

EFFECTIVE AGAINST ALL RATTLESNAKES, COPPERHEADS AND WATER MOCCASSINS

LIQUID FORM-READY TO USE-NO MIXING

THREE (3) YEAR SHELF LIFE

NO SUPPLY ISSUE- AVAILABLE AT ALL MAJOR DISTRIBUTORS- NO MORE BACKORDERS
• Virtually no adverse reactions
• Typical treatment one 10 ml vial
• No reported case of envenomation recurrence
• Pricing that allows all vets to stock it: $220 per vial

WELL, YOU NO LONGER HAVE TO IMAGINE BECAUSE THAT DAY IS NOW HERE!

Information:
www.venomvet.com

Specific product related questions should be directed to MT Venom:

Phone: 800-385-6914
INTRODUCTION

Raegan J. Wells, DVM, MS, DACVECC

Disclosures

No financial disclosures

Previous unpaid scientific collaboration with Veteria

Personal fascination with snake venom and pathophysiology of envenomation

Overview

• Brief review of rattlesnake envenomation pathophysiology
• Antivenom 101
• Antivenom options for the small animal veterinarian
• Other rattlesnake envenomation therapies
**Venom**

- **Enzymes**
  - Hyaluronidase & collagenase
  - Tissue destruction
  - Proteases
  - Necrosis/coagulopathy
  - Phospholipases
  - Cytotoxicity
- **Peptides that can act as toxins to many systems**
  - Neurotoxins
  - Cardiotoxins
  - Nephrotoxins

**Local Tissue Injury**

- ↑ capillary permeability
- Endothelial cell swelling & rupture
- Tissue edema, ecchymosis & necrosis
- Loss of the vascular basement membrane
- Myonecrosis
- Can become systemic = SIRS/SEPSIS/MODS

**Coagulopathy**

- **Fibrinolysins**
  - Defibrination = hemorrhage
- **Fibrinogen clotting enzymes**
- **Thrombin-like enzymes**
  - Do not activate XIII = small, friable blood clots
- **Anticoagulants**
- Platelet function inhibition
- Vascular damage
Venom Induced Coagulopathy (VIC)

Does not start as a consumptive coagulopathy
aka, this is not disseminated intravascular coagulation

Coagulation factors are not being consumed, rather they are
inhibited by the venom

Venom is also impairing platelet function, vessel wall function,
and can impact fibrinolysis

May be direct fibrinolysins, or may enhance native
fibrinolysis

Treatment is aimed at neutralizing the venom

Plasma is not indicated to treat rattlesnake envenomation

---

Thromboelastographic evaluation of hemostatic function in dogs treated for crotalid snake envenomation

Robert A. Armentano, DVM, DACVIM; Carsten Bandt, DVM, DACVECC; Michael Schaer, DVM, DACVIM; John Pritchett, DVM and Andre Shih, DVM, DACVAA

13% mortality (5/38 died)

Polyvalent ACP (IgG) = 20
F(ab')2 = 12
No antivenom = 6

Hypocoagulable whole blood tracing significantly associated with mortality

14/38 were hyperfibrinolytic

---

Mojave Toxins?

C. Scutulatus

Responsible for neurological complications

Types

- Mojave venom A
  - Presynaptic neurotoxin
  - Paresis/paralysis
  - Phospholipase activity
- Mojave venom B
  - Proteolytic enzymes

Documented in Southern Pacific Rattlesnakes (C. helleri)

Isolated in Prairie Rattlesnake (C. viridis) venom

Also myotoxin A

Neurotoxins possible in all species

May or may not exhibit classic swelling and pain
Common Clinical Signs

- Puncture wounds
  - Head
  - Distal extremity

- Regional swelling and pain
  - Tracheostomy may be necessary

- Tachycardia, hypotension, arrhythmias

- Neurological abnormalities
  - Obtundation
  - Seizures
  - Diffuse neuromuscular weakness

Myocardial injury in dogs with snake envenomation and its relation to systemic inflammation

Rebecca Lonhborg, DVM, Frida Persson, DVM, Bjorn Ablad, DVM; Amelia Goddard, BVSc(Hons); Michelle Tjernlund, BSc, MMedVet, PhD; Jakob L. Willesen, DVM, PhD; Inge Tarnow, DVM, PhD

Submitted January 7, 2013; Accepted October 29, 2013.

Address correspondence and reprint requests to Dr. Rebecca Langhorn, Department of Veterinary Clinical and Animal Sciences, University of Copenhagen, Groennegaardsvej 3, Ground floor, DK-1870 Frederiksberg C, Denmark. Email: rel@sund.ku.dk

Keywords: Myocardial injury, venom, companion animals, toxins

Abstract

Snake envenomation is a common occurrence in many countries. The envenomation poses a health risk to both people and animals. The type of snake, envenomation and its relation to systemic inflammation was significantly correlated with degree of myocardial injury in dogs envenomed at one or more time points. A significant correlation between cTnI and CRP concentrations. Evidence of myocardial injury was found in 67% of dogs envenomed by N. annulifera or V. berus.

Methods

Animals

From the Department of Veterinary Clinical and Animal Sciences, University of Copenhagen, Frederiksberg, Denmark (Langhorn, Persson, Willesen, Ablad); Department of Companion Animal Clinical Sciences, University of Copenhagen, Groennegaardsvej 3, Ground floor, Frederiksberg, Denmark (Langhorn, Persson, Willesen, Ablad) and Mads Kjeldgaard Hansen, DVM, PhD

Setting

– Prospective case-control study.

Design

– To investigate the presence of myocardial injury in dogs hospitalised for snake envenomation and to examine its relationship with systemic inflammation.

Interventions

– Concentration of cTnI (a biomarker of myocardial injury, companion animals, toxins)

Measurements and Main Results

– Blood was collected from dogs envenomed by N. annulifera or V. berus (2) 2014, pp 174–181

– At one or more time points; however, no correlation was found between cTnI and CRP concentrations. Evidence of myocardial injury was found in 67% of dogs envenomed by N. annulifera or V. berus.

– Concentration of cTnI cardiac troponin I, companion animals, toxins

Conclusions

– This could be due to differences in the toxic substances of the snake venoms or to differences in the cytokines induced by the venom toxins.

– The results of this study suggest that myocardial injury may be a common finding in dogs envenomed by N. annulifera or V. berus.

– Further research is needed to understand the mechanisms of myocardial injury in dogs envenomed by snake venoms.

– Offprints will not be available from the authors.

– B. arietans

– C. atrox

– Vipera berus

– Naja annulifera

– Diffuse neuromuscular weakness

– Regional swelling and pain

– Head

– Distal extremity

– Cardiac troponin I (cTnI)

– C-reactive protein (CRP)

– VPC ventricular premature complex

– CRP C-reactive protein

– V. berus

– N. annulifera

– Tachycardia, hypotension, arrhythmias

– Neurological abnormalities

– Obtundation

– Seizures

– Diffuse neuromuscular weakness

– In many countries, snake envenomation poses a health risk to both people and animals. The type of snake, envenomation and its relation to systemic inflammation was significantly correlated with degree of myocardial injury in dogs envenomed at one or more time points. A significant correlation between cTnI and CRP concentrations. Evidence of myocardial injury was found in 67% of dogs envenomed by N. annulifera or V. berus.

– This could be due to differences in the toxic substances of the snake venoms or to differences in the cytokines induced by the venom toxins.
Neuromuscular

Antivenom
- First developed in the late 1800s
- Immune response to venom created in host animal
- Purified antibodies infused into patient to neutralize venom
- Veterinary specific antivenoms regulated by U.S.D.A.
- Human antivenoms regulated by F.D.A.

Antivenom Production
- Venom is collected
- Animals (horses or sheep) are hyperimmunized to produce neutralizing antibodies against the venom(s).
- Antibodies are harvested from blood and purified
- Enzyme digestion utilized to fragment IgG molecules
- Antibodies are used to make final product
Pit Viper Antivenoms in Veterinary Medicine

- Crotalidae Polyvalent Whole IgG (Equine)
  - Boehringer Ingelheim®
- Crotalidae Polyvalent Immune Fab (Ovine)
  - CroFab®
- VenomVet™ (Equine)
  - MT Venom, LLC, Argentina
- Crotalidae Polyvalent Immune F(ab')₂ (Equine)
  - Veteria, Mexico

Antivenoms

<table>
<thead>
<tr>
<th>Type</th>
<th>Brand</th>
<th>Origin</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG</td>
<td>Antivenin (crotalidae)</td>
<td>USDA approved for veterinary medicine</td>
<td>Equine origin</td>
</tr>
<tr>
<td></td>
<td>Boehringer Ingelheim (Fort Dodge)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fab</td>
<td>CroFab®</td>
<td>Not approved for veterinary medicine</td>
<td>FDA Approved for human medicine</td>
</tr>
<tr>
<td>F(ab')₂</td>
<td>VenomVet™</td>
<td>USDA Approved, equine origin</td>
<td>Pending USDA approval, equine origin</td>
</tr>
<tr>
<td></td>
<td>Veteria</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Antibody Comparisons

- **IgG**
  - Molecular weight: 150 kDa
  - Longer ½ life than Fab and F(ab')₂

- **Fab**
  - Molecular weight: 50 kDa
  - Fc portion removed
  - Rapid elimination (~35X of IgG)
  - Risk of re-envenomation

- **F(ab')₂**
  - Molecular weight: 110 kDa (dimer)
  - Fc portion removed
  - Longer ½ life than Fab
  - Larger volume distribution than IgG
A randomized multicenter trial of Crotalidae polyvalent immune Fab (Ovine) antivenom for the treatment of rattlesnake envenomation in dogs

Michael E. Peterson, DVM, MS; Michael Matz, DVM, DACVIM; Karen Seibold, DVM, DAVECC; James Fitzgerald, DVM, DACVIM; Kevin Plunkett, DVM; Ken Johnson, DVM, DACVIM; and Karen Williams, DVM, PhD, DACVP

Objectives – To determine clinical efficacy of the Crotalidae polyvalent immune Fab (Ovine) antivenom (OPCA) for the treatment of rattlesnake envenomation in dogs.

Methods – One hundred and fifteen client-owned Crotalid (rattlesnake) snake bitten dogs in whom worsening of the envenomation syndrome was observed before OPCA treatment. In a multicenter randomized clinical trial a single dose (1 vial) of OPCA alone was compared with 2 doses (1/2 vial each) administered 6 hours apart. Standard supportive care was provided in all cases.

Measurements and Main Results – Of the 115 dogs enrolled in the study, 9 of which were fatalities, 23/95 (24%) cats, and 20 dogs had intermediate reactions occurred in 6 dogs (6%), and no serum sickness occurred within the 95 cases contacted at the 2-week posttreatment follow-up.

Conclusions – In the first randomized trial in dogs of antivenin in the United States, OPCA effectively stabilized or terminated venom effects. There were no statistical differences detected between treatment regimens when compared to 2 doses (1/2 vial each) administered 6 hours apart. Standard supportive care was provided in all cases.

Keywords – Crotalidae polyvalent immune Fab (Ovine) antivenom, Crotalidae polyvalent immune Fab (Ovine) antivenom for the treatment of rattlesnake envenomation in dogs, Crotalidae polyvalent immune Fab (Ovine) antivenom effectiveness in rattlesnake envenomation in dogs.
Clinical safety evaluation of F(ab')2 antivenom (Crotalus durissus – Bothrops asper) administration in dogs
Craig Woods, DVM, MS, MBA and David Young, DVM, PhD, DACVS

66 healthy dogs
- Administered 3 or 6 vials in under 1 hour
3 vial group (n = 30)
  - No reactions
6 vial group (n = 30)
  - Mild, self-limiting facial edema (n=3)
  - Vomit (n =1)
No severe adverse events or alterations in CBC

Canine Field Efficacy And Safety Evaluation Of F(ab')2 Antivenom

- 74 dogs
  - 4 vials F(ab')2 antivenom administered IV
  - No placebo
  - One death – intra-ocular envenomation
- Significant improvement in clinical scores
  - Pain, extension of pain, ecchymosis, discharge, swelling, extension of swelling, and sum of scores.
- Significant, rapid normalization of hematology
  - PT, PTT, platelets, echinocytosis
- No adverse events reported

Venom Levels In Dogs Treated With F(ab')2 Antivenom

Venom levels (ng/mL) were examined in dogs (n=55) at baseline, immediately after F(ab')2 antivenom administration, and at 3, 6, 12, and 24 hrs after presentation.
274 Cases Of Rattlesnake Envenomation In Dogs from Maricopa County, AZ

237 treated with Veteria F(ab')2 antivenom
24 treated with ACP
12 received both
4 patients died, 4 were euthanized

274 Cases Of Rattlesnake Envenomation In Dogs from Maricopa County, AZ

Overall survival > 97%
5/8 of the nonsurvivors received glucocorticoids
Only 8% of survivors received glucocorticoids
15/274 had a history of rattlesnake vaccine
No survival advantage
96% unvaccinated survived, 93% vaccinated survived
66/274 (24%) received antibiotics
Length of stay significantly (P<0.001) longer in dogs with bites to head and extremity combined
Lower body weight was associated with significantly (p<0.001) higher number of vials administered

274 Cases Of Rattlesnake Envenomation In Dogs from Maricopa County, AZ

Preliminary conclusions.....
F(ab')2 antivenom (Veteria Labs, Mexico) safe, low rate of hypersensitivity reaction (0.7%)
1 vial sufficient to mitigate clinical signs in most dogs
Survival advantage not appreciated with the following interventions:
✓ Rattlesnake vaccination
✓ Glucocorticoid administration
✓ Antibiotic administration

Bites to combination head and extremity more severe
Dogs > 10 years of age have more severe clinical signs
**Venom Vet™**

<table>
<thead>
<tr>
<th>Format and Attributes</th>
<th>10ml injection vial, sterile liquid contents, 3 year shelf life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>F(ab')2 neutralizing antibody fragments</td>
</tr>
<tr>
<td></td>
<td>Equine derived</td>
</tr>
<tr>
<td></td>
<td>Venoms used in production: Crotalus durissus, C. C. simus, Lachesis muta, Bothrops asper, B alternatus, B diporus</td>
</tr>
<tr>
<td>Cross Neutralization</td>
<td>Labeled to neutralize all common North American Pit Vipers</td>
</tr>
</tbody>
</table>

**Venom Vet™ - evidence**

**IVECCS 2014 Abstract Session**

- n=23 (canine)
- mean dose = 4.39 vials
- **1** dog received 16 vials, caution in interpretation
- 1 dog experienced anaphylaxis, 1 dog had urticaria
- All dogs had reduction of modified SSS

**Data from USDA approval process**

- n = 36 (canine)
- 0 deaths in treated patients
- Significant reduction in modified snakebite severity score
(p<0.05)

**Reference**


**Venom Vet™**

- USDA approved for veterinary use, April 2014
- Institute Biológico argentino S.A.I.C. Instituto Nacional de Microbiología. Antibothropico tetravalente
- Peer review literature and abstracts
  - Abstract session, IVECCS 2014
- F(ab')2 antivenom, polyvalent, produced in Argentina – equine origin
- No reconstitution required, liquid – ready for injection
- Not labeled for cats or horses
  - Has been used without known adverse events in both species
- Equine clinical trials happening now – expect label change by Fall, 2015
Veteria F(ab')2

- Peer review literature and abstracts
  - F(ab')2 antivenom, polyvalent, produced in Mexico – Equine origin
  - USDA approval – additional clinical efficacy trials planned
  - Not available for purchase at this time
  - Company based out of Mexico City

- Manuscript in preparations
- Antivenom effectiveness is measured based upon neutralization, not mg per vial

- Procedure for administration – F(ab')2

1-2 vials quickly depending on clinical signs

- Dilute antivenom (if lyophilized) in sterile, 0.9% NaCl, LRS, Plyte
- Administer as quickly as possible
  - Begin slowly (~1mL/kg/min) x 10 minutes
  - Tq to get remainder in within 30 minutes
  - Label instructions are available as well

- Monitor for signs of reaction
  - Body temperature, facial edema, hives

- Do not pre-treat with diphenhydramine or steroids

- Consider CRI of 1-2 vials over 4-6 hours if reenvenomation occurs, or protected clinical signs

---

Veteria F(ab')2 Antivenom Neutralizes the following venoms

<table>
<thead>
<tr>
<th>Venoms Neutralized</th>
<th>Potency Spec</th>
<th>Batch 1 Veteria</th>
<th>Batch 2 Veteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bothrops asper*</td>
<td>2790</td>
<td>2790.7</td>
<td>3005</td>
</tr>
<tr>
<td>C. durissus *</td>
<td>2790</td>
<td>1051.1</td>
<td>1080.2</td>
</tr>
<tr>
<td>C. helleri</td>
<td>2790</td>
<td>1350</td>
<td>1290.3</td>
</tr>
<tr>
<td>C. adamanteus</td>
<td>2790</td>
<td>975.2</td>
<td>1020.5</td>
</tr>
<tr>
<td>C. scutulatus A</td>
<td>2790</td>
<td>1130.4</td>
<td>1125.4</td>
</tr>
<tr>
<td>C. scutulatus B</td>
<td>&gt;790</td>
<td>1105</td>
<td>1230.5</td>
</tr>
<tr>
<td>A. bilineatus</td>
<td>&gt;360</td>
<td>496.6</td>
<td>500.4</td>
</tr>
<tr>
<td>A. contortrix</td>
<td>&gt;360</td>
<td>387.3</td>
<td>390.3</td>
</tr>
<tr>
<td>A. piscivorous</td>
<td>&gt;360</td>
<td>429.5</td>
<td>410.1</td>
</tr>
</tbody>
</table>

---

VenonVet

VetonVet
Equine Plasma?

6/6 dogs developed lymphadenopathy

“Snakebite Protein Support”
- Pooled plasma from horses vaccinated against C. atrox, C. adamentus, C. viridis, C. scutulatus
- Website claims cheaper, 4mL/kg dose recommended
- Unknown dose of antibodies
- All other proteins are included

I do not recommend use in species other than equine at this time

Vaccination

✓ What is the rationale?
✓ What is the evidence?
Natural Vaccination

- Antibodies following natural envenomation in humans documented from days to years
- Duration of immunity unpredictable

ELISA to measure antivenom in naturally exposed VS vaccinated horses
- Vaccinates – 3 vaccines, 30 days apart
- 28% of horses did not respond to vaccine
  - 50% had decreasing titers after last vaccine
- Natural exposure → higher titers
  **“Titers based on cell culture and mouse inoculation model designed by manufacturer of vaccine (unpublished)”**

I do not recommend the rattlesnake vaccine – no evidence of protection in dogs

Consider rattlesnake aversion training if high risk patient
Antibiotics – The Rationale

Most common bacteria isolated from crotalid mouths
- Pseudomonas
- Proteus
- Clostridium
- Bacteroides

Previous human studies recommended antimicrobial therapy based on studies of oral flora

Newer studies failed to document any morbidity or survival benefit with prophylactic antibiotics

Antibiotics?

Lack of value in human and veterinary medicine for RSE

Consider guidelines for responsible antimicrobial use

No documented case reports of tetanus in any veterinary or human literature secondary to snake envenomation

Humans and horses are significantly more susceptible to tetanus

Antibiotics – the veterinary evidence

Manuscript in press (Journal Vet Emerg Crit Care)

A Carr, et al
- Prospective observational study in So. California
- n = 102, canine
- No antibiotics administered
- Each patient followed for evidence of infection
- Avg. length of stay 24 hours
- Incidence of infection low (0.01%, 1/102)
- Overall mortality rate low (0.03%, 3/105)
  - 2 upper airway obstruction
  - 1 direct arterial envenomation
Glucocorticoids

No longer considered standard of care
Multiple publications demonstrating lack of survival or morbidity advantage

What about upper airway swelling?
- More antivenom STAT!
- These patients typically need a tracheostomy
- Steroids unlikely to prevent this need
- Glucocorticoid and surgical wound in hospital
  Increased risk of surgical site infection

NSAIDS

Not recommended
Platelet inhibition
- May exacerbate coagulopathy
Risk of kidney injury

Rattlesnake Envenoming – Summary Treatment

Analgesia
- Opioids are a safe option

Antivenom
- F(ab')2 Antivenom or Polyvalent ACP
  - Some cases stabilize without antivenom

IV Fluids
- Crystalloids, use systemically, avoid dilution **coagulopathy and risk of kidney injury**

Antibiotics only in select cases
- E.g., documented infections, severe distal extremity wounds
  - Monotherapy against likely opportunistic pathogens pending culture/sensitivity
  - E.g., Cefazolin, Ampicillin

Monitor coagulation times, PCV/TS, monitor for hemolysis
Monitor for arrhythmias
Prioritize renal perfusion
Avoid NSAIDs
Avoid plasma – will not treat coagulopathy
Summary- Overall Regarding Antivenoms

- Rattlesnake envenoming can be a serious clinical problem
  - Low mortality overall
  - Antivenom administration improves morbidity
  - F(ab')2 is safe and clinically effective in dogs
  - RTLR™ is not antivenom, not recommended for non-equine patients

- VenomVet™ USDA approved for pit viper envenomation in veterinary patients
  - Clinical efficacy in Eastern Diamondback envenomation
  - Anecdotal efficacy in AZ

- Boreinger Ingelheim (ACP) remains available, is USDA approved

FAQs - RSE

Can I give multiple types of antivenom to a patient?
Yes

The animal was vaccinated, does this mean they do not need antivenom?
Vaccination does not eliminate the need for antivenom

We used to treat these with steroids and Benadryl and the dogs survived, why should I give antivenom?
The newer F(ab')2 antivenoms are safe and effective, minimize morbidity and likely shorten time to recovery.
Cost may be justified by less time in hospital and less need for other interventions.

FAQs - RSE

I've heard that the fragmented (Fab) antivenoms don't last long and need more frequent re-dosing, why should I bother?
The Fab monomer antivenom (Crofab™) does have an extremely short $T_{1/2}$ and requires frequent re-dosing.
The F(ab')2 antivenoms have a longer $T_{1/2}$ than the monomer variations, but in most cases a single vial is sufficient.
The two fragmented antivenoms discussed in this webinar should not require more frequent dosing based upon antivenom composition.

If overall mortality of rattlesnake bite is low, why bother giving antivenom?
Antivenom improves clinical scores, reducing patient suffering and may decrease length of stay.
Common Treatment Plan

IV fluid therapy
• Shock and maintenance to perfuse kidneys

Analgesia
• Opioid CRI, multimodal may be required

Antivenom
• 1-2 vials rapid, repeat if clinical signs do not improve or worsen. Consider CRI (1-2 vial over 6 hours, continuous) for refractory or recurrent clinical signs

Common Treatment Plan

Baseline labs
• PCV/TS, venous blood gas/lytes, blood smear/CBC (platelet estimate), PT/PTT or whole blood clotting time (does blood clot in tube?)

Hospitalization and monitoring
• 24 hours ideal, continuous EKG ideal, blood pressure, urine output, pain scores, serial coags/platelet est. (repeat 1 hour post antivenom if possible, then in 12-24 hours), PCV/TS (monitor for hemolysis)

Common Treatment Plan

Discharge
• 24 hours if stable for at least 12 hours, sometimes finances dictate sooner

Recheck
• PCV/TS 24-48 hours after discharge to monitor for delayed hemolysis
Treated with multiple vials ACP antivenom, still unable to walk – severe myopathy

Immediately following rapid infusion of F(ab')2 antivenom - Veteria

1 hour following F(ab')2 antivenom - Veteria
SPONSORSHIP

Thanks to

VenomVet

for sponsoring tonight’s VETgirl webinar!

@VetGirlOnTheRun
VetGirlOnTheRun
Garret@vetgirlontherun.com
Justine@vetgirlontherun.com

2015 VETgirl Webinar Topics
Check out some of our 2015 RACE Approved VETgirl webinars
Please visit our website for a complete list www.vetgirlontherun.com

- Secure diagnosis and treatment
- Common feline ophthalmic conditions
- What’s new in veterinary wound healing
- Common emergency room procedures
- Arrested development: The RECOVER initiative and CPR updates
- To cut or not to cut: Approach to the abdominal radiograph
- Emergency management and treatment of rattlesnake envenomations
- Misconceptions of emergency and critical care
- Summer toxins affecting small animals
- Feline pediatrics: Treating the small and the sick
CHECK OUT OUR 2015 UPCOMING VETGIRL APPEARANCES!

Dr. Justine Lee
IVS, Vancouver, June 2015
IVS, Amelia Island, July 2015

Dr. Garret Pachtinger
NCASAM, October 2015
GVMA, November 2015
CVC, San Diego, Dec 2015