

Snake Bite- More Than Just a Pain in the Nose

By Kristina Rothers, CVT, VTS-EVN

On August 27, 2018 a five year old quarter horse gelding presented to the Colorado State University Veterinary Teaching Hospital for a rattlesnake bite of approximately one hour duration. Despite the horse presenting within one hour of being bitten significant swelling was already appreciable. These owners decided to bring the horse directly in to the clinic after finding him, however, if an owner decides to have a veterinarian come to them and wants to help their horse before a vet arrives the following recommendations can be made, firstly, try and keep the horse as quiet as possible due to the fact that an increased heart rate causes higher blood flow which results in dispersal of the poison to larger areas of the body. They can also wash the bite with soap and water. Beyond that it is important that they know what NOT to do. Do not cut the bite area, this old practice actually may contribute to further tissue damage and increases the risk of infection. Do not apply hot or cold compresses, either of those treatments further irritate the affected area, causing additional swelling and the risk of tissue death. If the horse was bitten on the nose and they notice significant swelling they can insert a cut piece of garden hose in each nostril to try and maintain an airway until the veterinarian arrives.

On presentation, the gelding's physical examination findings were; normal rectal temperature of 100.9 F, slightly elevated pulse at 44 beats per minute, normal respiratory rate of 12 breaths per minute and normal borborygmi in all four quadrants. The mucous membranes were unable to be fully examined due to the swelling of the muzzle however, color appeared a normal pink and CRT was approximately two seconds. His packed cell volume was 32% and the total protein was 6.0 g/dL. Auscultation of the heart and lungs were within normal limits. While rare, fatal cardiac arrhythmia following envenomation is possible so it is important to warn owners that this is a possible complication. The fang marks were identified on the muzzle and there was a bilateral serosanguinous nasal discharge present. Airflow was detected from both nostrils though it was slightly decreased. Inspiratory and expiratory effort was increased due to nasal swelling. It was decided to not perform a tracheostomy at that time. However, the supplies were kept close in case the horse went in to respiratory distress.

After discussing options with the owner, the owner consented to administration of antivenin. Antivenin has proved useful in horses even when given 24 hours post-envenomation. This horse had been bitten quite recently so the hope was that if we were able to administer the antivenin quickly enough the swelling would start to decrease and he would not need a tracheotomy, which turned out to be correct in this case. A sterile, 14-gauge Mila quick catheter was aseptically placed in the left jugular vein. His weight was estimated at 500kg. Two vials (20 mLs) of Antivenin (Venom Vet) was diluted in 1L of 0.9% Sodium Chloride and administered over 15-20 minutes. He was monitored for any adverse reactions, none were observed. Antivenin is an equine origin product and therefore an anaphylactic reaction can

occur. Also, anti-venom will help neutralize the toxins for approximately 48 hours; after such time, it is important to monitor him for signs of respiratory and/or cardiovascular distress. He was also given 500mg Flunixin Meglumine IV. The owners were asked when the horse had received his last tetanus toxoid vaccination. The horse had been vaccinated in May so a booster was not necessary.

The owners were anxious to take the horse home the same day so he was placed in an out-patient holding stall and monitored for several hours. After that time his respiratory effort was noticeably decreased and there was a moderate reduction in the swelling in his muzzle. At that time he was discharged to the care of his owners with instructions to carefully monitor him for the next several days. The owner was told to monitor for all of the following- any difficulty breathing, not eating or drinking, or decreased defecation. It was suggested that soaked feed be offered for a few days while the swelling slowly decreases. The horse was not normally fed grain so we suggested soaking his hay as well as offering small amounts of soaked Equine Senior and offering water with a handful of sweet feed in it to encourage drinking.

In Colorado, the only poisonous snakes present are three types of rattlesnakes (aka pit vipers). There are the prairie rattlesnake (*Crotalus viridis viridis*), the western rattlesnake and the massasauga. However, the western rattlesnake is found west of the Continental Divide and the massasauga is limited to the south eastern plains so we primarily see and treat prairie rattlesnake bites. The venom of these snakes is mainly hemotoxic and causes breakdown of tissues and blood vessels and impaired blood clotting.

In addition, as briefly mentioned earlier, potentially fatal cardiac abnormalities have been reported in rattlesnake bitten horses. While the prevalence and exact cause are unknown, in one study it was found that 40% of the horses they tested had experienced myocardial damage and 70% experienced a cardiac arrhythmia. Cardiac failure can occur weeks to months after the bite incident and appears to be more common in horses than other species. Horses that have recovered from snake bites should be evaluated every few months for cardiac health and owners should be watchful for signs that might suggest cardiac problems such as; shortness of breath, slow recovery after exercise, an increased effort to breathe and general weakness. Additional testing that can be done include measuring troponin levels (Cardiac Troponin I or cTnI) and having an ECG performed, looking for the presence of arrhythmias.

Lastly, there is a Western Diamondback Rattlesnake toxoid vaccine available for horses (Red Rock Biologics, Woodland, CA). It is a conditionally licensed, inactivated *Crotalus atrox* Toxoid vaccine labeled for use in healthy horses 6 months of age or older. The label claim for the vaccine is that it may also provide protection against the venoms of the Western Rattlesnake (including the Prairie as well as others), Sidewinder, Massasauga and the Copperhead. Partial protection may be obtained against Eastern Diamondback as well. Vaccination schedule is a primary series of three doses at one month intervals. Booster doses are recommended at 6 month intervals.

References:

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