Owner survey of headshaking in horses

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Objectives—To determine signalment, history, clinical signs, duration, seasonality, and response to various treatments reported by owners for headshaking in horses.

Design—Owner survey.

Animals—109 horses with headshaking.

Procedure—Owners of affected horses completed a survey questionnaire.

Results—78 affected horses were geldings, 29 were mares, and 2 were stallions. Mean age of onset was 9 years. Headshaking in 64 horses had a seasonal component, and for most horses, headshaking began in spring and ceased in late summer or fall. The most common clinical signs were shaking the head in a vertical plane, acting as if an insect was flying up the nostrils, and rubbing the muzzle on objects, having an anxious expression while headshaking, worsening of clinical signs with exposure to sunlight, and improvement of clinical signs at night. Treatment with antihistamines, nonsteroidal anti-inflammatory drugs, corticosteroids, antimicrobials, fly control, chiropractic, and acupuncture had limited success. Sixty-one horses had been treated with cyproheptadine; 43 had moderate to substantial improvement.

Conclusions and Clinical Relevance—Headshaking may have many causes. A large subset of horses have similar clinical signs including shaking the head in a vertical plane, acting as if an insect were flying up the nostrils, and rubbing the muzzle on objects. Seasonality and worsening of clinical signs with exposure to light are also common features of this syndrome. Geldings and Thoroughbreds appear to be overrepresented. Cyproheptadine treatment was beneficial in more than two thirds of treated horses. (J Am Vet Med Assoc 2001;219:334–337)

Headshaking was first described in the veterinary literature more than 100 years ago. For the purposes of the study reported here, headshaking was defined as a condition in horses in which the horse shakes or jerks its head uncontrollably without any apparent physical stimulus. Headshaking ranges in severity from a mild annoyance to a devastating affliction that renders the horse unusable and, at times, unsafe. Unfortunately, despite substantial efforts, causes for this condition are rarely determined. Several causes have been suggested, including middle ear disorders, ear mites, rider ineptitude, auditory tube diverticulum (guttural pouch) mycosis, periapical dental ostitis, allergic disorders, equine protozoal myelo-encephalitis (EPM), and vasomotor rhinitis. The purpose of the study reported here was to report information obtained from owners regarding signalment, history; clinical signs, duration, seasonality, and response to treatment in horses affected by headshaking.

Materials and Methods

The records of the University of California-Davis Veterinary Medical Teaching Hospital (VMTH) from 1986 to 1996 were searched, and 46 owners of horses with a complaint of headshaking were found and sent a standardized questionnaire. Eighteen questionnaires were returned from this initial mailing. Further questionnaires were completed between 1996 and 1999 by owners who had contacted the authors regarding their horses’ headshaking problems, owners of horses seen at the VMTH for a complaint of headshaking after 1996, and owners who had downloaded the questionnaire from the University of California-Davis School of Veterinary Medicine’s Web site. In all, 109 questionnaires were received from owners of horses with a headshaking problem.

The questionnaires requested information on age, breed, sex, time of year of first onset, times of year when headshaking started and stopped, use of horse, clinical signs observed with headshaking, vices, and response to any treatments owners and attending veterinarians had provided. Subsequently, all participating horse owners were sent an additional abbreviated questionnaire, which requested information on an unaffected horse, preferably owned and kept on the same property, to provide a control group for comparison purposes. Thirty-nine questionnaires were received for unaffected horses.

Statistical analyses—A software program was used for statistical analysis of data. Odds ratios (OR) and 95% confidence intervals (CI) were calculated to measure association between exposure variables and headshaking.

Results

Mean age of onset was 9 years with a range from 1 to 30 years. Seventy-eight (71.5%) horses were geldings, 29 (26.5%) were mares, and 2 (2%) were stallions. In comparison with sex ratios in the control group, geldings had 2 times higher odds of having headshaking than nongeldings (mares and stallions; OR, 2.16; 95% CI, 0.95 to 4.91). Breeds represented were Thoroughbred (n = 45 [41%]), American Quarter Horse or Paint (26; [24%]), Warmblood (17; [16%]), and various other breeds such as Morgan, Arabian, Appaloosa, Welsh Pony, Peruvian Paso, and grade (21; [19%]). In comparison with breed ratios in the control group, Thoroughbreds had 3 times higher odds of having headshaking than non-Thoroughbreds (OR, 3.21; 95% CI, 1.22 to 8.81). Forty-seven (43%) of the horses were used for pleasure riding, 29 (27%) for dressage, 8 (7%) for 3-day event competition, 18 (17%) for hunter-jumper competition, and 7 (6%) for other uses such as driving, endurance riding, or roping. Ninety-four of the 109 (86%) affected horses were located in...
North America, and 15 (14%) were located in New Zealand, the United Kingdom, Australia, or Germany. Five (5%) horses had stopped headshaking for more than a year, and the longest duration of clinical signs was 8 years. One owner reported having more than 1 affected horse on the premises.

Seasonality (the onset and cessation of clinical signs at specific recurring times of year) was observed in 64 (59%) horses. Of these 64 horses, 58 (91%) developed clinical signs in the spring or early summer that ceased in late summer or fall. Thirty of 64 (48%) horses had episodes of headshaking only during short intervals in the spring and fall, whereas the other 3 horses developed clinical signs in the fall that ceased in the spring. Forty-four of the 109 (40%) horses had clinical signs constantly or sporadically and had developed clinical signs too recently to ascertain seasonality. One owner did not report information regarding seasonality or date of onset.

In regard to temperament, 101 of 109 (93%) horses were described by their owners as “good, reliable horses except for headshaking.” Eight (7%) had vices such as bolting, rearing, or cribbing. Chief clinical signs included shaking or flipping of the head in a vertical plane (n = 97 [89%]), acting as if an insect were flying up the nostril (96 [88%]), and rubbing the muzzle on objects (82 [75%]). Less prevalent clinical signs were anxious expression while headshaking (n = 67 [61%]) and excessive snorting (70 [64%]).

Four of the 109 (4%) horses had headshaking behavior at rest only. Exercise precipitated headshaking in 45 (41%) horses, and 60 (55%) had clinical signs whether at rest or exercising. Eleven (10%) horses had clinical signs of headshaking only when ridden. Bright sunny days were associated with severe clinical signs in 57 (52%) horses, and 33 (30%) affected horses sought shade in the environment. Clinical signs of headshaking were reduced at night in 57 (52%) of the horses.

Four of the horses in the study had been tested for EPM by use of western immunoblot analysis of CSF for Sarcocystis neurona. Results were positive for 2 horses, and treatment with sulfonamides and pyrimethamine was not associated with a change in headshaking behavior. Subsequent repeat testing of CSF of 1 horse yielded negative results.

Cyclophosphamide was used to treat 61 of the 109 (56%) horses. Of these 61, 43 (70%) had moderate to great improvement in headshaking. Horses treated at the VMTH received cyclophosphamide (0.3 mg/kg [0.14 mg/lb] of body weight, PO) twice daily, and horses that responded to treatment did so within 1 week. Owners who stopped using the cyclophosphamide treatment reported recurrence of clinical signs. Other treatments used were antihistamines (1/16 treated horses responded), antimicrobials (2/11 horses responded), corticosteroids (3/20 horses responded), nonsteroidal anti-inflammatory drugs (0/6 horses responded), and melatonin (2/7 horses responded). Twenty-eight of the 109 (26%) horses were treated by a chiropractor (1 horse responded, and 4 horses responded slightly), and acupuncture was used on 25 of the 109 (23%) horses (4 horses responded, and 6 horses responded slightly). Placing a cloth or constricting piece of material on the muzzle improved clinical signs in 15 of 45 (33%) horses. Blindfolding or the wearing of a mask shielding the horse’s eyes from the sun was attempted in 75 (69%) horses and improved clinical signs considerably in 39 (52%) horses and slightly in 6 (8%) horses. Fly-control measures yielded improvement in 3 of the 109 (2%) horses.

Discussion

Many possible reasons have been suggested for headshaking in horses. Irritation by insects, middle ear infections, behavioral problems, ill-fitting tack, allergic conditions, neural disorders, and ocular disease are all considered possible causes.2-11 A large part of the difficulty in diagnosing this abnormality and treating a horse with headshaking lies in differentiating among these many causes. Results of the survey reported here indicated that a large subset of horses with headshaking shared the clinical signs of acting like an insect was flying up the nose, flipping of the head in a vertical plane, and rubbing the muzzle on objects. One horse was found to be allergic to certain grasses, and headshaking behavior ceased when the horse was no longer exposed to them. Another horse was found to have a behavioral problem; headshaking stopped when the horse was purchased by a new owner. An inner ear infection was detected in another headshaking horse, and the behavior stopped when the horse was treated with antimicrobials.

Thirty-four horses were evaluated at the VMTH and were given a thorough physical examination. Often radiography of the skull, endoscopy, and detailed oral, otoscopic, and ocular examinations were also performed. For most horses, the cause of headshaking was not determined. The horses that were not evaluated at the VMTH had typically been evaluated by a veterinarian by means of various degrees of physical examination and diagnostic procedures; most owners reported no obvious cause for the headshaking. Additionally, a lack of response to typical treatments such as antihistamines, nonsteroidal anti-inflammatory drugs, corticosteroids, or antimicrobials was most commonly reported. However, results regarding physical examinations and diagnostic procedures were limited by the fact that, for most horses, this information was obtained from owners rather than veterinarians.

Some authors have considered headshaking a behavioral vice.7 Causes such as rider error, resistance to head and neck flexion, type of work, and gender of owner have been suggested, but it seems unlikely that most of the horses examined in our study had headshaking for these reasons, considering our findings. This survey revealed that 93% of owners considered their horse a “good, reliable horse except for the headshaking,” and only 7% of the horses had a vice such as cribbing, rearing, or bolting. Additionally, only 10% of horses had headshaking specifically when ridden, making rider-associated causes improbable. According to owners, changing bits, saddles, and even trainers had no effect in eradicating this behavior.

Approximately half of the owners surveyed reported that their horses had more serious clinical signs in bright conditions, and blindfolding or eye-shading...
masks yielded improvement of clinical signs, indicating that light may be a stimulus for headshaking. We suggested this mechanism in a previous report, and it may be similar to photic sneezing in humans. Photic sneezing is postulated to be similar to photophobia, which results when persistent photic stimulation via afferent fibers of the optic nerve leads to activation of the afferent ophthalmic branch of the trigeminal nerve. Optic-trigeminal summation and a photic sneeze result if the afferent maxillary branch of the trigeminal nerve is stimulated instead of the ophthalmic branch, leading to a tickling sensation in the nasal mucosa. This same neural pathway could be involved in causing irritating sensations and subsequent headshaking behavior in response to light stimulation. The clinical signs of horses with headshaking with a photic component are different from those of affected horses that are not apparently affected by light. We wondered if perhaps light was a stimulus for headshaking by the mechanism of optic trigeminal summation occurring at the time of exposure to the light similar to the photic sneeze postulated in other mechanisms. Forty-one percent of the horses in our survey had headshaking only when exercised. Increased autonomic activity associated with exercise has been reported as a mechanism for induction of pruritis in horses with cholinergic pruritis. Exercise has been described to be a stimulus for headshaking activity in other reports. How the onset of exercise induces headshaking is unknown.

Almost 60% of the horses had substantial seasonality of clinical signs, with headshaking only during certain times of the year. Seasonality was observed in horses from several geographic regions. In other reports on headshaking, a similar seasonality has been suggested to reflect allergic or neuroendocrine alterations associated with seasonal and circadian activities. Seasonality could also suggest an allergic basis; however, this seems unlikely, because treatment with corticosteroids and antihistamines yielded improvement in only a few horses. A lack of positive response to allergy treatment has been reported in other studies. One significant difference between control and affected horses was sex distribution, in that Thoroughbreds (70%) and 17 of 20 (85%) affected horses were geldings. Another significant difference between control and affected horses was breed, in that 9 of 25 (36%) horses originated from the United States as well as several other countries, indicating that headshaking occurs in horses over a wide range of climatic and geographic conditions.

In a recent study, it was reported that 3 affected horses had positive results of western immunoblot testing of CSF for S. neurona and clinical signs of EPM had been successfully treated for headshaking by use of sulphonamides and pyrimethamine, the treatment of choice for EPM. In the study reported here, the same treatment failed to alleviate headshaking in 2 horses that had similar positive results. Two horses in our study had negative results for this test, suggesting that horses may have this syndrome without having EPM. In addition, headshaking has also been reported in horses that have lived their entire lives in the United Kingdom, where EPM has not been reported.

In our study, treatment with cyproheptadine with or without protection from sunlight was reported to provide moderate to great improvement in 43 of 61 horses. These findings are consistent with a recent study on the efficacy of cyproheptadine, which revealed improvement of clinical signs in 20 of 22 horses with headshaking. Cyproheptadine treatment has also been recommended by other researchers. The basis for the efficacy of cyproheptadine is not understood, but potential mechanisms include effects on trigeminal nerve-mediated facial sensation, anticholinergic effects, or central influence on melatonin and serotonin synthesis.

The behavior of horses affected with this syndrome is similar to that of horses that are extremely agitated by insects around the muzzle, but only 3 of 109 horses in our study were reported to improve with insect control measures. Thus, it appears unlikely that aggravation by insects is a common cause of this syndrome. We believe that sensation in the muzzle area that is not caused by actual stimulation or irritation, such as neuropathic pain, should be considered as an explanation for these clinical signs. Pain may be described as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” Burning, tingling, itching, or electric-like pain is referred to as neuropathic pain. Neuropathic pain implies nerve damage and reparative processes with resultant sensations that are unfamiliar and different from typical pain experiences. The neural malfunction may be central or peripheral, and pain thresholds and perceptions may be permanently affected. It is the authors’ opinion that neuropathic pain should be considered as a potential cause for headshaking.

Several features of headshaking and trigeminal neuralgia in humans are similar. Trigeminal neuralgia in humans is a disorder of the sensory divisions of the trigeminal nerve characterized by recurrent paroxysms of sharp stabbing pains in the distribution area of 1 or more branches of the nerve; its cause and pathogenesis are not well understood. Symptoms of trigeminal neuralgia are generally elicited by light tactile pressure to the perioral region. The disease is characterized by spontaneous remission followed by recurrence of
should be considered. A differential diagnosis of idiopathic headshaking appears that if a horse has 2 or 3 of these clinical signs, and 70 horses had all 3. Thus, it resulted in 80 to 100% improvement in 80% of horses. Carbamazepine alone was found to be effective in 88% of horses.

The 3 most characteristic clinical signs of horses with headshaking appear to be shaking or "flipping" of the head in a vertical plane, acting as if an insect were flying up the nostril, and rubbing the muzzle on objects. In our study, 98 of 109 horses had at least 2 of these clinical signs, and 70 horses had all 3. Thus, it appears that if a horse has 2 or 3 of these clinical signs, a differential diagnosis of idiopathic headshaking should be considered.

References