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What's a Pheochromocytoma, and How Do Vets Diagnose It?

There's a hormone-secreting tumor that can form in the adrenal glands of horses, potentially causing damaging high blood pressure, but it's so incredibly rare that only a handful of cases have ever been described in studies. Veterinarians don't normally notice the tumor until the horse is on the post-mortem table, at which time it's difficult to determine its significance (Did it kill the horse, or was it just an incidental finding?). But if veterinarians could know what combination of signs to look for, they could conceivably recognize the tumor—called a pheochromocytoma—in a sick horse with colic or internal bleeding, perhaps, and intervene, or at least not subject the horse to medications or treatments that could cause the case to worsen.

Daniela Luethy, DVM, a resident in large animal internal medicine at the University of Pennsylvania's New Bolton Center, and colleagues both at Penn Vet and the University of California, Davis (her alma mater), reviewed records for 37 horses diagnosed with pheochromocytoma on post-mortem exam from 2007 to 2014 at both veterinary schools, aiming to identify common signs in the horse that might lead to a higher clinical suspicion of the tumors. She presented the material at the 2015 American Association of Equine Practitioners Convention, held Dec. 5-9 in Las Vegas.

"Pheochromocytoma is the most common adrenal medullary neoplasm of domestic animals," she said, or, more simply, a tumor in a particular part of the adrenal gland, which lies in front of the horse's kidneys (cranially, or toward the horse's head). "It has been described in horses, dogs, cattle, and humans, and this tumor arises from the chromaffin cells of the adrenal medulla. These cells are responsible for release of catecholamines."

The tumor can secrete high amounts of catecholamines, hormones that can cause a number of side effects in the horse's body. In people, high levels of catecholamines associated with this tumor can lead to high blood pressure, headaches, and sweating.

Luethy said that authors of the few previous equine pheochromocytoma case reports described unilateral masses (on one side of the adrenal gland) that were most often benign. The most recent equine case report was published on two horses in 1995. Clinical signs included tachycardia (rapid heart rate), profuse sweating, excitation, and muscle fasciculations, and both horses had signs of colic. The first horse was euthanized, and the second horse died during colic surgery due to ventricular tachycardia. Both horses had intraperitoneal (inside the abdominal cavity) hemorrhage.

Veterinarians had identified pheochromocytoma in 37 of 4,094 horses on post-mortem exams at the two institutions. In seven of the cases, Luethy said, clinicians had observed possibly associated clinical signs in the live patient, but the rest were findings on post-mortem. "Colic was the most common presenting complaint (35%), and tachycardia was noted in 95% of cases (with a median of 68 beats per minute; normal heart rate is 28-44)," she said. The most common blood work abnormalities they saw in the seven horses were hyperlactatemia (high blood lactate concentration), which could be associated with poor perfusion (blood flow) to tissues and hyperglycemia (high blood sugar). In four of the horses, veterinarians noted hemoperitoneum (blood within the abdominal cavity) after the tumor ruptured.

Luethy noted 27 of the 37 horses had concurrent endocrine tumors, and eight of 37 had lesions similar to what is seen with a genetic condition in humans called multiple endocrine neoplasia syndrome.

In the end, Luethy and her colleagues noted pheochromocytoma in 0.95% of cases undergoing necropsy, that most of them were incidental findings, but that clinicians thought the tumors contributed to disease in seven of the cases (19%).

A specific type of scintigraphy might be useful in pinpointing and diagnosing pheochromocytomas in the live horse, as would analysis of blood and urine for particular compounds associated with high catecholamine levels. For now, Luethy said veterinarians should consider the possibility of pheochromocytoma in horses presenting with colic, tachycardia, and hemoperitoneum.