Equine Pheochromocytomas: Why it Should be on Your Differential List

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**Background:**
Pheochromocytomas are the most common adrenal medullary neoplasm of domestic animals. There have been only a few cases in the literature of equine pheochromocytoma and the condition is fairly rarely seen.

This neoplasm arises from the chromaffin cells of the adrenal medulla. These cells are responsible for release of catecholamines into systemic circulation. Functional pheochromocytomas may cause clinical signs associated with the production and secretion of catecholamines. Humans with pheochromocytomas present with a classic history of heart palpitations, headaches, severe sweating, and episodic severe hypertension. Previous case reports in horses have shown signs of colic and intraperitoneal hemorrhage.

**New Research:**
A recent retrospective study evaluating cases at the University of California - Davis and University of Pennsylvania New Bolton Center evaluated the clinical, laboratory, and pathologic findings of horses with pheochromocytomas diagnosed on post-mortem examination. A total of 37 horses were identified with pheochromocytomas, for a combined prevalence between the two institutions of 0.95%. There was no sex predisposition. The median age of horses believed to have clinical pheochromocytomas was 17 years (range, 13-18 years) and the median age of those believed to have incidental pheochromocytomas was 27 years (range, 16-27 years). A variety of breeds were represented, including Quarter Horse/Quarter Horse cross (8), pony breed (7), Arabian (6), Thoroughbred (4), Warmblood (3), Standardbred (3), Morgan (2), Appaloosa (1), Mustang (1), Paso Fino (1), and 1 of unknown breed.

The most common presenting complaint was colic, seen in 13 of 37 horses. Pheochromocytomas were considered to have contributed to clinical signs and death in 19% of cases (7 of 37 horses). Four of the 7 presumptive clinical cases had hemoperitoneum secondary to a ruptured pheochromocytoma and all four of these horses exhibited signs of colic. Median heart rate was higher in the presumptive clinical cases (86 bpm) versus the overall heart rate (68 bpm). The most common abnormal clinicopathologic findings were hyperlactatemia (median 4.9 mmol/L; range, 2.6-16.4 mmol/L) and hyperglycemia (median 183.5 mg/dL; range, 96-825 mg/dL). The mass was unilateral in 89% of cases and bilateral in 11% of cases. 22% were considered malignant and 78% were benign. One malignant case exhibited metastasis to the brain and lungs.
Twenty-seven horses had evidence of other endocrine tumors identified on post-mortem exam, with 8 horses exhibiting at least 3 disorders of growth within the endocrine system, suggestive of a possible multiple endocrine neoplasia (MEN) syndrome as described in people.

The authors concluded that although usually an incidental finding at necropsy, equine pheochromocytomas may contribute to acute death from intraperitoneal hemorrhage, and pheochromocytoma should be considered as a differential diagnosis in horses presenting with colic, tachycardia, and hemoperitoneum.

**Diagnosis in Human Medicine:**
Diagnosis in human medicine is based on clinical signs, metanephrine analysis, and advanced imaging. Pheochromocytomas in humans are often functional, and these patients present with a classic history of headaches, palpitations, diaphoresis, and severe hypertension, either consistent or episodic. Diagnosis involves a 24 hour urine test to evaluate for metanephrine, a catecholamine metabolite. Advanced imaging has been used to characterize the mass. These include meta-iodo-benzyl-guanidine (MIBG) scintigraphy and 18F-DOPA combined PET/CT scan. MIBG is similar to noradrenaline and therefore localizes to adrenergic tissue. MIBG scintigraphy has a sensitivity of 90% for detection of pheochromocytoma. The most advanced imaging technique is 18Fluoro-DOPA combined PET/CT scanning. This imaging modality is reported to have a sensitivity of 100% for detection of pheochromocytoma.

Additional research is required to develop methods of antemortem diagnosis of pheochromocytomas in horses. The first step is to consider this differential diagnosis in cases with appropriate clinical signs.

**References:**