The Mysterious Case of the Hard-hearted Horse

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Signalment

- 11 year old Percheron mare, 742 kg, good body condition, estimated 5-6 months pregnant
- presented with signs of (anyone…?)
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yup, you guessed it: COLIC and laminitis!

(what else would a 1600 lb horse present with at 3 pm on Friday?!)

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Gross pathology

- acute, diffuse, severe, fibrinonecrotic and hemorrhagic colitis and typhlitis
- acute, diffuse, mild, suppurative metritis
- acute, diffuse, moderate laminitis in all four feet
- ...and a remarkable \textit{incidental finding}!
and now:

in honor of Dr. Mac Law

(who gently admonished us last year not to reveal all of our secrets too soon and too easily)…
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Massive
Right
Atrial
Ossification!
areas of intramural ossification
areas of extension to the surface
4x magnification, H+E

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subgross, trichrome
vessels, 10x magnification, H+E
vessels, 20x magnification, H+E
Morphologic Dx

Myocardial fibrosis, fatty infiltration and chondro-osseous metaplasia, chronic, focally extensive, severe, with moderate myocardial atrophy and degeneration, right atrium.

Arterial myointimal and medial hypertrophy and fibrosis, chronic, diffuse, moderate to marked, right atrium.
Reports of such extensive atrial ossification in horses are rare but do exist.

In Equine Pathology, Drs. Rooney and Roberts cite a number of reports, the earliest of which dates to 1837.
According to Rooney and Roberts:

- process begins near one end of the atrium

- foci of calcification and bone formation in a heavy, fibrous tissue stroma

- also foci of adipose tissue and islands of cartilage in addition to fibrous tissue and bone

- wall can be 2.5 to 7.5 cm thick with yellowish-white trabeculae of bone on section

- more advanced cases: the entire atrium may converted to a bony mass covered by epicardium and endocardium
“We have seen only 3 cases in about 15,000 postmortem examinations primarily in light horses, and it may be that the lesion is commoner in heavy horses”

Rooney and Roberts, Equine Pathology
Pathogenesis?

1. Allergic reaction associated with tuberculosis (no evidence of this in our case)

2. Emboli from *Strongylus vulgaris* thrombi in the aorta in the vicinity of the coronary arteries (no evidence of chronic arteritis or scarring in cranial mesenteric or aorta)
3. Proposed in sheep with chondro-osseous metaplasia in heart > models for bioprosthetic heart valves (JVDI, 2007):

aberrant migration of the neural crest cells → ectopic clusters of these cells within the right atrium → proliferate and differentiate into a variety of tissues

However, these sheep had no evidence of fibrosis and myodegeneration as our horse does
4. In the Necropsy Book, Dr. King describes “Thebesian vessel scarring” in this region of the heart and attributes it to the right atrium not having a major nutrient artery but instead relying on the Thebesian vessels from the lumen

high workload and/or large horse ➔ hypoxia or even ischemia of myocardium ➔ chondro-osseous metaplasia, fatty infiltration and fibrosis?
Conclusions

• pathogenesis and etiology? remain a mystery
• clinical significance? no indication of dysfunction
• the real significance?

makes staying late on Friday afternoon to clean up 1600 pounds of horse parts worthwhile!
Special Thanks

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Questions?

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