Aortic rupture in Friesian horses

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Aortic rupture humans

Human 13th leading cause of death

- Abdominal aorta (74%)
  - first aneurysm formation
  - multifactorial:
    - Genetic factors
    - Life style
    - Age
    - Inflammation: elastin & collagen degradation
**Aortic rupture humans (2)**

- Thoracic aortic rupture (23 %)
  - rarely fatal spontaneous rupture
  - without prior aneurysm formation
  - due to atherosclerotic changes

**Aortic rupture Horses (1)**

- Horse (general)
  - aortic root rupture
    → acute cardiac failure and death
  - breeding stallions
    - >15 yrs age
    - histological no abnormalities
Aortic rupture Horses (2)

- Friesian horse
  - 1980: only 3 cases aortic rupture
  - No aneurysm formation
  - Thoracic
  - UU, UGent and Wolvega equine hospital
  - 1997- now: many cases

Structure Aorta

[Diagram of the aorta showing layers: Tunica adventitia, Tunica media, Tunica intima, and the arterial lumen.]
Research Friesians (1)

31 cases (1997-2010)

- Case history recorded
- Results clinical examination pooled
- Gross pathology results reviewed
- Collagen associated histopathology

Main Results (1)

1. Aortic rupture in Friesian more common

2. Clinical signs for diagnosis
   - Peripheral oedema
   - Colic
Main Results (1)

3. More chronic cases with fistulation

4. Appropriate approach during necropsy
Restant ductus arteriosus
The location of aortic rupture typically seen in Friesian horses

The scar of ductus arteriosus

The location of aortic rupture in other horse breeds

Right ventricle

Pulmonary artery

Heart valve

Left bottom chamber

Heart valve

Right bottom chamber

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Research Friesians 2

- Only limited histopathologic information
- 20 Friesian horses with aortic rupture
- Aortic walls analyzed with special stains: histology and immunohistochemistry.

Main Results 2

- Disorganization of elastic laminae
- Medial smooth muscle hypertrophy
- Medial necrosis
- Inflammation
- Medial fibrosis with aberrant collagen morphology
Main Results 2

Normal collagen (left)  Aberrant collagen morphology (right)

Main Results 2

Normal collagen (left)  Aberrant collagen morphology (right)
Research Friesians 3

Human literature:
- Elastin degradation > dilatation
- Collagen degradation > subsequent rupture
- Additional collagen abnormalities humans

Research Friesians 3

Collagen type 1 and 3
- Affected Friesians
- Unaffected Friesians
- Warmblood horses
- Amount
- Fragmentation
Research Friesians 3

Collagen type 1 and 3
- Nr lamellae
- Confocus microscopy

Metalloproteinases

Crosslinks collagen and elastin

Genetic background
Results Case history

- no gender predilection
- Mean 4.9 years
- 3 out of 31 cases found death without prior sympt.
- Over 1/3th of all cases in days to weeks prior to cardiac failure:
  - recurrent colic
  - coughing/dyspnoe
  - poor performance
  - anorexia
  - depression
  - epistaxis
- Other distinctive features reported 1 to 2 weeks prior to overt cardiac failure:
  - intermittent peripheral oedema
  - fever
  - sustained sinus tachycardia at rest

Results Clinical examination

- ↑ rectal temperature
- ↑ jugular pulse
- Pale mucous membranes
- Bouncing arterial pulsation
- Peripheral (ventral) oedema
- Cardiac arrythmias rare
- Sustained tachycardia and murmurs
Thank you for listening!