41ST ASIAN RACING CONFERENCE
RIYADH 2026

Exercise associated sudden death – progress since June 2024

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ASIAN RACING FEDERATION

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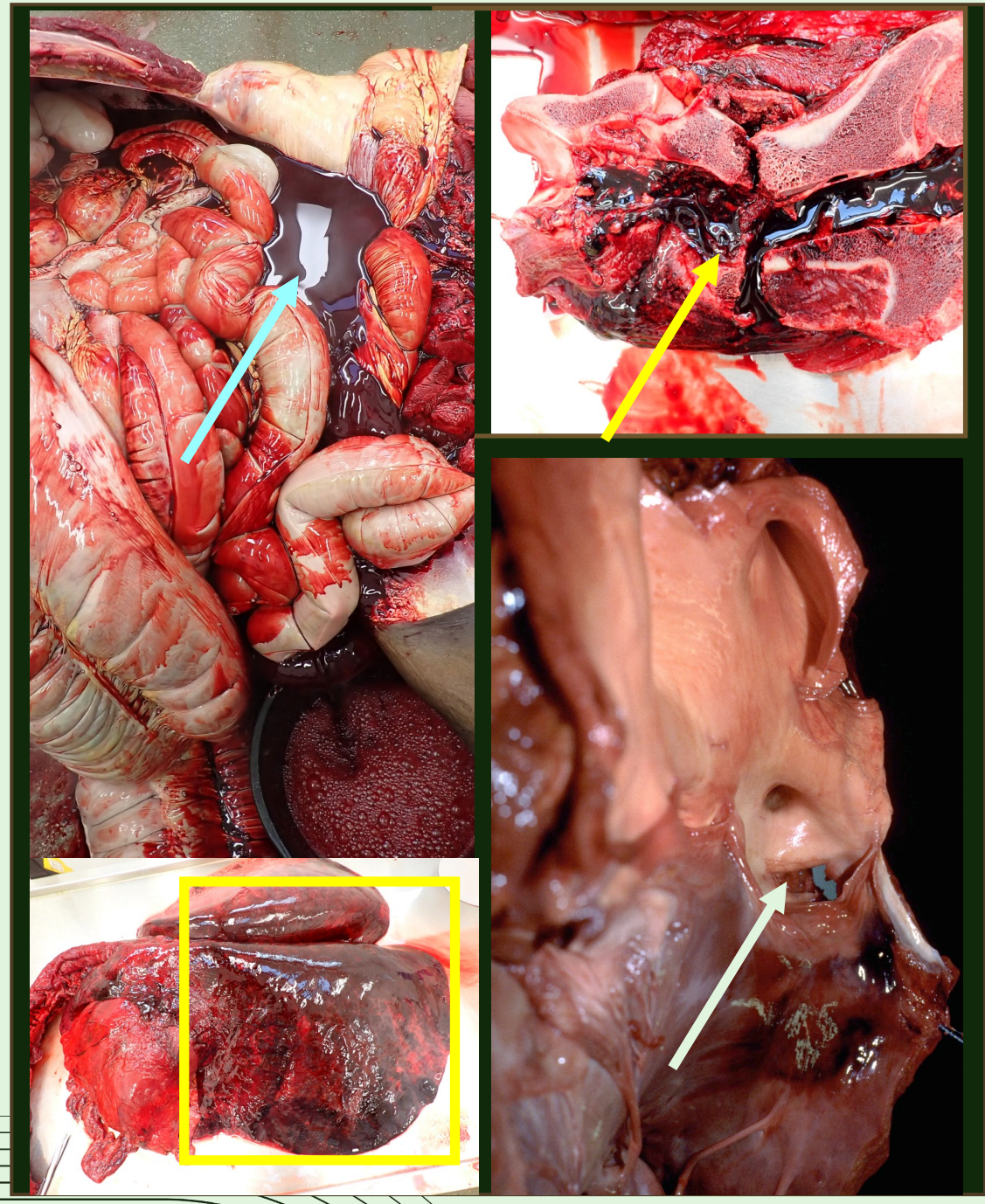
Exercise-associated sudden death

- **Definition:** "Fatal collapse in a closely observed and previously healthy horse either during exercise or within approximately one hour after exercise"
  - Recognise that pathologies which originate during racing/training may lead to death many hours or days later
- We have very little knowledge on **what is normal** with respect to cardiac and pulmonary physiology
- **Accurate phenotyping** underpins all research which involves comparing affected cases and non-affected controls
  - Is a "case" really a case?
  - Is a "control" a "case-in-waiting"?

What pathologies are found in EASD cases?

- Major causes:
  - Cardiac arrest and cardiac, cardiopulmonary and/or pulmonary failure & haemorrhage
  - Vascular catastrophe i.e. haemorrhagic shock - with or without trauma to vessels
  - CNS conditions and/or trauma
- Up to one third will be unexplained despite detailed necropsy
- Necropsy findings often reflect the process of death rather than its primary cause
- Different pathologists can interpret the same findings differently



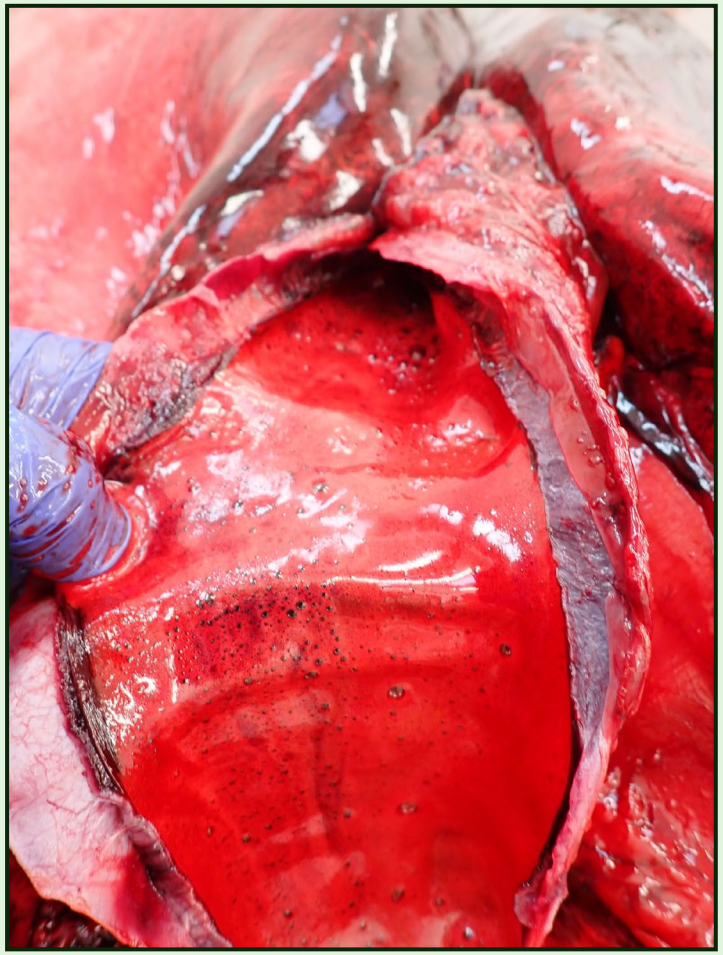
Domestic Animals–Original Article

Pulmonary bleeding in racehorses: A gross, histologic, and ultrastructural comparison of exercise-induced pulmonary hemorrhage and exercise-associated fatal pulmonary hemorrhage

Veterinary Pathology
2022, Vol. 59(6) 973–982

DOI: 10.1177/03009858221117859
journals.sagepub.com/home/vet

Guido Rocchigiani[1], Ranieri Verin[2], Francisco A. Uzal[3], Ellen R. Singer[4], Paola Pregel[5], Lorenzo Ressel[1], and Emanuele Ricci[1]

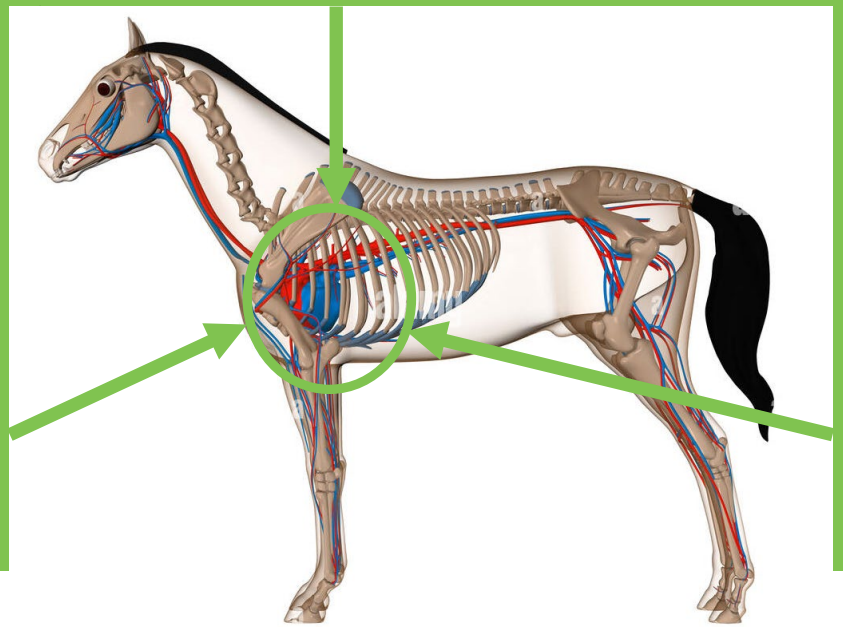


- This is a not typical "bleeder" having a very bad day…….
- EAFPH show significantly less vascular remodelling and other long-term structural pulmonary abnormalities horses with EIPH
- Most likely explanation
  - Cardiac arrest >> forward blood flow stops >> pressure backs up into lungs >> large number of pulmonary capillaries burst en masse
- Cardiac arrest = cardiac electrical activity stops, can be preceded by unstable rhythms
  - Pathologists cannot evaluate electrical activity at necropsy (currently)

Development of rhythm disturbances

Substrate

Acquired or congenital structural changes: scar tissue, inflammation, physiological hypertrophy
Genetic variants at sub-cellular level



Triggers

Premature depolarisations (very common in Thoroughbreds)

Modulators

Hypoxaemia, acid base changes
Autonomic nervous system
Psychological, pain, excitement

Findings from recent studies that have potential to have impact 2 *(Chair: David Eades)*	
14:15	The importance of early-life exposures: lessons from a Thoroughbred birth cohort study ***(Rebecca Mouncey)***
14:30	Tendon timebombs? Age-linked protein shifts in racehorse tendons ***(Anders Jensen)***
14:40	The effect of training and racing workloads on bone fatigue accumulation and injury in flat racing Thoroughbreds ***(Ashleigh Victoria Morrice-West)***
14:50	The Equine Track Tester, a simulator of the equine forelimb-ground interaction: application for assessing the security of horses while exercising on a surface ***(Nathalie Crevier-Denoix)***
15:00	Question time
15:10	The EquiFib app: evaluation for atrial fibrillation detection in equine performance and health management ***(Glenn Van Steenkiste)***
15:20	Detection of exercising ectopic atrial and ventricular beats using non-linear analysis of clinically normal electrocardiograms at rest or low-intensity exercise ***(Kamalan Jeevaratnam)***
15:30	Exercising electrocardiograms from horses with exercise associated sudden death ***(Laura Nath)***
15:40	Pulmonary artery stiffness in racehorses affected by exercise-induced pulmonary hemorrhage ***(Chiara Bozzola)***

Progress

- Drs Nath, Navas Solis, Durando & Durward-Akhurst have collected wearable ECG data from horses which subsequently developed EASD in training
- Identified wwo key rhythm disturbances although the **magnitude of increased risk** associated with these rhythms is unknown
  - Premature depolarisations in late recovery, a period which has not been emphasised previously
    - Solution: monitoring of wearable data
  - Atrial Fibrillation from the start of exercise
    - Solution: pre-race checks
      - UK, 2024&25 : 6 AF in 33,506 PRC
        - i.e. 1.8 pre-race AF in 10,000 starts
    - Challenges: veterinary manpower
      - Why do you need vets?
      - Example: EKO app for predicting human AF:
        - PPV (likelihood that a horse with a positive test results actually has AF) – 97%
        - work ongoing to identify it this tool can accurately identify horses that do not have AF

Journal of Veterinary Diagnostic Investigation
Volume 29, Issue 4, July 2017, Pages 442-449

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SAGE journals

Special Issue

Sudden death in racehorses: postmortem examination protocol

Santiago S. Diab[1], Robert Poppenga, and Francisco A. Uzal

- EASD group recommends that every racing jurisdiction:
  - monitors and audits fatality rates and necropsy results locally for racecourse and, ideally, EASD in training
    - Standard definitions for necropsy results are critical: adopt those in use on equine pathology publications since 1990s (see Lyle et al 2011)
  - contributes to an EASD Sample Sharing Network
    - Necropsy tissue are ideal, plucked hair roots are a useful minimum contribution
- Challenge
  - Veterinary pathology services with equine expertise may not be available where it is needed
- Solution
  - EASD group necropsy and sample collection guidelines have been produced for IFHA

Body System	Specific Diagnosis**
Cardio-pulmonary	Cardiac failure: cardiac lesions present
	Cardiac failure: cardiac lesions not observed
	Cardiac failure: pulmonary lesions present (cardiopulmonary failure)
	Cardiac failure: inflammatory (cardiomyopathy/myocarditis)
	Pulmonary failure: haemorrhage / vessel rupture
	Pulmonary failure: oedema
	Pulmonary failure: thrombosis
Central Nervous System	CNS haemorrhage
	Cervical vertebral fracture
	Skull fracture
	Skull and cervical vertebral fracture
	Other vertebral fracture
Haemorrhage	Extra-pulmonary vascular rupture and haemothorax
	Haemabdomen associated with pelvic fracture
	Haemabdomen associated vessel rupture (not fracture associated)
	External haemorrhage
Misc	Miscellaneous
Unexplained	Unexplained death

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IFHA EASD Working Group Members

Vicky Colgate, Sian Durward-Akhurst, Alastair Foote, Bronte Forbes, Lynn Hovda, Renaud Leguillette, Simon Libak Haugaard, Kamalan Jeevaratnam, John Keen, Celine Loubiere, Catriona Lyle, Celia Marr, Katharyn Mitchell, Laura Nath, Cris Navas de Solis, Tim Parkin, Peter Physick-Sheard, Mary Robinson, Freya Stein, Craig Suann, Sally Taylor, Francisco Uzal, Gunther van Loon

THANK YOU

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