Sudden Death in Racing Greyhounds

Richard Payne MA VetMB HonFIRVAP MRCVS
Hon. Senior Fellow of University of Liverpool School of Veterinary Science
GBGB Sudden Death Survey

• Started August 2006.
• Suggestion by track vet Di Hodgson that sudden deaths should be investigated.
• Developed into a survey by Hazel Bentall/NGRC.
• Now run by Richard Payne for the GBGB.
Histopathologists

- RVC team led by Dr Ken Smith.
- Dr Udo Hetzel (Liverpool vet school).
- Dr Peter Brown (Nottingham vet school).

- Carol Richardson (Greendale Labs) – early stages of the survey.
How the Survey Works

- Reported directly by track vet or racing office to Richard Payne on:
  - 07970 368702
- Three couriers transport frozen body to one of three centres:
  - Nottingham
  - RVC
  - Liverpool
- Standardized PME.
- Reported back to GBGB.
Organization into thirds
Data Security

- All parties have a unique ID:
  - Track
  - Track vet
  - Greyhound
  - Trainer
- Only GBGB know the true identities.
- Only GBGB uses the data.
RCVS Regulations

• Verbal consent from agent/owner.
• Only the reason for death is investigated.
• No unrelated research performed on samples.
• Samples are retained for retrospective analysis.
• Data is anonymized.
• Data only used for epidemiology.
Added Extras

- Survey acts as a surveillance tool for disease:
  - Acute Haemorrhagic Pneumonia
  - Canine Influenza
  - Kennel Cough
  - Kennel Sickness
Overall Rate

- 6.5 per 10,000 races.
- About two per month for all GBGB tracks.
Any Guesses?

• What do you think the main diagnosis is?

• My vote was for acute cardiac failure.
Overview of Numbers for all Sudden Deaths

- 131 Cases of sudden death comprising...
  - 46 Acute abdominal haemorrhage
  - 19 Acute haemorrhagic pneumonia
  - 18 Other (FB, peritonitis, lymphoma, [single cases])
  - 17 Acute cardiac failure
  - 12 No diagnosis (? Cardiac)
  - 6 Vertebral # (mainly cervical 2)
  - 4 Acute gastric dilation +/- volvulus
  - 4 Haemorrhagic gastroenteritis
  - 1 Str. zooepidemicus
  - 1 No PME (putrefaction)
Bar Chart of Diagnoses

Frequency Distribution

Frequency

ShortDx

NoDx | AAH | ACF | Other | AGDV | StrZoo | AHP | HGE | Ce# | NK
Overview of Three Syndromes

- Acute Abdominal Haemorrhage – AAH
- Acute Cardiac Failure – ACF
- Canine Haemorrhagic Pneumonia - CHP
Acute Abdominal Haemorrhage

AAH
Acute Abdominal Haemorrhage

• Big surprise.
• Multifocal bleeding from small vessels within the surface of the iliopsoas muscles.
• Muscle fascia ruptures to release blood into the abdomen in ~40% of cases.
• Repeat bleeds seen on histology:
  ▫ 13/46 cases were repeat bleeds
  ▫ 9 of these 13 had healing blood vessels
  ▫ 8 of these 9 had scarring
Signs of AAH

• Usually appear 1-5 minutes post race:
  ▫ Ataxia
  ▫ Dyspnoea
  ▫ Cyanosis

• Possible others for non-fatal AAH:
  ▫ Weakness
  ▫ Cramp (due to scarring)
  ▫ Sudden-onset poor performance
  ▫ Slow recovery
  ▫ Anaemia
PM Findings

- Subserosal capillary ruptures
  - Iliopsoas
  - Gracilis, semimembranosus, deep gluteal
- Retroperitoneal haemorrhage
  - Bursts into abdomen
- Sudden hypovolaemia is fatal
  - High metabolic demand
  - Vital organs not perfused (organ weights)
Organ Weights - Liver

![Graph of organ weights with box plots for AAH, ACF, and Other dx categories. The graph includes 95% CI Notched Outlier Boxplot, 95% CI Mean Diamond, and Outliers > 3 IQR markers.](image-url)
Histology of iliopsoas showing haemorrhage.
Possible Mechanisms (1)

• Hip hyperextension stresses the iliopsoas
  ▫ Related to eccentric contraction at end of hip extension (known risk factor for muscle injury)
  ▫ Acceleration phase (first 30-50 m)

• Tension on mesentery
  ▫ Lumbar spine dorsiflexion
  ▫ Gut mass shuttle

• Previous bleed scars may affect muscle function
  ▫ More tearing
  ▫ Recurrent cramp
Possible Mechanisms (2)

• Fascial compression syndrome
  ▫ Muscle swelling inside rigid envelope
  ▫ Ischaemia & infarction
  ▫ Degeneration & scarring
• Form of capture myopathy
  ▫ Doesn’t fit clinical picture
• Acute rhabdomyolysis
  ▫ Ditto
Possible Contributing Factors

• Hypertension
  ▫ Known exercise & greyhound problem
  ▫ Some cases do have glomerular damage

• Thin vessel walls
  ▫ Histological evidence present.

• No evidence for a genetic link
• No seasonal link
Treatment of AAH

- Bleeding is slow but persistent.
- Usually die within 15-20 minutes.

- Fast IV fluids.
- Coagulative agents – tranexamic acid (a.k.a. aminocaproic acid).

- Is it worthwhile?
- No cases have survived the clinical phase.
Prevention and Detection of AAH

• Non-fatal haemorrhage does occur.
• Impossible to detect by clinical examination.
• History of persistent cramping.
• Undiagnosed sublumbar pain 1-4 days post-race.
• Poor recovery.
• Anaemia.
Future Work

- Ultrasound.
- M.R.I.
- Fibrin degradation products
  - Difficult to do on PM blood samples.
Acute Cardiac Failure

ACF
Acute Cardiac Failure

• Die at the pickup.
• Usually run very well (Cf. AAH which have slow last races).
• Possible causes:
  ▫ Hyperkalaemia (fatal arrhythmia)
  ▫ Commotio cordis
  ▫ Sudden fall in venous return
  ▫ Hypoxia
  ▫ Lactic acidosis
Links with Racehorses and Athletes.

- The BHA is setting up its own sudden death survey with the advice from the GBGB.

- Possible similarities to human iliopsoas strain
  - Humans run using hip hyperextension
Acute Haemorrhagic Pneumonia

APH
Acute Haemorrhagic Pneumonia (1)

Sudden onset respiratory disease

- Lethargy
- Tachypnoea
- Pyrexic
- Coughing is not typical
  - Can be caught out that it is not a respiratory disease
- Die within 24-36 hours without aggressive therapy
Acute Haemorrhagic Pneumonia (2)

Diagnosis

• Report to GBGB / Richard Payne
  ▫ Epidemiological information needed from trainer
  ▫ Case history & treatment details from vet
• Samples to AHT (need GBGB permission first)
  ▫ Plain blood
  ▫ Plain nasal swab
Acute Haemorrhagic Pneumonia (3)

Treatment

• Needs aggressive i/v therapy for good prognosis

• Antibiotics

• NSAIDs

• Fluids according to need

• Oral and/or s/c therapy is not effective
  ▫ Slight response
  ▫ Relapse common
The survey is still active

- Sudden deaths
  - GBGB tracks
  - Kennels
- Disease
  - Enteric infections
  - Respiratory infections
    - AHT interested in canine resp’y disease esp recent case of H3N8 canine influenza.
Summary

• EAD is rare (2 cases/month for UK).
• Two main diagnoses at tracks:
  ▫ AAH
  ▫ ACF
• Possible mechanisms need more work.
• No risk factors identified.
• AAH has subclinical component.

• Survey also monitors general kennel diseases.
• CHP epidemiology.
• Ongoing.
Acknowledgments

• Dr Sarah Williams – greyhound videos.
• Dr Peter Brown – gross pictures.
• Dr Udo Hetzel – histology pictures.

• GBGB for the funding & support.
All Done.

- Thank you.
- Any questions?