BEVA / DEFRA
Equine Quarterly Disease Surveillance Report

Volume: 16, No. 3
July – Sept. 2020

HIGHLIGHTS IN THIS ISSUE

News Articles

- Update on the Animal Health Trust
- Screening stallion sera for Equine Viral Arteritis (EVA) antibodies

Focus Article

- Investigation of the 2019 outbreak of EVA at two connected premises in the South of England

Important note:
The data presented in this report must be interpreted with caution, as there is likely to be some bias in the way that samples are submitted for laboratory testing. For example they are influenced by factors such as owner attitude or financial constraints or are being conducted for routine screening as well as clinical investigation purposes. Consequently these data do not necessarily reflect true disease frequency within the equine population of Great Britain.

BEVA

Department for Environment Food & Rural Affairs

TABLE OF CONTENTS

INTRODUCTION

Welcome to the third quarterly equine disease surveillance report for 2020 produced by the Department for Food, Environment and Rural Affairs (DEFRA), British Equine Veterinary Association (BEVA) and Animal & Plant Health Agency (APHA).

National disease data is collated through multiple diagnostic laboratories and veterinary practices throughout the United Kingdom, providing a more focused insight into the occurrence of equine infectious disease. Due to the global mixing of the equine population through international trade and travel, collaboration on infectious disease surveillance between countries occurs on a frequent basis to inform and alert. Both national and international information will be summarised within this report.

To receive reports free of charge, via e-mail, on a quarterly basis, please contact equinesurveillance@gmail.com

Any comments and feedback on the report is welcomed and we encourage contributions on focus articles Please contact equinesurveillance@gmail.com

NEWS ARTICLES

Update on the Animal Health Trust

As you may be aware, the Animal Health Trust (AHT) closed at the end of July 2020. However, the epidemiology and disease surveillance group has been retained by the equine industry and is currently looking for a new permanent home. We are therefore continuing with a business as usual approach and would be delighted if you were able to continue to support us by sending us your data and publicising the Equine Quarterly Disease Surveillance report to interested colleagues. If you know of anyone interested in signing-up to receive the reports, do please ask them to contact equinesurveillance@gmail.com. Archived reports from the pilot issue in 2004 all the way to the 2020 editions, can be found at https://app.jshiny.com/jdata/icc/iccview/. With our very grateful thanks for all your support and help - it is greatly appreciated.

We should let you know that we are still able to supply horse and pony/foal swabs along with transport media. They are available now to purchase via equinesurveillance@gmail.com .

Screening stallion sera for Equine Viral Arteritis (EVA) antibodies

Due to the closure of the AHT, data held on its laboratory information management system has unfortunately been lost, despite considerable efforts being made to acquire it. However, diagnostic serum samples dating back to the beginning of 2018 have been retained as frozen aliquots marked with the allocated unique sample number that would have appeared on the corresponding laboratory test report issued by the AHT to the submitting veterinary surgeon. Consequently, these samples are available for further analysis but only if they can be linked to animals through the sample number. Therefore, we would ask if practices would please notify us via equinesurveillance@gmail.com of relevant details from all stallions under your care if they will require serological screening for EVA. This is so that when this year's sample is received, we can pair it with the previous sample to show a stable titre. We would require the following details from each stallion: animal name, date of last sample, AHT sample number and the test result. Alternatively, copies of the most recent AHT serology reports (issued as pdfs) can be submitted.

UK Infectious Disease Reports

(1 July to 30 September 2020)

This section summaries **laboratory confirmed** infectious disease outbreaks reported in the United Kingdom during the third quarter 2020. Each reported outbreak may involve more than one animal. To view current outbreak reports, see http://jdat.co.za/iccviewer/ . No reported outbreaks in a region does not necessarily equate to the area being free from the disease. When a particular disease is reported as 'endemic', disease outbreaks are common and are at an expected level.

Respiratory Diseases

Equine Herpes Virus-1 (EHV-1) Respiratory Infection

On 17 July 2020, AHT confirmed a single case of EHV-1 respiratory infection on a premises in Devon. The positive diagnosis was made by PCR on a nasopharyngeal swab.

HBLB Surveillance Scheme

Please note the HBLB Surveillance Scheme is currently on hold for diagnosis of equine influenza diagnosis. We will update our readers as and when further information is available.

Tell-Tail Text Message Alert Scheme

In the case of an outbreak, notification will be reported by the text alert service (Tell-Tail) for UK equine practitioners sponsored by Boehringer Ingelheim. This free of charge service alerts practitioners to outbreaks of equine influenza, equine herpes abortion and equine herpes neurological disease in the UK via text message. Sign up to receive alerts at www.telltail.co.uk

SURVEILLANCE OF EQUINE STRANGLES

(1 July to 30 September 2020)

2020Q3 SES laboratory

Surveillance of Equine Strangles (SES) is a Horse Trust funded surveillance project now based at the Royal Veterinary College (RVC). The SES Laboratory network is comprised of nine diagnostic laboratories based across the UK.

A total of **55 positive diagnoses of *S. equi*** were reported by SES Laboratory during Q3 2020 from samples submitted by 33 veterinary practices in the UK. Information regarding reported samples is summarised in Table 1.

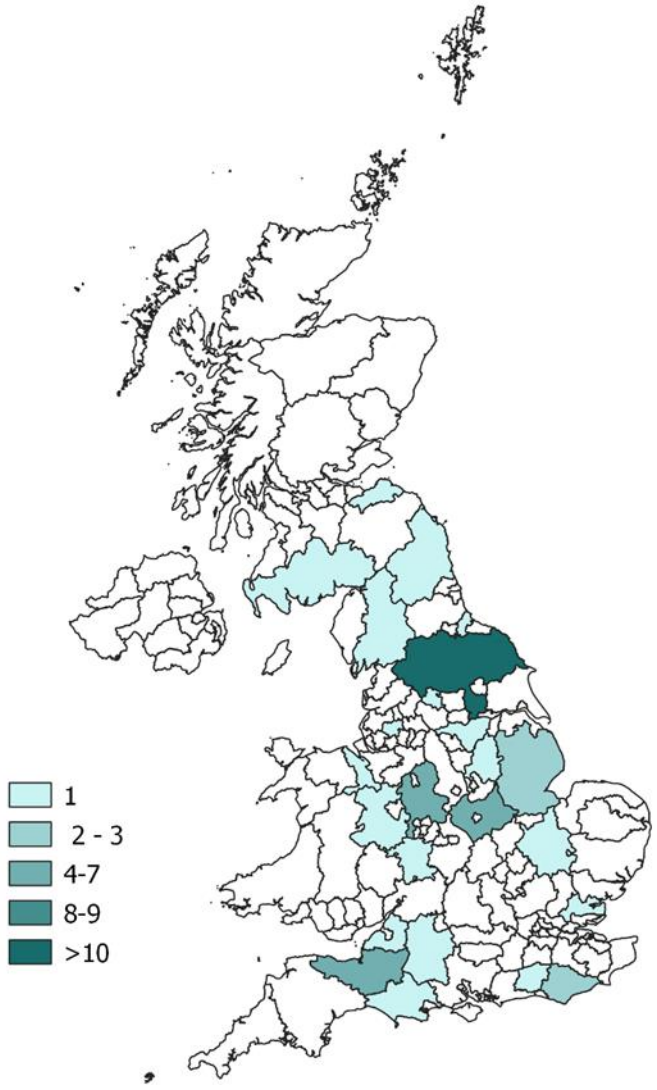


Figure 1: Frequency of reported laboratory diagnoses of *S. equi* across divisions of the UK from SES Laboratory during 2020 Q3. Diagnoses are mapped by submitting vet practice location.

Table 1: *S. equi* samples reported July – September 2020

	n	%
Total horses sampled	55	100%
Sample type*	56	
Swab	23	41%
Nasopharyngeal	15	65%
Abscess material	0	0%
Nasal	6	26%
Other	2	9%
Guttural pouch lavage	23	41%
Tracheal lavage	1	2%
Other	9	16%
Diagnostic tests		
PCR only requested	46	84%
PCR and culture requested	5	9%
Culture only requested	3	5%
LAMP**	1	2%
Signalment		
Sex of horse indicated	39	71%
Female	21	54%
Male	18	46%
Breed of horse	36	65%
Native UK pony	18	50%
Native UK horse	6	17%
Sports horse	9	25%
Non-UK native horse/pony	1	3%
Crossbreed	2	6%
Donkey	0	0%
Age of Horse	34	62%
Range (IQR)	2wks - 33yrs (4-10yrs)	
Median	6 years	
Clinical signs reported***	46	
Nasal discharge	14	30%
Pyrexia	7	15%
Other	4	9%
Abscess	6	13%
Inappetence	2	4%
Chondroids	1	2%
Glandular swelling	5	11%
Guttural pouch empyema	4	9%
Lethargy	3	7%
Reason for sampling reported	38	69%
Total reasons*	41	
Clinically ill horse	16	39%
Respiratory infection screening	1	2%
Seropositive strangles ELISA	8	20%
In contact	7	17%
Post infection screening	3	7%
Other	1	2%
Premises type	3	5%
Commercial	3	100%
Private	0	0%
Other	0	0%

**can include multiple entries per submission*

***Loop-mediated isothermal amplification*

****From 25 samples*

Virology

The results of virological testing for July to September 2020 are summarised in Table 2. Please note, APHA's sample population is different to the other contributing laboratories as their tests are principally in relation to international trade.

Table 2: Results of virological testing, July to September 2020

	Samples tested (n)	Positive (n)	CLs (n)
Serological Tests			
Reproductive/Systemic diseases			
EVA ELISA	969	10*	10
EVA VN	23	15*	2
EVA (APHA) VN	499	5*	1
EIA ELISA	462	0	8
EIA Coggins	39	0	5
EIA (APHA) ELISA	1	0	1
EIA (APHA) Coggins	880	0	1
EHV-3 VN	0	0	1
Reproductive/Respiratory/Neurological disease			
EHV-1/-4 CFT	177	0†	1
EHV-1/-4 (APHA) CFT	51	6	1
Respiratory diseases			
ERV-A/-B CFT	137	0†	1
Influenza HI	139	0†	1
Gastrointestinal disease			
Rotavirus ELISA	53	6	3
Neurological disease			
WNV (APHA) cELISA	2	0	1
WNV (APHA) IgM ELISA	1	0	1
Virus Detection			
Reproductive diseases			
EHV-3 PCR	0	0	1
EVA VI/PCR	0	0	1
EVA (APHA) VI/PCR	0	0	1
Reproductive/Respiratory/Neurological diseases			
EHV-1 PCR	346	1	8
EHV-1 LAMP	8	0	1
EHV-4 PCR	345	9	8
EHV-4 LAMP	8	4	1
EHV-1 VI	0	0	1
EHV-4 VI	0	0	1
Respiratory diseases			
EHV-2 PCR	24	6	3
EHV-5 PCR	23	1	2
ERV PCR	8	0	1
Influenza PCR	512	1	8
Influenza (APHA) PCR	153	0	1
Influenza LAMP	8	0	1
Gastrointestinal diseases			
Equine coronavirus PCR	17	0	1
Rotavirus (Strip Test)	5	2	1
Neurological disease			
WNV (APHA) PCR+	0	0	1

*Seropositives include vaccinated stallions, † Diagnosed positive on the basis of seroconversion between paired sera, ⁺APHA now provides testing for West Nile Virus as part of clinical work up of neurological cases, to exclude infection on specific request, provided the local regional APHA office has been informed. CFT Complement fixation test, CLs Contributing laboratories, EHV Equine herpes virus, EIA Equine infectious anaemia, ERV Equine rhinitis virus, EVA Equine viral arteritis, HI Haemagglutination inhibition, VI Virus isolation, VN Virus neutralisation, WNV West Nile virus

Bacteriology

A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 3. The BEVA laboratory registering scheme is for the testing of CEMO, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. Granting and maintenance of approval depends on a laboratory achieving correct results in quality assurance tests and reporting data to this report. BEVA publishes a list of approved laboratories annually. All 22 of the BEVA approved laboratories in the UK contributed data to this report. No equine bacterial notifiable diseases have been confirmed in the UK during the third quarter of 2020.

Table 3: Results of bacteriological testing, July to September 2020

	Samples tested (n)	Positive (n)	CLs (n)
Reproductive diseases			
CEMO (BEVA) PCR	528	0	12
CEMO (BEVA) culture	540	0	19
CEMO (APHA) PCR	11	0	1
CEMO (APHA) culture	1347	0	1
Klebsiella pneumoniae PCR*	520	1†	10
Klebsiella pneumoniae culture*	579	2†	22
Pseudomonas aeruginosa PCR*	520	8	10
Pseudomonas aeruginosa culture*	575	8	22
Respiratory diseases			
Streptococcus equi PCR	1712	88	8
Streptococcus equi LAMP	5	1	1
Streptococcus equi culture	559	20	14
Streptococcus equi ELISA	5204	669§	8
Rhodococcus equi culture	22	4	1
Rhodococcus equi PCR	36	3	2
Rhodococcus equi immunochromatography	15	7	1
Gastrointestinal diseases			
Campylobacter	49	4	4
Clostridium perfringens ¥	231	10	5
Clostridium difficile ¥	246	12	5
*Lawsonia intracellularis*** PCR	63	5	4
Lawsonia intracellularis IPMA	50	14[1]	1
Salmonella spp¶ culture	428	3	12
Salmonella spp¶ PCR	51	3	4
Salmonella spp¶ (APHA)	16	14	1
Miscellaneous diseases			
MRSA	80	3	7
Borrelia burgdorferi PCR	1	0	1
Borrelia burgdorferi ELISA	24	8	2
Burkholderia mallei (Glanders) (APHA) CFT	457	0	1

***** reproductive tract samples only,† capsule type 1,2,5, **§** seropositivity may be attributed to disease exposure, vaccination, infection or carrier states, **&** all samples from the same animal, # seropositives include exposure to the virulent form of *R equi* or the presence of maternally derived antibodies, **¥** toxin by ELISA, immunochromatography or PCR, ****** identified using PCR applied to faeces, **[1]** seropositives include vaccinated animals, **¶** Under the Zoonoses Order 1989, it is a statutory requirement to report and serotype positive cases for *Salmonella spp*. A positive case may have repeat samples taken.

BEVA British Equine Veterinary Association approved laboratories, CEMO contagious equine metritis (*Taylorella equigenitalis*), CFT complement fixation test, CLs Contributing laboratories, IPMA immunoperoxidase monolayer assay, MRSA methicillin resistant *Staphylococcus aureus*

APHA *Salmonella* results

Sixteen samples were submitted this quarter to the Animal and Plant Health Agency (APHA) and fourteen were positive for *Salmonella*. From the incidents involving isolates typed by the APHA, the serovars/phagetypes reported were *S.* Typhimurium (5 isolates; DT1, DT116 (x3) and RDNC), *S.* 4,5,12:i:- (4 isolates all DT193), *S.* Newport (2 isolates) and single incidents of *S.* Agama, *S.* Anatum and *S.* Kottbus. *Salmonella* Typhimurium (DT1 and RDNC) and *S.* Anatum are likely to be of wild bird origin whereas monophasic Salmonella Typhimurium DT193 is primarily found in pigs. *Salmonella* Typhimurium DT116 is newly recognised in GB and its origin is uncertain. *S.* Newport, *S.* Agama and *S.* Kottbus are usually associated with badgers.

For more information from APHA about *Salmonella* in Great Britain, please see the newly published 2019 *Salmonella* in livestock surveillance report https://www.gov.uk/government/publications/salmonella-in-livestock-production-in-great-britain

Toxicosis and Parasitology

A summary of diagnostic toxicosis testing undertaken by contributing laboratories is presented in Table 4 Results for toxicosis are based on histopathologically confirmed evidence of disease only (where applicable).

Table 4: Results of toxicosis testing, July to September 2020

	Samples tested (n)	Positive (n)	CLs (n)
Grass Sickness	15	2	1
Hepatic toxicosis	54	16	1
Atypical myopathy/Seasonal Pasture Associated Myopathy	0	0	0

Parasitology

A summary of parasitology testing undertaken by contributing laboratories is presented in Table 5.

Table 5: Results of parasitology testing, July to September 2020

	Samples tested (n)	Positive (n)	CLs (n)
Endoparasites			
Ascarids	6041	93	13
Strongyles (large/small)	6343	2041	16
Strongyloides	5680	441	12
Tapeworms ELISA serum	579	174	3
Tapeworms ELISA saliva	4797	1483	1
Tapeworm Fecal exam	4468	17	9
Oxyuris equi Fecal exam	1209	1	3
Oxyuris equi Tape Strip	94	2	7
Dictyocaulus arnfieldi	41	0	2
Fasciola hepatica Fecal exam	126	5	5
Fasciola hepatica ELISA serum	3	0	3
Cryptosporidia	98	2	4
Coccidia	1427	9	6
Theileria equi cELISA	188	0	1
Babesia caballi cELISA	188	2	1
Theileria equi (APHA) CFT*	114	1	1
Theileria equi (APHA) IFAT	246	4	1
Theileria equi (APHA) cELISA	162	4	1
Babesia caballi (APHA) CFT*	114	1	1
Babesia caballi (APHA) IFAT	246	6	1
Babesia caballi (APHA) cELISA	162	1	1
Dourine (APHA) CFT#	415	2	0
Dourine (APHA) IFAT	7	0	1
Ectoparasites			
Mites	135	2	8
Lice	172	1	6
Ringworm culture/cytology	234	21	9
Ringwork PCR	96	27	4
Dermatophilosis	50	7	6
Candida	39	1	3
Leptospira	10	0	2

* CFT suspect/positive samples are then tested by IFAT and all were negative, CFT Complement fixation test, CLs Contributing laboratories, IFAT Immunofluorescent antibody test

EQUINE GRASS SICKNESS

(1 July to 30 September 2020)

An equine grass sickness (EGS) surveillance scheme was established in spring 2008 to facilitate the investigation of changes in geographical distribution and incidence of the disease in Great Britain. Data gathered by this scheme is collated in a strictly confidential database.

Having up to date reports from across the country will help provide an accurate representation of numbers of EGS cases nationwide and is vital to help continue epidemiological research into the disease. Reporting cases of EGS can be done by either the attending veterinary surgeon or the owner, by following www.grasssickness.org.uk/research/reporting-grass-sickness-cases

A summary of 11 EGS cases reported in England and Scotland during Q3 2020 is presented in Table 6.

Table 6: Reported EGS cases during Q3 2020

Date	Location	Signalment	Presentation	Diagnosis	Outcome	Premises History	Additional Information
July 2020	England	10-year-old mare	Chronic	Clinical signs*	Survived	Unknown	On affected paddock for 6 weeks
July 2020	England	4-year-old mare	Acute	Clinical signs*	Euthanased	No history of EGS	On affected paddock for 4 months
July 2020	England	15-year-old mare	Acute	Clinical signs*	Euthanased	History of EGS	On affected paddock for 12 months
August 2020	England	10-year-old gelding	Acute	Clinical signs*	Euthanased	No history of EGS	On affected paddock for 9 years
August 2020	England	15-year-old gelding	Chronic	Clinical signs*	Survived	No history of EGS	On affected paddock for 6 years
August 2020	England	7-year-old mare	Acute	Clinical signs*	Euthanased	No history of EGS	On affected paddock for 6 weeks
August 2020	Scotland	3-year-old mare	Acute	Clinical signs*	Euthanased	No history of EGS	On affected paddock for 2 months
August 2020	Scotland	5-year-old gelding	Acute	Clinical signs*	Euthanased	History of EGS	On affected paddock for 18 months
August 2020	England	mare of unknown age	Acute	Clinical signs*	Euthanased	No history of EGS	On affected paddock for 3 years
September 2020	England	10-year-old gelding	Chronic	Clinical signs*	Survived	No history of EGS	On affected paddock for several weeks
September 2020	Scotland	19-year-old gelding	Acute	Clinical signs*	Euthanased	History of EGS	On affected paddock for 12 months

*Clinical signs observed in the case were consistent with a diagnosis of EGS

International Infectious Disease Reports

(1 July to 30 September 2020)

International Collating Centre

ITBF International Thoroughbred Breeders' Federation

Third Quarter Summary Report: July - September 2020

This article provides a summary of international disease outbreaks during 3Q 2020. It should also be noted that additional summary reports were kindly received for the USA that included further information on disease occurrence for that country but which had not been reported in previous real-time ICC reports. This additional information is identified by * in the tables and text where relevant throughout this report. The information from the ICC interim (real-time) reports are available on the interactive ICC website, which can be found at http://jdata.co.za/iccviewer/.

The data presented in this report *must be interpreted with caution*, as there is likely to be some bias in the way that samples are submitted for laboratory testing and subsequently reported. Consequently these data do not necessarily reflect true infectious disease frequency within the international equine population. A country with no reported outbreaks of a disease does not necessarily equate to the disease not being present in that country. Each table below summarises the number of disease outbreaks reported by a country. Each reported outbreak may involve more than one animal.

Reproductive Diseases

Country	CEM	EHV-1	EHV-3	Leptospirosis
Argentina	-	-	2	-
Belgium	-	-	-	2
Denmark	1	-	-	-
Japan	-	1	-	-
USA	-	-	*	-

*relates to additional summary information reported at the end of the quarter, but which was not reported via ICC interim reports

Contagious Equine Metritis (CEM)

Denmark

An outbreak in three stallions was confirmed. No clinical signs were observed.

Equine Herpes Virus-1 (EHV-1) Abortion

Japan

A single case of EHV-1 abortion in an unvaccinated Thoroughbred was confirmed.

Equine Herpes Virus-3 (EHV-3)

Argentina

Two outbreaks confirmed of EHV-3 affecting 29 animals including breeding stock and Thoroughbreds on two separate premises.

USA

*One case of EHV-3 infection noted in Kentucky was reported at the end of the quarter.

Leptospiral Abortion

Belgium

Two outbreaks of leptospiral abortion with a single case in each were confirmed. One case aborted at 10 months.

Country	EHV-1	EHV-2	EHV-4*	Adenovirus	Eq. Flu	Strangles
Belgium	-	1	-	-	1	2
Canada	-	-	-	-	-	1
France	1	-	20	-	1	9
Germany	-	-	-	-	4	-
Ireland	-	-	-	1	-	-
Japan	-	-	1	-	-	-
Italy	-	-	-	-	1	-
Netherlands	-	-	5	-	-	12
S. Africa	1	-	-	-	-	-
Sweden	-	-	-	-	1	-
Switzerland	-	-	-	-	-	8
UK	1	-	-	-	-	-
USA	-	*	1	-	6*	8*

*relates to additional summary information reported at the end of the quarter, but which was not reported via ICC interim reports

Equine Herpes Virus-1 (EHV-1) Respiratory Infection

France

One case was confirmed in a yearling Thoroughbred filly.

South Africa

One case was confirmed in Gauteng province.

UK

One case was confirmed on a premises in Devon.

Equine Herpes Virus-2 (EHV-2) Respiratory Infection

Belgium

One case confirmed in a two-month-old foal on a premises in West Flanders.

USA

*Numerous cases of infection with EHV-2 or EHV-5, some associated with clinical evidence of respiratory disease, were also noted in several states and reported at the end of the quarter.

Equine Herpes Virus-4 (EHV-4) Respiratory Infection

France

Twenty outbreaks were confirmed, 13 with single cases, one with three cases, five with two cases and one with cases unknown. Clinical signs included nasal discharge, cough and decreased performance. Positive diagnoses was in the majority confirmed by PCR on nasopharyngeal swabs.

Japan

An outbreak of EHV-4 respiratory disease was confirmed in eight unvaccinated Thoroughbreds.

Netherlands

Five outbreaks were confirmed, four with single cases and one with seven four/five- month-old foals affected. Clinical signs included nasal discharge, cough, pyrexia and lymphadenopathy.

USA

A single case in a vaccinated three-year-old on a premises in Georgia was confirmed. Clinical signs included anorexia and pyrexia.

Adenorvirus

Ireland

A case was reported in a foal on a premises in County Tipperary. Positive diagnosis was confirmed by PCR on tissue.

Equine Influenza (EI)

Belgium

One case on a premises in Hainaut. Clinical signs included pyrexia, nasal discharge and cough.

France

One case reported in a five-year-old Hanoverian stallion on a premises in Loiret. Clinical signs included nasal discharge, pyrexia, cough and depression.

Germany

Four outbreaks were reported; two with single cases, with one of these being in a seven-year-old vaccinated mare recently imported from Spain. One outbreak involved two Shetland ponies and one involved three animals. Clinical signs included pyrexia and cough.

Italy

A single case was reported. It was noted that control measures were in place.

Sweden

Three individual cases on different premises, all in Shetland ponies, were reported. All were traced back to the same consignment of horses imported from Holland. Clinical signs included cough, pyrexia and mucopurulent nasal discharge. Positive diagnoses were confirmed by PCR on nasal swabs.

USA

Six outbreaks were confirmed, four involved single cases, one involved three cases and one involved 11 cases. *EI is endemic in the USA and at least three other outbreaks were also noted and reported at the end of the quarter. With the exception of a group of five donkeys, occurrence of the disease was confined to horses.

*Rhodococcus equi**

USA

*Six cases of *Rhodococcus equi* infection were also noted, all in Kentucky and reported at the end of the quarter.

Strangles

Belgium

Two outbreaks were confirmed involving single cases, one with a co-infection of EHV-4, EHV-2 and EHV-5.

Canada

One case was confirmed in a five-year-old Standardbred gelding.

France

Nine outbreaks all involving single cases were confirmed. One case was in a four-year-old Thoroughbred. Clinical signs included nasal discharge, abscessation, pyrexia, lymphadenopathy and dysphagia.

Netherlands

Twelve outbreaks confirmed, nine of which involved single cases, one involved two cases, one involved three cases and one involved 15 cases. Positive diagnoses were mainly confirmed by PCR on nasopharyngeal swabs with one confirmed by PCR on guttural pouch lavage.

Switzerland

During the 3Q 2020 Switzerland reported eight separate outbreaks of strangles.

USA

Eight outbreaks, each with a single case were confirmed. Clinical signs included pyrexia, nasal discharge, lethargy and lymphadenopathy. *Strangles is endemic in the USA and a further 33 outbreaks were also noted in 10 states experiencing multiple disease events and reported at the end of the quarter.

Gastrointestinal Diseases

Country	Rotavirus	Salmonellosis
France	19	-
Switzerland	-	2
USA	*	*

*relates to additional summary information reported at the end of the quarter, but which was not reported via ICC interim reports

Rotavirus

France

Nineteen outbreaks were confirmed, with 15 involving one case, three involving two cases and one involving three cases. Positive diagnoses were confirmed by PCR on fecal matter or by PCR on rectal swabs.

USA

*A total of 17 cases of rotavirus infection were also noted and reported at the end of the quarter. The majority in 60-90 day-old foals in Kentucky. Of these, four were of the G3 genotype, seven of the G14 genotype and six were positive for both genotypes. The majority of cases were recorded in July.

*Proliferative Enteropathy**

*One case of *Lawsonia intracellularis* proliferative enteropathy was also noted in a foal in Kentucky and reported at the end of the quarter.

Salmonellosis

Switzerland

Two outbreaks of salmonellosis were reported.

USA

*Ten cases of salmonellosis were also noted, all in Kentucky and reported at the end of the quarter. Two involved *Salmonella* group C1, five *Salmonella* Group D1 and three were from infection with untyped *Salmonella.*

Neurological Diseases

Country	EEE	EHV-1	EHV-4	Rabies	WEE	WNV
Canada	2	-	-	-	-	1
France	-	-	-	-	-	3
Germany	-	-	-	-	-	8
Hungary	-	-	-	-	-	1
Italy	-	-	-	-	-	9
Portugal	-	-	-	-	-	1
Spain	-	-	-	-	-	13
Sweden	-	1	-	-	-	-
Switzerland	-	3	1	-	-	-
USA	97*	2*	-	1	1	24*

*relates to additional summary information reported at the end of the quarter, but which was not reported via ICC interim reports

Eastern Equine Encephalitis (EEE)

Canada

Two outbreaks, each with single cases in unvaccinated animals were confirmed. Clinical signs included ataxia and pyrexia.

USA

Ninety-seven outbreaks were confirmed in states including Florida, South Carolina, Virginia, Wisconsin, New York, Georgia and Michigan. *A further seven outbreaks were noted during this period and reported at the end of the quarter.

Equine Herpes Virus-1 (EHV-1) Neurological Disease

Sweden

One case was reported in a Warmblood recently imported from Belgium.

Switzerland

Three outbreaks were reported. One case was in a 16-year-old French Saddlebred gelding. Clinical signs included depression, pyrexia and urinary incontinence.

USA

Two outbreaks were confirmed in California, each with one case, with one being in a 17-year-old Thoroughbred gelding. Clinical signs included pyrexia, ataxia, muscle fasciculations and recumbency. *A further four single outbreaks were noted in Louisiana, Maryland, Maine and Pennsylvania and reported at the end of the quarter.

Equine Herpes Virus-4 (EHV-4) Neurological Disease

Switzerland

One outbreak of EHV-4 neurological disease was reported, although no details are available as to how this rare presentation of EHV-4 related disease was confirmed.

Rabies

USA

One case was confirmed in a five-year-old Warmblood gelding on a premises in Maryland, which was euthanased. Two further horses were exposed to the positive animal, which were vaccinated and received a booster vaccination once exposure was known.

Western Equine Encephalitis (WEE)

USA

One case was confirmed in an unvaccinated 30-year-old horse in Utah.

West Nile Virus (WNV)

Canada

One case was confirmed in an unvaccinated animal in Ontario.

France

Three outbreaks with one case in each were confirmed.

Germany

Eight outbreaks were confirmed.

So far this year, the National Reference Laboratory (NRL) for West Nile Virus (WNV) infection has confirmed the presence of WNV in 54 zoo and wild birds and 16 horses. A further three horses are currently being tested. Four horses have died as a result of the infection.

Most cases in birds and horses have been confirmed in the already known affected regions of eastern Germany. In addition, for the first time in the Federal State of Thuringia, WNV infection has also been detected in sick and/or dead zoo and wild birds. A new entry in the Federal State of Lower Saxony, district of Helmstedt, was confirmed in a clinically affected horse with neurological signs. Cases of disease in birds in this region are not yet known.

Thus, the virus shows a tendency to spread in 2020 compared to the previous year. Further cases of the disease in birds and horses are expected in the coming weeks. Horse owners should follow the vaccination recommendations of the Standing Veterinary Vaccination Commission (StIKo Vet).

Hungary

One outbreak was confirmed.

Italy

Nine outbreaks were confirmed.

Portugal

One case was confirmed. Control measures are in place.

Spain

Thirteen outbreaks were confirmed. Three with single cases.

USA

Twenty-four outbreaks were confirmed, 23 with single cases and one involving two animals.
*Three further outbreaks were also noted and reported at the end of the quarter.

Miscellaneous Diseases

Country	AHS	Anaplasmosis	Borna	EIA	Lepto	Piro	PHF	VS
Canada	-	-	-	-	-	-	4	-
Finland	-	-	-	-	-	1	-	-
France	-	-	-	-	1	-	-	-
Malaysia	1	-	-	-	-	-	-	-
S. Africa	-	--	-	-	-	3	-	-
Switzerland	-	1	2	-	-	1	-	-
USA	-	-	-	3	-	-	6*	36*

*relates to additional summary information reported at the end of the quarter, but which was not reported via ICC interim reports

African Horse Sickness (AHS)

Malaysia

One outbreak was confirmed in five horses on a single-premises. Positive diagnoses were confirmed by RT-PCR. Control measures are in place.

Anaplasmosis

Switzerland

One outbreak of anaplasmosis was reported in Switzerland.

Borna Disease

Switzerland

Two outbreaks of Borna disease were reported.

Equine Infectious Anaemia (EIA)

USA

Three outbreaks were confirmed in Quarter Horses. Two involved one case and one involved two cases. All premises were quarantined.

Leptospirosis

France

One case was confirmed in an eight-year-old Saddle Horse stallion. Positive diagnosis was confirmed by PCR on aqueous humor.

Piroplasmosis

Finland

One case was confirmed in Riihimäki, Etelä-Suomi. Piroplasmosis was last reported in Finland in 1985.

South Africa

Piroplasmosis is regarded as endeimic in South Africa. Sporadic cases were reported in Gauteng (18 cases), Mpumalanga (one case) and Western Cape (one case).

Switzerland

One outbreak of piroplasmosis was reported.

Potomac Horse Fever (PHF)

Canada

Four outbreaks in Quarter Horses, all involving single cases were confirmed. Clinical signs included diarrhoea, anorexia, dehydration, tachycardia and lethargy.

USA

Six outbreaks were confirmed, five involving one case and one involving 10 cases. Clinical signs included diarrhoea, pyrexia, dehydration and lethargy. *A further 11 outbreaks were also noted, with the majority in Kentucky and reported at the end of the quarter.

Vesicular Stomatitis (VS)

USA

Thirty-six outbreaks were confirmed in the following states, Arizona, Arkansas, Kansas, Missouri, Nebraska and Oklahoma. *VS continues to spread and a further 167 outbreaks were also noted mainly in equines, but some involving cattle and reported at the end of the quarter. The Indiana serotype of the virus was involved in all affected premises.

Investigation of the 2019 outbreak of EVA at two connected premises in the South of England

Joseph Lattimer[1], Matt Barnard[2], Andy Paterson[2], Iain Bell[2], Richard Hepple[2], Sam Holland[3], Alastair George[3], Helen Roberts[1]

[1]Exotic Disease Control, Department for Environment, Food and Rural Affairs, London, UK

[2]National Emergency Epidemiology Group, Animal and Plant Health Agency (APHA), Weybridge, UK

[3]Veterinary Exotic Notifiable Disease Unit, APHA, Weybridge, UK

A look at: Equine Viral Arteritis (EVA)

Virus classification: Genus: Arteriviridae. Enveloped, single-stranded RNA

Transmission: Incubation of 2-14 days after infection. Horizontal transmission; aerolisation, virus in abortion material, fomites, venereal transmission during natural breeding/artificial insemination, embryo transfer. Vertical transmission; fetal infection resulting in abortion or interstitial pneumonia in new-born foal.

Clinical signs: Predominantly subclinical. Outbreaks can occur with clinical signs including; pyrexia, conjunctivitis, rhinitis, nasal and ocular discharge, peripheral oedema, abortion in pregnant mares and interstitial pneumonia in foals. A subclinical carrier state occurs in stallions, with virus being persistently shed in semen and this feature plays a crucial role in the spread and persistence of EVA virus.

Laboratory diagnosis: Serology for immune status – usually screened by ELISA, if positive, virus neutralisation (VN) test is performed as a confirmatory test. Testing infectious status – if respiratory signs, nasopharyngeal swab for PCR +/- viral isolation. If a stallion, semen testing including PCR +/- viral isolation to rule out carrier status.

Geographic distribution: Present worldwide (with exception of Iceland and Japan), but the clinical and subclinical prevalence varies between countries and breeds.

Control: Pre-breeding serological screening as outlined in Horserace Betting Levy Board (HBLB) Code of Practice https://codes.hblb.org.uk/index.php/page/53. Vaccination (with an inactivated vaccine in the UK) for stallions. Serological testing must demonstrate freedom from disease prior to initiating vaccination courses. Where a stallion is found to be positive, infectious status must be established by semen testing to rule out persistent shedding status. Confirmation of a positive case warrants movement restrictions, biosecurity and hygiene measures and laboratory clearance.

Notifiable in the UK: EVA Order 1995 – notifiable in all stallions and in mares that have been covered in the preceding two weeks of a seropositive test result. It is not notifiable if a non-bred mare or gelding are found to be seropositive. However, infectious status should still be established by repeating serology two weeks later, if titres are stable, there is no evidence for current infection and the seropositivity demonstrates previous exposure.

Zoonotic Risk: None recognised.

Abstract

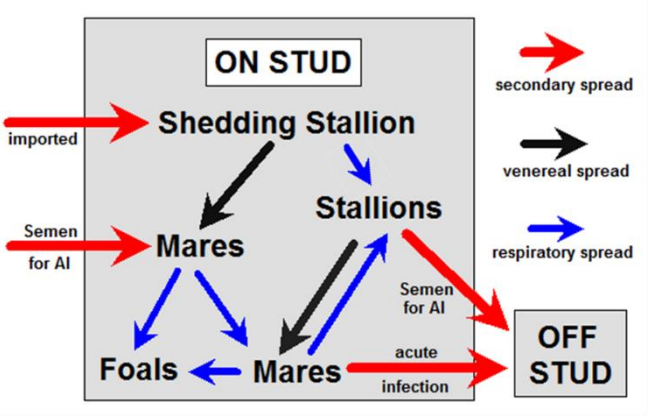
Equine Viral Arteritis (EVA) is a disease of equines caused by Equine Arteritis Virus (EAV) which causes both symptomatic and asymptomatic infections in infected animals; having the potential to cause economically significant outbreaks due to the potential for establishment of long term "shedder" status in stallions, abortion in mares, and, infrequently, death in young foals. EVA has worldwide prevalence and is endemic in many EU Member states. It is not, however, considered endemic in the UK (Newton et al., 1999) and is classed as a notifiable exotic disease. In early 2019, four stallions resident in the South of England tested positive for EVA infection following

routine pre-breeding screening. This paper details the epidemiological investigation that was carried out to determine the potential for transmission of the disease across the country, and the source of origin.

Introduction

EVA is an acute contagious disease of equidae caused by a virus in the family *Togaviridae* EAV (Westaway et al., 1985), and is notifiable within the United Kingdom. There is no risk to public health. EAV has two main routes of transmission; via infective aerosolized secretions from the respiratory tract of an infected animal (Bryans et al., 1957), and venereal transmission (Timoney et al. 1987) (Figure 2). However, fomite transmission (Collins et al. 1987) and transmission through contact with aborted fetuses and fetal membranes (Cole et al., 1986), also present a plausible risk pathway.

Figure 2: Typical routes of transmission of EAV on and off a stud farm



EAV is known to cause mainly sub-clinical infections but clinical signs may also be observed depending on a variety of factors. Signs of clinical infection are variable, although typical symptoms include a combination of: fever and nasal discharge; conjunctivitis ('pink eye', Figure 3); watery eyes; swelling of the testicles or udder, eyes, or lower legs; depression; anorexia; lethargy; stiff movement (Timoney et al., 1993) and abortions.

Figure 3: Conjunctivitis seen with EVA gives the disease the name 'pink eye'

Whilst EAV causes either a subclinical or acute infection and spontaneous clearance is seen in mares and young foals, spontaneous clearance is not achieved in some stallions, with infections of the immunologically-privileged reproductive tract that can last for the lifetime of the animal. The status of "shedder" stallions is testosterone dependent and are an important source of the virus until the point of castration; there are currently no licenced therapeutics for EVA in the UK. As such, treatment is limited to the management of clinical signs and the risk of shedder stallions may only be mitigated in the UK through controls on breeding, 'naming' of confirmed shedders, euthanasia, surgical castration or export. In continental Europe control of EAV infection may also include restricted reproductive activity, whereby EAV positive stallions may only mate with EAV positive mares, in order to mitigate the risk of EVA in naïve mares acquiring infection during service. An EVA vaccine (Equip Artervac (Zoetis)) is licenced for use in the EU and routine vaccination is recommended for stallions and teasers in the UK under the HBLB Codes of Practice. Routine vaccination of mares is not currently recommended.

EAV has a worldwide distribution and is common in several EU Member States. In Spain it is considered endemic; a study conducted by Cruz and colleagues estimated seroprevalence to be 16.8% (95% confidence interval 5.2-28.5%) (Cruz et al., 2016). Whilst there is no requirement under EU Intracommunity trade rules for animals to be vaccinated or pre-movement tested, trade partners may agree to private testing. Due to the widespread nature of the virus, the current HBLB Code of Practice for EVA recommends that "horses imported from countries where EVA is endemic … are serologically tested negative for EVA before importation and quarantined, monitored and re-tested after arrival".

In addition to this it is necessary under the code to ensure that the disease status of breeding stock is determined annually prior to the start of the breeding season, with no animal being used for breeding purposes until they have been demonstrated to be EAV negative. For entry of horses into the EU from third countries, stallions must either have a continuous vaccination record following a negative test for EVA, or be pre-movement tested; there are no requirements for mares, foals or geldings.

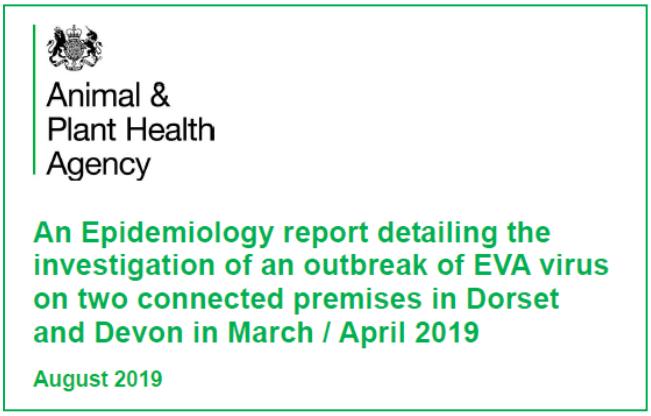
Case Study

Background

In early 2019, as a result of routine pre-breeding serology testing, four Spanish stallions, resident in the South of England, tested positive for EAV: three from one premises (herein referred to as P1, with the horses denoted as KF-G, KF-P, and KF-L) and; one from another premises (herein referred to as P2, with the horse denoted as FR-I). No clinical signs were observed in any of the infected stallions. Of these, one stallion, KF-G, travelled to an artificial insemination (AI) stud farm for semen collection in April 2018, however a single negative pre-breeding semen test indicated that KF-G was not infected at the time of collection. Therefore, infection must have taken place between April 2018 and April 2019.

Following the confirmation of EVA infection in the four stallions (by serological and semen testing) an epidemiological investigation was carried out with two main aims: 1) a tracing investigation to determine if the EAV positive stallions had transmitted the infection to other animals across the UK at equine gatherings; and 2) a local investigation on the premises to determine the source of infection.

Figure 4: An epidemiology report of the outbreak was published by the APHA in August 2019



Investigation of onward transmission of EAV from the infected stallions

On multiple occasions throughout the course of 2018, the stallions (later identified as positive for EAV) attended equine gatherings in the UK that presented the potential opportunity for both the acquisition and spread of the disease via respiratory or fomite contact, with some attended by hundreds of horses, including some from EU Member States. Several gatherings were identified for further investigation: the Great Britain Pura Raza Espanola; The Grange British Dressage event and; The Master du Cheval Iberique (MCI) European Dressage Championship. Ninety five potential contacts were identified during the tracing investigation and followed up with serological testing and semen testing of seropositive stallions. No EAV positive horses were identified, excluding the possibility of onward infection or the acquisition of infection at such gatherings. It is of note that a large proportion of the equines traced were vaccinated against EAV, providing them with protection against onward infection from the infected stallions. In addition to this tracing exercise, which ruled out spread occurring at these equine gatherings, follow-up was also carried out for semen donations from one stallion used to inseminate one mare, whereby two straws from each of four ejaculates tested EAV negative by two separate PCR tests.

Investigation of the source of infection for the 2019 EVA outbreak

In December 2018, three horses from Spain were imported: two stallions (KF-LE and KF-B) which tested negative on arrival and a mare, which was not tested. Both stallions tested negative in April 2019 which therefore ruled out their import as a source of infection. Whilst the infection status of the mare is unknown, as neither stallion which shared transport with her tested positive post-import, it can be concluded that, despite the close contact, she did not spread infection onward to the two stallions. The same premises of origin sent a horse to a different premises in the UK in July 2018 which is currently resident in the English Midlands and tested positive by ELISA for EVA antibodies; follow up testing on semen samples taken more than 7 days apart were all negative ruling out current infection, but previous infection or vaccination was not ruled out. However, no contact between this animal and the cases under investigation was identified. The infected stallion at P2 had been born at P1, moved as a young horse to the second establishment but returned to P1 for schooling at various dates.

These findings prompted an investigation into the horses stabled at P1 to determine their infection status and the possibility of infection being acquired at P1. Thirty one horses were present at P1 at the time of the investigation. Testing for antibodies of all these horses demonstrated that widespread EAV infection was present at P1, with 19 of 31 resident horses testing positive; four horses were not tested and four were identified as

previously vaccinated. Therefore, of the unvaccinated, tested, horses 83% were EAV positive at the time of the investigation. Whilst it was not possible to determine the initial source of infection at the premises the dates of arrival on farm and birth records indicates that one of the infected horses on the premises represents the source infection and that onward infection was as a result of the prolonged and close contact of the animals stabled together, either by direct contact, or aerosol transmission. It is likely that EAV has been present at P1 for a significant period of time, during 2018 and that due to the absence of clinical signs and no regular testing the infection had gone undetected until the pre-breeding screening of the infected stallions was carried out. Therefore, it is highly likely that all four positive animals became infected via the aerosol/respiratory route, or via direct contact with infected secretions and the likely window for virus circulation on P1 is between April 2018 and December 2018.

Discussion

This investigation focussed on mitigating risk of onward spread of EVA following the first identification of four infected stallions (trace forward), and identifying the source (trace backward). The investigation was carried out within the UK government policies on the control of EVA infection as an exotic notifiable disease and concluded that no onward spread of infection to the wider UK equine population had occurred through contact at equine gatherings. The source of infection was P1 where infection had been circulating for some time although the exact time could not be determined it was estimated to have occurred during summer 2018.

We have carried out a lessons learned exercise and identified several issues as a result of this outbreak:

- Lack of routine use of EVA vaccination in competition horses (stallions), poor records for identification and movements of horses.
- Current EVA legislation only focuses on mitigating the risk from breeding, particularly with respect to persistently infected stallions.
- Import legislation does not require pre-movement testing or vaccination; although the HBLB Codes of Practice for EVA do recommend this, clearly not everyone is using this guidance.
- Enforcement powers only allow permanent breeding restrictions on the infected animal(s) until freedom from infection can be demonstrated; they do not include movement restrictions, because of the welfare impact of life-long measures.
- There is a lack of evidence to support the need for euthanasia or surgical castration. Obtaining samples of semen from persistent shedders is costly, difficult and test sensitivity and specificity on samples of variable quality is unknown – the RT-PCR test detects viral RNA with high sensitivity, while virus isolation is less sensitive and may give rise to false negatives. Test mating with naïve mares is costly and raises concerns for welfare as well as ethics.

Figure 5: Notification by Defra about the suspicion of EVA in stallion FR-I on P2 was posted in the Veterinary Record in August 2019

Letters & Notices

NOTIFIABLE DISEASE

Equine viral arteritis in the UK

I WOULD like to draw the profession's attention to the following notice confirming the presence of equine viral arteritis (EVA) in a stallion:

'In accordance with Article 7(1)(a) of The Equine Viral Arteritis Order 1995 (SI 1995/1755), the secretary of state for the environment hereby gives notice that, following a veterinary inquiry into the suspicion of the existence of EVA in the stallion "Lago Icon", the chief veterinary officer of the Department for Environment, Food and Rural Affairs has confirmed, on the basis of the evidence available, that the virus of the disease has within 56 days prior to the completion of the inquiry existed in the stallion "Lago Icon" based at Stokelake, Chudleigh, Newton Abbot, Devon.'

EVA is a notifiable disease in the UK in all stallions and in mares that have been mated or inseminated in the past 14 days

Therefore, the UK administrations will conduct a review of the legislation covering EVA and the related powers of enforcement, as well as the current EVA control strategy.

Conclusion

In early 2019 four stallions tested positive for EAV at two premises in the South of England.

The ensuing investigation described here concluded that, whilst the source of infection could not be determined, on the balance of probability it was most likely to have been a horse with undisclosed infection resident on P1 that subsequently transmitted the infection onward, establishing a persistent outbreak local to the premises perpetuated through transmission by direct contact, or through aerosolized secretions.

Importantly, based on the records available, the investigation revealed that attendance at equine gatherings resulted in no onward transmission of the virus and that even the gatherings determined as "relatively higher risk" showed no evidence of viral transmission. This finding appears to indicate that infrequent travel and contact associated with equine shows and gatherings poses a significantly lower risk of EAV transmission than the prolonged exposure associated with the stabling of infected and naïve horses together on a premises.

References

Newton JR, Wood JL, Castillo-Olivares FJ, Mumford JA. (1999) Serological surveillance of equine viral arteritis in the United Kingdom since the outbreak in 1993. Vet Rec 1999;145:511–6

Westaway E.G., Brinton M.A., Gaidamovich S.Y. Togaviridae. Intervirology. 1985;24:125

Bryans JT, Crowe ME, Doll ER, Mccollum WH. Isolation of a filterable agent causing arteritis of horses and abortion by mares; its differentiation from the equine abortion (influenza) virus. Cornell Vet. 1957 Jan;47(1):3-41. PMID: 13397177

Timoney PJ, McCollum WH, Roberts AW, McDonald MJ. Status of equine viral arteritis in Kentucky, 1985. Journal of the American Veterinary Medical Association. 1987 Jul;191(1):36-39

Collins J.K., Sari S., Ralston S.L. Equine viral arteritis at a veterinary teaching hospital, Prev Vet Med. 1987;4:389

Cole JR, Hall RF, Gosser HS, Hendricks JB, Pursell AR, Senne DA, Pearson JE, Gipson CA. Transmissibility and abortogenic effect of equine viral arteritis in mares. J Am Vet Med Assoc. 1986 Oct 1;189(7):769-71. PMID: 3021696

Timoney PJ, McCollum WH. Equine viral arteritis. Vet Clin North Am Equine Pract. 1993 Aug;9(2):295-309. doi: 10.1016/s0749-0739(17)30397-8. PMID: 8395325; PMCID: PMC7134676

Cruz F, Fores P, Mughini-Gras L, Ireland J, Moreno MA, Newton R. Seroprevalence and factors associated with seropositivity to equine arteritis virus in Spanish Purebred horses in Spain. Equine Vet J. 2016 Sep;48(5):573-7. doi: 10.1111/evj.12500. Epub 2015 Oct 6. PMID: 26278700

Important note

The views expressed in this focus article are the author's own and should not be interpreted as official statements of Defra or BEVA.

UK Report on Post-Mortem Examinations

(1 July to 30 September 2020)

Details about post-mortem examinations were reported by two UK Veterinary Schools and three other contributing laboratories. Data from each laboratory is organised by the laboratories regional location. There may be more than one laboratory reporting information for each region.

East and South East of England

Twenty-one **aborted fetuses** were examined. Sixteen were found to be umbilical cord torsions and the other five were reported as follows:

- One case presented with what was thought to be placental mineralisation.
- One case presented with cleft palate and what was thought to be placental mineralisation.
- Three cases remained undiagnosed.

Six **gastrointestinal** cases were confirmed. There were three cases involving the stomach. The first case presented with gastric and diaphragmatic rupture, with septic peritonitis and pleuritis. The second case presented with gastric rupture and the third case presented with actinobacillus septicaemia, glomerulonephritis and disseminated intravascular coagulopathy (DIC), possibly associated with recent palatine cautery. The fourth case involved multiple intra-abdominal adhesions secondary to broad ligament/uterine haematoma and haemabdomen.. The fifth and sixth cases involved the large colon, one was a post-surgical caecal impaction and the other was an acute colitis (*salmonellosis*), with concurrent pulmonary and mesenteric *Rhodococcal* abscessation.

Seven **musculoskeletal** cases were confirmed:

- One case was identified with traumatic catastrophic open bilateral MC3 fractures
- One case had marked chronic bacterial (*staphylococcal*) vertebral osteomyelitis (L3 – L4) with associated extensive abscessation of left sublumbar muscles and left upper hind limb
- One case was identified with traumatic vertebral fracture (T14), with vertebral collapse and spinal laceration
- One case was found to have traumatic fracture of ribs 4-7 dorsally on the right side, leading to formation of a large subpleural haematoma, mild pulmonary lacerations and haemothorax
- One case was identified with traumatic acute catastrophic fracture of the right humerus
- One case of severe chronic laminitis was found to have a pituitary adenoma
- One case was found with severe chronic laminitis

One **respiratory** case was confirmed with marked acute pulmonary haemorrhage and sudden death.

Two **neurological** cases were confirmed. The first case presented with severe hepatopathy of uncertain aetiology with hepatic encephalopathy. The second case, for which only the head and neck were submitted, presented with seizures/altered behaviour associated with a chronic organising cerebral infarction.

Scotland

Four **gastrointestinal** cases were confirmed. The first case had peritonitis with macroscopic findings of a perforated pelvic flexure with haematoma and histology showed ideopathic focal eosinophilic enteritis. The second case was confirmed as ulcerative colitis of the large colon and the third case was an impaction of the large colon. The fourth case showed exudate suggesting peritonitis, but there was no morphological explanation.

Two **musculoskeletal** cases were examined. One case presented with pain on contact (toxic myopathy excluded) and decreased mentation but no gross abnormalities other than incidental lesions (parasitism) histological findings were within normal limits and the brain was yet to be examined. One other case presented with necrotising myositis; gross findings showed necrosis, oedema, haemorrhage and emphysema in muscles of the right fore limb, which was confirmed by histology.

One **neoplasia** case had macroscopic findings of a pituitary mass.

Two **neurological** cases were examined. One case presented with clinical suspicion of phrenic nerve damage, but no gross lesions were found and histology showed minimal myofibre atrophy. The second case was diagnosed as equine grass sickness based on histopathology of cranial cervical ganglia only.

Three **other** cases were examined. The first case was a peri-anaesthetic death that demonstrated non-excessive surgical site haemorrhage and it was noted that selected major organs were normal on histology. The second case presented as wound dehiscence and eventration. Macroscopic findings showed necrosis of the ventral abdominal surgical site, but histology was not performed. The third case had limited history and no macroscopic findings were observed.

South West

Four **gastrointestinal** cases were examined. The first case was a gastric impaction confirmed on gross post-mortem. The second case was a caecal tympany and impaction. The third case was an acute and severe multifocal to coalescing fibrinoulcerative typhilitis with histology pending. Clostridial toxin ELISA (C.perfrigens and C.difficile), Salmonella, Clostridial and coronavirus PCR, Fecal worm egg count were all negative. The fourth case was a caecal intussception, necrosis and rupture of the large colon diagnosed on macroscopic findings.

Two **musculoskeletal** cases were examined. The first case was of mild and chronic laminitis. The second was a case of laminitis post abortion and infection diagnosed on macroscopic findings.

ACKNOWLEDGEMENTS

We are extremely grateful to the following 27 laboratories for contributing data for this report.

All laboratories contributing to this report operate Quality Assurance schemes. These schemes differ between laboratories, however, all the contagious equine metritis testing reported was accredited by BEVA with the exception of the APHA, which acts as the reference laboratory.

Agri-Food and Biosciences Institute of Northern Ireland
Animal Health Trust Diagnostic Laboratory Services
Animal and Plant Health Agency
Austin Davis Biologics Ltd
Axiom Veterinary Laboratories Ltd.
Biobest Laboratories Ltd.
BioTe
B & W. Equine Group Ltd.
Chine House Veterinary Hospital
The Donkey Sanctuary
Donnington Grove Veterinary Group
Endell Veterinary Group Equine Hospital
Hampden Veterinary Hospital
IDEXX Laboratories
Liphook Equine Hospital
NationWide Laboratories
Newmarket Equine Hospital
Oakham Veterinary Hospital
Rainbow Equine Hospital
Rossdales Laboratories
Sussex Equine Hospital
Synlab VPG Exeter
Synlab VPG Leeds
Three Counties Equine Hospital
University of Glasgow
University of Edinburgh
Valley Equine Hospital

We are extremely grateful to the Horserace Betting Levy Board (HBLB), Racehorse Owners Association (ROA) and Thoroughbred Breeders' Association (TBA) for their continued combined contribution to the Equine Infectious Disease Service.

We would welcome feedback including contributions on focus articles to the following address:
Email: equinesurveillance@gmail.com
Website: https://app.jshiny.com/jdata/icc/iccview/