



Reproduction/Foal Medicine

Chaired by Michael Sadlier

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09.00–09.15

Prevalence of tumour types submitted for histology to a university pathology department

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Aims: The prevalence of equine tumour types is poorly documented and varies between populations. This study presents prevalence data for equine tumour submissions to a university histology department. **Methods:** Records were retrieved from the University of Bristol's pathology department database of equine tumour histology submissions (2000–2010). Tumours considered insignificant *post mortem* findings, mesenteric lipomas, pituitary adenomas and cases with insufficient data were excluded. Cases with multiple tumours were classified by the primary lesion. Tumours were classified by anatomic location/type; cases of lymphoma were classified separately. **Results:** A total of 498 cases were included comprising 276 geldings, 171 mares and 34 unneutered males (28 unrecorded), mean age 13 years. A wide variety of tumour types were reported. The most common cases by anatomical classification are shown in the table below. When classified by type only, the most abundant cases were: (number of cases; % of total): sarcoids (96; 19%), squamous cell carcinoma (SCC) (94; 19%), lymphoma (44; 9%), and melanoma (35; 7%).

System/type	Number of cases (% of total)	Main sub-groups (% of group)
Skin/subcutis (excluding reproductive organs and head)	148 (30%)	Sarcoid (45%) Melanoma (17%) Mast cell tumour (9%)
Penis/prepuce/testes	73 (15%)	SCC (48%) Sarcoid (21%)
Head (excluding eye/periocular)	65 (13%)	SCC (22%) Sarcoid (14%)
Ocular/periocular	48 (10%)	SCC (71%) Sarcoid (10%)
Lymphoma	44 (9%)	Alimentary (36%)
Uterine/vulval/ovarian	35 (7%)	Granulosa cell tumour (66%)
Hoof	19 (4%)	Keratoma (100%)
Others	66 (13%)	

Conclusions and practical significance: A variety of tumour types were found although epithelial tumours predominated. Tumours for which a diagnosis was required were included rather than incidental or pathognomonic findings. The data are useful when considering differential diagnoses of tumours encountered in practice and provide a basis for comparisons with other populations. **Acknowledgements:** We thank colleagues at the University of Bristol for pathological investigations and access to case records.

09.15–09.30

Treatment of hypovolaemic horses with nonsteroidal anti-inflammatory drugs: Is it associated with subsequent nephrotoxicity?

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Aims: To determine whether horses undergoing surgery for colic have evidence of renal insufficiency, and if so, whether this was correlated to previous nonsteroidal anti-inflammatory drug (NSAID) administration, duration of colic signs, volume status and survival. **Methods:** Records for 86 horses admitted for colic requiring surgery were analysed retrospectively. Data collected included signalment, duration of colic, treatment with NSAIDs prior to admission (including drugs used and dosage), volume status (based on physical examination and clinical pathological data) and outcome. Creatinine concentrations were measured on admission, as well as on up to 3 subsequent occasions. **Results:** Fourteen (16.3%) horses had creatinine concentrations greater than the reference range (RR; >144 µmol/l) at admission, and this was significantly associated with duration of colic signs ($P < 0.0005$) and volume status. The creatinine concentration returned to within the RR within 24–48 h in the majority of horses (11/14; 78%). In the remaining 3 horses, the azotaemia persisted, suggestive of renal insufficiency. Two additional horses developed azotaemia during hospitalisation. Seventy-six (88%) horses had received at least one NSAID prior to admission. There was no correlation between creatinine concentration at admission and prior NSAID administration ($P = 0.31$), number of NSAID doses ($P = 0.14$) or a higher than recommended dose of NSAID administered ($P = 0.32$). There was also no association between NSAID administration and outcome ($P = 0.635$). **Conclusions and practical significance:** Despite the potential concerns regarding the development of acute renal failure, NSAID administration did not appear to be correlated to persistent azotaemia in this population of horses. Measurement of creatinine concentrations is however a relatively crude assessment of renal function, and thus caution should still be used when administering NSAIDs to hypovolaemic animals, especially when multiple drugs are administered in animals considered at increased risk, such as geriatric horses and those suffering from pre-existing renal disease or hepatic dysfunction.

09.30–09.45

The effect of treatment with single or multiple doses of d-cloprostenol in early dioestrus on CL function, interovulatory interval and oestrous behaviour in the mare

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Aims: The dose of prostaglandin needed for full luteolysis depends on the type of analogue and the interval from last ovulation. **Methods:** Mares were examined every 8 ± 1 h for ovulation and then given either a single or multiple injections of 37.5 μ g of d-cloprostenol at known intervals post ovulation. Luteolytic response was determined clinically. Full luteolysis was identified by ultrasonic disappearance of the CL, early follicle development and ovulation together with cervical relaxation and oestrus. Partial luteolysis was identified by the same parameters but without cervical relaxation or oestrus. **Results:** Full response was seen in all mares treated later than 140 h (5.8 days) ($n = 84$). No response was seen earlier than 68 h ($n = 9$). The percentage of mares responding fully at each 8 h interval from 68–140 h was 11, 16, 25, 32, 36, 86, 87, 79, 80 and 83%, respectively ($n = 169$). The corresponding percentage with partial luteolysis was 33, 47, 42, 36, 32, 9, 7, 14, 10 and 0% ($n = 169$). No instance of partial luteolysis was seen over 140 h nor below 68 h. The corresponding percentage of full response and partial response for mares given multiple doses every 8 h up to 68, 76, 84, 92, 100, 108, 116, 124, 132 and 140 h were 0, 0, 0, 27, 14, 18, 17, 33, 29 and 50% (full response) and 0, 33, 42, 45, 41, 53, 25, 67, 57 and 0 (partial response). For comparison the percentage nonresponse for single or multiple doses at each interval was 56 and 100, 42 and 50, 33 and 58, 23 and 27, 25 and 45, 0 and 29, 0 and 25, 7 and 0, 10 and 14, and 17 and 50%, respectively. Eleven multiple treated mares had luteal persistence >15 days. **Conclusions and practical significance:** Contrary to popular belief, a single dose of sufficient d-cloprostenol given at the correct interval from ovulation has greater luteolytic efficacy than multiple doses.

09.45–10.00

Intervoluntary intervals in Irish and UK based mares receiving deslorelin implants; effect of implant removal and comparison with Australian and USA experiences

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Aims: Deslorelin implants (Ovuplant[®]), recently licensed in the UK and Ireland for ovulation induction in mares, have been associated with prolonged interovulatory intervals in the USA, leading to the practice of removing implants post ovulation. Trial data in Australia indicates a less significant effect, suggesting possible geographical variation. Objectives of this study were to assess the effect of deslorelin implants, with and without removal, on oestrous cycle length in Thoroughbred broodmares resident in the UK and Ireland. **Methods:** Intervoluntary intervals from 88 oestrous cycles were analysed retrospectively. Implants containing 2.1 mg deslorelin acetate were administered subcutaneously during 65 oestrous cycles and removed in 42 of these cycles. Twenty-three mares received human chorionic gonadotrophin (Chorulon[®]) intravenously. Differences in interovulatory intervals and effect of mare age and breeding status on cycle length were evaluated for the 3 treatment groups. Statistical analysis was performed by multiple analysis of variance with Bonferroni *post hoc* testing using PASW 18.0 for Windows. Significance level was set at $P < 0.05$. **Results:** There was a significant difference in interovulatory interval ($P = 0.02$) between mares in which the

implant was not removed, compared to control and implant-removed groups (Table 1). The effect was more significant in lactating mares at the second or subsequent oestrus period than in nonlactating mares ($P = 0.02$). There was no significant difference between treatment groups for mares aged up to and over 10 years. **Conclusions and practical significance:** Nonremoval of deslorelin implants post ovulation results in a statistically significant increase in interovulatory intervals, which is more pronounced in lactating mares. In most cases, the delay is shorter (1–3 days) than reported in some USA studies, similar to the mean of 1.2 days reported in Australia and unlikely to be of serious concern. This information may assist in accurate scheduling of covering or insemination of deslorelin-treated mares at the subsequent oestrus period.

Table 1: Intervoluntary intervals in the different treatment groups

Treatment group	No. of cycles	Mean interovulatory interval (days)	Range (days)	No. of cycles >22 days	Percentage of cycles >22 days
Ovuplant [®] not removed	23	23.86	19–37	14	60.8%
Ovuplant [®] removed	42	21.95	19–38	9	21.4%
Control (Chorulon [®])	23	21.86	19–27	7	30.4%

10.00–10.15

Identification of the embryo proper at Days 19–22 is a useful guide to future viability of the pregnancy

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Aims: While recent developments have improved first cycle pregnancy rates and reduced losses due to multiple conception, little progress has been made in understanding and prevention of embryo and fetal loss. The reported range of embryo loss is from 2.6–24% with a mean of 8.6% of 17,581 pregnancies (Vanderwall 2008). The inner cell mass or 'embryo proper' can be identified adjacent to the wall of the embryonic vesicle as early as 18 days post ovulation including the heartbeat. **Methods:** A total of 1256 pregnancies were identified in TB mares at 17–23 days post ovulation. Mares in which the embryo proper was not identified were examined again at short intervals. Mares were re-examined up to 40 days for identification of further embryo loss. **Results:** The percentage of pregnancies in which the embryo proper was not seen at 17, 18–27 days post ovulation was 97.1, 68.9, 28.5, 18.1, 12.9, 9.5, 0, 14.3, 0 and 9.7%, respectively. The percentage of subsequent embryo failure in these mares where the embryo proper was not seen was 2.9, 6.5, 11.7, 18.8, 45.5, 40, 50, N/A, 100, N/A and 100% respectively. When compared with the mean embryo loss of 5.57% of all 1256 pregnancies and 2.4% of those in which the embryo proper was seen, the absence of the embryo proper becomes indicative of subsequent pregnancy failure as early as 18–19 days post ovulation. Only 5 (1.2%) out of 408 pregnancies in which the embryo was seen at 17–19 days subsequently failed. The sensitivity of embryo proper detection was 92% and specificity was >87% from Day 19 onwards. **Conclusions and practical significance:** Practitioners are therefore recommended to examine mares no later than 19–20 days post ovulation. Failure to visualise the embryo proper



with heartbeat suggests further examinations at short intervals until the embryo proper is seen. Its absence by Day 24–25 is highly indicative of subsequent pregnancy failure.

Reference: Available on request from the author.

10.15–10.30

Removal of equine arteritis virus from stallion semen doses by single layer centrifugation with Androcoll-E

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Introduction: Equine arteritis virus (EAV) is transmitted via semen during natural mating or artificial insemination (AI) in naïve mares. The virus may cause in-contact pregnant mares to abort. Previously, density gradient centrifugation was reported to separate stallion spermatozoa from EAV (Morrell and Geraghty 2006). However, many spermatozoa were lost during the 3-stage protocol, rendering it impractical for routine use. A related but more practical technique, Single Layer Centrifugation (SLC) with Androcoll, is now available for selecting robust spermatozoa from ejaculates and separating them from seminal plasma (Morrell *et al.* 2010). SLC-selected spermatozoa are fertile when used for AI.

Aims: To determine whether stallion spermatozoa can be separated from EAV in semen doses by SLC. **Methods:** Both fresh and cooled semen doses were available from a shedding stallion. The extended semen was layered on top of Androcoll-E followed by centrifugation at 300 **g** for 20 min. The sperm pellet was harvested into fresh INRA96 extender in a clean tube. Aliquots of the uncentrifuged semen samples and the SLC-selected sperm samples were analysed for EAV by virus isolation and by polymerase chain reaction (PCR). **Results:** The uncentrifuged samples were positive and the SLC-selected samples were negative for EAV by PCR. However, some of the SLC-selected samples were positive for EAV by virus isolation, but with a lower virus titre than the corresponding uncentrifuged samples.

Conclusions and practical significance: It was possible to reduce EAV infectivity by approximately 2 logs in both fresh and cooled stallion semen doses. After further research, it may be possible to use this method to improve the biosecurity of semen doses, thus protecting naïve mares from infection via AI.

Acknowledgements: This study was funded by the CF Lundström Foundation, Sweden.

References

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