Objective: To characterise the faecal microbiota of horses undergoing surgery for a large colon lesion compared to a control group of surgical orthopaedic patients.

Methods: Faecal samples were collected on admission, every 48 h during hospitalisation, weekly for 4 weeks post discharge and every 2 weeks during months 2 and 3 following discharge. Samples were processed to extract bacterial DNA and preparing 16S rRNA amplicon libraries for sequencing. Sequence data were analysed to compare diversity and composition of faecal microbiota at admission to subsequent samples within each group.

Results: Nine large colon cases and five orthopaedic controls were recruited. Samples collected from controls on admission showed greater population diversity compared to the colic group but the differences were not significant. Clustering of samples collected on admission between groups was evident in an ordination plot. Species richness significantly increased over time in the colic group compared to controls. Clustering of samples by time relative to surgery was not evident in either group. A few OTUs were found to be significantly differentially abundant when samples collected on admission were compared to subsequent samples.

Conclusions: These results suggest that colic is not associated with massive changes in the composition of faecal microbiota or 3 months of sampling was not enough to explore recovery of gut microbiota following colic or orthopaedic surgery.

Ethical animal research: The study was approved by the University of Liverpool Veterinary Research Committee (VREC207) and horse owners provided informed consent for participation in the study. Source of funding: S.E. Salem’s PhD studies was funded by the Egyptian Ministry of Higher Education. Competing interests: No conflicts of interest have been declared.

References

COLLATERAL HEAT GENERATION DURING APPLICATION OF A LAPAROSCOPIC VESSEL SEALING DEVICE IN HORSES

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Background: It is unclear if routine application of vessel sealing devices are associated with risk of inadvertent intestinal injury related to surface heating and collateral thermal damage.

Objective: To determine the temperature of the vessel sealing device tip, the tissue adjacent to the device, and the abdominal cavity during routine equine laparoscopic surgical procedures.

Methods: Fifteen healthy mares underwent unilateral laparoscopic ovarioectomy utilizing a standing flank approach. A thermocouple was used to evaluate the temperature at the tip of the vessel sealing device, the tissues adjacent to the device, and the local abdominal cavity environment during positioning and activation of the vessel sealing device.

Results: The average maximum tip temperature reached 64°C over a period of 10-15 cuts for approximately 6 minutes. This was a temperature increase of approximately 41°C from room temperature. The average temperature reached within the abdomen was approximately 42°C and temperature of tissue in close proximity of the vessel sealing device was 54°C.

Conclusion: Minor thermal tissue damage can occur upon contact with device temperatures as low as 44°C with sufficient contact time. In contrast, brief contact with device temperatures of 80°C results in severe tissue damage. Based on the results of this study, inadvertent tip contact of the vessel sealing device to abdominal structures is likely to result in thermal tissue damage. While the vessel sealing device might appear harmless to collateral tissues, evidence suggests that tissues in close proximity to the tip may be at risk.

Ethical animal research: Ethical approval obtained from the Colorado State University Institutional Animal Care and Use Committee. Owner consent: Not required. Source of funding: None. Competing interests: None.

LIPOPOLYSACCHARIDE DELAYS APOPTOSIS OF EQUINE NEUTROPHILS IN VITRO

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Background: Horses are particularly susceptible to endotoxin, generating a robust systemic inflammatory response resulting in serious, often life-threatening, consequences. Upon activation, neutrophil apoptosis is suppressed to extend their lifespan. Delayed neutrophil apoptosis has been implicated, in part, as a contributing factor to the development of an excessive systemic inflammatory response to endotoxin in other species, but has not been well-studied in horses.

Objective: To evaluate equine neutrophil apoptosis in response to E. coli lipopolysaccharide (LPS) treatment in vitro.

Methods: Neutrophil apoptosis was assessed with cytology; Annexin V and propidium iodide staining quantified with flow cytometry; and caspase-3, -8, and -9 activities in neutrophil lysates.

Results: Treatment with LPS resulted in delayed apoptosis after 12 and 24 h incubation in neutrophils isolated from 44 horses on 79 occasions (12 h: P = 0.008, 24 h: P < 0.001). There was a significant correlation between increasing LPS dose and reduced apoptosis after 24 h incubation (r = -0.67, P < 0.001). Caspase-9 activity was significantly reduced in LPS-treated neutrophils after 12 h incubation (P = 0.006).

Conclusions: LPS treatment delays equine neutrophil apoptosis for up to 24 h in a dose-dependent manner in vitro due to decreased activity of the caspase-9, an initiator caspase of the intrinsic pathway of apoptosis.

Ethical animal research: Ethical approval was obtained from the University of Saskatchewan Committee on Animal Care and Supply and the University of Saskatchewan Animal Research Ethics Board. Source of funding: No external funding. Competing interests: None.