Equine*Review*

Introduction: This edition of the Equine Review looks at thromboelastography in obese horses, the effect of omeprazole and sulcrafate on gastrointestinal injury and perioperative lung ultrasound changes on horses underdoing general anaesthesia.

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Thromboelastography in obese insulin-dysregulated horses

Equine metabolic syndrome (EMS) is a collection of risk factors for endocrinopathic laminitis that consist of obesity, regional adiposity and insulin dysregulation (ID). Adipose tissue dysregulation and interplay between proinflammatory and prothrombotic states is established in people, but it is unknown if this exists in horses. Thromboelastography is a global assessment of haemostasis which can identify both hypo and hypercoagulable states. Lovett et al (2022) investigated whether coagulation profiles differ between healthy horses and those with obesity and insulin dysregulation. Horses were confirmed as having EMS by using the oral sugar test. A total of 15 horses were in each group (healthy vs those with EMS). Thromboelastography was performed as well as a standard coagulation profile. Maximal amplitude (MA) and G-values were higher when horses had EMS.

There were positive correlations between these values with serum insulin and with body condition score. A higher MA and G-value were reflective of larger final clot strength and stability; the authors concluded that obese, insulin-dysregulated horses are hypercoagulable compared to healthy controls. The hypercoagulable state of obese human patients is a consequence of complicated interactions of adipose tissue dysregulation, oxidative stress and chronic systemic inflammation. Mechanisms include increased tissue factor release from adipocytes, enhanced biosynthesis of fibrinogen and clotting factors by the liver and increased hepatic expression of plasminogen activator inhibitor-1 leading to hypofibrinolysis.

Effect of omeprazole and sucralfate on gastrointestinal injury

Equine gastric ulcer syndrome (EGUS) includes both equine squamous gastric disease (ESGD) and equine glandular gastric disease (EGGD); aetiologies and risk factors for the subtypes differ. For ESGD, direct acid injury is highly relevant; for EGGD, this is believed to result from breakdown of normal mucosal defence mechanisms and subsequent acid injury. A relationship between non-steroidal anti-inflammatories (NSAIDs) and EGGD has been well documented at excessive doses, but this has not been demonstrated for EGUS at clinically relevant doses. Bishop et al (2021) evaluated the efficacy of omeprazole and sucralfate given as monotherapy for preventing gastric lesions in fasted horses treated with NSAIDs: 14 horses received omeprazole or sucralfate while undergoing a feed/fast protocol with NSAID administration (5 days of flunixin meglumine). This was repeated with the other treatment after an 8-week washout period. Serial gastroscopy, ultrasound and haematology were performed. Median EGSD score prior to treatment was 1.25 and 0 for EGGD. There was a significant effect of time on ESGD and EGGD scores for both drugs, and scores were higher for sucralfate compared to omeprazole. There was a significant effect of time on maximum right dorsal colon wall thickness on ultrasound following administration with sucralfate. This remained relatively constant when horses were treated with omeprazole. The authors concluded that omeprazole is more effective at mitigating gastric ulcer lesion severity in healthy horses when exposed to a feed/fast protocol with NSAIDs. However, this study was performed in healthy horses; response to treatment may be different in horses with clinical illness.

Perioperative lung ultrasonography in healthy horses undergoing general anaesthesia

Lung ultrasound (LUS) allows for easy detection of lesions close to the pleural surface. Detailed descriptions of lung ultrasound findings in horses are lacking. General anaesthesia (GA) is a predisposing factor in horses for pleuritis and pneumonia. Understanding perioperative lung ultrasound changes in horses would be useful for the early detection of pulmonary complications after anaesthesia and would enable guiding of appropriate treatment. Ribonnet et al (2022) described ultrasound findings before and after GA and evaluated whether GA induces changes in healthy horses. A further aim was to identify horse variables that are associated with LUS changes after anaesthesia. Lung ultrasound was performed preoperatively and at seven other time points, from 5 minutes after anaesthetic recovery, up to 24 hours postoperatively. A total of 25 horses were included. Hypoxia was not recorded during any GA administration but was noted in eight horses during recovery. There was a significant increase in the amount of l-lines, B-lines and coalescent B-lines after anaesthesia compared to before. A lung ultrasound score was created and this was higher after anaesthesia. The maximal lung ultrasound score after anaesthesia was correlated to the length of the procedure and was higher in horses with abnormal cardiorespiratory values during anaesthesia. It was considered likely that gravity-dependent atelectasis could explain why the total procedure time had a significant impact on the maximal lung score. Lung rockets were rarely present in this study; this is considered a sign of loss of aeration in human medicine and is always seen as an abnormal finding. The fact that consolidation, irregular pleura and pleural effusion were not present preoperatively and were rarely seen postoperatively in this study, suggests that they are indicators of thoracic disease, similar to human medicine. The authors concluded that LUS changes can be induced by GA in healthy horses, which may aid clinicians to identify pulmonary complications after anaesthesia, although this study did not investigate which LUS findings indicate lesions. EQ

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