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FRIDAY November 9, 2018: Selected abstracts for ORAL presentations

ROOM 1

10:30-10:45

FIRST SUCCESSFUL RADIOFREQUENCY ABLATION OF ATRIAL TACHYCARDIA IN A HORSE GUIDED BY A HIGH DENSITY 3D ELECTRO-ANATOMICAL MAPPING SYSTEM (RHYTHMIA)

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Transvenous electrical cardioversion (TVEC) has a 95% success rate for cardioversion of atrial tachyarrhythmia but recurrence rate is about 35%. A 5-year-old showjumper stallion with regular atrial tachyarrhythmia was treated successfully with TVEC twice but showed early recurrence each time. An electrophysiological study suggested a right sided atrial tachycardia and the option for ablation was taken. In the standing horse, a decapolar catheter and two TVEC catheters, in case atrial fibrillation would occur during the procedure, were inserted in the left jugular vein and placed in the coronary sinus, right atrium and left pulmonary artery, respectively. Subsequently, under general anesthesia, an electro-anatomical mapping catheter (Intellamap Orion, Boston Scientific) was inserted into the right jugular vein and used to create a 3D electro-anatomical map (Rhythmia, Boston Scientific) of right atrium and venae cavae. Activation mapping, whereby the coronary sinus signal served as time reference, revealed a focal atrial tachycardia with a cycle length of 400 ms with earliest activity at the caudodorsal interatrial wall. An ablation catheter (Intellanav OI, Boston Scientific) was guided towards the site of earliest activation using the Rhythmia mapping system and targeted for ablation. During the 5th application (temperature-controlled 60 W, maximal temperature 60°C), the atrial tachycardia terminated and became non-inducible. Total ablation time was 366 seconds. Recovery was uneventful. This is the first time that the exact origin of an atrial arrhythmia is identified by 3D electro-anatomical mapping and is successfully treated by radiofrequency ablation. This study proves that both techniques are technically feasible in adult horses.

10:45-11:00

PROSPECTIVE EVALUATION OF THE DIAGNOSTIC ABILITY OF A SMARTPHONE ECG IN HORSES (PRELIMINARY RESULTS)

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The objective of this study was to evaluate the diagnostic ability of a smartphone electrocardiogram (SpECG) compared to a standard base-apex ECG (ECG) in horses. A 1-minute ECG tracing was recorded with a SpECG and ECG simultaneously on both sides of the thorax. All tracings were evaluated by 2-blinded observers for quality, presence and classification of arrhythmias as well as for the duration of P-wave, PR-interval, QRS-complex and QT-interval (ms). Cohen's Kappa (κ) was used to calculate agreement between ECG and SpECG for presence and classification of arrhythmias. Chronbach's alpha (α) was used to calculate agreement between devices and inter-rater agreement for the duration of electrical events.Twenty-five horses were enrolled, 7 of which had an arrhythmia. There was an excellent agreement for the detection and characterization of arrhythmias ($\kappa = 1$, $P = 0.00$). There was good to excellent agreement between both devices for the duration of P-wave and PR-interval (SpECG on the right side) ($\alpha = 0.76$[CI = 0.64-0.84]$P < 0.00$ and $\alpha = 0.87$[CI = 0.8-0.91]$P < 0.00$ respectively), QRS-complex (SpECG on left side) ($\alpha = 0.7$[CI = 0.35-0.77]$P < 0.00$) and QT-interval (both sides) ($\alpha = 0.7$[CI = 0.28-0.74]$P < 0.00$). There was a very good inter-rater agreement with the SpECG for the duration of PR and QT intervals ($\alpha = 0.83$[CI = 0.73-0.89]$P < 0.00$ and $\alpha = 0.75$[CI = 0.53-0.82]$P < 0.00$ respectively), moderate for the QRS-complex ($\alpha = 0.65$[CI = 0.2-0.7] $P < 0.00$) but low for P-wave. These results suggest that SpECG is a useful and accessible screening and arrhythmia-detection tool in horses. These findings could be easily extrapolated to equine primary care settings allowing for prompt recognition and early referral of horses. It should not replace standard base-apex ECG in horses.

Eight Standardbred mares were included: five with induced AF and three time-matched controls. All horses were euthanized 57 days after study start and 4 mm biopsies were collected from the right and left atrial appendage (RAA and LAA) and the right ventricular myocardium (RV). The myocardium was paraffin embedded and 4 µm sections stained with Picro-Sirius Red and scanned in 20x brightfield. Images were blinded and analyzed to quantify collagen in three ways: in the entire myocardial sections and in three areas with decreased and three areas with increased collagen between cells.

Analysis of the entire sections revealed significantly more collagen in the LAA of the AF group compared to controls (P = 0.023) but not in the RAA (P = 0.145). In areas with decreased interstitial collagen there was significantly more collagen in the LAA of the AF group (P = 0.036) and a trend was found in the RAA (P = 0.069). In areas with increased interstitial collagen a trend toward more collagen was found in both LAA and RAA (P = 0.063 and P = 0.060). There was no difference in collagen in the RV between the two groups in any analysis. These findings prove that AF causes structural remodeling of the equine atrial myocardium and may be of importance when choosing and predicting the outcome of antiarrhythmic therapy and likelihood of AF recurrence.

12:15-12:30

EFFECT OF DITHIOTHREITOL ON THE DIFFERENTIAL CELL COUNT OF EQUINE TRACHEAL WASH ASPIRATES

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Analysis of tracheal secretions is a commonly applied diagnostic modality in the investigation of equine lower airway disease. In human respiratory medicine, the addition of a mucolytic agent following collection has been shown to increase diagnostic sensitivity, total cell recovery and the quality of cytospin preparations. We hypothesised that the addition of the mucolytic Dithiothreitol (DTT) to equine tracheal wash samples would (a) reduce background mucus superimposition, (b) improve the "readability" of cytospin preparations and (c) significantly alter neutrophil differential ratios. Fifty nine tracheal wash samples were collected from forty two horses presenting either with clinical signs consistent with, or for routine screening for lower airway inflammation. Prior to processing, one sample aliquot was treated with an equal volume of 0.1% DTT and the paired aliquot left untreated. Samples were subsequently cytospun and stained using May-Grünwald Giemsa. Differential cell counts and slide quality scores were calculated(1). Paired data were compared (Wilcoxon Rank test) and analysed for agreement (Bland-Altman plots). Significant airway inflammation was assumed beyond a threshold of 20% neutrophils. DTT treatment significantly reduced background mucus staining and consequently improved "readability" of the preparations. Regarding neutrophil ratios, there was no significant difference, and good agreement, between treated and untreated samples. Discounting cases with cytological evidence of bacterial infection, addition of DTT did not significantly (Fishers exact; P = 0.17) alter the categorisation of cases based on the 20% threshold. Based on these results, addition of DTT facilitates cytological examination of tracheal wash cytospin preparations without altering the differential neutrophil percentage.

12:30-12:45

IN VITRO BACTERICIDAL ACTIVITY OF NEBULIZED SILVER ON EQUINE COMMON RESPIRATORY BACTERIA

Charlotte Paindaveine[1], Thibault Frippiat[1,2], Jacques Mainil[3], Jean-Noël Duprez[3], Tatiana Art[1]
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Bacteria are commonly isolated from the airway of horses suffering from acute or chronic respiratory disorders, in particular Gram-positive *Streptococcus equi* subsp. *zooepidemicus* and Gram-negative *Actinobacillus equuli* subsp. *equuli*. These disorders are generally treated with antibiotics. Antimicrobial resistance is, however, an important challenge for scientists and a global willingness exists to decrease the use of antibiotics, in both human and veterinary medicine. Therefore, today alternative treatments are privileged to treat different bacterial infections, like essential oils, heavy metal ions, bacteriophages, …

This objective of this study was to test the *in vitro* bactericidal activity of a commercialized chelated silver (Ag^{++}) solution against *S. zooepidemicus* and *A. equuli* after nebulization. For either bacterial species, the bactericidal effect was firstly tested when dilutions of the solution was added in Brain-Heart-Infusion (BHI) nutrient broth. Secondly, the solution was nebulized on Petri dishes. For both parts of the study, chelated and non-chelated Ag^{++} were tested and gentamicin and physiological serum were used as positive and negative controls, respectively.

In BHI, both chelated and non-chelated Ag^{++} had significant bactericidal effects. When nebulized, chelated Ag^{++} also had a significant bactericidal effect, while it was technically impossible to evaluate nebulized non-chelated Ag^{++}, due to its properties.

According to the results obtained, nebulized Ag^{++} could be a promising alternative to antibiotics to treat respiratory bacterial disorders in horses. Further research is now needed to determinate its *in vivo* efficiency in diseased horses, as well as its toxicity when nebulized in the equine airway.

Key words: antimicrobial resistance, silver, respiratory, infectious, horse

Selected abstracts for POSTER presentations

CATHETER-RELATED VENOUS DISEASE IN HORSES AT A REFERRAL CLINIC - INCIDENCE, RISK FACTORS AND BACTERIAL CORRELATION

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The purpose of this prospective clinical study was to determine incidence, risk factors and bacteriological results of catheter-related venous diseases (phlebitis, periphlebitis, thrombophlebitis) in long-term