

EquineReview

Introduction: For this edition of the Equine Review, the author has selected three interesting and clinically relevant abstracts that were presented at the 13th International Symposium on Equine Reproduction in Foz do Iguacu, Brazil on the 10–14th July 2023, published in the *Journal of Equine Veterinary Science*, volume 125, June 2023; accessible at <https://www.sciencedirect.com/journal/journal-of-equine-veterinary-science/vol/125/suppl/C>.

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Intrauterine use of penicillin and gentamicin

The objective of this study was to measure the concentration of gentamicin and penicillin in the uterine fluid of mares following intrauterine infusion of either a standard (PPGent) or long-acting (LA-PPGent) compounded formulation of procaine penicillin and gentamicin. Ten reproductively sound mares in early estrus were administered 2378 mg of procaine penicillin and 200 mg of gentamicin via a single intrauterine infusion in either a standard ($n=5$) or slow-release ($n=5$) formulation. Penicillin and gentamicin concentrations were assessed by inserting a pre-weighed length of absorbent umbilical tape into the uterine lumen using a double guarded pipette; analyses were then performed using chromatography and mass spectrometry. Mean intrauterine drug concentrations of PPGent peaked at 0.5 hours (penicillin: $10\,123.0 \pm 4298.0$ µg/ml; gentamicin: 3397.3 ± 1338.5 µg/ml) and exceeded the minimum inhibitory concentration for relevant organisms for 72 hours (penicillin: 2.59 ± 6.34 µg/ml; gentamicin: 2.14 ± 2.4 µg/ml). Mean concentrations of LA-PPG were lower at peak and exceeded the minimum inhibitory concentration for 24 hours for penicillin and 32 hours for gentamicin. These results support the combined use of procaine penicillin and gentamicin as an intrauterine therapy in the treatment of endometritis caused by susceptible organisms. It is important to note that this was a compounded formulation, and it cannot be assumed that the combination of commercially available preparations in practice will have the same result nor be clinically efficacious. However, this is interesting and clinically relevant research, and the author looks forward to further research from this group.

N-acetylcysteine as a diagnostic aid

A study by Lu et al (2023) looked into the impact of N-acetylcysteine infusion on the detection of bacterial endometritis – 59 barren mares were evaluated immediately before and one day after infusion with 120 ml of a 3.3% solution of N-acetylcysteine. Fluid was analysed for turbidity, culture and cytology. On day 0, 81% of samples were cytologically negative, with 27% cytologically negative the following day. On day 0, 63% of samples had no bacterial growth, 20% had scant growth, 10% had light growth, 7% had moderate growth and none had heavy growth. The next day these bacterial growth profiles changed to 31% no growth, 25% scant growth, 15% light growth, 24% moderate growth and 5% heavy growth. Turbidity was significantly associated with culture result, with 100% of those mares displaying an increase in turbidity from less than of 50 million cells/ml to above this threshold also having an increase in culture grade ($p<0.01$). If turbidity did not change, only 36% of those samples had an increase in culture grade ($p<0.05$). A strong association between lavage turbidity and bacterial growth was found, making this a potential adjunct diagnostic tool, especially in clinical settings with limited opportunities for performing cytology. Additionally, 48 mares had a negative cytology and no or scant bacterial growth on day 0. These mares would reasonably have been designated “clean” by a practitioner based on these results. However, following N-acetylcysteine infusion, 17 of these mares (35%) displayed an inflammatory cytology and increased bacterial growth. This raises the question – does N-acetylcysteine infusion disrupt mucus, or other material, exposing bacteria permitting the clinician to be able to diagnose their presence? Regardless of the mechanism, N-acetylcysteine may aid the diagnosis of uterine bacterial infection in the case of a false-negative result.

Fetal bone development

This study aimed to determine if bone characteristics of the second phalanx, third distal metacarpal and proximal and distal sesamoid bones could predict fetal age. Ten healthy pregnant mares with known gestation lengths were used. Fetuses were examined by transrectal ultrasound every 2 weeks from 9 months of gestation until parturition. At each examination, the length of the ossified portion of the second phalanx's diaphysis was measured, the presence or absence of the second phalanx's and distal third metacarpal's epiphyses and the time of appearance of the proximal and distal sesamoid bones were documented. The length of the second phalanx correlated strongly with days of gestation ($P<0.0001$; $r^2=0.75$) and the proximal epiphysis of the second phalanx and distal epiphysis of the third metacarpal appeared on ultrasound in a mean of 294 and 268 days of gestation respectively. Proximal and distal sesamoids were first observed at 295 and 317 days respectively except for the smallest foal where they appeared at 331 and 335 days respectively. In conclusion, the length of the second phalanx can be used in addition to the length of the first phalanx as a biometric parameter in late gestation. The distal third metacarpal's, first phalanx's and second phalanx's epiphyses, and sesamoid bones diaphysis, appear in a chronological order with the third metacarpal's distal epiphysis appearing first, followed by the first phalanx's second, the second phalanx's third, the proximal sesamoids fourth and distal sesamoid last. These results provide some data to assess fetal skeletal development and therefore gestational age using the often accessible distal limb via transrectal ultrasound. The author looks forward to a full publication of these data. **EQ**

References

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