The Use of Microdialysis to Detect Drugs in Equine Allantoic Fluid

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Current treatment protocols for equine placentitis inconsistently prevent premature parturition. Little is known about the transfer of drugs across the equine placenta, and treatment strategies are largely empirical. The primary objective of this study was to validate the use of an *in vivo* microdialysis system for monitoring placental transfer of drugs into the allantoic cavity of pregnant pony mares. We hypothesized that *in vivo* microdialysis would be a sensitive technique for measurement of penicillin G potassium, gentamicin, and fluinixin meglumine in allantoic fluid of pregnant mares. Five normal pregnant pony mares were used at 269-271 days of gestation. A 16-gauge catheter was placed in the left jugular vein for collection of peripheral blood samples for validation data. The mare's abdomen was scanned using a 3.5 MHz sector ultrasound probe to identify a significant allantoic fluid pocket. Using ultrasound guidance, a 17-gauge spinal needle, preloaded with a 0.25mm diameter microdialysis probe, was inserted into the allantoic cavity. Penicillin G Potassium (22 000u/kg, q 6 h, IV), gentamicin (6.6mg/kg, q 24 h, IV) and flunixin meglumine (1mg/kg, q 24 h, IV) were administered to mares. Allantoic microdialysis and serum samples were collected at set time intervals over a 24 hour period. Drug levels were measured in samples using high-performance liquid chromatography (penicillin and flunixin) or ELISA (gentamicin). Descriptive data analysis was performed, tested for normality, MIC levels indicated and all results reported as means ± standard error. Peak serum concentrations of penicillin G were 53.65 μg/ml ± 37.12 at 5 minutes post drug injection, and levels remained detectable for 120 minutes post injection (0.62 μg/ml ± 0.53). Gentamicin serum concentrations were 47.07 μg/ml ± 17.15 at 15 minutes post drug injection, and levels remained detectable for 1080 minutes post injection (0.10 μg/ml ± 0.04). Flunixin meglumine serum concentrations were 19.83 μg/ml ± 6.36 at 5 minutes post drug injection, and levels remained detectable for 1440 minutes post injection (1.44 μg/ml ± 0.27). Peak allantoic concentrations (mean ± SE) of penicillin G were 9.78 μg/ml ± 4.81 at 45 minutes post drug injection, and levels remained detectable for 210 minutes post injection (0.93 μg/ml ± 0.91). Minimum inhibitory concentrations (MIC ~0.03 μg/ml) for penicillin G were detectable 15 minutes post drug injection (5.98 μg/ml ± 2.88) and remained above MIC levels for a period of 210 minutes post injection (0.93 μg/ml ± 0.91). Peak gentamicin allantoic concentrations were 8.49 μg/ml ± 6.86 at 105 minutes post drug injection, and levels remained detectable for 1260 minutes post injection (0.05 μg/ml ± 0.04). Minimum inhibitory concentrations (MIC ~4 μg/ml) for gentamicin were detectable 45 minutes post drug injection (4.9 μg/ml ± 5.0) and remained detectable for a period of 330 minutes post injection (4.4 μg/ml ± 3.09). Flunixin meglumine concentrations were undetectable in allantoic fluid. These data confirm that the microdialysis system is a useful technique for measuring concentrations of penicillin G and gentamicin in equine allantoic fluid but not flunixin meglumine. Keywords: placentitis, mare, microdialysis.