Effect of flunixin meglumine, meloxicam and firocoxib on equine embryonic vesicle mobility

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Embryonic vesicle (EV) mobility arises as a result of prostaglandins produced by the conceptus and endometrium that promote local contraction of the uterine smooth muscle, displacing the EV throughout the entire lumen of the uterus. Administration of anti-inflammatory drugs at the time of embryo transfer is routinely used to reduce subclinical uterine inflammation and prostaglandin F2α production by the endometrium. Stout and Allen (2001) observed that EV mobility was markedly reduced immediately after an i.v. injection of flunixin meglumine (FM). Inadequate migration of the EV through the uterine lumen can impair maternal recognition of pregnancy. The aim of this study was to evaluate the effect of three nonsteroidal anti-inflammatory drugs (NSAIDs) on EV mobility: FM, an antiprostaglandin non-specific for cyclooxygenase (COX), firocoxib (FIRO), selective for COX-2 and meloxicam (ML), a COX-2 preferential. Day 12 pregnant mares were divided into three treatment groups of 10 mares/group: FM (1.1 mg/kg, IV), FIRO (0.2 mg/kg, PO) and ML (0.6 mg/kg, IV). Embryonic vesicle mobility was monitored with serial transrectal ultrasound examinations, every 5 minutes for 1 hour. The first examination was the pre-treatment control and the second examination was done after the administration and peak plasma level established of each NSAID. After the second transrectal ultrasound examination, serial examinations were done every 5 minutes for one hour. After 24 hours of NSAID treatments, a third series of transrectal ultrasound examinations was performed to detect remaining post-treatment effects. The EV locations were assigned during ultrasound exam based on Ginther’s (1998) methodology, which divided the uterus into 9 segments. Embryonic vesicle movements were compared quantitatively between treatments. The data were analyzed by Kolmogorov-Smirnov test, comparison with ANOVA followed by Tukey test. FM and ML groups induced a 61% and 67% decrease in EV movements per hour, respectively. Unlike FM and ML, FIRO did not interfere with the EV mobility, presenting similar values before and after treatment. As the FIRO is a NSAID COX-2 selective, this result indicated that embryonic and or endometrial prostaglandins are produced predominantly by COX-1. We observed no alteration on EV mobility in all groups 24 hours post-treatments. In conclusion, FIRO was the only NSAID with no effect on EV mobility and is, consequently, safer when used in early pregnant mares.

Keywords: Equine embryo mobility, nonsteroidal anti-inflammatory drugs, prostaglandin