

plan multiple days in advance and also increasing the number of follicles that could be aspirated. Furthermore, it would be highly beneficial to the equine industry and scheduling TVA procedures. We hypothesized that a single injection of P&E result in synchronization and optimization of the number of follicles to occur at least 9 - 10 days after treatment. Eight mares underwent initial ovarian follicles counting (i.e. follicular mapping) via transrectal ultrasonography and were given 10 ml of BioRelease P&E intramuscularly on day 0; transrectal palpation and ultrasonographic examination, and follicular mapping was repeated for each mare 3 times (i.e., on days 3 and 6, in addition to days 9, 10, or 11, based on mare availability). Serum was collected on the days of ultrasonographic examinations and frozen for determining concentrations of anti-Mullerian hormone (AMH), luteinizing hormone (LH), and follicle stimulating hormone (FSH). Data on follicle count data from this study were combined with previously obtained pilot data, for a total of 24 mares. Data on follicle count were analyzed by unpaired two-tailed Student's *t*-test and AMH concentrations by a multiple comparison test. Follicle counts increased ($p = 0.024$) by a mean of 4.13 follicles/mare between the first and last follicular mapping sessions. AMH concentrations on day 3 ($0.8473 \text{ ng/ml} \pm 0.1699$, mean \pm SEM) were significantly higher compared to day 6 ($0.7033 \text{ ng/ml} \pm 0.1737$, mean \pm SEM).

Keywords: Mare, progesterone, estradiol, follicle, transvaginal aspiration, oocyte

Prepartum amniotic rupture in a Thoroughbred mare

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Prepartum amniotic rupture has been described in humans.¹ In mares, there are reports of prepartum placental disruption associated with hydrosical conditions. This report describes a full thickness prepartum amniotic tear in a Thoroughbred mare, initially diagnosed by transrectal ultrasonography at 236 days prepartum. A 7-year-old Thoroughbred mare was pregnant with her first foal. Transrectal ultrasonography (15, 17, 28, 42, 60, 89, 119, 148, and 183 days) findings were normal and the mare apparently had a filly. Transrectal ultrasonography evaluation on 211 days revealed a normal amnion and a combined thickness of the uterus and placenta (CTUP) of 0.6 cm. At 236 days, transrectal ultrasonography was performed as part of routine screening and no amnion could be identified. Allantoic fluid was moderately and uniformly increased in echogenicity and the fetus was visualized with no amnion separating the fetus from the allantoic membrane. No precocious mammary gland development was noted, but substantial placental edema was observed in the chorioallantois and endometrium and CTUP was 2 cm. Serum amyloid A was slightly elevated ($32 \mu\text{g/ml}$) with normal white blood cell count (7.6×10^3), and fibrinogen (200 mg/dl). Total estrogens were $1,040.04 \text{ pg/ml}$ and progesterone concentrations were 4.51 ng/ml . Treatment for placentitis (once

every 24 hours for altrenogest [0.044 mg/kg], 57 mg of firocoxib and 500 mg of flunixin meglumine, and once every 12 hours for pentoxifylline [8.5 mg/kg] and doxycycline [10 mg/kg]) was initiated. Serial transrectal and transabdominal ultrasonography were performed and the chorioallantois continued to thicken and was edematous. Amnion was intermittently viewed in transrectal ultrasonography, but in an abnormal and wrinkled appearance. At all times, fetal heartbeat was within 80 - 100 bpm. At 313 days of pregnancy, the mare was admitted for monitoring, and altrenogest, firocoxib and pentoxifylline treatment continued. In addition, once every 24 hours, 2,660 mg of aspirin was given. At day 317, the mare foaled. No amnion was visible after observing the mare's water breaking, foaling required manual assistance, and the amnion was not noted. Fetus was born alive but euthanized due to 90° contracture of both front fetlocks. Fetus and fetal membranes were submitted for histopathology analysis and revealed an amniotic rent measuring 10 cm with rolled edges and a diffusely thickened amnion. Allantois was thickened with areas of adenomatous hyperplasia and embedded hair shafts. To our knowledge this is the first reported case of prepartum amniotic rupture diagnosed by transrectal ultrasonography in the mare

Keywords: Mare, amniotic, rupture, prepartum

Reference

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Evaluation of passively acquired rabies antibody titers and immune responses in healthy foals vaccinated against rabies at 4 or 6 months of age

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Passively acquired antibodies provide protection against disease in foals prior to completion of a primary immunization series. Postvaccination immunologic protection against rabies is expected with titers $\geq 0.5 \text{ IU/ml}$, but information on the lifespan of passively acquired antibodies and influence on immune response is lacking. In the spring of 2020, the American Association of Equine Practitioners updated vaccination guideline recommendations to begin rabies vaccination at 4 to 6 months of age instead of initiating at 6 months of age. The update made initiation of foal vaccination recommendations consistent for all 5 core equine diseases (Eastern equine encephalomyelitis [EEE], Western equine encephalomyelitis [WEE], West Nile virus [WNV], tetanus, and rabies). The aim was to evaluate the rate of passively acquired rabies antibody decline and compare the immune response to vaccination when initiated at 4 or 6 months of age. Forty-nine foals, in 3 farms, born to mares vaccinated against EEE, WEE, WNV, tetanus, rabies, equine influenza virus,

equine herpesvirus 1/4, botulism, rotavirus, plus or minus autogenous *Salmonella typhimurium* and *Clostridium perfringens* in the last 6 weeks of pregnancy, were enrolled. All foals were determined healthy and had adequate postnursing IgG. None received hyperimmunized plasma. Blood was drawn monthly and submitted to Kansas State University rabies laboratory to quantify antirabies neutralizing antibody via the rapid fluorescent focus inhibition test. Foals were allocated with a generalized, randomized block design, based on rabies titer at 1 month of age. Foals received a commercial combination EEE, WEE, WNV, tetanus, rabies vaccine beginning at either 4 or 6 months of age. Foals received a booster 30 days after their initial injection. Rabies antibody concentrations were analyzed to establish the rate of decline prior to and after vaccination immune responses. Prior to vaccination, geometric mean rabies titers were 3.5, 1.1, 0.6, and 0.4 IU/ml at 1, 2, 3, and 4 months of age, respectively. Through the first 4 months of life, antibody titer decline was 90%. At 4 months of age, 33/49 (67%) foals had rabies titer \leq 0.5 IU/ml. The geometric mean postvaccination rabies titers were 0.8 and 1.0 IU/ml in foals that began initial vaccination series at 4 and 6 months of age, respectively. Postvaccination, 20/25 (80%) foals in the 4-months age group and 20/24 (83%) foals in the 6-months age group had rabies titer \geq 0.5 IU/ml. In our study, the rate of rabies antibody declined over the first 4 months of life, indicating that most foals are expected to have a titer below 0.5 IU/ml prior to 4 months of age. The immune response to vaccination was similar between foals that started their immunization series at 4 months of age compared to those started at 6 months of age. future is unknown.

Keywords: Rabies, vaccination, titers, immunization, immunity

Prospective ultrasonographic evaluation of caudal placenta and cervix in pregnant mares in relationship to foaling outcomes and placental abnormalities

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Clinical diagnostic procedures to evaluate the late pregnant mare are largely limited to physical examination and ultrasonographic evaluation of the fetus as well as the combined thickness of the uterus and placenta (CTUP). The cervix of a pregnant mare is a key physical and immune barrier to contamination of the pregnant uterus from the vagina yet there is limited research that evaluated changes in the cervix, which might be indicative of potential problems during equine pregnancy. Objective was to evaluate changes in CTUP and mean cervical diameter (CX) determined by transrectal ultrasonography (Sonoscape S9 with 9.5-15 MHz linear probe; Seattle, WA), and the relationship of these parameters to subsequent foaling outcomes and placental abnormalities. The study was conducted in Thoroughbred mares in central Kentucky during 2017 (n = 112 mares), 2018 (n = 109

mares), and 2019 (n = 139 mares). Mares were examined by 1 of 2 examiners on a monthly basis from 4 months gestational age (GA) until term (total examinations; n = 1810). At term, outcomes were classified as normal or abnormal foal and normal or abnormal placenta (based on observation of a fetal membranes inspection at the farm). Data were analyzed by a random-effects mixed model including mare as the random effect, gestational age as a covariate and foaling outcome, placenta as well as examiner as a fixed-effects (JMP ver 14.0). Correlations were evaluated by a Pearson's coefficient. The CTUP was higher (p = 0.001) in mares with abnormal placenta at term but was not related (p = 0.3) to foal outcome. The CTUP increased (p < 0.001) with GA and was affected (p < 0.001) by examiner. The CX increased (p = 0.05) in mares with abnormal foaling outcome but was not related (p = 0.2) to abnormal placenta at term. Again, CX increased (p < 0.001) with GA and varied (p < 0.001) with examiner. As noted, CX and CTUP increased with GA and were positively correlated (r = 0.26; p < 0.01). Our findings suggested that measurement of CX and CTUP in mares are related to foaling outcome and placental abnormalities at term, respectively. Future studies should examine the predictability of foaling outcomes in mares based upon prospective evaluation of these parameters.

Keywords: Mare, pregnancy, placenta, cervix, ultrasonography

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Oocyte collection rate and in vitro embryonic development with low dose deslorelin in mares

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Equine assisted reproductive technologies have become increasingly popular throughout the past 20 years, especially ovum pick up (OPU) and intracytoplasmic sperm injection (ICSI). Successful production of in vitro embryos through OPU/ICSI often relates to the number of oocytes, but limited research has been devoted towards ovarian super stimulation for this purpose. This study aimed to determine if low doses of the gonadotropin releasing hormone agonist, deslorelin, (LDD) would increase number of follicles, increase number of oocytes collected or affect oocyte quality. Mares (n = 11, 5 - 13 years) were assigned for this study. Each mare served as her own control in a cross over design. All estrous cycles were monitored through routine transrectal ultrasonography and all visible follicles recorded. Routine transrectal vaginal aspiration was performed on mares in both groups at ~ 20 hours after ovulation induction treatment. For treated estrous cycles, when at least