

The High Risk Mare

What we have learned from an experimental model of ascending placentitis

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Our ability to accurately evaluate fetal viability in a mare carrying a high risk pregnancy is fair, at best. If and when we do recognize that a fetus is in trouble, our only option for intervention is to treat the mare with drugs because inducing parturition to deliver a premature foal has disastrous consequences. Unfortunately, little is known about the efficacy of drugs in controlling a disease or their effects on the well being of the fetus. If we are to improve survival rates in foals from mares at risk of premature delivery, we need to be able to identify the mares at risk, learn what drugs cross the placenta so that the mares and their fetuses can be treated appropriately and understand how the fetus responds to disease.

Ascending placentitis is the most common cause of premature delivery of a foal. It accounts for over 30% of the premature births and loss of foals within the first 24 hours of life. Unfortunately, not all mares with placental infection show signs of infection, such as vaginal discharge and udder development. If the mare does show signs of impeding delivery more than 2 weeks before their due date (using 335 days of gestation as the norm), a veterinarian can assist mare owners by performing a number of procedures to determine the extent of the problem. The veterinary examination is helpful in determining how the mare should be managed, i.e. should she be shipped to a referral hospital, can she be treated at home and then what treatments will be used. The goal of treatment is to prolong the pregnancy because chronic infections of the placenta are associated with accelerated maturation of the fetus. Therefore, a fetus can be born as early as 305 or 310 days of gestation and survive with neonatal care if it has

been subjected to a prolonged in utero stress.

Procedures that a veterinarian may suggest for evaluating fetal viability include rectal examination, transabdominal and transrectal ultrasonography, and hormonal analysis. When used alone, none of the procedures are extremely accurate in identifying disease. However, when transrectal ultrasonography and measurement of maternal plasma progesterin concentrations are combined, many mares with low grade infection can be identified. Transrectal ultrasonography of the placenta is more helpful in identifying mares with placental infection in late gestation than is transabdominal ultrasonography because over 90% of placental infections are ascending infections, i.e. bacteria ascend through the vagina from the environment. The veterinarian performs transrectal ultrasonography to determine if the placenta has thickened or detached from the uterus. If either occurs, the fetus will receive less oxygen than normal. This condition is called hypoxia and if not corrected will result in a dead or premature fetus or if the condition is chronic, a fetus that is small, thin and weak at birth. Mares that exhibit a vaginal discharge and have placental separation should have a culture of the vaginal secretions taken and be placed on the appropriate antibiotics. As there are no data indicating how long the mare should remain on the antibiotics, the owner needs to discuss with their veterinarian their treatment plan. Most commonly, the mare is placed on antibiotics for 7 to 10 days and then is re-examined. If the vaginal discharge has stopped and the placental separation has not increased, the mare may be taken off the antibiotics if cost is a factor.

Not all mares that are at risk of premature

labor will exhibit changes on transrectal ultrasonography. In a project that we conducted at the University of Florida, 12 of 15 mares (80%) that were infected experimentally exhibited placental thickening and/or placental separation before they aborted or delivered a foal prematurely. Four of the 15 mares never developed an udder or a vaginal discharge. It is likely that these mares would not have been examined in a clinical setting unless they had a previous history of premature delivery. We therefore evaluated a number of hormones in the dam's blood in an attempt to identify if any of the hormones measured could be used as an indicator of fetal stress or impending parturition. Our work indicated that measurement of plasma progesterin every few days may be useful in identifying compromised pregnancies before 310 days of gestation.

Progestins are metabolites of progesterone that are produced by the equine placenta beginning around 60 days of gestation until parturition. They are considered to be the hormone that blocks premature uterine contractions. The progesterin profile seen in the mare's blood during mid-to late gestation is unique and differs greatly from that seen in other domestic species. Between 180 and 310 days of gestation, plasma progesterin concentration in the dam is relatively stable with values ranging from 2 to 10 ng/ml. After 310 days of gestation, plasma progesterins rise dramatically reaching levels that are 2 to 3 times that of baseline. Levels peak 24 to 48 hrs before delivery. The rise in plasma progesterins about 3 weeks before parturition in a normal pregnancy is associated with maturation of the fetus. If the rise occurs before 310 days of gestation it indicates that the fetus is stressed or is undergoing accelerated maturation. Premature rises may be seen in pregnant mares that require surgical correction of a colic, in mares with a prolonged medical condition or laminitis and in mares that develop an ascending placental infection. A rapid drop in progesterins has been seen in mares after colic surgery, in mares with herpes virus infection and in mares with placental infection. Data indicate that mares with ascending placentitis may exhibit

a premature rise or a steady decline in plasma progesterins when 4 samples were collected every 2 to 3 days. In the experimental and clinical cases that have been evaluated, mares either aborted or delivered a compromised or precociously mature foal before their expected due date. Therefore, mares that are at risk of premature deliver can be identified by serial samples of progesterins and a management plan developed. Our work with an experimental model of ascending placental infection indicated that if 4 blood samples were taken 2 to 3 days apart (over 8 to 10 days) and a transrectal ultrasonographic examination was performed (one time), we could identify premature deliver in 14 of 15 mares with placental infection. Three of the 14 mares that were identified as having a problem did not have a vaginal discharge or udder development.

Most of us look at a placenta after the mare has delivered her foal. If there is no discharge, discoloration or thickening most of us assume that it is normal and we discard the placenta. We have found that this is not always the case, especially if the mare delivers her foal prematurely. In our experimental model of ascending placental infection, mares that aborted within 5 days of bacterial inoculation of the cervix, had no evident changes to their placentas when they were examined visually. However, when sections of placenta were submitted to the pathologist, all placentas had microscopic changes consistent with severe inflammation. Because of these findings we strongly recommend that placentas be submitted to the pathology laboratory if the mare delivers her foal prematurely. The information obtained from the microscopic examination will be valuable if the mare is to be bred back because many mares that develop a placental infection will do so in a latter pregnancy.

The birth of a premature foal is devastating because most do not live. Often times, the foal and placenta are buried and no one ever determines why the mare foaled early. Culturing the uterus of the mare within 24 hours of premature delivery may be of some use in

identifying the cause of the premature birth. Normally, if the uterus is cultured on the day of foaling, a mixed population of gram negative bacteria are recovered in small amounts. In mares with experimental infection, only one or two bacteria were recovered from the uterus. We always recovered the bacteria that was

inoculated in the cervix and in some cases this bacteria was joined by a gram negative rod. If the premature foal is born viable, the uterine culture is extremely important in identifying bacteria that may have been in the uterus during fetal development. The foal can then be placed on antibiotics to which the bacteria are sensitive.