



Pregnancy Concerns— Keeping Losses to a Minimum

by **HEATHER SMITH THOMAS**

Early embryo loss is a large problem in the horse industry—a significant number of mares bred (25 to 40 percent) do not produce a live foal, and it has been estimated that about 30 percent of all pregnancies are lost within the first two weeks after breeding. Along with early embryo loss, infections of the placenta and/or fetus, or developmental abnormalities of the fetus, can jeopardize pregnancy at a later time. Several studies at the University of California, Davis, are looking into ways to minimize various losses.

Early pregnancy losses may be the result of breakdown in the communication “signaling” between the growing embryo and the mare’s uterus—the uterine lining must be able to recognize the presence of the embryo and begin the process of pregnancy, otherwise the mare comes into heat again. Very little is known about the signaling mechanisms in the mare that establish and maintain a successful pregnancy.

It is thought that estrogen produced by the early embryo may play a role in the two-way communication between embryo and uterine lining, since the equine embryo produces large amounts of estrogen. A more complete understanding of the signaling is needed before researchers can develop treatments to prevent early embryonic loss. Since growth factors from the uterus in pigs seem to stimulate estrogen production in the embryo, a study was set up to determine whether this might be the case in mares, but this research found that the growth factor does not regulate estrogen production by the equine embryo as it may in the pig.

This study by Drs. Anderson, Walters and Roser determined that the growth factor was produced in large

amounts by both the embryo and the uterine tissue, but that uterine secretion was not further increased by estrogen. They found that the level of growth factor in uterine tissues was the same in both pregnant and non-pregnant mares. Therefore, additional study is needed to discover the specific signals that are crucial during early embryonic development in the horse, now that a model has been established for the study of embryonic hormone production which can be used in further experiments to help develop treatments aimed at preventing early embryonic loss.

Another study looked at the problems of later pregnancy, using sonographic analysis of the fetus to determine its health. The life of a fetus can be at risk when the pregnant mare experiences medical or surgical problems, and veterinarians need a reliable way to evaluate the health status of the fetus during these times. Up until now, little has been known about equine fetal physiology, anatomy and growth during the early stages of gestation. Early detection of problems is the key to treatments that might prevent fetal loss. For instance, if it were determined that a fetus was not growing normally or had a life-threatening problem, it could be treated either with drugs that increase uterine blood flow, antibiotics or anti-inflammatories, depending upon the problem. A fetus with a problem could have its birth assisted or induced.

Dr. Carol Gillis at UC Davis conducted a detailed study to document the sonographic appearance of equine fetuses during normal development, so as to obtain information on the development and health status of the fetus from four months gestation up until birth. This information was used to assess a number of characteristics and to develop a set of

standards that would allow veterinarians to assess fetal growth and health at various stages. The study was also used to evaluate a new method (transabdominal ultrasonic) for fetal sex determination, since the present method (through the rectum) is only possible for a limited time during early pregnancy due to the increasing size of the fetus. As it grows larger, it cannot be fully visualized via the mare’s rectum.

Before Dr. Gillis’ study, fetal health could only be evaluated during the last month of gestation. Since mares may abort at any stage of pregnancy, the information gleaned from her study can be very useful, serving as a guideline to assess fetal health through most of a pregnancy. Gillis outlined the parameters to determine fetal well-being, and established growth charts for different body parts—the most reliable ones are based on measurements of the aorta, head, eye, femur and kidney. Veterinarians can use this information to help differentiate between a normal and an abnormal fetus. Thus fetal monitoring with ultrasound, combined with medical treatment when the need is determined, may help decrease the incidence of abortion in high risk mares.

The study also determined that fetal gender can be accurately identified during mid-gestation (100 to 220 days), a much more convenient time for checking a mare—after the busy time on a breeding farm is over. Use of the transabdominal approach for fetal sexing also makes it much easier, especially when dealing with nervous mares or any individuals that are difficult to palpate through the rectum. This type of research is continually adding to the veterinarian’s knowledge, tools and methods for assisting the horse breeder.