

What to expect when she's expecting: Foaling 101

Part I – Managing the late pregnant mare and preparation for foaling

Foaling season is an exciting time of the year for both veterinarians and breeders. For first time breeders the pregnancy, foaling, and neonatal periods can be stressful, as they should be. Proper care for the pregnant mare and appropriate preparation for foaling and potential complications are key in an uneventful foaling and healthy newborn. This guide is meant to be an overview of some key components and to allow the expecting horse owner to develop a plan and questions for their veterinarian. It is not meant to be an exhaustive checklist, so we encourage you to consult with your veterinarian with plenty of time before foaling is expected.

Pregnancy Basics

Normal gestational length in the horse can be highly variable, but is 330-345 days on average. There are a wide variety of causes of a longer gestational length. Some mares tend to carry foals longer than average, and some may consistently carry foals out to a year or longer. Mares that are due earlier in the year typically carry foals longer than those due in the late spring, which is thought to be due to photoperiod (the amount of time in the day the horse is exposed to sunlight). Some pregnancy abnormalities may also lead to longer pregnancies, including dysmaturity (a foal that is less mature than what it should be for a given gestational age) or a previous twin that resulted in slowed development of the remaining foal. It is very rare for a long gestation foal to be large enough to cause dystocia (a difficult birth), and typically long gestational lengths are required for adequate development of the foal and preparation for life outside the mare. Rarely is it a good idea to induce labor in a horse, so taking advantage of ways to predict foaling will help to reduce the number of sleepless nights the owner has to endure! Foals born before 320 days gestation are considered premature and may face a variety of hurdles, so if foaling is looking imminent in a mare that hasn't neared her due date, notify your veterinarian immediately as a team approach will be required for any chance of survival of the foal.

Early in pregnancy management of the mare can typically continue as normal. Vaccinations and deworming should be kept up to date, and teeth floating should be performed regularly to ensure the mare can maintain adequate nutrition through pregnancy and lactation. Typically their caloric intake does not need to be increased significantly until around the last month of gestation, when they are going to begin lactation. However, it is important to maintain mares in adequate body condition (around a 6/9 on the body condition scoring system). The major changes to vaccinations early in pregnancy are the type of vaccine. Typically pregnant mares should be vaccinated with killed vaccines or those tested and approved for use in pregnant mares. Be sure to tell your veterinarian if your mare is pregnant so they can choose the appropriate vaccines.

Later in pregnancy some additional vaccinations are recommended to protect the foal both

before and after birth. One significant concern in pregnant mares is equine herpes virus-1 (EHV-1) which can cause late-term abortions or significant disease in the newborn. Vaccination of the mare for EHV-1 is recommended at 5, 7, and 9 months of gestation to prevent disease or abortion. In addition, antibodies are key proteins involved in preventing disease in all animals by binding to pathogens, and foals are born with extremely low levels of circulating antibodies due to the type of placenta present in the horse. The early immune system of the foal relies heavily on antibodies that they gain by ingesting colostrum, or the mare's first milk, within the first 24 hours of life when their gut can absorb these intact large proteins. By vaccinating the mare for EEE/WEE, tetanus, WNV, and other pathogens (as deemed necessary by your veterinarian) approximately 4-6 weeks prior to the expected foaling date, antibodies for these pathogens will be produced and present in high concentrations in colostrum, thereby protecting the foals against these diseases. In addition to the mare's standard vaccines, rotavirus vaccination is recommended in the last couple months of pregnancy as well. This is a virus that does not affect adult horses, but is a common cause of diarrhea in youngsters. By vaccinating the dam late in pregnancy it will increase antibodies against this pathogen in the colostrum, thereby conferring protection to the foal.

Predicting Parturition

A wide variety of cues can lead us to predicting when a mare is going to foal. Obviously, having an exact ovulation date with confirmed pregnancy off of that cycle is ideal. If an exact date of conception is not known, some fetal measurements, including ocular or aortic diameter, can be measured using transabdominal ultrasound by your veterinarian and used to estimate gestational age. These tend to become more sensitive as pregnancy progresses, but it can become more difficult to locate these structures transabdominally as the fetus gets larger depending on its location in the mare's abdomen. Below are some other changes to monitor that can indicate when she is getting closer to foaling.

- Around 1 month before foaling the mare's udder will begin to show some enlargement, and you can get some watery milk out of it.
- About 2 weeks prior to foaling you will notice relaxation of the pelvic ligaments. You will notice that the muscles and ligaments of the hindquarters, tail head, and perineum will begin to soften. Her hindquarters may begin appearing more sunken.
- 1-2 weeks prior to foaling you will see significant enlargement of her udder. As she gets closer to parturition the milk present in her udder will become thicker and more yellow in color. This is the transition to her producing colostrum. This is the antibody rich milk that will provide foals with the essential components to an early healthy immune system. Some mares, particularly multiparous mares (those who have had multiple foals) may leak colostrum prior to foaling. If you notice this occurring during this period, be sure to notify your veterinarian and save as much as you can in the freezer to ensure that the foal has a colostrum stock that can be fed immediately after birth
- In the 24-48 hours prior to foaling a variety of changes occur. The first that you may notice is the udder will "wax" over with a bead of colostrum as it gets thicker just before foaling. In addition, milk calcium can be measured daily with a variety of commercial kits. The milk calcium will increase to greater than 10mmol/l when the mare is within 48 hours of foaling.

Preparing the Foaling Area and Mare

The foaling area should be prepared about 4-6 weeks prior to the expected foaling date, and the mare should start being put in there to allow her to get used to the area and prevent any “surprise” foalings in a less-than-ideal area. Foalings can occur either indoors or outdoors, and there are pros and cons to each. Whether it is going to be inside or out, the major considerations are having an area that is clean, dry, and free of hazards. For outside foalings, this means a wide open area where the mare is by herself. There should be no standing water, hazardous fencing, or bushes/trees that could pose a threat to the newborn foal. For indoor foalings, a large (at least 12x12) stall with straw bedding is important.

A few considerations for the mare should be addressed at this time, well in advance of the anticipated foaling date. If the mare has had a caslicks procedure, this should be opened about 1 month prior to foaling. In addition, neonatal isoerythrolysis (NI) is a potential risk that should be screened for in mares that have had multiple foals or received any blood products (whole blood, plasma) in the past. NI results when the mare possesses antibodies against the foal’s red blood cells. When the foal ingests colostrum, these antibodies will cross the gut and gain access to the foal’s blood stream, allowing incompatible antibodies to attack the foal’s red blood cells. The mare will only develop antibodies against these different blood groups if she has been exposed to them in the past, so it is only a risk if the mare has had previous foals or been exposed to different blood groups due to blood products. Horses have a large number of blood groups, but the groups Aa and Qa are the 2 that tend to cause NI reactions. At risk mares should be tested for antibodies against these blood groups prior to foaling to determine whether additional steps need to be taken to avoid a problem in the foal.

Foaling monitoring systems will help the anxious horse owner get a bit more sleep during this stressful time, help reduce anxiety in both the owner and mare, and make for a more natural and uninterrupted birth. Many farms have cameras in foaling stalls and a closed circuit TV set up elsewhere in the barn or a nearby house so someone can be sleeping there and periodically wake up to check the camera without going into the barn and disrupting the mare. In addition there are a wide variety of systems that will send alerts when they detect a mare is going into labor. These include systems that monitor how the mare is laying down, sweating, or separation of the vulvar lips and will send a signal to selected people when labor has started. These foal monitoring systems should start being utilized if you begin to see signs of imminent parturition, or around a week or so before the expected foaling date as some mares will not give you much notice.

What to expect when she's expecting: Foaling 101

Part II – Foaling and the Early Neonatal Period

The day has arrived... Your mare is looking like she is about to pop, and you are sure foaling is going to happen tonight. Knowing the normal progression of parturition and the immediate post-foaling period will be pivotal to ensuring a healthy foal. By having a thorough understanding of normal foaling, you will be able to more easily identify when something is amiss and in need of veterinary attention. Normal labor in horses progresses very quickly, so early intervention is required if a problem arises.

The Stages and Normal Progression of Labor

Stage I of labor can take minutes to hours (generally an hour or two, but it can be up to four). Often the mare will appear to be colicky. They often pace, look at their sides, will get up and down frequently, and urinate often. During this period the foal will be turning to the correct foaling position, which involves it's front feet extended towards the cervix and their head between their front legs. Uterine contractions begin during this stage, which causes much of the discomfort. In addition, cervical dilation is occurring during this time, which is essential for uncomplicated foaling. Horses are one of very few species that can halt labor early in this stage if they feel threatened, so it is very important to not disrupt the mare during this period or you can expect to be up another night! If she isn't already, be sure to put the mare in the foaling area during this time. In addition you can wrap the mares' tail with brown gauze to minimize contamination of the foal during labor. Depending on how far away your veterinarian is located and how comfortable you feel with the foaling process, you may want to notify your veterinarian at this time. This should be discussed with your veterinarian ahead of time.

Stage II of labor begins when you see her break (which is due to rupture of the chorioallantois portion of the placenta and release of allantoic fluid). This stage should progress very quickly (no more than 30 minutes) and is associated with significant pushing by the mare. After the water breaking you will see the white amnion surrounding the foal. should be able to see two front feet followed by foal's muzzle at the level of their knee. Often mare will get up and change positions periodically during this phase. In addition, once the foals' hips are engaged in the pelvic canal the mare will often stop pushing for a period to rest, then finish delivering the foal. Once the foal's nose is delivered, break the white amnion if it hasn't already broken, and clear the fluid and membrane from around its nose by massaging the nasal passages a few times and pushing the fluid out. Then as long as everything is progressing normally, you should step back and let the mare do the work. Resist the urge to pull the foal if all is going well, as it can result in trauma to the mare or foal as well as premature umbilical rupture. Once the foals chest is delivered ensure the foal is breathing on its own, even if the mare takes a break. If there is any concern about the foals viability, ensure the nose is clear



water

you
You
the
the

first, then rub the foal briskly with towels. Often this is enough to stimulate breathing on the foal's part and will help dry them off and warm them up. Once the foal is delivered and everyone appears happy and healthy, give the mare and foal some time alone to bond. This period is very important for maternal bonding, and is often forgotten as everyone is excited about the new foal. Within two hours, and more typically in the first hour, the foal should be up and nursing.



Stage III of labor is expulsion of the fetal membranes, aka the placenta. This should be completed within three hours after birth, and the mare is put at significant risk of infection and serious illness if she experiences a retained placenta. Do not wait to contact your veterinarian if you suspect she has a retained placenta, as early intervention is key. Be sure to save the placenta for examination by your veterinarian. They will look closely at the placenta to ensure that it is intact, for any evidence of placentitis, or indication of

placental insufficiency.

These stages are summarized with a **“1-2-3 rule”**. This makes the general timeline of events easier to remember. The foal should be delivered within 1 hour of the beginning of stage II labor. Within 2 hours of birth the foal should be up and nursing on its own. The placenta should be expelled in its entirety within 3 hours after birth. By keeping this rule in mind you can more easily decide if a foaling is progressing in a timely fashion.

Foaling Problems

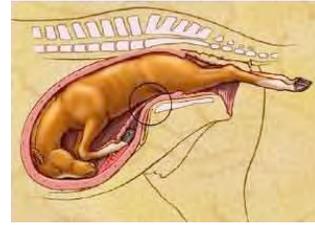
With horses being the fragile creatures they are, it's amazing that most foalings go as smoothly as they do. However, if problems should arise they need to be dealt with promptly to give the mare and foal the best chance at survival. We recommend learning as much as you can about what to do in a foaling emergency before the situation should arise so you can be as prepared as possible.

“Red bag”, or premature placental separation: In a normal delivery the red chorioallantois ruptures, resulting in the “water breaking” and you see the white amnion directly around the foal. If the chorioallantois separates from the uterus prematurely it will not rupture. The result is that you see a red, velvety membrane first instead of the white amnion. Since this is caused by premature separation of the placenta from the uterine wall, the foal becomes oxygen deprived during delivery. If you see this, you have to immediately rupture the sac and pull the foal



out. The easiest way to do this is with a sharp pair of scissors, so be sure you have a clean pair in your foaling kit. Since it is difficult for the foal to breathe on its own until its thorax is through the birth canal, you will have to help deliver the foal as quickly as possible until it is to a point where normal respiration is possible.

Dystocia, or “difficult birth”: This refers to any birth that is difficult or prolonged due to poor positioning of the foal, anatomic abnormalities in the mare, or congenital defects resulting in an inability for the mare to deliver the foal normally. Normal foal position is front feet and nose first, in a “diving position”. A breech birth, or when they come hindquarters first, particularly important to deal with and resolve quickly, as the umbilical cord will be compressed prematurely as it enters the pelvic inlet, resulting in oxygen deprivation to the foal. The most common cause for simple dystocia is shoulder lock, and is something that most owners can deal with quickly. The widest point of a foal is at their shoulders, and they frequently become stuck in the pelvic canal at this point. To resolve this, gently pull one forelimb at a time in synchrony with the mare’s contractions. This will help to pull one shoulder through at a time. If they get caught at the foal’s hips, you can try rotating the foal 45* to have them align diagonally with the mare’s pelvis, which is the widest point of the pelvic canal.



Times to Call Your Veterinarian Immediately

There will be some obvious foaling emergencies that require immediate veterinary attention. However, there are some situations where the foal may appear healthy, but urgent care can prevent serious consequences.

- **Dystocia or red bag delivery**, even if the foal is alive and out: these foals often have experienced some degree of oxygen deprivation, depending on how severe the dystocia and how prolonged the delivery was. Hypoxemic-ischemic encephalopathy (HIE) also known as "**Dummy Foal Syndrome**" is a potential consequence of oxygen deprivation in utero or during delivery, and may not manifest until hours to days after birth. However, preemptive steps may be taken to prevent complications, and serial neurologic assessments will be important to catch any problems early.
- **Meconium staining** of the foal and/or placenta: if there is any evidence of dark meconium (first manure) during delivery the foal should be assessed immediately. These foals are at high risk to develop aspiration pneumonia, and early treatment will be key for survival
- **The inability to stand and nurse on their own within 2 hours** (most normal foals are able to accomplish this within an hour): this can be an early sign of problems, including HIE or sepsis. While they often look too leggy and uncoordinated, normal foals will be able to get through the uncoordinated phase quickly and be able to get up and down on their own.
- **Evidence of broken ribs**: broken ribs are fairly common in foals, as their shoulders are tight through the pelvic canal and their elbows can press in with extreme pressure, resulting in rib fracture. Unfortunately the most common site is directly over their heart. Any foals that have swelling, soreness, crackling sounds, or you can feel crepitus (a rough feel of the bone ends moving over each other) should be evaluated quickly by a veterinarian to ensure there is no damage to the underlying structures or an imminent risk of the fractures causing injury to the heart or lungs. Foals that are suspected to have rib fractures should be handled with extreme care to not cause further shifting of the fracture ends.

All postpartum mares and newborn foals should be evaluated by a veterinarian about 12 hours after birth. The mare should be evaluated for any injuries and general health and condition. The placenta should be closely inspected for any evidence of placentitis, placental insufficiency, or incomplete expulsion. The foal should be evaluated for any congenital abnormalities and general health. In addition, blood should be drawn at 12-18 hours of age to test for IgG concentrations. This is a measure of the antibodies absorbed from colostrum. Inadequate IgG results in failure of passive transfer and needs to be addressed quickly by administering further colostrum (if the foal is less than 24 hours old, when they still absorb antibodies from the gut) or intravenous plasma (if the foal is greater than 24 hours old). The umbilicus should be evaluated thoroughly, and dilute chlorhexadine should be used to dip the umbilicus a few times a day for the first 3-5 days of life.

Foaling season is an exciting time for any horse owner, but much anxiety can be reduced by taking the appropriate steps ahead of time to ensure you are well prepared for potential complications. Specific steps to take and what is applicable for your situation should be discussed early on with your veterinarian, so you both have a good game plan for when that day comes.

Some good resources for expecting owners

- **The Complete Book of Foaling: An Illustrated Guide for the Foaling Attendant by Karen E N Hayes DVM MS**

- **The Foaling Primer: A Month-by-Month Guide to Raising a Healthy Foal by Cynthia McFarland**

- **A foaling guide from the Veterinary School at Kansas State University http://www.vet.k-state.edu/VHC/equine/pdf/Foaling_guide.pdf**

If you have any questions regarding foaling and what to expect or questions about any equine health issue please speak with your veterinarian or any of the veterinarians at New England Equine.

Erica Secor, DVM

Jacqueline Bartol, DVM, DACVIM