

Failure of Passive Transfer

If foals don't get the necessary antibodies from their dams, they are at risk of developing serious medical conditions

Overview

Newborn foals are born with virtually no infection-fighting antibodies. Foals obtain these antibodies, also referred to as immunoglobulins, from their dam's colostrum—a special type of milk that is produced by the mare during the last one or two weeks of gestation. Most foals nurse from their dams and obtain at least 1 liter of good-quality, antibody-rich colostrum within the first eight hours of life. This process by which mares pass antibodies on to their foals via the colostrum is referred to as passive transfer of immunity. When foals don't get any or enough of these important antibodies, it is called failure of passive transfer.

In addition to antibodies, the calorie-dense colostrum also contains growth factors and white blood cells and possesses laxative properties to help the foal pass the meconium (first feces).

It is imperative that foals ingest and absorb colostrum within the first few hours of life because foals are only able to absorb antibodies during the first 18-24 hours of life. Beyond one day of life, the specialized cells that line the foal's gastrointestinal tract and assist in absorbing the life-saving antibodies cease to function.

Studies have shown that absorption of maternal antibodies from colostrum is greatest within 6-8 hours of birth. Since the average foal has a suckling reflex within 2-20 minutes of birth, can stand within one hour, and can nurse from its mother within two hours, this is normally not a concern. In fact, it is currently estimated that only 10-20% of newborn foals are diagnosed with failure of passive transfer.

Depending on both the amount of colostrum ingested and the quality of the dam's colostrum, failure of passive transfer can be either complete or partial. Foals with



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either complete or partial failure of passive transfer are at-risk for developing serious medical conditions such as pneumonia, diarrhea, and joint infections.

Causes

There are numerous causes of failure of passive transfer. Some of the most common include:

- Mares that drip or run milk for several hours prior to parturition. These mares are actually losing the antibody-rich colostrum that foals require to survive.
- Orphaned or rejected foals and foals that are unable to rise and nurse (due to dysmaturity, prematurity, postmaturity, weakness, or limb deformities, for example) all lose the opportunity to ingest the much-needed colostrum from their dams.
- Mares that have poor-quality colostrum that does not contain the type or amount of antibodies needed to protect the foal can result in failure of passive transfer. This occurs if a mare is not properly vaccinated or is moved to a new environment too close to the time of foaling.
- Foals that do nurse, but are unable to

absorb the antibodies from the colostrums, can also have failure of passive transfer.

Diagnosis

To diagnose failure of passive transfer a veterinarian performs a physical examination on the neonate and takes a blood sample to measure the foal's antibody levels. The specific antibody measured is immunoglobulin G (IgG).

Foals with IgG levels less than 200 mg/dl are diagnosed with complete failure of passive transfer, whereas IgG levels between 200 and 800 mg/dl is considered a partial failure of passive transfer. Normal foals generally have IgG levels between 1,000 and 2,000 mg/dl.

There are several commercial test kits that can be used on the farm to measure foal IgG levels to diagnose failure of passive transfer. In general, these tests provide relatively reliable results in approximately 10 minutes. Results are not quantitative (i.e., the test do not give the exact mg/dl of IgG), but simply indicate if the foal's IgG levels are above or below a certain cut-off value. To obtain an exact value, the sample needs to be sent to a laboratory for analysis, which will take approximately 24 hours. Obviously, this is not a practical option for foals that are in dire need of colostrum.

Treatment

Foals diagnosed with either complete or partial failure of passive transfer require an alternate source of immunoglobulins. There are three main ways to achieve this goal. First, foals can be administered fresh or frozen colostrum. For example, if the mare is leaking colostrum prior to parturition, the colostrum can be stripped from the mare and frozen until the foal is born. Upon the arrival of the foal, the frozen colostrum can be thawed (not in a micro-

wave!) and immediately bottle fed to the foal. Alternatively, if another mare on the farm lost her foal during parturition, the colostrum from that mare can be stripped and frozen for future use.

Second, dried IgG products are available that can be mixed with water and bottled to the colostrum-deprived foal. These products are stable at room temperature and have a longer shelf-life than fresh or frozen colostrum, but they are expensive and have variable absorption. That is, their efficacy is somewhat questionable.

Finally, equine plasma high in IgG can be administered intravenously. This option is used for foals that: have very low IgG levels (less than 200 mg/dl); are too old to absorb orally administered immunoglobulins; or have abnormal gastrointestinal function that would preclude the absorption of the immunoglobulins. Post-supplement testing of blood IgG levels is recommended.

Prognosis

The prognosis for foals diagnosed with failure of passive transfer is variable. Not all foals with failure of passive transfer will become sick, and not all foals that achieved

passive transfer of immunity are guaranteed to be healthy. Nonetheless, almost all foals that develop life-threatening infections have at least partial failure of passive transfer. Therefore, it is imperative that foals with failure of passive transfer are diagnosed and treated as soon as possible.

Prevention

The most important means of preventing FTP is to ensure the foal stands and nurses shortly after birth. This is most successfully achieved on farms that have birth attendants that can witness the birth and assist the mare and foal when necessary.

Other important factors that can help minimize failure of passive transfer and post-natal infections is to maintain a clean foaling environment (including the mare), to properly vaccinate the mare (e.g., according to the AAEP vaccination guidelines), and to keep the mare in one environment (not move her) within the last month of gestation. This will ensure that the mare has had sufficient time to develop antibodies specific to the types of microorganisms that are present in the environment in which the foal will be born. ◀

FAST FACTS

- Within 8 hours after birth, a foal should to stand and nurse from its dam to ingest and absorb the antibodies (immunoglobulins) that are in the mare's first milk called colostrums.
- This process is referred to as passive transfer of immunity/
- Foals that fail to nurse or are unable to absorb the antibodies are classified with failure of passive transfer.
- Failure of passive transfer is diagnosed based on a veterinarian's examination and a blood test that measures the foal's immunoglobulin (IgG) levels.
- Foals with IgG levels less than 800 mg/dl are considered to have either a partial or complete failure of passive transfer.
- Foals with failure of passive transfer can be treated with either fresh or frozen colostrum, a commercial form of IgG, or by the intravenous administration of plasma products that have a high concentration of immunoglobulins.
- Prognosis of foals with failure of passive transfer is variable; however, good foaling management strategies can help prevent many cases of failure of passive transfer.

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Question: Failure of Passive Transfer?

- Answer:**
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