

DOWN BUT NOT OUT – Complete Failure of Passive Transfer

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A local veterinarian was called out to a ranch to examine a 6-day-old foal. The brood mare was 8 years old and had given birth to at least one foal previously. The presenting complaint by the owner was that the foal appeared lethargic, and had rapid respiration and sunken flanks. Initial physical examination revealed a decreased body temperature (97.9°F; normal range is 99.0° to 101.8°F), increased respiratory rate, abnormal lung sounds, a mild heart murmur, and slight icterus or jaundice. The foal was depressed and clinically dehydrated as estimated by decreased skin turgor. It was noted that the foal was not suckling and that the udder of the mare was full.

Blood samples were collected for analysis of antibody (IgG) levels, a complete blood count (CBC), and a serum chemistry panel. A SNAP[®] Test, used initially to evaluate IgG levels, showed no color change, indicating levels < 200 mg/dl. An ARS IgG test later quantified the immunoglobulin level at 114 mg/dl. The CBC revealed a normal white blood cell count, but elevated fibrinogen, indicating active inflammation. The main abnormalities noted on the serum chemistry panel were low total protein and low globulin levels. A diagnosis was made of complete failure of passive transfer and possible sepsis or infection.

The foal was administered 1 liter of commercial equine plasma through an intravenous catheter. The foal was also treated with BioSponge[™], due to a farm history of clostridial enteritis, and systemic antibiotics. A re-evaluation the following day revealed a much more active foal that was suckling well from the mare. Body temperature, respiratory rate, and heart rate were all within the normal range. A second blood sample, collected to evaluate the IgG level after plasma transfusion, revealed an antibody level of 372 mg/dl. Since this was still considered low for a foal at risk of infection, a second liter of plasma was administered, and the other medical treatments were continued. Blood antibody level in the foal the day after the second liter of plasma was 541 mg/dl. Antibiotic therapy was discontinued after a 5 day course.

The mare in this case foaled out in a pasture with no apparent complications. Quality of her colostrum was not tested and suckling by the foal was not monitored. The very low initial IgG levels indicated that the foal had not acquired any significant amount of antibodies from the mare through her colostrum. It may have been that the mare either did not produce colostrum (unlikely in a mare that has had previous foals) or leaked colostrum in the days preceding foaling. It is also possible that the foal did not suckle

the mare in the first 24 hours of life. Since the mare exhibited good mothering instincts and readily let the foal suckle when it was feeling better, it was presumed that the cause of the failure of passive transfer was loss of colostrum, but this was not known with any certainty.

Failure of passive transfer of maternal antibodies has been reported to affect between 5 and 20 percent of newborn foals. Inadequate uptake of colostrum antibodies leads to an inability to fight infection from pathogenic bacterial and viral organisms to which every foal is exposed. Mares only produce the antibody-rich colostrum during the final few days at the end of each pregnancy. Premature leakage or suckling by her foal will remove colostrum from the mammary gland, after which time only normal milk is produced. In addition, newborn foals can only absorb antibodies from colostrum during the first 24 hours of life, with most antibody uptake occurring during the first 8 to 12 hours. After 24 hours, the specialized cells lining the intestinal tract responsible for processing colostrum are lost and the foal can no longer absorb antibodies even if colostrum is ingested.

The foal in this case was at significant risk of infectious disease due to inadequate antibody protection. Early and accurate recognition of the problem by the attending veterinarian and timely institution of therapy in the form of plasma and antibiotics prevented an almost certain fatal outcome.

Take home message(s):

1. Quality of colostrum in a postpartum mare can be evaluated quickly and accurately using a Brix refractometer.
2. A majority of foals begin to suckle from their dam within the first 2 hours of life.

Suckling within the first 24 hours should be monitored by farm/ranch personnel.

3. Success of passive transfer of antibodies can be assessed by measurement of IgG levels in the foal's blood.
4. Early testing may be performed at approximately 12 hours of life, with the option of oral supplementation if levels are determined to be low.
5. A final assessment of antibody transfer can be made after 24 hours of age. If IgG levels are low after 24 hours of age, an intravenous plasma transfusion is required, as oral antibodies will no longer be absorbed.
6. IgG levels of >800 mg/dl are considered adequate; levels of 200 to 400 mg/dl indicate partial failure of passive transfer, and levels <200 mg/dl indicate complete failure of passive transfer. Levels between 400 and 800 mg/dl may be adequate if the foal is healthy, in a clean environment, and exposure to pathogenic organisms is low.



Foal at 6 days of age



Foal at 5 weeks of age