PREVENTIVE HEALTH CARE OF THE NEWBORN FOAL

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Foals are particularly vulnerable in the six months of life. A study of all veterinary interventions for 343 foals during their first year of life found that 36% of all veterinary attention occurred within the first month of life, and 60% in the first 3 months. 82% of deaths occurred within the first six months of life (Galvin and Corley, Irish Vet J 63:37, 2010).
Early preventative care aims to reduce the incidence and severity of disease during this vulnerable period.

Hygiene at time of foaling

A simple, yet very effective way to prevent disease in newborn foals is to be meticulous about hygiene in the foaling box. In the field, mares will generally choose to foal in a quiet area which is not contaminated by faeces. In the box, the mare has no choice but to defaecate and foal in the same place.
Preventative measures include meticulous cleaning of the box and washing the mares udder and back legs (particularly around the stifle folds) once the mare has stood following foaling, prior to the foal beginning to seek and nurse.

Ensuring adequate colostral transfer in foal

Foals are born without a fully functioning immune system. Their immune defence in the first days of life depends on absorption of antibodies that are present in the colostrum from the mare. This transfer of antibodies (so-called passive immunity) is absolutely vital to preventing disease in the neonatal foal and therefore needs to be monitored. Any mare that has dripped milk prior to foaling (a relatively common occurrence) is at high risk of not having a high concentration of antibodies in the colostrum or first milk. Some mares appear to have poor quality colostrum every year.

There are two ways to ensure that there is adequate transfer of passive immunity: Checking the quality of the colostrum and measuring the immunoglobulin G (IgG) concentration in the foal's blood.

Colostrum quality is most practically measured with a BRIX sugar refractometer. >25% is good quality colostrum - >20% may be adequate for the foal, but should not be stored for future foals.

IgG can be measured in a sample of the foal's blood. Stall side kits (SNAPfoal) are available. Most texts suggest measuring at 18 hours, when the colostrum concentration peaks. However, if IgG is measured at 6-12 hours, then oral replacement of immunoglobulins may be used. The ideal IgG concentration is >8g/L. Between 4 and 8 g/L is partial failure of passive transfer, and the decision whether to supplement is based on the health status of the foal, and adequacy of local management.

If a foal needs to be supplemented with colostrum – can only give orally before approximately 12 hours of age. The advantage of oral supplementation is longer persistence of immunoglobulins in blood, and IgA in colostrum allowing for local mucosal immunity. If the foal is over 12 hours, intravenous plasma will have to be used. A good rule of thumb is 1 litre of plasma for each 2g/L desired increase. I recommend remeasuring the IgG after supplementation.

It should be noted that the SNAPfoal test is not perfect, and generally under-estimates foal IgG. Some foals will continue to have a 4-8g/L IgG concentration with this test, despite repeated supplementation. I have found that IgG measurement by another method (such as radial immunodiffusion) almost always confirms that the IgG is adequate. However, septic foals may consume the IgG administered and need repeat supplementation.

Treatment of the external umbilicus

It is common practice to treat the umbilicus immediately after birth. This is based on the fact that infections can occur either in the external umbilicus or the internal umbilical remnants. However, particularly in the case of the internal umbilical remnants, it is not clear that the infection arrives in the foal through the umbilicus. In some, and perhaps most, cases infection arrives via the blood stream. As blood flow ceases in the umbilical vessels, it provides an ideal environment for bacterial growth as there is no blood flow to allow the arrival of immune series cells, and the internal umbilical structures are kept at body heat.

Commonly used substances for dipping the external umbilicus are iodine containing solutions and a mixture of chlorhexidine and alcohol. In one study 0.5% Chlorhexidine and 7% iodine were more effective at reducing bacterial colonization of the stump than 2% iodine or 1% povidone-iodine. However, 7% iodine also led to rapid desiccation, sloughing of adjacent skin, and breaking off of the desiccated stump, leaving a patent urachus. Therefore chlorhexidine is the preferred treatment for umbilical stumps.

Mare vaccination

Vaccination of the mare can be an important step in protecting the health of the foal, as antibodies generated in the mare will be passed onto the foal in the colostrum. Vaccination of the mare against rotavirus generates rotavirus specific IgG in the colostrum and IgA in the milk. Together these antibodies can greatly reduce the incidence of rotavirus infections in vaccinated herds.

Prophylactic use of antimicrobials in foals

The high incidence of bacterial infections has led to the practice of prophylactic administration of antimicrobials in the first days of life, by some veterinarians. This practice is highly controversial, because increased use of antimicrobials increases bacterial resistance to those antimicrobials in the general bacteria population, which may impact on human as well as animal health. A recent study found no difference in the incidence of infectious disease between neonatal foals treated with prophylactic antimicrobials and those that were not treated, however, the incidence of infectious diseases in the study population was very low, making it difficult to draw definitive conclusions from this study. In contrast, a study from the 1970s demonstrated a reduction in the number of infections in neonatal foals treated prophylactically with neomycin or framamycin during the first 30 days of life. However, it is important to note that routine foal management practices on stud farms have significantly improved since this study was carried out, which may make this finding less directly relevant in the modern stud farm situation.
There is some evidence that prophylactic antibiotic treatment can be successful, at least for a single problem disease. Prophylaxis with azithromycin for the first two weeks of life reduced the incidence of *Rhodococcus equi* from approximately 20% to 5% in one randomised study.

Gastric ulcer prophylaxis

Gastric ulcer prophylaxis is very controversial in neonatal foals. Whereas sick neonatal foals have a relatively high incidence of gastric ulcers, it appears that acid production in the stomach is not a primary cause. Furthermore, it has been shown that the use of acid suppression is associated with an increased incidence of infectious diarrhoea, at least in hospitalised foals. This makes physiological sense, as the acid in the stomach acts as a barrier to the entry of bacteria into the intestine. By removing this barrier, we potentially make foals more susceptible to infections in the intestine.

Sucralfate acts as a 'bandage' by binding to exposed or damaged mucosa. It does not reduce the acid in the stomach. Therefore sucralfate may be a better drug to use for prophylaxis of gastric ulcers in foals than drugs which suppress acid production, such as omeprazole and ranitidine.

Prevention of *Rhodococcus equi*

The most successful way to reduce the incidence of *Rhodococcus equi* is to improve management. Isolating affected foals appears to be one of the most effective ways to prevent further spread in a herd. *Rhodococcus equi* is spread by foal-to-foal aerosol transmission. This is one reason that farms where foals are mustered (collected together in a small pen on space) between the time they are turned out in paddocks and brought into the stables have some of the highest incidences of Rhodococcus.

In dry, arid areas such as Australia, the main load of Rhodococcus comes from dusty corners of fields and dry soil covered handling areas. Soaking these areas prior to mustering reduces amount of virulent Rhodococcus in the air that the animals are exposed to. However, in more wet, temperate climates such as Ireland the stable may be a more important source of infection than fields. Disinfecting stables and walkways can help reduce the infectious load. In all environments, high stocking densities are associated with increased incidence of disease. Although this can be difficult to change in the short-term, longer term strategies to reduce stocking density can be very successful on endemic farms.

Administering plasma from animals hyperimmunised against Rhodococcus to young foals has been advocated as a way to reduce disease incidence. However, studies of plasma to prevent infection have had very variable results. It is possible that differences in the timing of administration and perhaps quality of the plasma may explain the differences between studies.

What is certain is that the cost of plasma often makes its use in prevention strategies unattractive. The cost to prevent each case of Rhodococcus varies from €2800 to €5500, depending on how effective the plasma is expected to be.

There have been several studies aimed at producing a vaccine for *Rhodococcus equi* and there are several new approaches at various stages of development. Vaccination of pregnant mares with inactivated vaccines and vaccination of foals with live modified vaccine has not yet yielded consistently good immunity in foals. However, recent advances in vaccine technology may mean that an effective vaccine becomes available in the next several years.

Another approach to prevention has been the administration of prophylactic antibiotics during the first few weeks of life. Administering azithromycin for the first two weeks of life reduced the incidence of Rhodococcus from 20% to 5%. However, a separate study where azithromycin was administered for the first 4 weeks of life resulted in a delay in the onset of Rhodococcus by one month, but not a decrease in the incidence of disease. Tulathromycin prophylaxis neither prevented Rhodococcus nor delayed the onset of symptoms.