Stabilisation of the critically ill foal in the field

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Attendance to critically ill foals is a common occurrence for any equine field practitioner. It is frequently a challenging situation, where immediate assessment of the specific requirements of the foal needs to be made, an emergency treatment plan put into place and finally deciding if the foal should be referred for further care.

A critically ill patient is defined as a patient in whom death is possible or imminent. Imminent death is frequently associated with patients that have cardiopulmonary arrest which is a sudden cessation of spontaneous and effective respiration and heartbeat. This occurs most commonly in newborn foals but can be seen in older foals associated with systemic disease, which frequently results in cardiac or respiratory insufficiency leading to hypoxic acidemia, which can further lead to respiratory arrest with resultant bradycardia and eventually asystole.

Whether cardiopulmonary arrest occurs in the immediate post partum phase or later; immediate intervention in the form of cardiopulmonary resuscitation is essential. Cardiopulmonary resuscitation which has been described extensively elsewhere should be performed in foals that have any of the following: Absent or gasping breathing; absent or irregular heartbeats; heart rate < 40beats/min; non responsive foals and foals delivered by C-section

Immediate assessment of the specific requirements of the critically ill foal that has not required resuscitation is best made by performing a thorough clinical examination. This should consist of an initial observational examination and be followed by a thorough clinical examination. It is important to remember that many conditions in foals are multi-systemic and that clinical signs alone rarely lead to a definitive diagnosis but rather is used to guide initial emergency therapy, selection of further diagnostic tests and decision making with regards to referral.

An initial observational assessment of the foal allows assessment of respiratory rate and pattern, alertness, maturity and subjective assessment of hydration status.

Observational assessment
Respiratory rate and pattern should be assessed from a distance as restraining/ handling may significantly increase the respiratory rate. A respiratory rate of >60BPM is normal immediately after birth but falls to 20-40BPM within 1-2 hours of birth. Any irregularity of pattern and a high or low respiratory rate is significant. Abnormal chest or abdominal movements associated with respiration may be related to such conditions as rib fractures, other thoracic trauma and diaphragmatic abnormalities. High respiratory rates can be related to several systemic conditions in addition to excitement so careful clinical examination is critical.
Similarly if the foal is noted to be dehydrated on the observational exam then a quick assessment of hydration parameters, such as HR, mucous membrane color, CRT and pulse quality should be made to determine if it is necessary to commence fluid therapy.
Following completion of the clinical examination a list of the specific requirements of the foal can be made bearing in mind that the overall approach to the management of critical-care foals in the field can be generally summarized by five major points of supportive care. These include ventilation, perfusion, nutrition, passive immunity, and antimicrobial coverage.

**Ventilation**
If immediate ventilatory support is required this will normally have been done during the initial stages of the examination. Other tests may then be selected to assess respiratory function or disease these would include ultrasonography, radiography and blood gas determination.

**Perfusion**
In general shock doses of polyionic non-glucose containing fluids (20ml/kg) are administered as a bolus for resuscitation. If necessary this bolus can be repeated 3-4 times depending on the hydration status of the foal and response to therapy. Where possible and especially in foals not in the immediate post-partum phase, immediate assessment of glucose concentrations can be made by the use of hand held glucometry units. This is especially important in foals where hypoglycemia may be thought to have contributed to collapse of neurological signs.

IV catheterization is necessary for most critical-care foals. Short term rigid catheters are often used for initial resuscitation but generally speaking they kink or break more easily, require more frequent replacement and are more thrombogenic that catheters designed for long term use. Also most foals that present as critically ill require intravenous therapy in the form of fluids, antibiotics or parenteral nutrition for at least a number of days and “overthewire” polyurethane catheters often are most economical over time.

**Nutrition**
When presented many critically ill foals may not have been nursing for a period of time. The resultant dehydration is addressed immediately with intravenous fluids but it is important to assess the foal following the administration of the initial shock dose of fluids. Foals that resume nursing immediately may need little more than continued monitoring of blood glucose levels. Foals that remain depressed and will not nurse require nutritional support; this may involve placement of a nasogastric tube and administration of enteral nutrition or depending on the condition of the foal may require parenteral or more commonly partial parenteral nutrition.

**Passive immunity**
If available on farm determination of IgG status should be performed. There are many commercially available kits which give good results. However, regardless of the result it is frequently beneficial to administer at least 1 l of hyperimmune plasma. The reasons for this are multifactorial, many ill foals are in a negative energy balance, and they will use this protein as a source of calories or will lose IgG levels in response to overwhelming sepsis or localized infections. In addition plasma is a colloid and will help rapidly stabilize the cardiovascular system in states of hypotension.

**Antimicrobial Coverage**
Generally speaking, all critical-care foals should receive antimicrobial coverage. Sepsis and the systemic response to it must be assumed to be present or to be imminent in all such patients. Antimicrobial coverage is required for treatment or prevention of generalized septicemia. Sequestered infectious processes are also not uncommonly found to affect the respiratory tract, intestinal tract, umbilical structures, joints, and physes.

It is often impractical to draw and to submit blood cultures in the field setting but where possible they should be obtained or if the foal is to be referred and the referral facility is close by <1 hr then it may be judicious to withhold antibiotic therapy until a blood culture can be performed at the referral facility.

Samples should be taken on farm for complete blood counts, serum biochemistry and electrolyte evaluation. Even if the foal is to be referred these samples can be sent with the foal.

If antimicrobial therapy is being initiated in the field then selection is usually empirical. It is recommended to choose broad-spectrum coverage as although sepsis is often associated with gram negative organisms, gram-positive organisms are also frequently encountered.

**Recommended reading**
- Bentz BG. Equine perinatology, neonatology and pediatrics II. In: Proceedings of the the American Board of Veterinary Practitioners Symposium 2002; 375-385.