

## **Principles of Treatment for Compromised Endurance Horses**

The successful treatment of the compromised endurance horse relies upon:

- knowledge of disease processes
- correct and adequate supplies
- uninterrupted supervision of the patient
- aggressive management of the condition and
- a suitable place for treatment (adequate shelter, lighting and space and enclosed yards, place to hang fluids)

In addition, there are four principles of therapy.

1. As infectious diseases have been eliminated in the pre-ride inspection, the clinical syndromes presented in the compromised endurance horse are related to fluid and electrolyte loss.
2. The treatment of compromised endurance horses with non-steroidal anti-inflammatory drugs and hypotensive agents are contraindicated until rehydration is complete.
3. If in doubt commence aggressive I/V fluid therapy first.
4. The use of oral rehydration formulas are contraindicated in the absence of normal audible intestinal motility.

### ***Owner/Person Responsible - Veterinarian Relationship***

The treatment of a severely compromised horse at an endurance ride is a true medical emergency. A veterinarian attending to such an animal should be conscious that any treatment must be with the owner's consent and with the owner being aware of the all ramifications of such a treatment, including cost. No matter how urgent the horse's condition or the dramas associated with the crisis, the veterinarian must remain in control.

In relation to treatment of horses the AERA Rulebook (2016) Section 3 (Veterinary Rules) is relevant:

"3.1 Veterinarians have jurisdiction over the welfare of a horse when the horse is under veterinary control as defined in Table 2 of the AERA General Rules.

#### **AVOIDING TREATMENT**

3.3 Should a person responsible for a horse infringe Clause 42.2 of the AERA General Rules (Code of conduct ensuring the welfare of the horse) that person shall be subject to a penalty as provided by Table 3 of the AERA General Rules.

#### **REFUSAL OF TREATMENT**

3.4 Whilst a person may prima facie refuse veterinary treatment for a horse, all persons are subject to common law statutes regarding cruelty to animals. Should any person refuse treatment for a horse pursuant to clause 42.2(c), that person may be reported to the RSPCA by a veterinarian, chief steward or any member of the public for cruelty to an animal. Successful prosecution by the RSPCA would be dependent on the nature, severity and circumstances of the refusal.

Compromised horses at endurance rides are a clinical challenge due to the complicated physiological and biochemical processes causing the condition. Treatment veterinarians should be aware of the contributing factors to a horse's collapse, the treatment protocols and have access to suitable medical supplies.

### ***Conditions Contributing to a Collapsed or Severely Compromised Horse***

Apart from lameness, which is a potential consequence of any form of exercise, a number of specific clinical disorders have been identified in endurance horses and are generally associated with metabolic derangements. Clinical problems are usually seen when the environmental temperature and/or humidity are high, and when there are extensive fluid and electrolyte losses. Factors such as terrain, the fitness and speed of the horse and the judgement of the rider also contribute. A variety of conditions, some or all of which may occur, contribute to the compromised horse include:

- Dehydration & electrolyte deficiency, hypocalcaemia
- Hyperthermia
- Myositis
- Colic (ileus or impactive)
- Hypoglycaemia
- Endotoxemia
- Anhidrosis
- Trauma due to fall from any of the above
- Neurological deficits

The ride organising committee may request the veterinary surgeon to take urine and/ or blood samples from random or selected horses before during or after the ride commences for the purposes of analysis for the detection of prohibited drugs. The basic tenet of endurance riding is that horses must be completely drug free. (Equine Anti-Doping and Controlled Medication Rules-Section 5 of the 2016 Rulebook downloaded from the AERA website at [www.aera.asn.au](http://www.aera.asn.au))

### ***Determination of the Degree of Compromise***

Horses are eliminated for metabolic compromise or lameness. Lameness presented for treatment is usually for myositis or trauma. Metabolically compromised horses can present across the spectrum from mild (not requiring treatment) to severe or collapsed.

Mildly dehydrated horses will present with elevated heart rate, slow capillary refill times, tacky mucous membranes, skin turgor >2secs, decreased or non-existent audible intestinal motility and decreased urine output. Most of these horses will recover without treatment (unless not eating) but should be checked every 30minutes.

Moderately dehydrated horses (5% loss of bodyweight, 20 - 25 liter deficit) present with significantly elevated heart rate (>70bpm), depression, skin turgor 3-4 seconds, abnormally colored and dry mucous membranes, capillary refill >3secs, weakness, no audible intestinal motility and no interest in food or water.

Severely dehydrated horses (10% loss of bodyweight, 50 - 75 liter deficit) present with distress, skin turgor >4secs, heart rates >80bpm, weak pulses, congested or purple mucous membrane colour with prolonged capillary refill time, cold extremities, weakness/staggering, colic signs with scant or dry faeces. Both moderate and severely dehydrated horses require

intravenous rehydration and careful monitoring and treatment for associated complications such as colic.

Colic in endurance horses is usually the result of dehydration. Therefore, I/V fluids therapy must be the first part of treatment and NSAID's should not be administered until hydration status has returned to normal. Pain can be controlled by using a combination of alpha-agonists and opiates and lignocaine infusions. Most endurance ride colics respond with supportive care but a small number remain intractable and need to be referred to a hospital facility for further monitoring or surgery. Horses that develop endotoxaemia that similarly do not respond also need referral to a hospital facility.

Exertional Rhabdomyolysis will require pain relief and aggressive I/V fluid therapy if myoglobinuria is present. Milder cases may respond without treatment.

Synchronous diaphragmatic flutter is a symptom of dehydration and electrolyte loss (principally calcium) resulting in depolarisation of the phrenic nerve as it crosses the pericardium. The diaphragm then contracts with each heartbeat. Treatment is therefore based on rehydration and electrolyte replacement. Affected horses are typically hypocalcaemic but may include hypokalaemia, hypochloraemia &/or metabolic alkalosis. They may resolve with rest, and the administration of oral electrolytes, but more advanced cases require IV fluids. After 10 litres of IV fluid 1 bag of calcium borogluconate should be added to 1-2 5 litre bags. It is important to monitor for bradycardia while calcium borogluconate is administered.

Heat stressed or heat exhausted horses can be difficult to handle as they often develop neurological signs and are unaware of their surroundings (Misheff 2004). Treatment, in addition to I/V fluid therapy and electrolyte replacement, must include aggressive cooling using cold/iced water, fans in high humidity areas, cold water enemas if safe to do so, to lower temperature or ice baths to lower temperature.

### **Treatment**

This treatment protocol is a guide to the treatment of a compromised endurance horse. Most cases presented for treatment can be multifactorial e.g. dehydration plus colic; myositis plus colic etc. This is an example of a treatment regime that would be instituted in a severe case.

- A. Catheterise with 12G or 10G catheters and superglue or suture to skin.  
Record clinical data, collect required samples (EDTA, FI. Ox., Lith. Hep., Serum; Blood smears) and label samples.  
Commence rapid I/V fluids (based on assessment of hydration and data collected from clinical examination)

*In hypovolemic shock 10-15% of body water (50-75L) and up to 50% of circulating volume has been lost. In such cases 20L of I/V fluids must be administered by rapid I/V infusion usually requiring multiple lines ( Generally gravity flow can be as low as 10L/hr so increase flow rate by increasing number of lines and height of fluids or use of pressure infuser).*

*Rapid fluid infusion necessitates monitoring for development of pulmonary oedema, especially in recumbent animals. Once the animal urinates freely or after 20 to 30L, rapid I/V fluids can be reduced.*

Connect large bore giving set to large bore catheter. Initially administer 10 - 20L of Hartman's at maximum flow rate.

After 10L add 1 bag of calcium borogluconate milk fever preparation to 1-2 5L bags and monitor heart rate. Occasionally, the infusion of calcium needs to be stopped temporarily due to cardiac arrhythmias. It should be recommenced after further fluids. Continue fluids and medications according to hydration status and clinical response.

Endurance horses are generally hypoglycemic and supplementation with I/V glucose is useful. 5% glucose (50g/L) can be given at a rate of 2L/hour.

A recovering horse redevelops interest in food and water. If this does not occur, I/V fluids must be continued.

#### B. Anti-inflammatory and Analgesia for Use in Colics and Myositis

Flunixin meglumine (50mg/ml) is used in titrated doses relevant to hydration status and degree of required analgesia. For example: 150mg (3ml) increments to maximum dose in conjunction with fluid administration and resolution of clinical signs. NSAID's will further damage kidneys that are already compromised by low blood pressure, hypoxic insult and myoglobinuria.

Alpha-2 agonists will decrease blood pressure and gut motility and should be used with caution in dehydration. In the case of intractable colic, titrate doses to the degree of analgesia required (Xylazine (preferred), Romifidine, Detomidine). Narcotics (Butorphanol - Dolorex or Torbugesic at 10mg/ml) are also used in titrated doses of 0.5-1.5ml per 500kg horse in combination with alpha-2 agonist.

- C. Lignocaine Hydrochloride (20mg/ml) is a potent drug for relief of visceral pain. It also acts as a prokinetic for the treatment of ileus (Dart et al 1998). A loading dose of 1.3mg/kg (32.5mls per 500kg) diluted in 500ml or 1L bag administered quickly, followed by a continuous I/V infusion of 0.05mg/kg/min (75mls diluted in 1L saline per hour per 500kg horse). This treatment aids in control of severe colic pain to allow I/V fluid therapy and is useful for treating the inevitable ileus that is associated with a collapsed horse. Colics that fail to respond to analgesia and fluid therapy are candidates for referral.
- D. The addition of Dimethyl Sulphoxide (DMSO) may be beneficial as it is a potent anti-inflammatory agent and free radical scavenger. Dose is 1gm/kg added to 5L Hartman's (most preparations are at a concentration of 9gms/ml). Therefore, 500kg horse receives 55mls. This can be added to the first 10L of fluids.
- E. Thermal Regulation. Hyperthermia (rectal temperature above 40°C) and in all cases where sweating has ceased, supplemental cooling is necessary using large volumes of cold or, in non-responsive horses, iced water applied all over the horse. This is continued until rectal temperature is stable below 39°C. The administration of I/V fluids at ambient temperature is also effective at dropping core body temperature. Cold water enemas can also assist, if it is safe to do so.
- F. Gastric Decompression. Indwelling nasogastric tube will provide relief for gastric distension in cases of colic due to ileus. Rectal examination should be performed to monitor large bowel distension.

- G. Access to Food and Water. Access to food and water should not be allowed until gastrointestinal signs have returned to normal and there is no further abdominal pain and appetite has returned. The use of DSSS (dioctyl sodium sulphate-succinate) and oral electrolytes solutions could be administered at this time.

## **Conclusion**

No attempt at providing guidelines for veterinarians involved in such a strenuous competitive event as endurance riding can be final. The extent of these guidelines, vetting procedures and treatment protocols, are also, of necessity, limited and cannot be a complete treatise on endurance. New research, better training and feeding methods and different competitive events may all produce evidence that amendment of these guidelines is required.