

Influence of Proprietary Herbal Blend on Insulin Resistance in the Horse

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Introduction:

Insulin resistance in the horse has been a problem plaguing private veterinary practitioners for years if not decades. The problem seems to be getting worse and more prevalent as time progresses, which raises issues and questions as to a possible husbandry or dietary problem that are contributing to the rise in caseloads. Insulin resistance or non-insulin dependent diabetes is a condition whereby the cells within the body fail to respond to insulin in a normal fashion. Insulin is a hormone secreted by the pancreas in all mammals with the primary function of helping to drive sugar into the cell for purposes of energy production. In cases of insulin resistance (IR), the cells fail to respond to the insulin for various reasons, and in the end there is a void of sugar available for the cells to use as energy and perform their normal tasks. This problem then leads to malfunction at a cellular level, which can then lead to more of a broader based problem at a multi-organ level. In humans and horses, this overall problem is generally referred to as a “metabolic syndrome” due to the fact that the insulin resistance then leads to potentially other health problems such as elevated blood lipids, hypertension, renal disease, cardiovascular disease and in horses, laminitis. The exact link between insulin resistance and laminitis in the horse has yet to be discovered, but is generally considered to be a breakdown in normal cellular function, laminar cells, leading to rotation and further deterioration of the foot. Insulin resistance has been associated with overall increased body weight due to visceral fat accumulation and poor dietary habits. Most IR horses are considered to be overweight and very cresty when viewed on examination. Some horses may actually demonstrate an increased water consumption and likewise increased urine output. Diagnosis of insulin resistance in horses can be difficult and lead to many “gray zones” of interpretation. In our practice, we generally will combine the results of an insulin panel, which includes resting insulin and glucose values, with clinical signs noted in the patient. Most insulin resistant horses are presented initially to our clinic for evaluation of foot problems such as laminitis and not so much due to being overweight. There has been much interest in the influence of low grade or chronic inflammation on a variety of diseases ranging from cardiovascular problems to cancer on the human side of medicine. Several studies also suggest that there may be a connection between inflammation and insulin resistance in human medicine.^{1,2} A recent article addressed the possible connection between insulin resistance in humans and inflammation by evaluating C-reactive protein and fibrinogen in patients considered to be at risk.³ It was readily determined that those patients afflicted with IR or considered to be at risk of development of IR did have elevated values of C-RAP and in some cases fibrinogen. Chronic

inflammation can be a result of many etiologies ranging from diet, lifestyle factors to repeated trauma. In most instances of inflammation, various cytokines and eicosanoids are released into the bloodstream. The cytokines and eicosanoids have varying tasks but in the short term they serve as messengers, triggering the recruitment of various immune cells and alteration of blood circulation. The main goal or course with acute inflammation is to heal or promote recovery in the individual. In chronic inflammation, this sequence of events is persistent and fails to stop. Chronic inflammation leads to low or moderate levels of free radicals, cytokines and eicosanoids being produced on a constant basis. Free radicals can lead to cellular DNA damage, which can result in apoptosis, malfunction or even conversion to a neoplastic state. Cytokines, especially IL-1, IL-6 and TNF- α , are thought to possibly influence the synthesis of acute phase proteins by the liver.⁴ Acute phase proteins are an important part of the inflammatory process and often used as markers of inflammation.

Purpose of Study:

The purpose of the study was to evaluate the impact of administration of an herbal blend to horses diagnosed with insulin resistance. Clinically, we were evaluating the insulin and glucose levels before and 2 weeks post administration of the herbal product, Cur-OST®, Nouvelle Veterinary Inc.. Considering that the majority of IR horses presented with clinical signs of laminitis, lameness scores were also evaluated before and after administration of Cur-OST®.

Results:

	Insulin Pre	Insulin Post	Glucose Pre	Glucose Post
Horse 1	347 pmol/L	189	6.8 mmol/L	4.3
Horse 2	453 pmol/L	193	5.1 mmol/L	5.8
Horse 3	204 pmol/L	118	5.8 mmol/L	3.9
Horse 4	1553 pmol/L	926	6.4 mmol/L	5.4
Horse 5	1543 pmol/L	95	6.1 mmol/L	3.9
Horse 6	783 pmol/L	201	8.0 mmol/L	6.4

** normal insulin values 29-179 pmol/L and normal glucose values (4.2-6.4 mmol/L)

	<u>Lameness Pre</u>	<u>Lameness post</u>
Horse 1	Grade 4/5 LF, rotation	Pain resolved, 0/5
Horse 2	No evident rotation, 2/5	Pain resolved, 0/5
Horse 3	Grade 5/5, rotation	Pain resolved, 2/5
Horse 4	Grade 3/5, no rotation	Pain resolved, 1/5
Horse 5	Grade 3/5, no rotation	Pain resolved, 0/5
Horse 6	Grade 5/5, rotation	Pain resolved, 1/5

Discussion:

Inflammation is a suspected common link between a variety of medical conditions afflicting humans and animals. Herbal medicine has been a common treatment modality for hundreds of years and in many instances, herbs have shown dramatic ability to reduce inflammatory mediators naturally. The proprietary formula Cur-OST® was evaluated in a clinical trial in 2006 evaluating the impact on horses with clinical arthritis. In that study, Cur-OST® demonstrated an ability to reduce synovial fluid levels of inflammatory mediators PGE-2 and MMP-9. Given the success with that small trial and considering the possible link between inflammation and insulin resistance demonstrated in human literature, Cur-OST® was evaluated in horses demonstrated to have suspected insulin resistance and clinical laminitis.

The results of the small IR trial performed at Timbercreek Veterinary Hospital, PC are demonstrated in the two contained charts. Insulin values were initially high in the pre- samples with variation of glucose values, with most being considered high end normal or slightly elevated. The elevated insulin levels are noted due to suspected insulin resistance and inability of cellular receptors to recognize and utilize insulin, thus leading to an overproduction and elevated serum level. The clinical status in terms of associated laminitis was also evaluated with the patients demonstrating a range of clinical signs. There were two mildly affected IR horses in the trial, which both demonstrated marked increase in insulin values but clinically they were relatively sound with only slight elevation of digital pulses and sensitivity to hoof testers in the toe region. Both of these horses were considered small and more compact breeds versus the other patients. At the end of two weeks, the patients were re-evaluated clinically. The majority of the owners noted marked improvement in comfort level and lameness in as little as 4 days on the Cur-OST® product with no additional need for NSAID therapy or prescription medication. Insulin values also were noted to have reduced towards a more normal level with glucose values showing a reduced value as well. Clinical evaluation of the lameness also demonstrated marked improvement.

The overall conclusions associated with this trial are that there does appear to be an inflammatory component associated with insulin resistance in horses. Granted that the trial was small in terms of included patients, but there was an overall trend towards improvement noted in all patients. Normal therapy for insulin resistant horses includes dietary modification with less carbohydrates and starches as well as feeding lower quality grass hays. Those horses afflicted with laminitis and IR are generally treated via corrective trimming and application of specialty shoes to help support the foot. Most IR horses are destined to wear a grazing muzzle for years to come or be confined to a dry lot to minimize excess carbohydrate intake and further exacerbation of the condition and to promote weight loss. It is to be noted that in the trial, the diets of the candidates were not altered or changed in any way, nor were specialty shoes applied. All candidates were noted to be of heavy body condition at the beginning of the trial and were actually encouraged to feed grain daily to allow for administration of the product as well as continuing to have unobstructed access to pasture grass. At the two week follow up, the patients were noted to have not gained any further weight and in some cases were actually noted by their owners to have lost some weight in the process despite no change in diet.

It is our conclusion that inflammation is an underlying link or cause of insulin resistance in horses and feel that this needs to be addressed in future therapies along with typical supportive care.

References:

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