

## Studies Regarding Treatment in Navicular Disease

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**Abstract.** The study we have performed was conducted during 2006-2007, on a number of 16 horses, aged between 4 and 18 years, belonging to following breeds: Quarter Horse, Dutch Warmblood, Thoroughbred, Passo Fino, Hanoverian, Selle Française. There is no direct correlation between the age and incidence of this degenerative process.

The therapy of this disease has sought the combination between medical treatment and recovery one, and surgical treatment when the results of medical treatment and the recovery were negative.

**Keywords:** navicular, disease, horse, treatment

### INTRODUCTION

This study consists of a detailed approach of therapeutic protocol in navicular disease. Navicular disease is a chronic degenerative affection of podotrochlear bursa and navicular bone. It has a complex pathogenesis, in which the following anatomical structures might be involved: navicular bone, the vascularization of the foot, the distal interphalangeal joint, the ligaments of navicular bone and the tendon of the deep digital flexor.

The study has been conducted at Tufts Cummings School of Veterinary Medicine, Massachusetts, U.S.A., on 16 horses, out of which 7 were presented for a consult in 2006 and 9 in 2007. The age of the horses is between 4 and 18 years. There is no direct correlation between the age and incidence of this degenerative process.

The horses are belonging to different breeds, both performance and leisure -Quarter Horse, Dutch Warmblood, Thoroughbred, Passo Fino, Hanoverian, Selle Française, with the highest frequency in Quarter Horse and Dutch Warmblood. We notice here that our data correspond from this point of view to the ones mentioned in the literature.

### MATERIALS AND METHODS

Therapy of this disorder aims combining medical treatment with the recovery, and when results are negative the surgical treatment is used.

#### **The medical treatment**

The main objectives of the medical treatment are the administration of:

- Nonsteroidal antiinflammatory drugs - Phenylbutazone;
- Corticosteroids;
- Hyaluronic acid;
- Condroprotective substances - polysulfated glycosaminoglycan (PSGAG), glucosamine, chondroitin sulfate, etc.

- Vasoactive medication - Isoxsuprine, pentoxifylline, etc.
- Interleukin-1 Receptor Antagonist Protein (IRAP).

#### *Nonsteroidal Antiinflammatory Drugs*

This group of drugs has two main effects, the antialgic and anticoagulant effect. In this class, the most commonly used drugs are:

- *flunixin meglumine* 1,1 mg/kg, IV, twice a day;
- *phenilbutazone* 2,2 mg/kg, per os, twice a day;

Treatment will last at least one week, the best results being achieved through the combination of the two drugs. In our case we used only phenilbutazone. Particular attention will be given to the side effects of these products, since a long period of administration favors the emergence of gastric ulcers and renal failure. For this reason it is recommended conducting a preventive treatment in this respect.

#### *Corticosteroids*

Corticosteroids are used for their anti-inflammatory effect. They can be administered orally or intra-articular, the latter having the greatest efficiency. The product we used is *Depo Medrol®*, containing 20 mg / ml of methylprednisolone acetate.

The dose varies between 40 and 120 mg per joint, depending on the size of the animal and the size of the synovial bursa. In navicular disease we used 60 mg per joint.

#### *Hyaluronic Acid*

The product we used is called *Hylartin®*, and it contains 10 mg/ml sodium hyaluronate. Upjohn Company is producing. This product is administered intra-articular in conditions of perfect sterility, the recommended dose being 20 mg per joint. The treatment is repeated weekly with a total of three or four administrations.

Another product based on hyaluronic acid is *Legend®* (hyaluronate sodium). This is the only drug of this class that can be administered intravenously. The dose is 40 mg/administration, once a week with three consecutive repetitions.

#### *Condroprotective Substances*

In this group are included polysulfated glycosaminoglycan (PSGAG), glucosamine, chondroitin sulfate, and other substances. PSGAG have a protective role of cartilage more than a curative one. They are used more prophylactically to prevent the loss of cartilage substance.

The product we are used is *Adequan® I.M.* and has as active substance polysulfated glycosaminoglycan. The therapeutic protocol consists of administering a dose of 500 mg intramuscular at five days interval with 6-8 repetitions.

#### *Vasoactive Medications*

In this substance category belong *isoxsuprin* and *pentoxifylin*. In a few cases we used *isoxsuprin*. Isoxsuprin has as main effect the relaxation of smooth muscles of blood vessels. It stimulates the beta-adrenergic receptors. It is demonstrated that in navicular disease isoxsuprin lead to a significant increase in local temperature, which will produce vasodilatation. This supports the ischemic theory of this disease (15).

In large doses isoxsuprin induces a decrease of blood viscosity and reduces the platelet aggregation.

The recommended dose is 0,6 - 0,66 mg/kg, per os, twice a day, for 21 days. Then follows a course of 14 days with one administration a day and after 7 days with the daily management. Each tablet contains 20 mg of active substance.

#### *Interleukin-1 Receptor Antagonist Protein - IRAP*

The principle of this treatment consists of blocking the bonding between interleukin 1 (IL-1) and tissue, thus preventing the negative consequences of this action. IL-1 is a cytokine

secreted by cells of the immune system, which plays an important role in regulating immune responses, crucial in intervening in the activation and suppression or orientation of these responses (10). In joint diseases, this cytokine accelerates destruction of articular cartilage.

This treatment protocol consists of harvesting a quantity of 20 ml of blood in syringes with an anticoagulant and specially treated glass balls that stimulate the production of protein antagonist. The sample is incubated at 37°C for 24 hours and then is centrifuged for obtaining autologous serum, which contains protein receptor antagonist of interleukin-1. There will be three intra-articular administrations at one week interval. The recommended dose is 1-2 ml.

### **The Surgical Treatment**

Involves the fasciotomy of impair navicular ligament or the navicular suspensory ligament. If the results are not satisfactory the palmar digital nerves neurectomy is used.

### **The Recovery Treatment**

The recovery treatment seeks to:

- allow for rest period followed by a progressive resuming of the physical activity;
- perform orthopedic shoeing;
- undergo extracorporeal shock waves physiotherapy.

### *The Rest Period*

The rest interval should be customized for each animal and correlated with the degree of healing. Usual duration is 6 weeks. Resumption of physical activity is done gradually, with intervals of 5-10 minutes of exercises in circle, then by ridden horse. Every two weeks, this interval will be increased by one minute, until you reach the two 30 minutes a day, of which 10 minute will trap. If the animal can perform these exercises without difficulty, it will be added one minute of canter, every 30 minutes. This increase in length is made every 10 days, until it reaches 30-35 minutes.

### *The Orthopedic Shoeing*

This operation aims to ensure the medio-lateral as well as the cranio-caudal balance of the hooves. Oval aluminum horseshoes are used. These can be simple oval ones or horseshoes with a support for the frog. For decompressing the navicular region, the orthopedic pads are used, which can be made of rubber or leather, the latter being the better. They have different degrees of inclination, in the treatment of navicular syndrome are indicated the ones with the degree of tilt between 1-3°. The adjustment depends on their results from X-ray examination.

### *Focalized Extracorporeal Shock Waves Therapy*

It is a non-invasive method, which uses a pressure generated in a fluid environment that can be concentrated on the affected region. During the physiotherapy, horse adopts a staying attitude being slightly sedated. Between 1000 and 2000 pulsations are used, at a level of energy that will not exceed 0.5 mJ/mm<sup>2</sup> for 10-20 minutes. Number of sessions depends on the location and severity of lesion. In soft tissue conditions a minimum of two sessions is required, and for bone disorders a session is sufficient (3).

To avoid damage to adjacent tissue, this treatment may be done under radiographic or ultrasound guidance.

## **RESULTS AND DISCUSSIONS**

Medical treatment consisted of using the:

- Non steroidian anti-inflammatory drugs: phenylbutazone- per os, the dose of 2.2 mg/kg/ day, for five days minimum. Phenylbutazone was used in the treatment of 13 cases.

- Corticosteroids: methylprednisolone acetate (Depo-Medrol®), intraarticular, 60 mg per joint. Number of administration depends on the degree of recovery of the animal. Methylprednisolone acetate was administered intraarticular to 9 horses.
- Hyaluronic acid - Hylartin® (sodium hyaluronate), intraarticular, 20 mg per joint, 3-4 administrations at one week interval. Hyaluronic acid administered by intra-articular way, was used in 6 horses.
- Hyaluronic acid Legend® (sodium hyaluronate), the only product of this class of drugs that can be administered intravenously. The dose is 40 mg/administration, once a week with three consecutive repetitions. This product, with intravenous administration, was used in 5 cases.
- Polysulfated glycosaminoglycan (Adequan® I.M.), intramuscularly in dose of 500 mg per administration, at five days, with 6-8 repetitions. This product has been administered to 4 horses.
- Interleukin-1 Receptor Antagonist Protein-IRAP. There are three intra-articular administrations of 1-2 ml each at an interval of seven days. IRAP therapy was used in 3 cases.

The recovery treatment sought to:

- Provide an adequate period of rest - more than six weeks, to all patients taken in the study;
- Perform orthopedic shoeing in 12 cases;
- Undergo the focalized extracorporeal shock wave therapy with a number of pulsations between 1000 and 2000, at a level of energy that will not exceed  $0.5 \text{ mJ/mm}^2$  for 10-20 minutes. For bone disorders a session is sufficient and in soft tissue conditions a minimum of two sessions is required. This method was used in 7 cases out of 16.

The surgical treatment was used only in one case and consisted of digital palmar nerves neurectomy of the affected limb.

## CONCLUSIONS

1. Our studies show that there is no direct correlation between the occurrence of this disease, age and sex of the animal, our caseload being represented by the horses of both sexes, aged between 4 and 18 years.

2. Conditions encountered at the level of the navicular bone are: inflammatory processes, sclerosis and navicular bone degeneration, small sesamoid bone fracture, pedal osteitis, impair ligament and collateral ligaments of the small sesamoid desmitis and deep digital flexor tendinitis, at the insertion place on small sesamoid bone.

3. In the studied cases, navicular disease therapy pursued two main objectives:

- Offering a medical treatment and a surgical one;
- Ensuring a recovery treatment.

The medical treatment consisted of the administration of hyaluronic acid intra-articular as well as intravenous, corticosteroids (methylprednisolone) intra-articular, the non-steroidian anti-inflammatory drugs (phenylbutazone) per os, but also the IRAP procedure. In one case the palmar digital nerves neurectomy was performed. The recovery treatment was achieved by performing extracorporeal shock wave physiotherapy, by applying orthopedic horseshoes and by granting a period of rest, individualized for each case.

4. Navicular disease remains a controversial topic, in which prevention and treatment, the method of shoeing and management of physical activity of the horse has a major role.

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