

COMPARATIVE CLINICAL, HEMATOLOGICAL AND BIOCHEMICAL PARAMETERS IN A HORSE WITH PROGRESSION OF MELANOMA

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Abstract

This is a clinical case of an adult over twenty year old horse with a progressive melanoma with infiltration on the perineal region and around the tail. The purpose of this research is to clarify the nature of the process and to start an alternative therapy, depending on the results according to the clinic and laboratory analyses and in particular, the values of C – reactive protein.

Key words: progressive, melanoma, infiltration, perineal, horse, C-reactive protein

INTRODUCTION

Melanoma is a common neoplastic disease typical for horses with gray fur color. Target cells are melanocytes which represented mostly pigmented cells of the skin but occurring in other internal organs (Pilsworth et al, 2006).

According to literature, 80 of gray horses over age of 15 years develop melanoma of the skin, but in practice there are cases of horses with different color hair.

The etiology of melanoma in horses is still not fully clarified. A prevailing theory is that melanomas in older gray horses are due to impaired metabolism and, in particular, overproduction of melanin. It is believed that this leads to the synthesis of young forms of melanocytes so called melanoblasts giving uncontrolled growth, which leads to their accumulations in dermis (Rashmir-Raven AM et al, 2006). As reasons for the occurrence of these formations are considered the most carcinogenic endogenous factors such as oncogenes, genetics, hormonal and biochemical changes in the body (Ivanov V et al, 1982).

Unlike human malignant melanoma, such neoplastic formations characteristic mainly gray horses are encapsulated and metastatic. According to the literature, the most common organs which give metastases are the regional lymph nodes lungs, spleen, liver, heart and others. Individual studies indicate that all skin

melanomas should be seen as possible malignant and treated as such (MacGillivray KC et al, 2002).

MATERIALS AND METHODS

Clinical studies were conducted within the horse, and hematological and biochemical analysis in the clinical laboratory in the Faculty of Veterinary Medicine at University of Forestry-Sofia. Three male horses, stallions grown under identical conditions and used in the direction Equestrian were studied.

Horses are in the following age categories respectively horse № 1 (to 23 years old horse affected with melanoma), horse № 2 (to 13 years old horse covered with mechanical trauma) and horse № 3 (to 7 years old, who is clinically healthy and actively used in the classical disciplines of equestrian sports).

Reported were the main vital signs (pulse, respiration, heart rate, internal temperature, color of the conjunctives, and lymph nodes) according to plan of clinical examination.

Receiving blood is done by venepuncture from v.jugularis in sterile vacutainers for hematological and biochemical analyzes which were carried out on the same day. Were used Hemoscreen-18 automatic and semi- automatic Screen Master LIHD 113 bio- chemical analyzer, and differential blood count was analyzed separately by microscopic examination of blood outspread with manual

counting and determination of cells. Sedimentation rate of erythrocytes(ESR) was reported by method Westergreen.

C-reactive protein (CRP) was examined by express turbidimetric method in MDL Cibalab LTD.

On horse № 1 was performed biopsy and histological examination demonstrating that the presence of melanin producing cells (melanocytes).

RESULTS AND DISCUSSIONS

The horse with melanoma was the normal physiological parameters such as pulse 29/min., 14 respiratory movements /min., and internal temperature 38.2°C. Conjunctivae, lymph nodes and cardiovascular capacity were also normal.

During inspection and palpation in the perineal area and anal area around are establish soft tissue formation from multiple pigmented popular formations, by monitoring and tendency to ulceration.

The remaining two controlled horses № 2 and № 3 during clinical studies also showed normal physiological parameters.

The main indicators such as Hb, WBS, RBS and Hct are in reference limits for sport horses and stallions (tabl.1).

During reporting ESR by Westergreen it was confirmed the rule of literature that erythrocytes due to the relatively large size and the presence of agglomerate, the reported values for 15 minutes is not indicative for sport horses. During reporting 30 minutes is typical sharp acceleration of ESR especially in horse №1, wich normalized at 60 and 120 min. It is believed that reporting 60 minutes is the most determining for horses (Natchev B. 1966). For horse № 3 is delayed precipitation of erythrocytes, which is due to the physical load during intense daily physical exercises. Furthermore, many authors have concluded that the erythrocyte sedimentation occurs more slowly in sport horses than horses used for work. Especially accelerated erythrocyte sedimentation is characteristic for horses used for work at low altitude or working underground (Natchev B. 1966)

Table 1: Hematological tests

Hematological tests	Horse № 1	Horse № 2	Horse № 3
Hb : g/l	130	113	118
WBS:	7,8	5,9	6,1
RBC: g/l	9,17	6,9	7,85
Hct: %	38,3	30,5	36,2
Myelocytes	0%	0%	0%
Metamyelocytes	1%	0%	0%
St	3%	4%	3%
Sg	61%	53%	57%
Eo(eosinophils)	4%	6%	5%
Ba (basophils)	1%	0%	0%
Mo(monocytes)	1%	2%	3%
Lymphocytes	29%	35%	32%
ESR –mm /Westergreen/:	15'- 0 30'- 90 1h- 115 2h-120	15' -11 30'- 75 1h-115 2h-135	15'- 0 30'- 40 1h - 80 2h - 110

With respect to the differential blood count at horse № 1 has neutrophilic presence of young forms (metamyelocytes) which, together with relatively high proportion of leucocytes in band show a left shift of the blood, or the so-called, nuclear shift to the left.

This indicates activation of the bone marrow and hard formation of white blood cells, which shows the resilience stored by the body. The presence of only one piece of monocytes in horse № 1 is also advantageous with regard to the nature of the process. Because the presence of numerous monocytes so-called monocytosis a sign of malignancies (Angelov et al, 1999).

In biochemical studies (tabl.2) have slightly elevated levels of glucose in the three horses, but also shows that a horse № 1 has lower glucose levels of horse № 2 (horse with traumatic inflammation). Horse № 3 is the

lowest value close to reference. This is probably due to the alimentary hyperglycemia because of the specialized diet for sporting horses (Angelov et al, 1999).

High values about horse № 2 could be due to the presence of residues of anti-inflammatory drugs.

Levels of total protein and albumin are in reference values, which can be interpreted as a favorable sign, regarding the status of certain internal organs and it mostly liver, where it synthesizes plasma proteins (Angelov et al, 1999).

Other indicators with higher values are horse of urea and creatinine at horse, which may imply serious damage in the kidney. In any serious impairment of kidney function, would inevitably occur changes in the values of total protein and albumin (Mircheva T. et al, 2005).

Elevated creatinine at horse № 2 are the result of residual substances following treatment with steroid anti-inflammatory drugs, and slightly overvalued at horse № 3 is most likely due to intense physical activity (Angelov et al, 1999).

Other enzymes of biochemical as *ASAT*, *ALAT*, *AP*, *LDH* and γ -*GT*, where in reference limits in all three horses (tabl.2).

The same goes for the studied electrolyte values (*Ca*, *Mg*, and *P*).

The results obtained in the study of *C-reactive protein (CRP)* not identified elevated.

Following clinical and laboratory studies, given the nature of the disease and the age of the investigated patient horse № 1 is the most rational to apply conservative therapy with Cimetidine (2,5 mg/kg per os three times a day for 3 months), such as is required for testing tolerability (Rowe EL et al. 2004).

Cimetidine is a histamine H2-antagonist, which used as an alternative therapy for horses with melanoma, with considerable success. Some examinations have shown a reduction of tumor growth, as shown in a few cases (Pilsworth RC et al, 2006).

Table 2: Biochemical parameters

Biochemical tests	Horse № 1	Horse № 2	Horse № 3
GLUCOSA	8,8 mmol/l	9,8 mmol/l	7,1 mmol/l
TOTAL PROTEIN	78,9 g/l	75,1 g/l	67,7 g/l
ALBUMIN	39,1 g/l	35,3 g/l	30,4 g/l
UREA	12,2mmol	9,2mmol/l	6,7 mmol
CREATININE	285µmol/l	291 µmol/l	215 µmol/l
ASAT	187,6 UI/L	213,4 UI/L	273 UI/L
ALAT	9,3 UI/L	8,5 UI/L	12,4 UI/L
AP	367,8 UI/L	345,8 UI	244,1 UI/L
γ-GT	21,4 UI/L	13,0 UI/L	13,3 UI
LDH	394,7 UI/L	376,2 UI/L	370 UI/L
Ca	3,1 mmol/l	3,1 mmol/l	2,7 mmol/l
Mg	0,7 mmol/l	0,54mmol/l	0,6 mmol/l
P	1,4 mmol/l	1,2 mmol/l	0,97mmol/l
CRP	0,66 mg/l	0,69mg/l	0,53mg/l

CONCLUSION

The purpose of this study was to determine the content of C-reactive protein, and can be used in the diagnostics of melanoma with infiltration.

In this case, the values of C-reactive protein compared with other hematological and biochemical parameters were normal. However, such an examination is necessary for the monitoring, before and after the drug treatment or chemotherapy.

REFERENCES

1. Angelov G, Ibrishimov N, MILASHKI S. Clinical and laboratory studies in veterinary medicine, Sofia 1999;
2. Mircheva T., I. Georgiev, Fundamentals of clinical chemistry in domestic animals, Sofia 2005;
3. Pilsworth RC, Knottenbelt D. Skin diseases refresher. EquineVeterinary Education. 2006;228-230.
4. Seltenhammer MH, Heere-Ress E, Brandt A, et al. Comparative histopathology of grey horse melanoma and human malignant melanoma. Pigment Cell Research. 2004;17: 674-681
5. Rowe EL, Sullins KE. Excision as treatment of dermal melanomatosis in horses: 11 cases (1994-2000). JAVMA. 2004;225;94-96.
6. Rashmir-Raven AM, Foy JM, Brashier MK. Cutaneous Tumors in Horses. Western Veterinary Conference 2006. Vin.com
7. Hewes CW, Sullins KE. Use of cisplatin-containing biodegradable beads for treatment of cutaneous neoplasia in equidae: 59 cases (2000-2004). JAVMA. 2006; 229:1617-1622.
8. MacGillivray KC, Sweeney RW, Del Piero F. Metastatic Melanoma in Horses. J.Intern Med. 2002; 16:452-45
9. Pavord T.& Pavord M. The complete equine veterinary manual 114-166
10. Ivanov V. Lazarov B, Georgiev. Pathophysiology of livestock Sofia 1982
11. Natchev B. Clinical examination of internal diseases in domestic animals Sofia 1966