University of Veterinary Medicine Budapest

Measurement of serum hepcidin in dogs with infection – preliminary results

Zs. Vizi, D. Szabó, K. Szabó, Á. Sterczer
Department of Internal Medicine, University of Veterinary Medicine, Budapest
vizi.zsuzsanna@univet.hu

Introduction

Hepcidin is the key regulator hormone of the iron homeostasis. It binds to ferroportin, the iron exporter membrane channel on enterocytes and macrophages, causing internalization and degradation of this complex. Through this mechanism it causes decreased iron absorption and iron sequestration in macrophages. Induced by inflammatory cytokines (IL-6), hepcidin inhibits bacterial growth, limiting the iron sources. In human patients, increased hepcidin concentrations are associated with bacterial infections and secondary nonregenerative anemia.

Aim of this study was to evaluate serum hepcidin concentrations in dogs with infections.

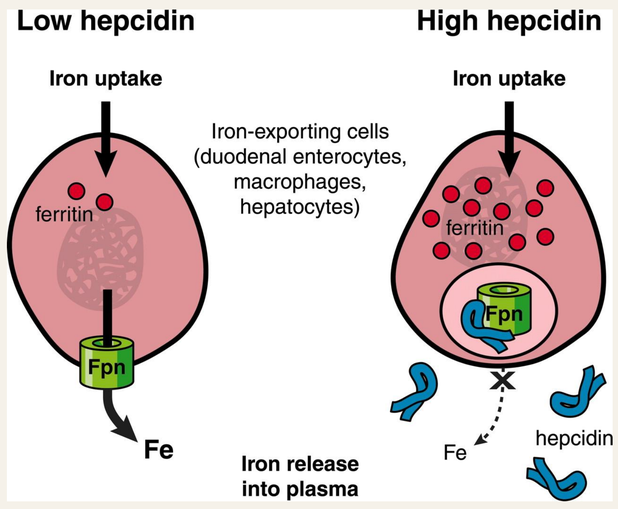

Figure 1. Action of hepcidin on ferroportin channels[1]

Materials and methods

12 dogs with various infections (pyometra, septic peritonitis, generalized pyoderma) presented in the Small Animal Hospital of the University of Veterinary Medicine, Budapest were included in this study. Blood samples were collected during the first diagnostic evaluation of the patients for complete blood count and routine biochemistry including C-reactive protein (CRP), iron and iron binding capacity. *Left over samples* were used to measure serum hepcidin concentration with liquid chromatography-tandem mass spectrometry method. Results from a healthy dog population (n=86) from our previous study were used as controls[2].

Hematocrit, albumin, CRP, iron, and hepcidin, were compared between the sick and healthy groups using the Mann-Whitney-U test with the R commander software. Level of significance was determined as $p<0,05$.

Results

Mean hepcidin concentration of the septic population was **45.73 ng/mL** (10.7 – 110.1) compared to the healthy controls 16.6 ng/mL (2.3 – 41.1). **8/12** dogs had hepcidin levels over the previously determined reference range (5.3–36.4 ng/mL). Results are shown in Figure 2 and Table 1.

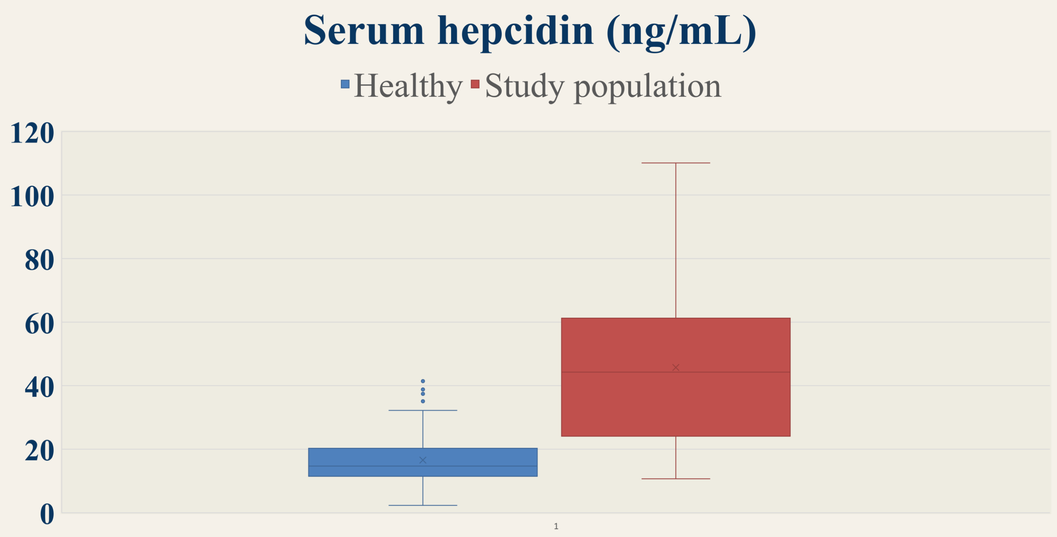

Figure 2. Serum hepcidin concentration in dogs with infection vs healthy controls

Parameter	Study population (mean)	Healthy controls (mean)	Significance
Hematocrit (%)	35.0	50.0	p=0.002*
CRP (mg/L)	147.3	2.57	p<0.001*
Albumin (g/L)	23.12	32.0	p<0,001*
Iron (µmol/l)	17.22	26.06	p=0.125
Iron binding capacity (µmol/l)	46,7	60,42	p=0,083
Hepcidin (ng/mL)	45.73	16.6	p=0.07

Table 1. Mean hematocrit, C-reactive protein (CRP), albumin, iron and hepcidin concentrations in the study population vs healthy controls.

Discussion

Our study in this small population of dogs with various infectious conditions showed, that serum hepcidin concentration tends to be increased in canine patients with infections and may contribute to the development of nonregenerative anemia, also known as anemia of inflammation. Determination of the prognostic role of elevated hepcidin concentrations requires further studies with larger sample size.

References
[1] Tomas Ganz: molecular control of iron transport. *JASN* February 2007, 18 (2) 394-400; DOI: https://doi.org/10.1681/ASN.2006070802
[2] Zs. Vizi, K. Lányi et al: Serum hepcidin measurements in healthy dogs using liquid chromatography/tandem mass spectrometry *Vet Clin Pathol* DOI:10.1111/vcp.12872 „in press”

Conflict of interest: The authors were NOT supported by any company or organization during this study.