The assesment of domestic cats body condition through direct and indirect methods

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Abstract
The cats inability to adapt their enzymatic package to a domestic lifestyle and a restricted space of movement , for cats raised in appartments , made them more prone to overweight and obesity. Body scoring is a method of evaluation subjective and semiquantitative through inspection and palpation. Through the inspection and palpation of the fat that covers the chest , the presence or absence of the abdominal waist and the size of the belly fat are enough to establish the body score for cats. The biochemistry results showed significantlu changes of the parameters leptin, insulin, plasma total ghrelin, cholesterol and tryglicerides, which sustains their role in the adaptation of cats to a positive or negative energy balance. The purpose of this study is to change the owners perspective regarding the way they treat the physiologycal needs of their pets. They ignore their cats need for space, unlimited acces outside, their needs regarding the food, especially the increased requirements of proteins. The owners tend to mistakenly believe that a cat with an ideal score is underweight and that overweight cats are an ideal score.
Keywords: *cats, body score, overweight, leptin, plasma total ghrelin.*

Introduction

Metabolic disorders are caused by the increased need for a particular element or nutrient, which becomes deficient under certain conditions. Metabolic storage disorders are the result of the body's inability to break down certain substances into the partial or total lack of the necessary enzymes. Substances can accumulate in the body to toxic levels or the body cannot produce a certain substance it needs. Clinical signs appear within weeks or months after birth. These diseases are usually fatal (Zoran Debra, 2002). Emaciation, marked weakening, pathological hypotrophy of tissues, are manifestations of deficiencies of supply, parasitism, tumor and infectious diseases. The terms “overweight” and “obese” are used to denote the gravity of excessive fat mass. Individuals are classified as overweight if they exceed 10% to 20% of their ideal body weight and as obese when they exceed more than 20% of their ideal body weight (Loyd C., 2014). There are more complex assessment systems, such as body score that combine visual assessment and palpation of adipose tissue mass to divide body composition into several predefined categories. A number of metabolic changes occur, which may not be evident through a routine laboratory evaluation. Therefore, it is very important for clinicians and owners, periodic monitoring of weight changes and to initiate appropriate actions to prevent or treat unwanted weight gain (Russell et al, 2000).

Materials and methods

The purpose of the present study was to establish the body score of the cats included in the study and the effects of weight gain, of the overweight on the plasma concentration level of the hormones ghrelin, leptin and insulin.

In the study entered 20 cats: 11 females, of which 7 were sterilized and 4 were unsterilized and 9 were males, of which 7 were sterilized and 2 were intact. This study was performed by morphometric analysis, respectively body score with 5-point reference scale, biochemical analysis, hematological examination and determination of hormones ghrelin, leptin and insulin, as well as

by coproparasitological examination. The study was conducted in the period 2018-2019 in collaboration with the cat owners.

The history of the evaluated cats followed the situation of deworming and vaccination, breeding environment, gender, breed, age and a brief description of the nutritional history. The 20 cats did not show any clinical or subclinical signs of major pathologies before or after evaluation. In the diagnosis of cats an important weight had the visual physical evaluation and by palpation, respectively the body score and the determination of the body weight by weighing. Body score is a method of subjective and semi-quantitative physical evaluation.

Blood samples were collected from the jugular vein to assess glucose, cholesterol, triglyceride, total lipid, total protein, PAL, urea and leptin, ghrelin and insulin levels. These parameters were determined using a UV Vis Screen Master Touch spectrophotometer, based on the End Point colorimetric reaction, after incubation at 37 ° C, according to the time indicated on the package leaflet. The plasma concentration of ghrelin and leptin was determined by ELISA, and the concentration of insulin by an immunochemical test with electrochemiluminescence detection, ECLA. Fecal samples were collected from the two underweight cats. To detect the presence of eggs and oocysts, the Willis flotation method was used. The principle of the method is based on the floating and lifting of light eggs and oocysts on the surface of saturated sodium chloride solution and their adhesion on the glass blade.

Results and discussions

Of the 20 cats examined, following the morphometric evaluation, it was established that two cats are underweight, one unsterilized female and one unsterilized male, 12 have an ideal body score, of which 4 are sterilized males, 4 sterilized females, 2 intact males and 3 intact females, and 6 cats are overweight, of which 2 are sterilized males, 3 non-sterilized females and one intact female. From the case study included, 3 are fed only on dry food, and 17 receive both wet and dry food, the overweight cats being included in the category of those receiving both wet and dry food.

After examining the smears of the 20 cats classified in the case, we observed in the 6 overweight cats, changes in the form of red blood cells, poikilocytosis, red blood cells with irregular margins. This change in shape occurs due to the oxidative stress that occurs as a consequence of the presence of excess adipose tissue. Other changes in leukocytes or platelets were not observed.

The biochemical examination of the 6 overweight cats revealed changes in cholesterol, ranging from 260 mg / dl to 401 mg / dl and triglycerides, with values ranging from 83.1 mg / dl to 189 mg / dl. Following the determinations of the plasma concentrations of the hormones in the 6 cases of overweight, we found the decrease of the plasma concentration of ghrelin in all 6 patients, together with the increase in the concentration of leptin and insulin. The values of the ghrelin varied between 2020-2320 pg / ml, much lower compared to the normal values of 4000 pg / ml, the values of leptin ranged from 8.9 to 9.9 Ng / ml, well above the normal values of 2 Ng / ml and insulin values, 76-91 Pmol / l, increased above normal, 60 Pmol / l.

Following the macroscopic examination of the faeces collected from patient number 13, the presence of ovular capsules was observed, and following the determinations made by the Willis flotation method, we showed under the microscope, the presence of cestode oncospheres and the diagnosis of digestive cestodosis was made. In case number 9, the presence of the eggs of *Toxocara cati* was found and the diagnosis of toxocariasis was made.

It has been demonstrated the hypothesis that in the case of overweight cats, as long as the leptin concentrations are higher, the insulin resistance of the cat will increase. Apleton discovered in 2002 that, the increase in the percentage of body fat in cats is accompanied by increased insulin

resistance, respectively, increased insulin compensatory secretion and increased leptin concentration (Appleton et al, 2002).

Laurence Colliard's 2008 study showed that the owners, from a visual point of view, underestimate the body score of cats, considering cats with ideal score, normal weight as underweight, which makes the owners to feed them more, thus increasing the chances that over time cats become overweight or even obese (Colliard et al, 2008).

Conclusions

Of the 20 cases examined by visual inspection, palpation and weighing, 6 cats are overweight, of which 2 are male and 4 are female, and 2 cats are underweight, one female and one male unsterilized. Of the 6 overweight cats, 5 are sterilized and one unsterilized female, which shows the high incidence of weight gain in sterilized cats. None of the patients examined were found to have diabetes, blood glucose levels were within normal limits. The 2 underweight cats were positive at the co-parasitological examination, being infested with nematode eggs and cestode oncospheres. Hematological determinations, namely examination of blood film, revealed in the overweight patients, changes the shape of the erythrocytes, the irregular margins. This change of shape occurs against the background of oxidative stress that the body is subjected due to the presence of excess body fat.

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